

No. 627,178.

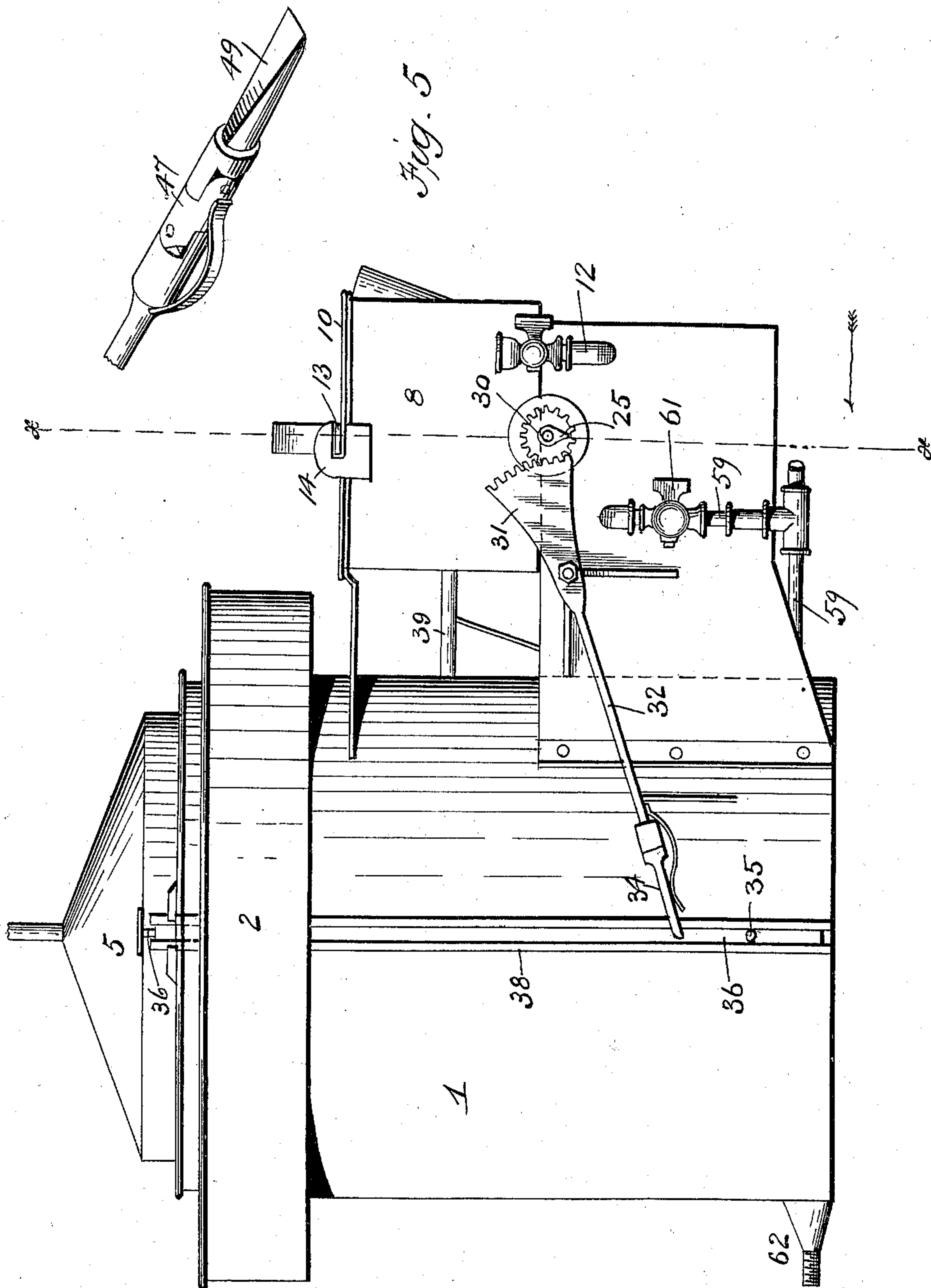
Patented June 20, 1899.

F. M. DRAPER.
ACETYLENE GAS GENERATOR.

(Application filed June 11, 1898.)

(No Model.)

4 Sheets—Sheet i.



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Fig. 1.

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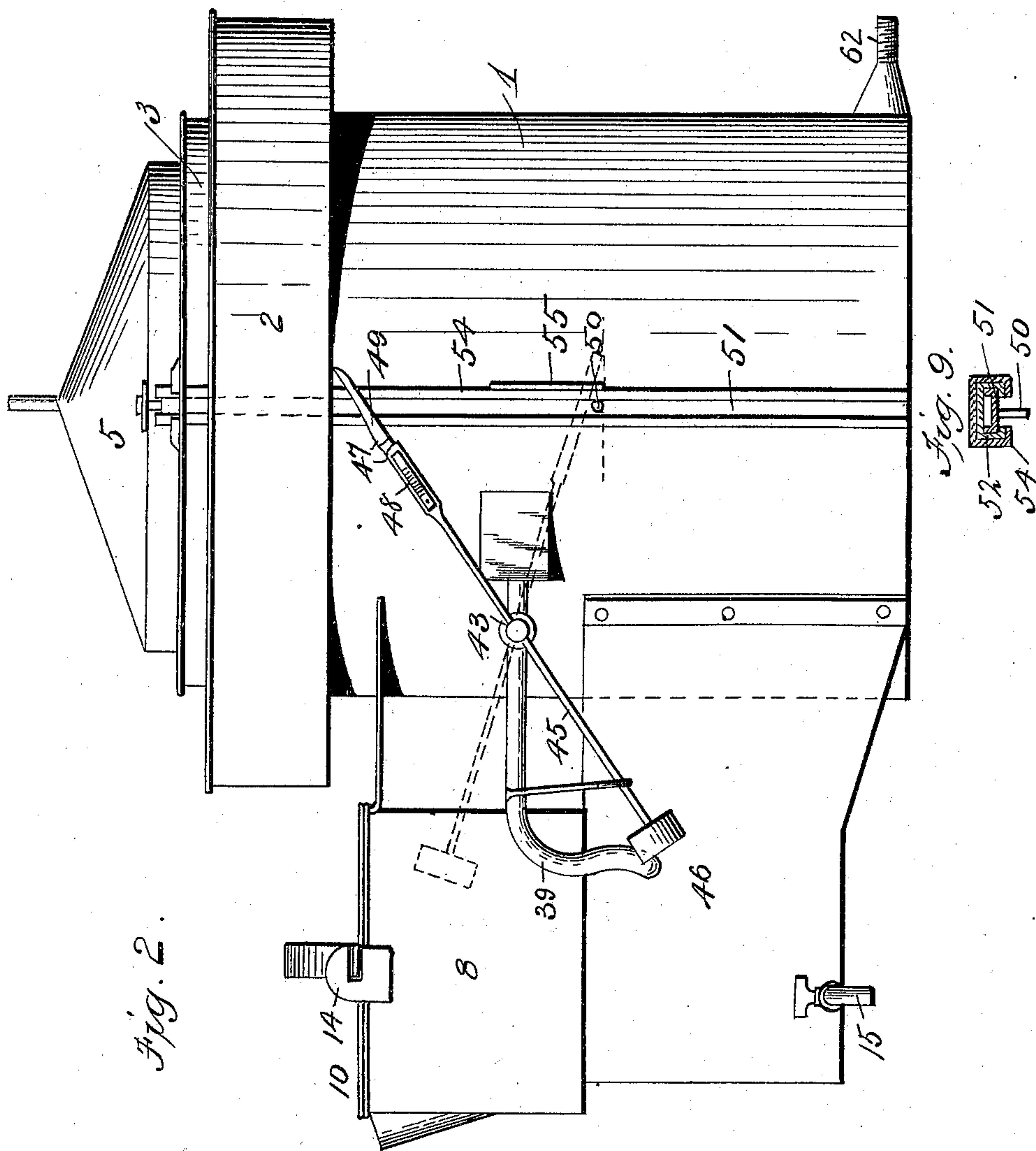
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(No Model.)

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Fig. 8.

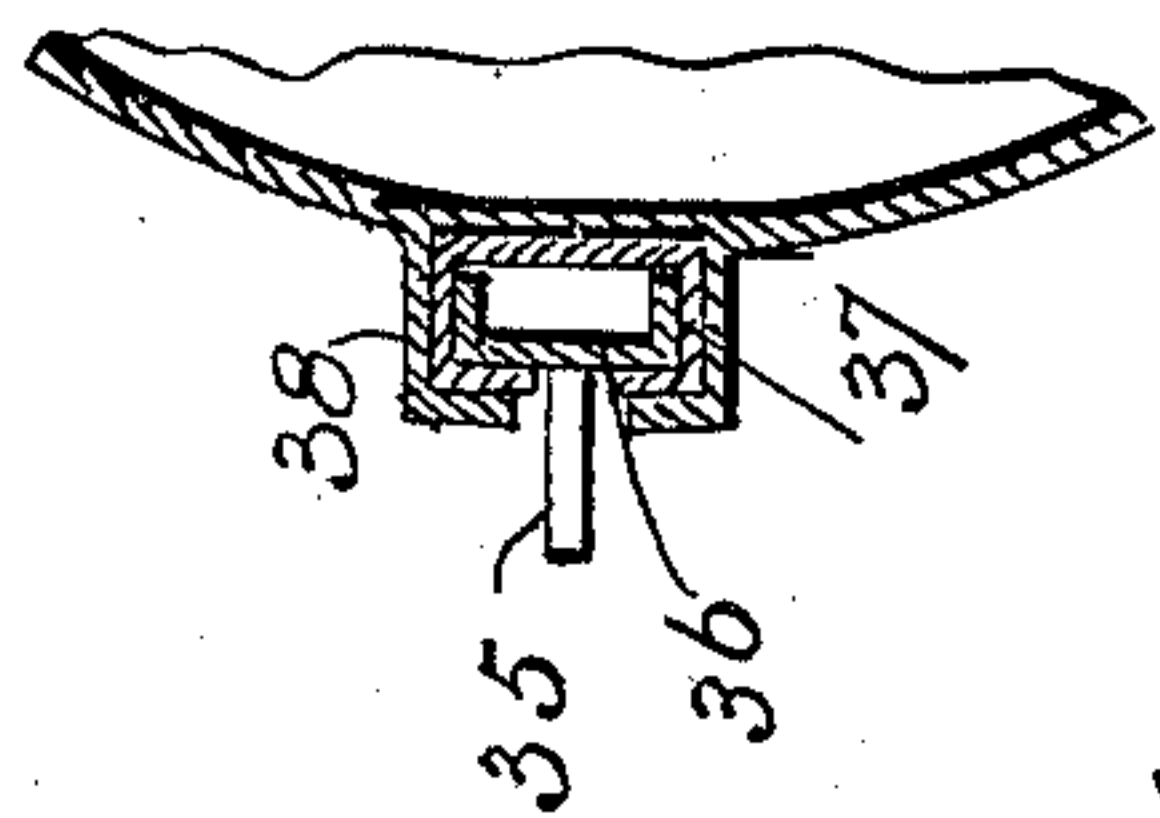
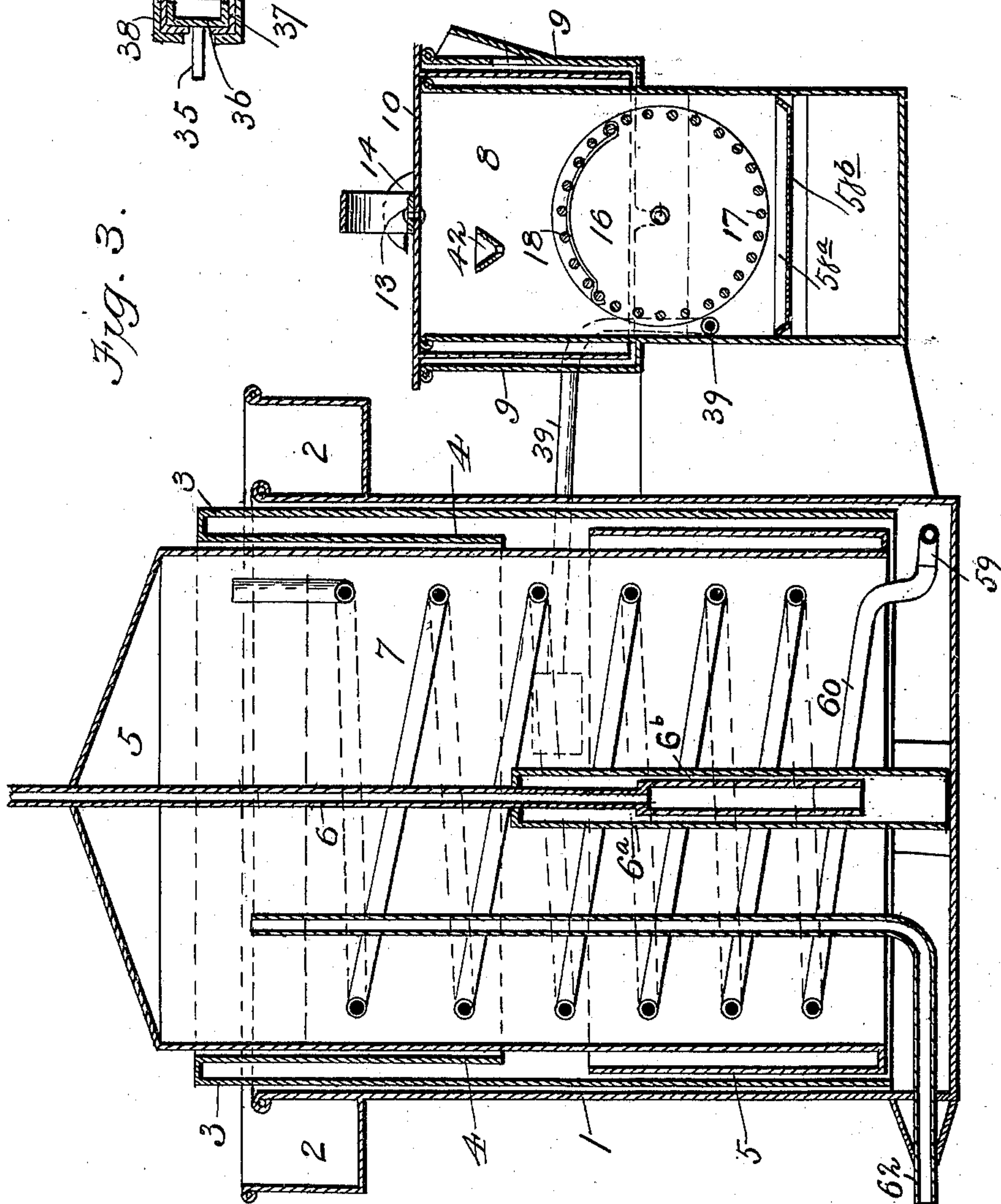


Fig. 3.



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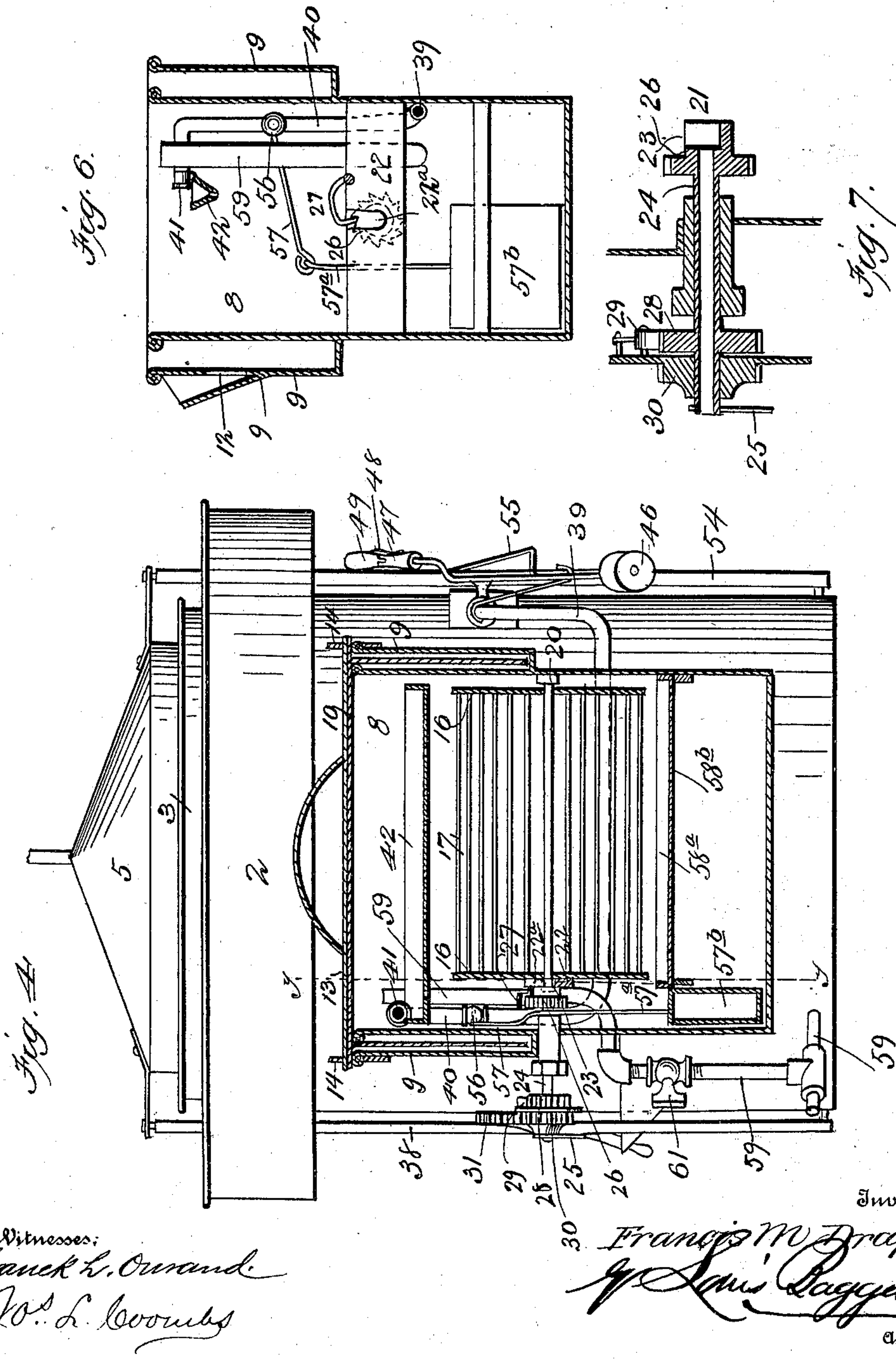
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

FRANCIS M. DRAPER, OF DANA, INDIANA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 627,178, dated June 20, 1899.

Application filed June 11, 1898. Serial No. 683,193. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. DRAPER, a citizen of the United States, residing at Dana, in the county of Vermilion and State of Indiana, have invented new and useful Improvements in Acetylene-Gas Machines, of which the following is a specification.

My invention relates to machines for manufacturing acetylene gas, in which calcium carbide and water are brought into contact with each other, which chemically combine to evolve the gas. In such machines it is important that the carbide and water be fed to the generating-chamber in regulated quantities, so that no more gas than is necessary be generated.

The object of my invention is to provide an improved acetylene-gas machine in which the carbide is contained in a rotary cage provided with openings to allow the water to enter the same and also allow the ashes caused by the spent or decomposed carbide to fall to the bottom of the generating-chamber in which the cage is located.

It is also an object to provide means for automatically rotating the cage and also regulating the quantity of water fed to the generating-chamber by the movement of the movable section of a gasometer.

It also has for its object to improve generally such machines whereby I secure important advantages with respect to efficiency in operation.

The invention consists in the novel construction and combination of parts hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a gas-machine constructed in accordance with my invention. Fig. 2 is a similar view looking from the opposite side. Fig. 3 is a central longitudinal section. Fig. 4 is a vertical section on the line $x x$, Fig. 1. Fig. 5 is a detail perspective view of the lever by which the quantity of water admitted to the carbide-cage is regulated. Fig. 6 is a transverse section of the generator on the line $y y$, Fig. 4. Fig. 7 is a detail longitudinal section of the shaft and mechanism for rotating the carbide-cage. Fig. 8 is a detail horizontal section of one of the bars, slide, and guides of the gasometer. Fig. 9 is a similar view of the other bar, slide, and guide.

In the said drawings the reference-numeral 1 designates the stationary section of a gasometer open at the upper end and provided at said open end with a chamber 2, surrounding the same. Located in this cylinder is a vertically-movable open-ended cylinder 3, provided with an interior casing 4, extending from the top downwardly to about one-third of the height of the cylinder. Telescoping within said cylinder 3 is a vertically-movable dome or section 5, provided with a downwardly-extending escape-pipe 6, with which is connected a sliding pipe 6^a, which pipes when said sections or cylinders 3 and 5 are elevated to their extreme height will allow the gas contained therein to escape. Secured to the lower end of pipe 6 is a pipe 6^b, which engages with pipe 6^a when elevated to raise the latter. Said section 5 is also provided with an interior casing 7. The gasometer thus described is to be filled with water, as usual, so as to form a seal and operate in the ordinary manner.

Secured to the outer cylinder 1 is a generating chamber or vessel consisting of a rectangular box 8, provided at the upper end with supplemental walls 9, forming a water-chamber to receive the top or cover 10, forming a water seal to prevent escape of gas. Said vessel or box is also provided with an air-vent 12, which is designed for the purpose of drawing off the air when the generator is first started, so that the air in the generator shall not go with the gas to the holder. This is accomplished by opening the vent for a minute or two after generation begins, when the acetylene generated will drive out the air. The cover 10 is held in place by a pivoted bar 13, the ends of which engage with slots in catches 14, secured to the box. Said vessel or box is provided with a cock 15 to draw off the water accumulating therein. Located in said vessel or box is a rotatable carbide-cage consisting of end heads 16 and longitudinal bars 17 with spaces therebetween. A number of said bars are not connected with said heads, but are secured to straps or bands 18, which in turn are hinged to one of the fixed bars, so as to form a door for inserting the carbide in the cage. The said heads are provided with a journal, one end of which engages with a fixed bearing 20, secured to the box or vessel 8, while the

other engages with a slot 21 in a rotatable bearing 23 of the shaft 24, extending through the said box. Adjacent to the bearing 23 is a plate 22, provided with a slot 22^a, open at the upper end, with which the shaft 24 also engages. It will be seen that the said cage cannot be removed until the slot 21 is in a perpendicular position, with its open side pointing upward, so as to register with the slot 22^a.

There is a pointer or hand 25 at the outer end of said shaft coinciding with the slot for indicating when the latter is in position to allow the cage to be removed. Said shaft is provided with a ratchet-wheel 26, with which engages a pawl 27 to prevent backward movement of the cage. Secured to the shaft 24 outside of said box or vessel is a ratchet-wheel 28, with which engages a spring-actuated pawl 29, pivoted to an oscillating cog-wheel 30, loosely journaled on said shaft, so that as said cog-wheel is turned in one direction the ratchet-wheel 28 and the carbide-cage will be rotated; but on the return or reverse movement said cog-wheel, and consequently the carbide-cage, will not be moved. Meshing with the cog-wheel 30 is a cogged segment 31 at one end of a lever 32, pivotally connected with the generator and provided at its opposite end with a pivoted spring-actuated dog 34, with which is adapted to engage a pin 35, secured to a vertically-movable bar 36, connected at the upper end with the movable dome 5. This bar works in a vertical slide 37, the upper end of which is secured to the cylinder 3, which in turn works in a vertical guide 38, secured to the cylinder 1. The said bar and slide telescope, the bar 36 first moving with the dome 5 until the latter reaches its highest limit, when the cylinder 3 will commence to move, carrying with it the slide 37. The guide and slide are formed with vertical slots to allow of the movement of the pin. The said dog is so constructed that on the descent of the bar 36 the pin will strike and depress the dog, so as to ride past it without operating the lever; but on the upward movement of said rod the pin will engage with the dog to operate the lever, which through its connections will rotate or turn the carbide-cage. The object of rotating the cage is to sift the ashes or spent carbide from the cage and bring a fresh quantity under the water-trough, hereinafter described. At the opposite side of the machine is a water-pipe 39, communicating with the cylinder 1, by which water from the latter is fed to the carbide-cage. This pipe passes through one end of the carbide-chamber and extends transversely across the same to near the opposite side or end and is then turned upwardly or provided with a vertical pipe 40, having a lateral nozzle 41. Pivoted to this nozzle is a trough 42, located above the carbide-cage and provided with perforations in its bottom to allow water to escape therefrom to the carbide-cage. The object of pivoting this trough is to allow it to be turned up out of the way when the cage is to be removed.

The numeral 43 designates a stop-cock connected with the pipe 39, and secured thereto is a lever 45, provided with a weight 46 at one end. At the opposite end said lever is provided with a pivoted lug 47, adapted to turn outwardly or horizontally and against which bears a spring 48 for holding it in place. Pivoted to said lug is a vertically-movable dog 49, with which is adapted to engage a pin 50 on a vertically-movable bar 51, secured to the dome 5. This bar works in a vertically-movable slide 52, secured to the cylinder 3, which in turn works in a vertical guide 54, secured to the cylinder 1. This bar and slide are similar to bar 36 and slide 37 and work in a similar manner. Said guide and slide are formed with vertical slots to allow the pin to project therethrough and work up and down. The construction of said bar and lever is such that when the gas in the gasometer gets below a certain limit and the dome falls the pin 50 will strike the dog 49, which in turn will operate the lever to open the stop-cock and admit a requisite quantity of water to the trough and carbide-cage. Upon the upward movement of the pin it will elevate and ride past the dog without operating the lever. The said dog is also adapted to engage with an inclined rod or cam 55, secured to the cylinder 1, so as to throw it sidewise so as to clear it from the pin. The object of this construction is that when the carbide in the cage is exhausted or spent and the gas in the gasometer has been withdrawn the dome 5 in its descent will depress the bar 51, so that the dog coming in contact with said rod or cam will be thrown off the pin 50 and the lever allowed to fall and close the stop-cock and prevent flooding of the generating-chamber. (See dotted lines, Fig. 2.)

It may happen that during the operation of the machine all water supplied or fed to the cage is not decomposed, so that it will accumulate in the lower part of the generating-chamber and eventually rise up and enter the carbide-cage. To prevent this and automatically cut off the supply of feed-water when the water in the said chamber rises to a certain level, I provide the following means: Connected with the vertical pipe 40 is a stop-cock 56, the stem of which is provided with a lever 57, to which is connected a vertical rod 57^a, having a float 57^b at its lower end, which will be elevated when the water reaches a certain level and shut the cock, and thus cut off the supply of feed-water. The said generating chamber or box is provided with a draw-off cock 15, and located in said chamber, below the cage, is a pan 58^a, provided with a perforated bottom 58^b, to collect and hold any fine carbide which may escape from the latter.

The numeral 59 designates a gas-pipe leading from the upper end of the generating-chamber to the gasometer and extending up above the water-line in the latter. Said pipe is provided with coils 60, located in the gas-

ometer, for cooling the gas, and is also provided with a stop-cock 61.

The numeral 62 designates a gas-pipe extending from the gasometer to the burner or burners. (Not shown.)

The operation of the machine is as follows: Water is supplied to the water-chamber at the upper end of the cylinder 1, which will overflow into the latter, so as to keep up the proper level therein. The carbide-cage has then placed in it a suitable quantity of calcium carbide. A requisite quantity of water is then supplied to the perforated trough and from thence escapes to the cage to generate sufficient gas to fill the gasometer, which will elevate the movable sections thereof, as usual. Upon the upward movement of the dome the pin 35 will strike the dog 34 of the lever 32, operating the latter and through its connections turning the cage, causing the ashes or spent carbide to be sifted from the cage and a fresh supply of the carbide to be brought under the water-trough. In case more gas is generated than the gasometer will hold the excess or surplus will escape through the pipes 6 and 6^a, connected with the dome. As the gas in the gasometer is consumed the dome and movable cylinder will fall until a predetermined limit has been reached, when the pin 50 of bar 51 will strike the dog 49, depressing the lever 45 and opening the stop-cock 43, so as to admit a quantity of water to the trough and carbide-cage sufficient to generate enough gas to again fill the gasometer. This operation will be continued successively until all the carbide in the cage is spent or exhausted, the cage being rotated on the upward movement of the dome and the stop-cock 43 closed on such movement and opened upon the downward movement of the dome.

When all the carbide in the cage is exhausted or spent, the dome will descend, and the pin 50, engaging with the dog of the lever 45, would operate the latter and open the stop-cock 43 and flood the generating-chamber if provision were not made for preventing the same. To prevent this flooding, there is secured to the cylinder 1 an inclined rod or cam 55, which when the dome descends and the pin 50 falls below a predetermined limit the latter will engage with said rod or cam, by which the dog will be forced outwardly, clearing the pin and allowing the lever 43 to fall and close the stop-cock, thus cutting off the supply of water to the generating-chamber.

The float 57^b, as before stated, is for the purpose of cutting off the supply of water to the generating-chamber in case the water accumulating in said chamber would tend to rise therein, so as to reach the level of the carbide-cage.

While I have described and shown the carbide-cage as being operated by the upstroke of the gasometer, it is obvious that the said cage may be turned by the downstroke of the lat-

ter without affecting the principle of the invention.

Having thus fully described my invention, what I claim is—

1. In an acetylene-gas machine, the combination with the generator, of the gasometer comprising the stationary cylinder connected therewith provided with an annular water-chamber at the upper end, the vertically-movable open-ended cylinder located therein having an interior supplemental wall or casing, the vertically-movable dome having an interior supplemental wall or casing, the downwardly-extending escape-pipe secured to said dome, the vertically-movable pipe through the upper end of which the escape-pipe passes and the pipe secured to the lower end of the escape-pipe, substantially as described.

2. In an acetylene-gas machine, the combination with the generator, of the carbide-cage comprising the end heads and bars, the journals secured to said heads, the fixed bearing with which one of said journals engages, the plate having an open slot therein, the rotatable bearing formed with an open slot with which the other journal engages, and the shaft to which said rotatable bearing is secured, substantially as specified.

3. In an acetylene-gas machine, the combination with the gasometer comprising the stationary cylinder, the vertically-movable dome and the bar connected therewith provided with a pin, of the generator connected with said gasometer, the rotatable carbide-cage located therein, the shaft with which one of the journals of said cage is connected, the ratchet-wheel secured to said shaft, the loose cog-wheel provided with a pawl engaging with said ratchet-wheel, the pivoted lever having a cogged segment meshing with said cog-wheel, and the pivoted dog at the opposite end of said lever with which said pin is adapted to engage, substantially as described.

4. In an acetylene-gas machine, the combination with the gasometer comprising the stationary cylinder, the exterior guide secured thereto, the vertically-movable open-ended cylinder, the vertically-movable dome telescoping therein, the bar connected with said dome provided with a pin and the slide within which said bar works movable in said guide, of the generator, the rotatable carbide-chamber located therein, the shaft connected with said cage having a ratchet-wheel fixed thereto, the loose cog-wheel on said shaft provided with a pawl engaging with said ratchet-wheel, the lever having a cogged segment at one end engaging with said cog-wheel, and the pivoted dog at the opposite end of said lever, substantially as described.

5. In an acetylene-gas machine, the combination with the gasometer comprising the stationary cylinder and the vertically-movable dome, and the bar connected with said dome, and provided with a pin, of the generator,

the pipe connecting the same with the gasometer provided with a stop-cock, the weighted lever having a pivoted dog adapted to be engaged by said pin, and said pipe extending
 5 up into the generator and provided with a lateral nozzle and the perforated trough pivotally connected with said nozzle, substantially as described.

6. In an acetylene-gas machine, the combination with the gasometer comprising the stationary cylinder, the vertically-movable dome and the bar secured to said dome provided with a pin, of the generator, the pipe connecting the same with the gasometer provided
 15 with a stop-cock, the lever connected therewith provided with a pivoted dog with which said pin is adapted to engage and said pipe extending up into the generator and provided with a lateral nozzle, the perforated
 20 trough connected therewith and the rotatable carbid-cage located in said generator and means for intermittently rotating the same by the movement of said dome, substantially as described.

25 7. In an acetylene-gas machine, the combination with the generator, the gasometer comprising the stationary cylinder, the vertically-movable dome provided with depending bars provided with pins, the pipe connecting said
 30 gasometer and generator, the stop-cock, the weighted lever connected therewith provided with a pivoted dog with which the pin of one of said bars is adapted to engage, and the pivoted perforated trough, of the rotatable carbid-cage

located in said generator, the shaft connect- 35
 ed therewith provided with a fixed ratchet-wheel, the cog-wheel loose on said shaft provided with a pawl engaging with said ratchet-wheel, the lever having a cogged segment at one end meshing with said cog-wheel and a
 40 pivoted dog at the other end, substantially as and for the purpose described.

8. In an acetylene-gas machine, the combination with the gasometer comprising the stationary cylinder and the vertically-movable 45
 dome provided with a downwardly-depending bar having an outwardly-projecting pin, of the generator, the pipe connecting the same with the gasometer provided with a stop-cock, the weighted lever connected with said
 50 stop-cock, the spring-actuated lug pivoted to said lever, the dog pivoted to said lug and the inclined rod or cam with which said dog is adapted to engage, substantially as described. 55

9. In an acetylene-gas machine, the combination with the generator and the rotatable carbid-cage, of the water-supply pipe, the stop-cock connected therewith, the arm connected with said stop-cock, the vertical rod 60
 and the float, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANCIS M. DRAPER.

Witnesses:

FRANK H. SMITH,
 B. B. CONAWAY.