No. 607,701. Patented July 19, 1898.

J. A. OLSON.

ACETYLENE GAS GENERATOR.

(Application filed Aug. 17, 1896.)

(No Model.) 2 Sheets—Sheet 1.

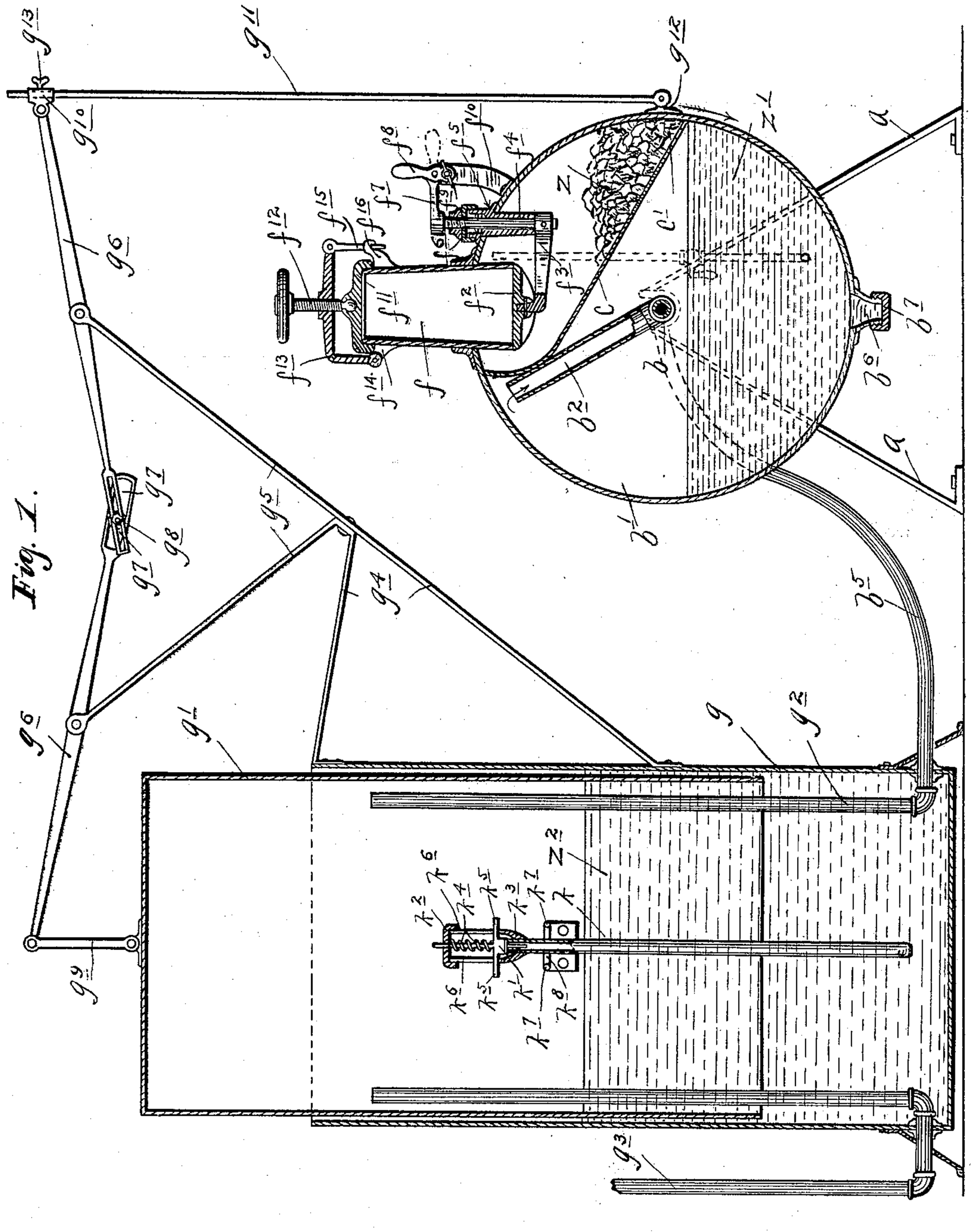

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

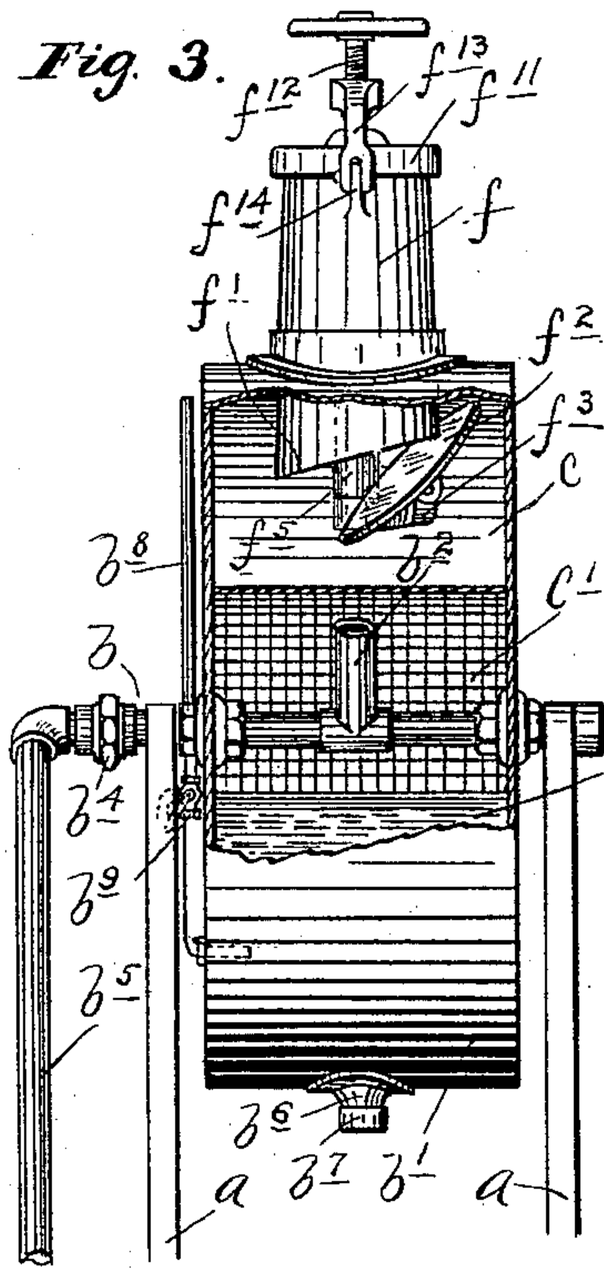


Fig. 2.

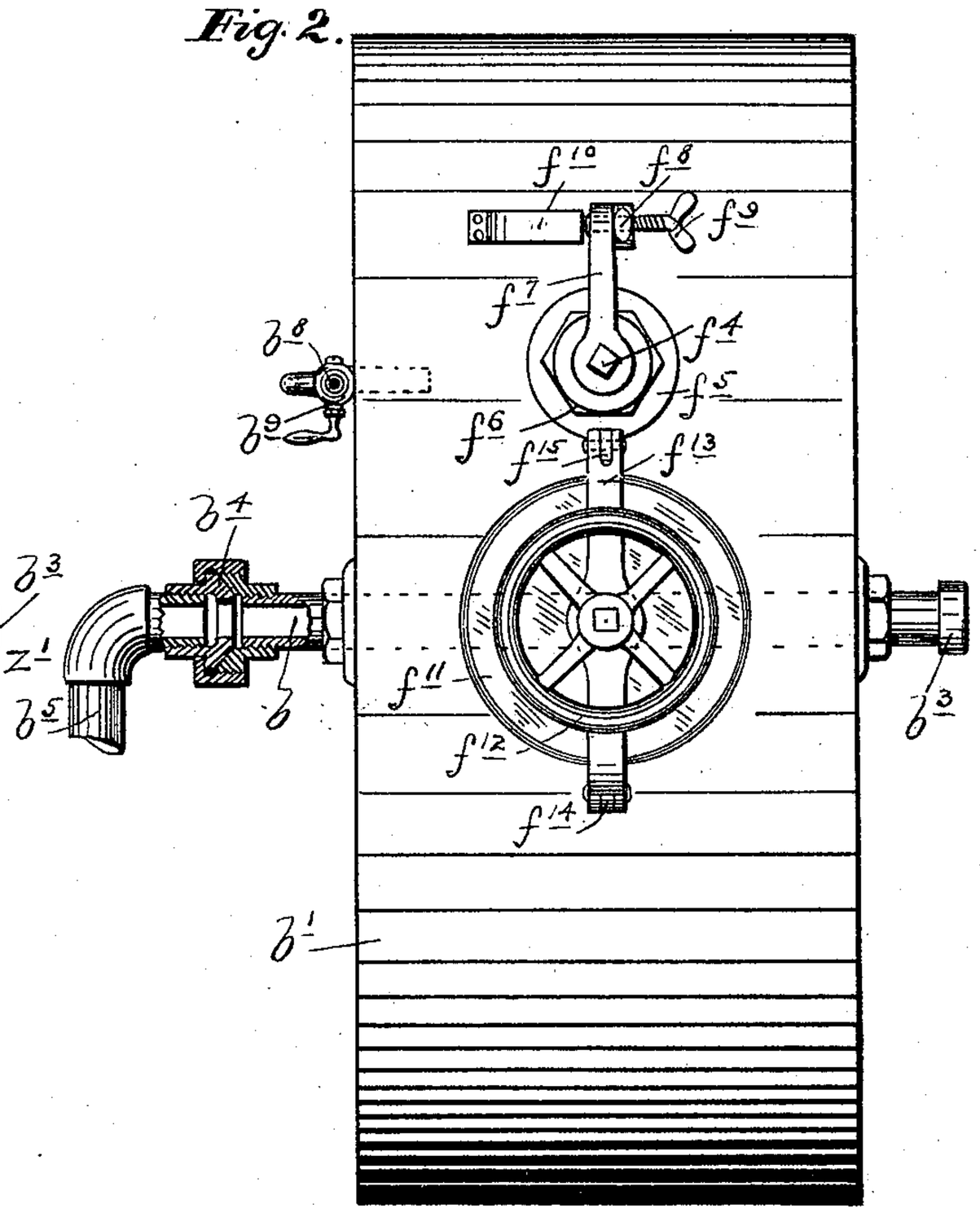


Fig. 5.

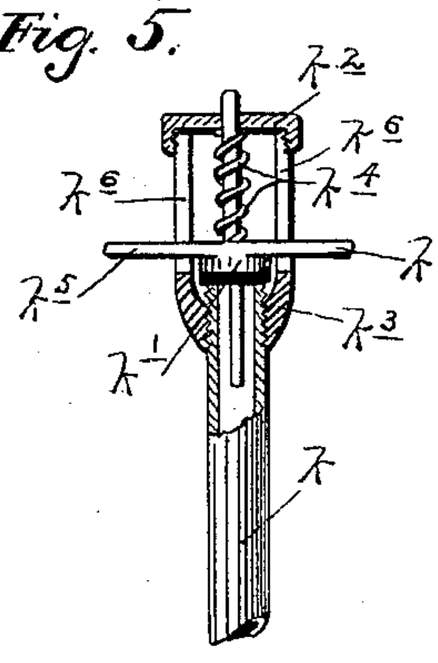


Fig. 6.

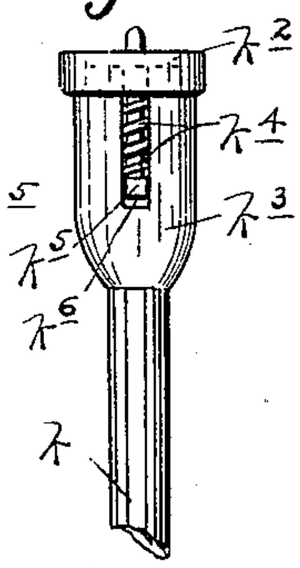
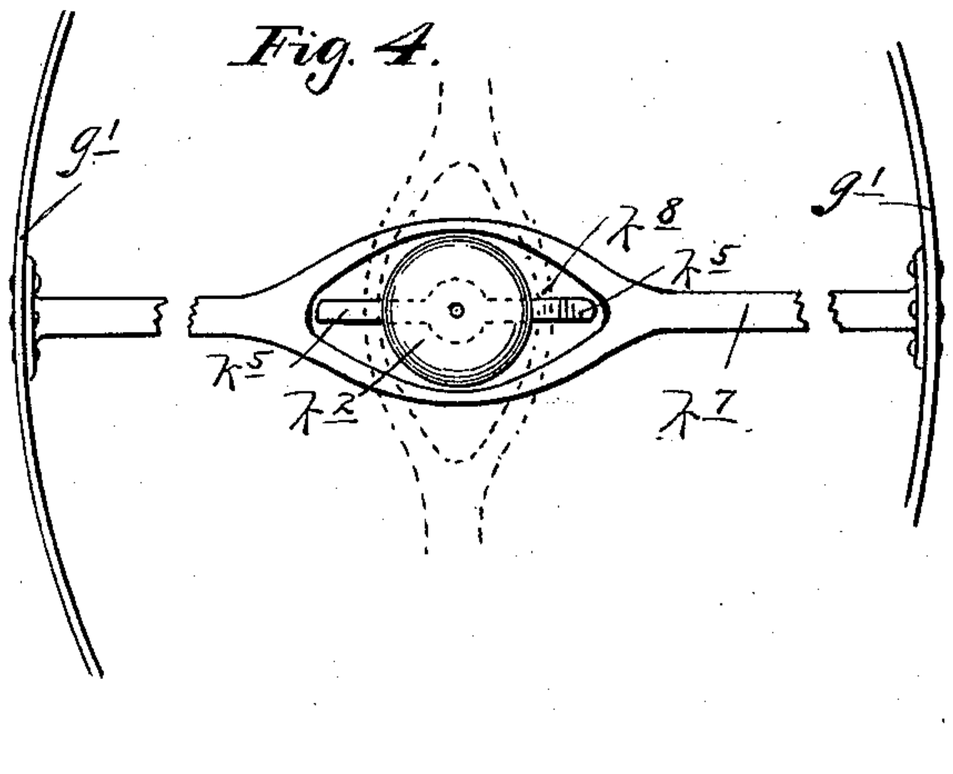


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN A. OLSON, OF MINNEAPOLIS, MINNESOTA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 607,701, dated July 19, 1898.

Application filed August 17, 1896. Serial No. 603,047. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. OLSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Acetylene-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to gas-generators, and has for its especial object to provide certain improvements in that class of gas-generators which are employed for generating acetylene gas by automatically controlling the contact between bodies of calcium carbid and water.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The preferred form of my invention is illustrated in the accompanying drawings, wherein, like letters referring to like parts throughout the several views—

Figure 1 is a view in vertical central section taken transversely through the entire plant or apparatus. Fig. 2 is a view principally in plan, but with some parts broken away and others shown in section, showing the generating-receptacle. Fig. 3 is a side elevation of the generating-receptacle shown in Fig. 2. Fig. 4 is a detail view in plan, with some parts broken away, showing a safety-valve-actuating device. Fig. 5 is a view, partly in front elevation and partly in central vertical section, showing the safety-valve and escape-pipe; and Fig. 6 is a side elevation of the parts shown in Fig. 5.

I will first describe the preferred form of my novel generating-receptacle or generator.

In suitable bearing-brackets a, which are secured to the floor or other support, are loosely journaled the projecting ends of a hollow shaft or spindle b, secured to and movable with which is a drum or cylinder b', provided with closed ends. The hollow shaft b is in communication with the interior of the drum b', and, as shown, this is accomplished by means of a radially-projecting branch pipe b^2. One projecting end of the hollow shaft b is closed by a cap b^3, and the other end of the same is connected, by means of a swivel-acting stuffing-box b^4, with a draw-off or gas-conveying pipe b^5. As shown, the drum b' is provided at its lower portion with a discharge-nipple b^6, which is normally closed by means of a removable cap b^7. At one end the said drum is shown as provided with the water-supply pipe b^8, provided with a valve b^9. This pipe b^8, it will be noted, opens into the drum b' below the water-level of the same, while the upper open end of the pipe rises to such a height that it will always be kept considerably above said water-level. The initial supply of water may be introduced into the drum b' through this pipe b^8, and by connecting the same with a source of water-supply under pressure and removing the cap b^7 of the nipple b^6 water may be forced through the said drum to clean the same with a flushing action.

The carbid-holder is carried with the drum b' or generating-receptacle, being located therein eccentric to the axial shaft or stem b. In this preferred form of the apparatus the carbid-holder is formed by means of a partition-plate c, which is secured within the drum longitudinally thereof and extends substantially throughout its transverse dimensions on a chord of the circle formed by the shell or periphery of said drum b'. Preferably only the lower portion of this partition-plate c is perforated, and, as shown, this perforated portion is formed by a reticulate or woven section c'.

The carbid is introduced into the carbid-holder through a filling device constructed as follows:

Secured to and passing through the periphery of the drum b' above the partition c is a small open-ended cylinder f, preferably of such size as to receive sufficient carbid to charge the carbid-holder. The lower inner end of this cylinder f is cut off on an incline, as shown at f', and is adapted to be closed by means of a disk-like bottom plate f^2, which is loosely mounted on the free end of an arm f^3, secured to the lower end of a vertical shaft f^4. The shaft f^4 is mounted in a sleeve

f^5, secured to the drum b', and the upper end of the same works outward through a stuffing-box f^6 and is provided with an operating-lever or handpiece f^7 f^8. The hand-engaged section of this lever f^7 f^8 is provided with a projecting portion in which is mounted a thumb-screw f^9.

f^{10} indicates a resistance-bracket rigidly secured to the drum b', with its upper end in position to be cleared or passed by the lever f^7 f^8 when the section f^8 is turned as indicated by dotted lines in Fig. 1, but in such position that when the said section f^8 is turned as indicated by full lines in said Fig. 1 its upper end may be engaged by the projecting end of the thumb-screw f^9.

It will be noted that the bottom plate f^2 is so pivoted or hinged to the free end of the lever f^3 as to be permitted considerable pivotal movement, so that when the lever f^3 is turned as shown in Fig. 3 the said bottom plate f^2 may tilt to the incline indicated in said figure, and thus permit the ready discharge of the contents of the cylinder f. Again, in virtue of this pivotal movement of the bottom plate f^2 and the incline f' of the cylinder f, as the said arm f^3 is moved so as to throw said bottom plate f^2 into its closed position it will automatically adjust itself to the angle of said bottom and may be pressed thereagainst, so as to form a gas-tight joint therewith. The closed position of this bottom plate is shown in Fig. 1, and in this position it may be held by the thumb-screw f^9, which is tightly screwed against the resistance-bracket f^{10}.

The upper end of the cylinder f is normally closed with a gas-tight joint by means of a cap f^{11}, which is swiveled on the lower end of a hand-screw f^{12}, which works through a hinge-iron f^{13}, one end of which is pivoted to lugs f^{14} of the cylinder f and the other end of which is provided with a pivoted latch-piece f^{15}. The latch-piece f^{15} may be engaged at will with detent lugs or hooks f^{16}, formed on the cylinder f. Obviously by engaging the latch-piece with the lugs f^{16} and tightening the screw f^{12} the cap f^{11} may be tightly clamped in place, while by loosening said screw f^{12} and releasing the latch f^{15} the said cap f^{11} may be readily removed.

It may be here stated that the purpose of the charging device just described is to enable the carbid-holder to be loaded with the carbid without permitting the escape of the noxious acetylene gas from the generator into the room. As is evident, by first removing the cap f^{11} from the cylinder f, then filling the said cylinder with carbid, then replacing the said cap f^{11}, and then removing the bottom plate f^2 from the bottom of the said cylinder the carbid may be introduced onto the carbid-holder, as described.

In connection with the generating mechanism just described I employ a storage-tank or gasometer involving, preferably, telescoping water-seated tank-sections, the interior of which tank or gasometer is in communication with the rotary generating-receptacle, and the movable section of which is connected to the said generating receptacle or drum in such manner that the vertical reciprocations of the same will produce an oscillating movement of said receptacle or drum, thereby carrying the carbid held by the carbid-holder c into or out of the water.

As shown, g indicates the fixed and g' the vertically-movable telescopic sections of the storage-tank or gasometer, and, as shown, the draw-off pipe b^5 from the drum b' terminates in a vertical section g^2, which opens within the storage-tank above the highest water-level of the same. g^3 indicates a service-pipe which also opens into the storage-tank above its highest water-level and which extends to the ordinary points of consumption.

From one side of the tank-section g, projecting toward the generator, is rigidly secured a spider-like bracket g^4, provided with a pair of arms g^5. At the extremities of each of the arms g^5 is mounted the intermediate portion of one of a pair of levers g^6. These levers g^6 are provided at their adjacent ends with elongated slots g^7. In the slot g^7 of one of these levers is adjustably secured a sliding head g^8, which has a suitable projection which engages the slot g^7 of the other lever. The opposite end of one of these levers g^6 is connected to the head of the vertically-movable tank or gasometer section g' by means of a link g^9, and the opposite end of the other lever g^6 is provided with a pivoted head g^{10}. This pivoted head g^{10} is adjustably connected to the peripheral shell of the rotary drum b' by means of a connecting-rod g^{11}, the lower end of which, as shown, is secured to a lug g^{12} on said drum and the upper end of which works through a perforation in said head g^{10} and is adjustably secured therewith by means of a thumb-screw g^{13}.

Fig. 1 of the drawings shows substantially the properly-adjusted positions of the parts of the apparatus as required for ordinary use. As is evident, however, by adjusting the rod g^{11} through the head g^{10} the perforated section c' of the carbid-holder c may be raised or lowered vertically with respect to a given position of the levers g^6 and movable gasometer or tank section g'. Again, by adjusting the sliding head g^8 in the slot g^7 of the lever g^6, by which it is carried, the operative length of the one lever g^6 may be increased or decreased with respect to the other at will, so as to increase or decrease the amount of oscillatory motion which the drum b' will be given under a given vertical movement of the movable tank or gasometer section g'.

In Fig. 1, z indicates bodies of calcic carbid held within the generating receptacle or drum b' by means of the carbid-holder c c'. z' indicates water contained in said drum b', and z^2 indicates water contained in the storage-tank or gasometer g g'.

In connection with the gasometer or stor-

age-tank there may also be employed a safety device for permitting the escape of gas from the gasometer whenever there is such an overproduction of gas as to be dangerous. The safety device which I have shown involves novel features of construction and comprises as follows:

k indicates an escape-pipe the inner end of which terminates in the gasometer, above the water-level of the same, and the outer end of which may be connected to a flue or may lead to the atmosphere outside of the room in which the apparatus is located. The inner upper end of the pipe *k* is normally closed by a valve *k'*, the stem of which works upward through a cap k^2 of a pipe-head k^3. On the stem of the valve *k'*, compressed between said valve and the cap k^2, is a coiled spring k^4, which tends to hold said valve closed. The valve *k'* is also provided with a pair of laterally-projecting arms k^5, which work in vertical grooves k^6, formed in the pipe-head k^3, and project out a considerable distance beyond the same. The movable tank or gasometer section *g'* carries a trip-bar k^7, which is secured thereto in a horizontal position and has an oval or elongated eye k^8 at its center, which works around the pipe *k* under the vertical movement of said tank-section *g'*, and when sufficiently raised the bifurcated portions of said bar are adapted to engage the projecting arms k^5 of the valve *k'* and thereby open said valve. The vertical position of the trip-bar k^7 on the tank-section *g'* with respect to the arms k^5 of the valve *k'* is such that the vertical movements of said tank-section *g'* throughout its ordinary zone of operation—that is, in the ordinary generating action—will not cause the engagement of said bar with said arms k^5; but when by an overgeneration or otherwise the tank-section *g'* is thrown above its ordinary zone of operation the valve *k'* will be raised, so as to open the escape-pipe *k* and permit the escape of the confined gas from the gasometer.

It will be noted by reference to Fig. 4 that when the bar k^7 is turned as shown by full lines the valve-arms k^5, pipe-head k^3, and cap k^2 may all be readily inserted through the eye k^8; but when the said bar is turned as indicated by dotted lines it will engage the said arms k^5, as above described. Therefore in placing the gasometer-section *g'* in working position it should be turned so that the bar k^7 will stand in a position indicated by full lines in Fig. 4, and then after it has been lowered the tank-section may be turned so that the bar will stand as indicated by the dotted lines.

It will be noted that the cylinder *f* of the filling device flares or increases in diameter toward its lower end. This is important, as it renders the discharge of the carbid therein contained, under the action of gravity, more positive and rapid.

It will also be noted that the open end of the branch pipe-section b^2 from the axial pipe *b* extends much higher than the said pipe *b*. This will permit the axial pipe *b* to be entirely submerged in the water without interfering with the generating action of the generator.

The general action of the above-described apparatus as an entirety is probably obvious from the foregoing description, but may be briefly summarized as follows: The proper parts of the apparatus being charged or loaded with water or carbid, as already described, the generating action may be started by forcing the drum *b'* to revolve in the direction indicated by the arrow on Fig. 1 until the carbid *z* on the carbid-holder *c c'* is dipped into the water *z'*. This, of course, will start the generation of gas, which as it is generated will flow through the pipe connections $b^2\, b\, b^5\, g^2$ into the gasometer or storage-tank, and as this generation of gas continues the gasometer-section *g'* will be caused to rise. This rise of the gasometer-section *g'*, acting through the levers g^6 and link connections $g^9\, g^{11}$, will cause the drum *b'* to rotate in a direction reverse from the arrow indicated on Fig. 1, thereby raising the carbid bodies *z* entirely out of the water *z'*, and thus stopping the generation of gas for the time being. When, however, the gas in the gasometer is drawn off through the service-pipe g^3, so that the pressure therein is reduced, the movable gasometer-section *g'* will of course lower and, through the connections described, will cause the drum *b'* to again rotate in the direction indicated by the said arrow, thus again throwing the carbid bodies *z* into contact with the water *z'*, thereby causing a further generation of gas, which when it has created sufficient pressure will again stop the further generation of gas, as just described. It will thus be seen that this apparatus in its preferred form is completely automatic in its action and requires no attention further than to keep the same properly supplied with the gas-producing substances.

It will be understood, of course, that various alterations in the details of construction of the preferred form of my invention above described may be made without departing from the principles of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a pivoted generating-receptacle adapted to contain water and provided within with a carbid-holder, of means operated by the generated gas, for oscillating said pivoted generating-receptacle to bring the carbid and water therein contained into and out of contact.

2. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, and means operated by the generated gas, for

oscillating said receptacle and automatically moving the carbid on said carbid-holder, into and out of the water of said receptacle.

3. In a gas apparatus, the combination with a generating-receptacle, in the form of a drum, adapted to contain water, and pivoted on its axial center, of a carbid-holder formed therein by a perforated partition-plate extending longitudinally of said drum, substantially on an arc thereof, and a gas-tight filling device opening to said carbid-holder through the periphery of said drum.

4. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, of an expansible storage-tank in communication with said generating-receptacle, and operating connections between the movable section of said storage-tank and said pivoted generating-receptacle, for causing the pivotal movement of the latter under the movements of the former.

5. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, of an expansible storage-tank in communication with said generating-receptacle, and operating connections between the movable section of said storage-tank and said pivoted generating-receptacle, said connections involving as an element, an adjustable part by means of which the pivotal position of said carbid-holder with respect to the water contained in said generating-receptacle may be varied independent of the movement of said movable tank-section, substantially as described.

6. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, of an expansible storage-tank in communication with said generating-receptacle, and operating connections between the movable section of said storage-tank and said pivoted generating-receptacle, said connections involving, as an element, means for varying the movement of the said pivoted generating-receptacle with respect to any given movement of said movable tank-section.

7. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, of an expansible storage-tank or gasometer in communication with said generating-receptacle, and operating connections involving a pair of levers pivoted at their intermediate portions, connected together at their adjacent ends and connected at their opposite ends, one to the movable gasometer-section and the other to said generating-receptacle at a point eccentric to its axis, substantially as described.

8. The combination with a generating-receptacle, adapted to contain water, mounted for pivotal movement and provided with a carbid-holder located eccentric to its pivot, of an expansible storage-tank in communication with said generating-receptacle, and operating connections involving the pair of levers g^6 pivoted at their intermediate portions to suitable supports and provided at their adjacent ends with the slots g^7, the adjustable head g^8 working in said slots g^7, the link g^9 connecting the extended end of one of the levers g^6 with the movable tank-section, the pivoted head g^{10} on the extended end of the other lever g^6, and the connecting-rod g^{11} secured at one end to the shell of said generating-receptacle and adjustably secured at its other end to said head g^{10}, substantially as described.

9. The combination with a generating-receptacle and a carbid-holder located therein, of a filling device involving a cylinder or tube opening through said receptacle, above said carbid-holder, and having its inner end cut on an incline, a removable cover for the outer end of said cylinder, a removable bottom for the beveled inner end of said cylinder, a rock-shaft extending through said generating-receptacle, substantially parallel to the axis of said cylinder, an arm secured on the inner end of said rock-shaft and carrying said removable bottom at its free end, and means for rocking said rock-shaft from its outer end, substantially as described.

10. The combination with a generating-receptacle and a carbid-holder located therein, of a filling device involving the cylinder or tube f opening through said receptacle above said holder and having its inner end beveled at f', a removable cover for the outer end of said cylinder, the removable bottom f^2 for the beveled inner end of said cylinder, the rock-shaft f^4 extending through said generating-receptacle, the arm f^3 secured to the inner end of said shaft f^4 and hinged or pivoted to said bottom f^2 at its free end, the operating-lever involving the section f^7 secured to the outer end of the shaft f^4 and the pivoted handpiece f^8 provided with the thumbscrew f^9, and the stop or bracket f^{10} fixed on said generating-receptacle, substantially as described.

11. The combination with a generating-receptacle, of a filling device for the same involving a cylinder or tube opening through said receptacle and having its inner end cut on an incline, a removable cover for the outer end of said cylinder or tube, a removable bottom for the inclined inner end of said cylinder or tube, a rock-shaft extending into said generating-receptacle, an arm on the inner end of said rock-shaft secured to and carrying said removable bottom, and means for rocking said rock-shaft from its outer end, substantially as described.

12. The combination with an expansible gasometer, of an escape-pipe k leading therefrom and provided at its inner open end with the valve bracket and cap k^3 k^2, the valve k'

normally closing said pipe k and provided with the lateral extended arms k^5 working in the slots k^6 of said bracket k^3, and the trip-bar k^7 secured to the movable gasometer-section and provided with the elongated eye k^8 coöperating with the extended valve-arms k^5 and working substantially as described.

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

JOHN A. OLSON.

Witnesses:
JNO. F. MOSSBORG,
FRANK D. MERCHANT.