No. 621,648. Patented Mar. 21, 1899.

# E. P. GARDNER.

## ACETYLENE GAS GENERATING APPARATUS.

(Application filed Dec. 27, 1898.)

(No Model.)

Fig. 1.

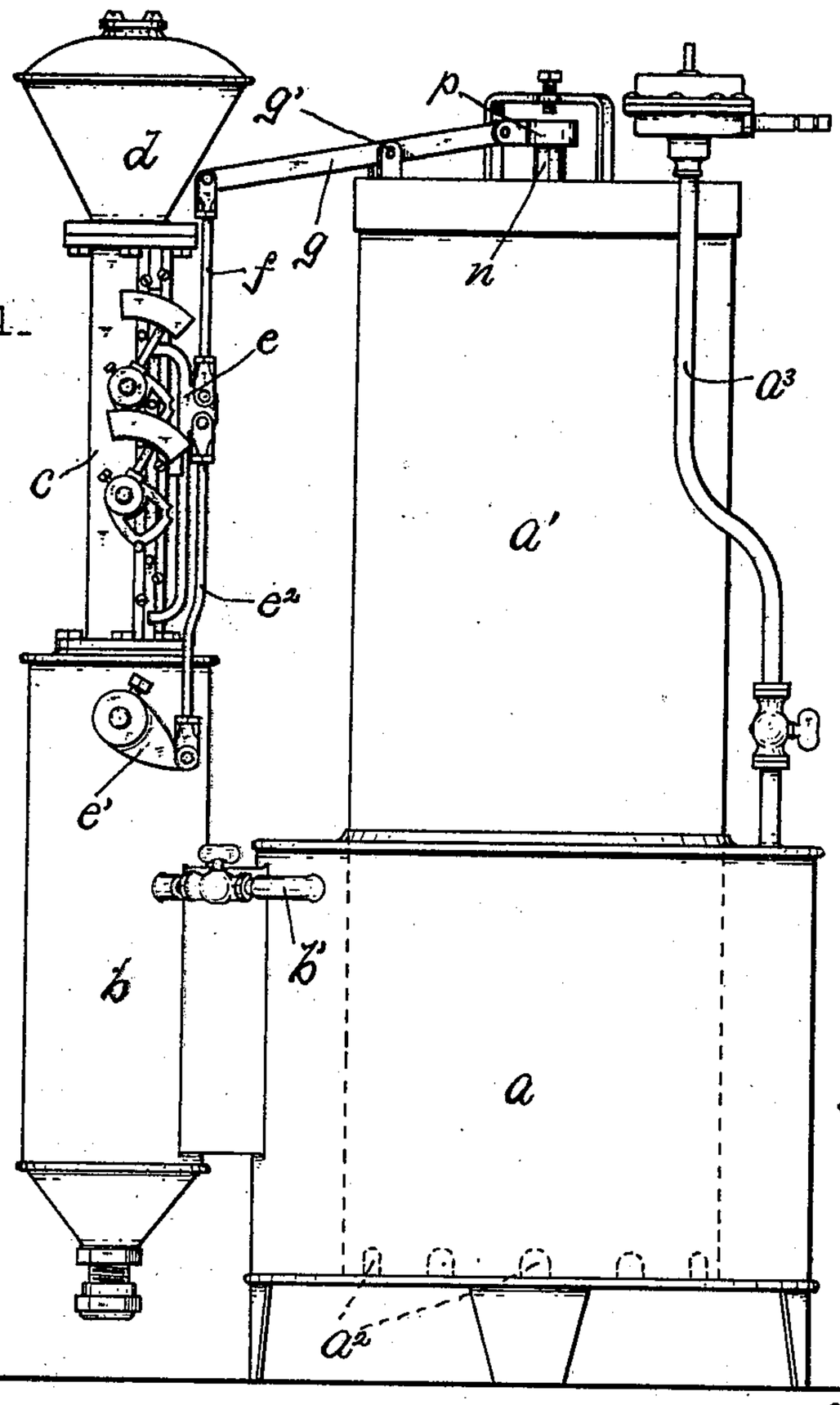



Fig. 3.

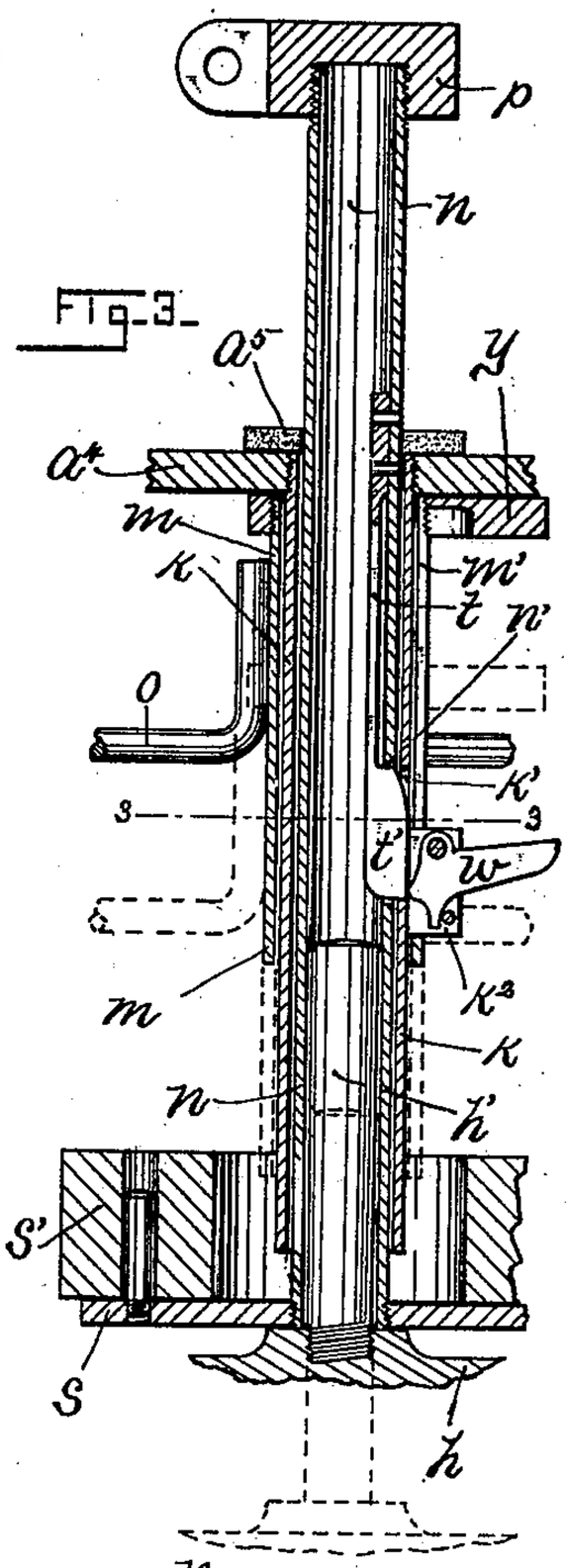



Fig. 5.

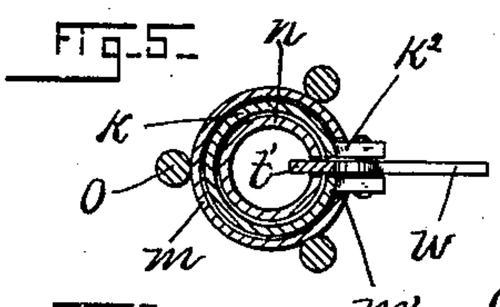



Fig. 2.

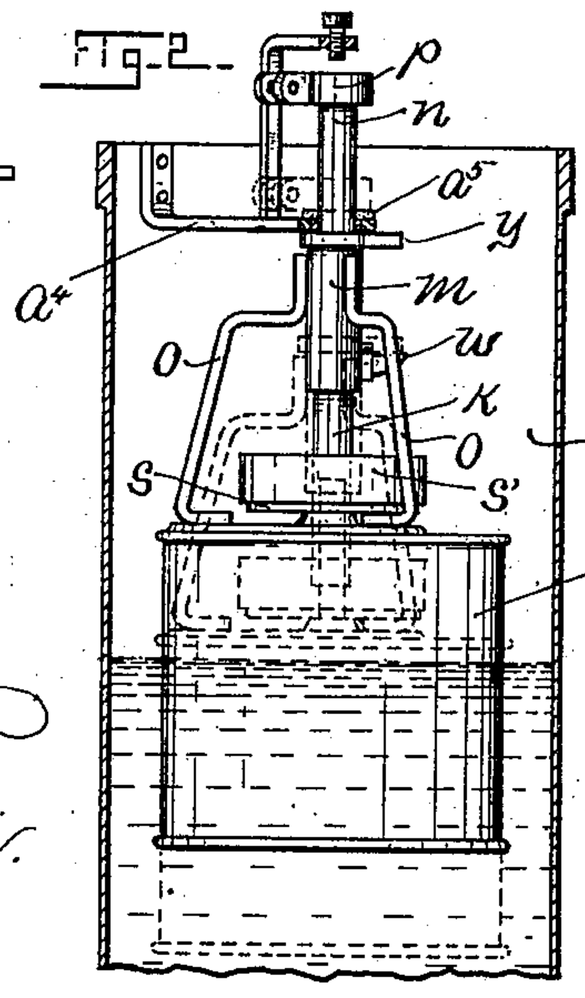



Fig. 4.

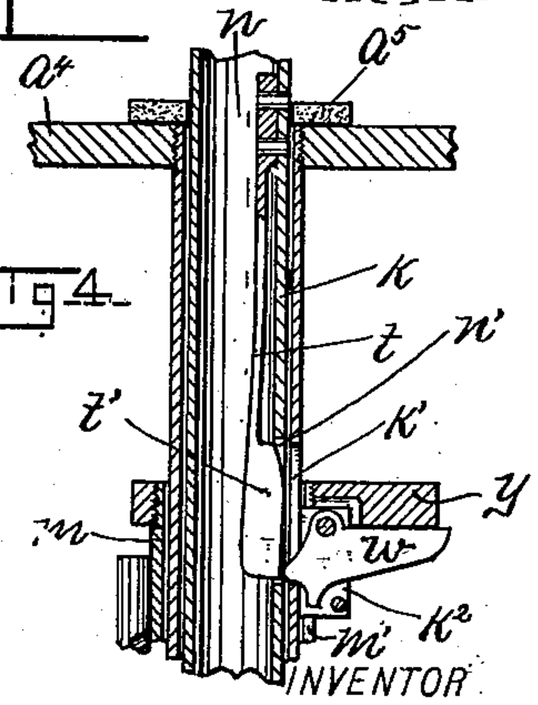
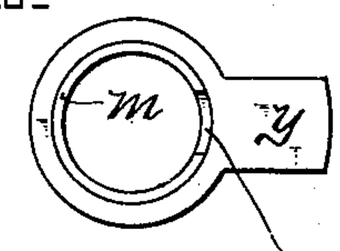



Fig. 6.

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# UNITED STATES PATENT OFFICE.

EDWIN P. GARDNER, OF NORWICH, CONNECTICUT, ASSIGNOR OF ONE-HALF TO TIMOTHY KELLY, OF SAME PLACE.

## ACETYLENE-GAS-GENERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 621,648, dated March 21, 1899.

Application filed December 27, 1898. Serial No. 700,434. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN P. GARDNER, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Acetylene-Gas Apparatus, of which the following is a full, clear, and exact description.

This invention is in acetylene-gas apparatus of the class which, briefly described, comprise a gas-receiver having located adjacent thereto a gas-generating chamber and above the latter a carbid-storage chamber. Between the carbid-storage chamber and the gas-generating chamber mechanism is located for automatically feeding the carbid in measured quantities from the former to the latter. The said carbid feeding and measuring mechanism in this present instance is actuated and controlled by certain novel mechanism located largely within a portion of the gas-receiver and actuated automatically at the proper time to set in operation or stop said carbid-feeding mechanism as the gas in the receiver becomes exhausted or as the latter becomes filled.

The particular object of this invention is to provide carbid-feeding mechanism which shall act very rapidly when effecting the work for which it is designed, such rapid movement being desirable in order that the passage from the generating-chamber to the carbid-feeding chamber be left open for the briefest possible time, thus practically preventing the passage of moisture from the generating-chamber to the carbid-feeding chamber, which would result in the softening and sticking together of the carbid and preventing the feeding thereof.

To assist in explaining my invention, I have provided the accompanying sheet of drawings, which serve to illustrate the same as follows:

Figure 1 shows in elevation a gas-machine fitted up with my improvements. Fig. 2 shows in central vertical section the portion of the receiver in which my present improvements are located. Fig. 3 shows my improved mechanism on a somewhat enlarged scale and in central vertical section. Fig. 4 is a view similar to Fig. 3, showing a portion of my said mechanism and the manner in which the same operates. Fig. 5 is a cross-sectional view taken on the line 3 3 of Fig. 3. Fig. 6 illustrates in plan a certain detail of construction of my invention.

Referring to the drawings, the said receiver of the apparatus consists of two concentric cylindrical tanks or water-chambers $a$ and $a'$, the former of which is of somewhat greater diameter, but of much less height than the latter. Chamber $a$ surrounds the lower portion of the chamber $a'$, and the top of the former is closed while the upper end of the latter is left open, communication between said chambers being established at the lower end of the chamber $a'$ by means of passages $a^2$ through the wall of said chamber, as shown in dotted lines in Fig. 1. The reference-letter $b$ denotes the gas-generating chamber, supported adjacent to the said receiver and communicating therewith by means of pipes $b'$. Reference-letter $c$ denotes a chamber located above the chamber $b$ and within which the said measuring mechanism is located, and the letter $d$ denotes the carbid-storage chamber supported above the said chamber $c$.

The carbid measuring and feeding mechanism (which, however, forms no part of my present invention) embodies a slide $e$, adapted to travel vertically to set in operation said mechanism and also a certain moisture-cut-off device (also forming no part of this invention) located in the upper portion of the chamber $b$. The external portion of the last-named mechanism consists of an arm $e'$, connected by a rod $e^2$ with the slide $e$ and is thus rocked by the movements of said slide. Slide $e$ is connected by a link $f$ to one end of a lever $g$, that is hung at $g'$ at the upper end of the chamber $a'$, the other end of which lever has connected thereto a float $h$, located in the water in said chamber and adapted to rise and fall therewith, the changes of the water-level being caused by the introduction of gas into or its exhaustion from the receiver, as hereinafter explained, said motion of the float effecting the rocking of the lever $g$, which latter, through the link $f$, imparts motion to the slide $e$, controlling the said carbid-feeding and moisture-cut-off mechanisms. Assuming that the supply of gas is nearly exhausted in the receiver and the float $h$ is traveling downward, such action rocks lever $g$ to draw

the slide *e* upward, the latter actuating the carbid-feeding mechanism to feed a charge of carbid downward to the generating-chamber and actuating also the moisture-cut-off mechanism to permit the passage of the carbid into the chamber *b*. The formation of gas at once begins, and said gas passes from chamber *b* through pipes *b'* to chamber *a*, forcing the water therein and in chamber *a'* to rise in the latter, said water being forced through the passages $a^2$ and into the chamber *a'*, carrying upward with it the float *h*, which, through lever *g*, actuates the carbid-feeding mechanism and the moisture-cut-off mechanism in the reverse directions to those just mentioned. The gas in the chamber *a* passes therefrom through pipe $a^3$, and as it is consumed the float *h* again falls and the operations just described are repeated.

Describing particularly my improvements, the reference-letter $a^4$ denotes a bar extending across the chamber *a'* near its upper open end and having depending therefrom, midway its length, a tube *k*, which receives and forms a guide for two other tubes *m* and *n* concentric with the tube *k* and located, respectively, outside and within the latter. Tube *m* is adapted to rise and fall with the float *h*, and to attain this end the tube *m* has radiating outward and downward therefrom arms *o*, secured to the upper face of the float *h*. The tube *n* is somewhat longer than the tube *k* and projects beyond the ends thereof and bears on its upper end a connection *p*, by means of which the tube is secured to the lever *g*, and on the lower end the tube *n* has secured thereto a disk *s*, adapted to receive and support a weight *s'*. The tube *n* is adapted to travel with a vertically-reciprocating motion, and to assist in retaining the float *h* in line therewith the latter is provided with an upwardly-extending stud *h'*, entering the lower end of said tube, as shown in the drawings. Located within the tube *n* is a spring *t*, having a widened portion *t'*, projecting through an opening *n'* in said tube, and when said tube *n* and the float *h* are in their highest position, as shown in Fig. 3, the spring portion *t'* registers with and enters an opening *k'* in the tube *k*. The said tube *k* has on each side of its opening *k'* a wing $k^2$, which wings project through a slot *m'*, extending almost throughout the length of the tube *m*, and between the said wings $k^2$ a trigger *w* is pivoted, one arm of which engages the edge of the spring portion *t'* and whose other arm lies in the path of a projecting arm *y*, formed on a ring secured to the upper end of the tube *m*.

Assuming now that the various elements of the mechanism are in the positions shown in Fig. 3, (the float *h* being in its upward position,) it will be seen that as said float begins its downward travel the tube *m* will travel correspondingly on the tube *k*, (dotted lines in Fig. 3,) while the tube *n* will remain in its elevated position. The downward travel of float *h* and the tube *m* continues until the arm *y*, carried by the tube *m*, engages and rocks before it the trigger *w*, such action resulting in forcing inward the spring portion *t'* from the opening *k'*, as shown in Fig. 4. When the spring portion *t'* is withdrawn from the opening *k'*, as just mentioned, the tube *n* is free to travel downward, and such action takes place at once by reason of the weight *s'* resting on the disk *s*, secured to the lower end of the tube *n*. The tube *n* then drops by gravity until the weight-supporting disk nearly reaches the top of the float *h*, such downward movement of said tube having by that time rocked lever *g* and actuated the mechanism controlled thereby in the manner already described. To relieve the rigid shock that would result if the weight were allowed to drop directly upon the float, I place an elastic washer $a^5$ upon the cross-bar $a^4$, said washer being of such thickness that it receives and checks the connection *p* just before the weight reaches the float. As the float *h* and tube *m* begin to travel upward by reason of the rising of the water in the chamber *a'*, caused by the formation of gas, as above explained, the tube *n* and its weight are also carried upward by said float until the spring portion *t'* registers with and snaps into the opening *k'* of the tube *k*. Said elements having now reached their uppermost positions are retained therein until there occurs a repetition of the operation just described, it being understood that in the said upward travel of the tube *n* the lever *g* is rocked in the direction the reverse to that in which it is rocked by the downward travel of the tube.

My improved mechanism (operating to rock very rapidly the lever *g*) actuates the carbid-feeding mechanism with a correspondingly-rapid movement, this being especially desirable as against the comparatively slow movement attained when the lever *g* is connected directly with the float *h*. The passage of moisture from the generating-chamber to the carbid-storage chamber during the feeding of the carbid is thus rendered practically impossible.

Having thus described my invention, I claim—

1. In gas apparatus, in combination in and with a gas-controlled water-chamber, a float, a weighted slide, means for retaining said weighted slide in its elevated position and for releasing the same when the said float reaches its lowest position, substantially as specified.

2. In gas apparatus, in combination in and with a gas-controlled water-chamber, a float, a weighted slide, means for retaining said weighted slide in its elevated position and for releasing the same when the said float reaches its lowest position, and a lever supported by a fixed fulcrum and having one end connected with the said weighted slide, substantially as specified.

3. In gas apparatus, in combination in and with a gas-controlled water-chamber, a float, a weighted slide, means for retaining said weighted slide in its elevated position and for releasing the same when the said float reaches its lowest position, carbid-feeding mechanism substantially as set forth, and mechanism connecting said feeding mechanism with the said weighted slide whereby the feeding mechanism is caused to operate with a rapid movement, as and for the purpose specified.

4. In gas apparatus, in combination, a receiver, a generating-chamber and pipe connections between said receiver and chamber, carbid-measuring mechanism over the generator, a float and an independently-operating weighted slide within said receiver, and connections between the said carbid-measuring mechanism and the weighted slide and float whereby the said carbid-measuring mechanism is caused to operate with a rapid movement, substantially as specified.

5. In gas apparatus, in combination in and with a gas-controlled water-chamber, a float, a weighted slide, means for retaining said weighted slide in its elevated position and for releasing the same when the said float reaches its lowest position, carbid-feeding mechanism, a generating-chamber, a moisture cut-off between the said generating-chamber and feeding mechanism, and mechanism connecting the said moisture cut-off with the said weighted slide, all substantially as specified.

Signed at Norwich, Connecticut, this 14th day of December, 1898.

EDWIN P. GARDNER.

Witnesses:
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MAY F. RITCHIE.