No. 689,789. Patented Dec. 24, 1901.

T. A. BRYAN.

ACETYLENE GAS GENERATOR.

(Application filed Mar. 26, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

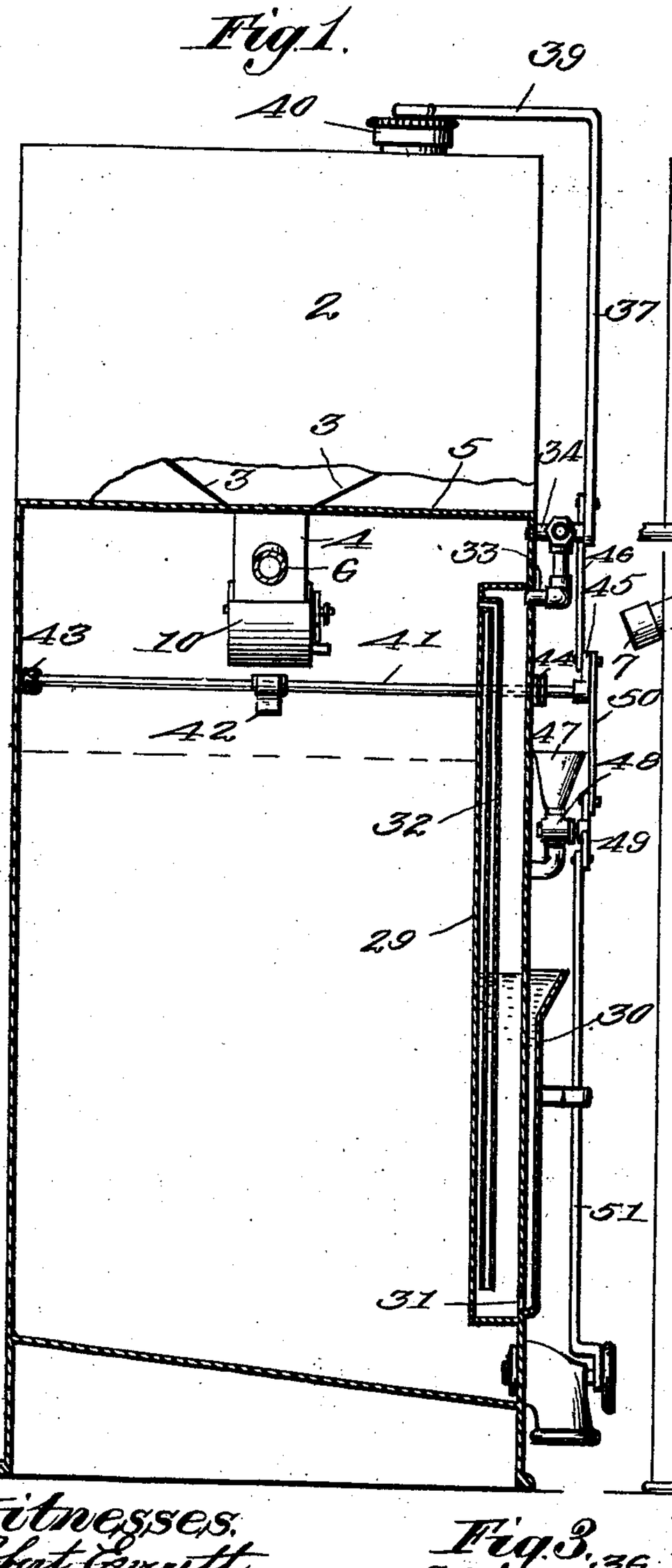
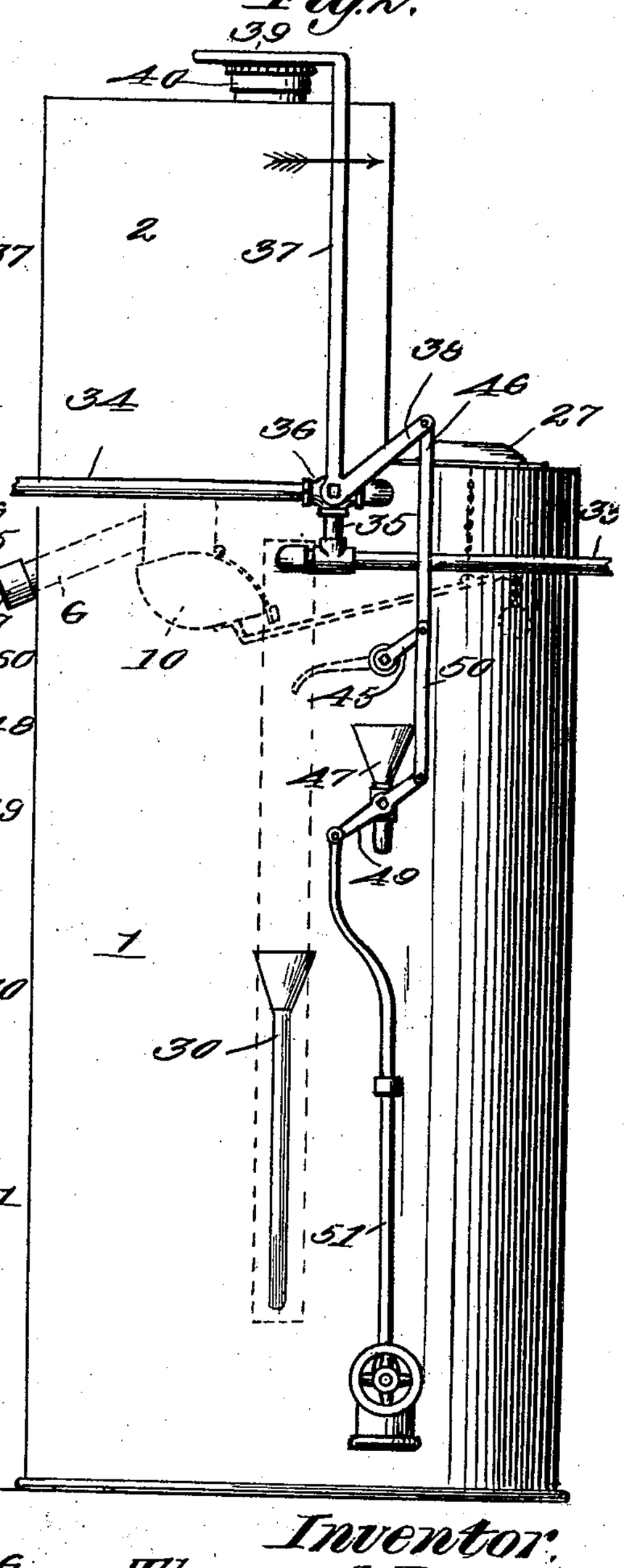
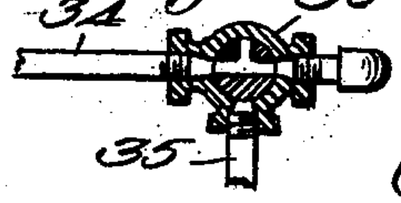


Fig. 2.



Witnesses.
Robt. Everett.
Bruce A. Elliott.

Fig. 3.



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Thomas A. Bryan.
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(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

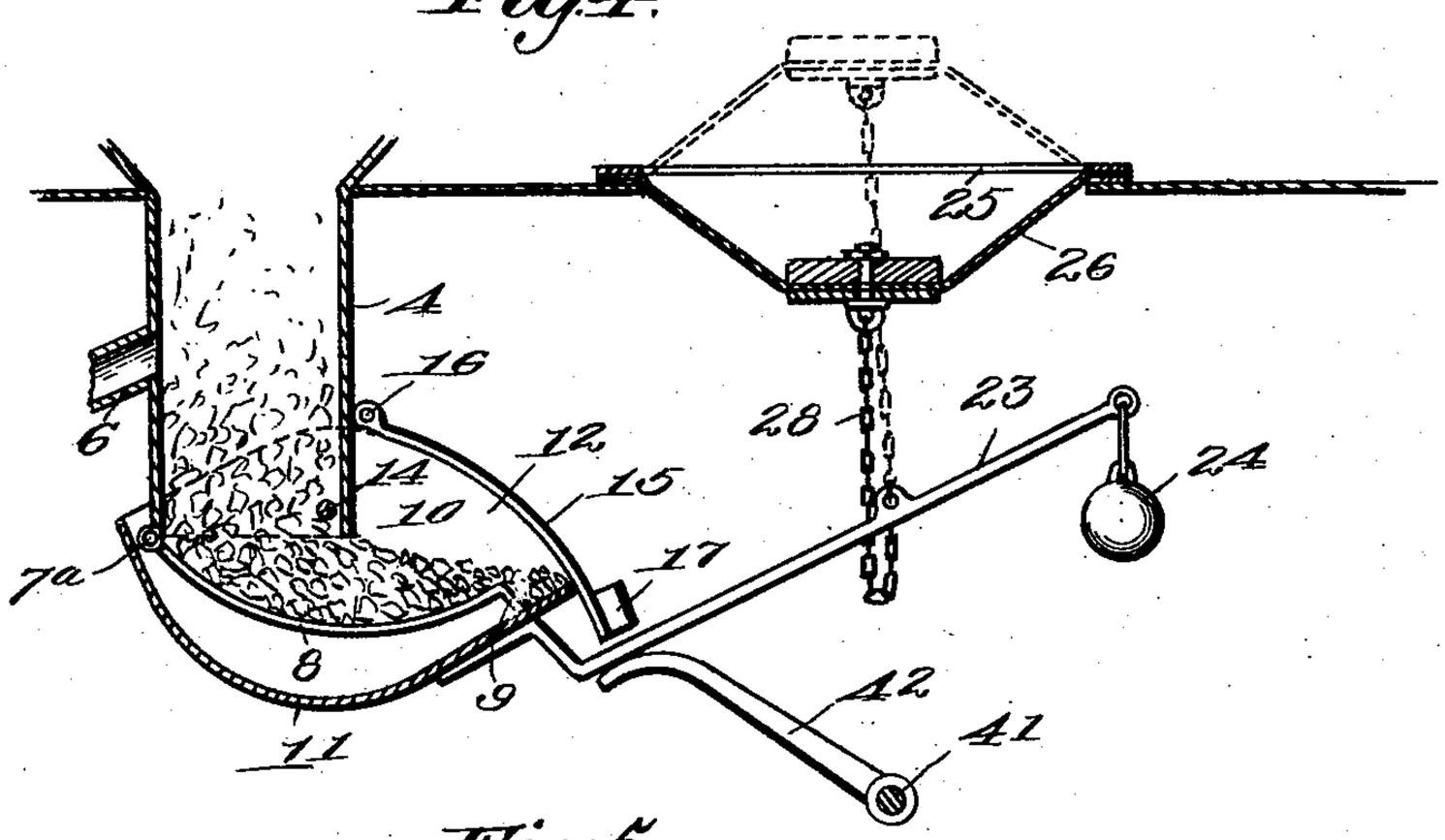


Fig. 5.

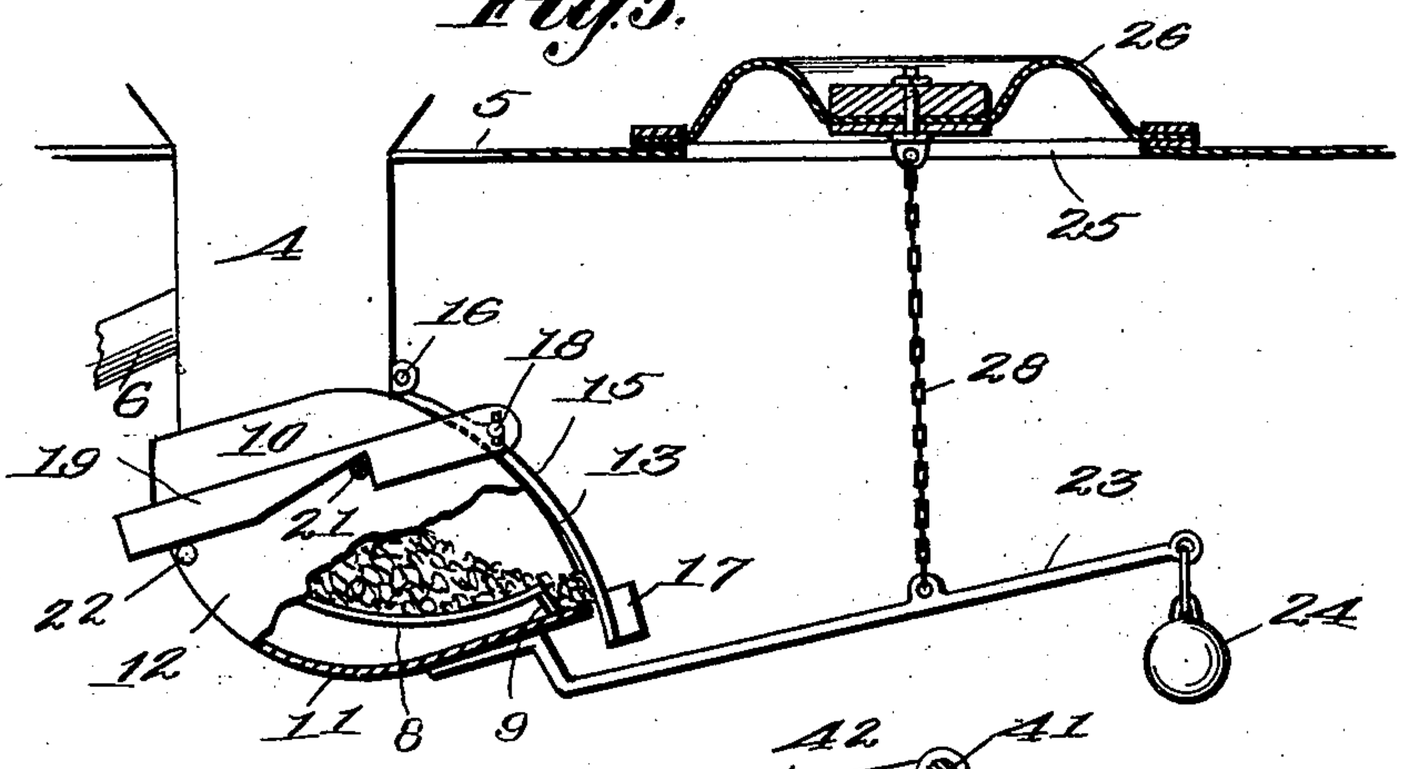
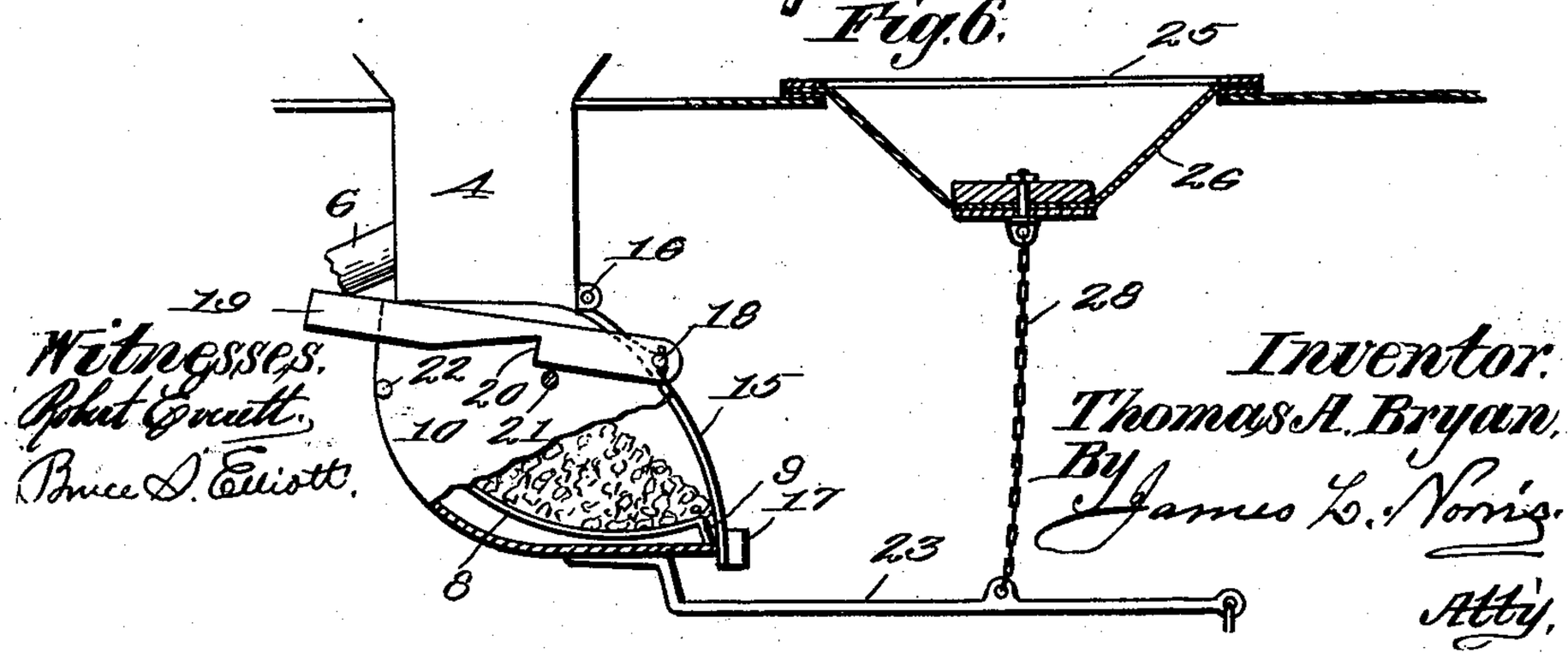


Fig. 6.



Witnesses.
Robt Ewalt.
Bruce D. Elliott.

Inventor.
Thomas A. Bryan.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

THOMAS A. BRYAN, OF BALTIMORE, MARYLAND.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 689,789, dated December 24, 1901.

Application filed March 26, 1901. Serial No. 52,985. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. BRYAN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

My invention relates to certain new and useful improvements in acetylene-gas generators.

A general object had in view is to provide a generator designed particularly for furnishing gas for illuminating railway-trains and to so construct said generator that for a given capacity it will occupy less space than machines of a like character as now commonly constructed for ordinary use.

In an application filed by me February 11, 1901, having the Serial No. 46,852, in which the same general object was had in view, I have described and illustrated a form of apparatus in which the feed of the carbid is controlled by the movements of a diaphragm exposed to the pressure of the gas generated, the fall of the carbid into the generator being caused by the force of gravity. The present invention while resembling in certain particulars that embraced in my said prior application differs therefrom in many important respects and principally in the fact that in the form of apparatus described herein I provide for a positive or forced feed of the carbid.

Stated in detail, the objects of the present invention are to provide an improved construction and arrangement of parts actuated automatically by variations in the pressure of gas in the generating-chamber for causing a forced or positive feed of the carbid to the generator and for controlling such feed, so that the supply of gas will be in substantially exact proportion to its consumption, to provide an improved construction and arrangement of parts for automatically preventing the fall of carbid into the generator should the parts actuating the feed device become broken or disarranged, to provide improved means for the escape of gas from the generator when the pressure of the gas within the generator exceeds a given degree, and, finally, to provide certain novel details of construction and combinations and arrangements of parts, all as hereinafter fully described.

In order that my invention may be clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a central vertical section through an apparatus constructed according to my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional detail of a valve. Fig. 4 is a sectional view illustrating the feed mechanism positively locked in an inoperative position. Fig. 5 is a view, partly in section and partly in elevation, illustrating the same mechanism in the position for feeding carbid; and Fig. 6 is a similar view, the diaphragm being shown in its lowest position, or the position it would assume if ruptured, and the feed-chute being shown closed thereby to prevent feed of carbid.

Referring to the drawings, the numeral 1 indicates a cylindrical vessel affording a combined generator and gas-holder. This vessel will hereinafter be referred to as the "generator" or "generating-chamber."

Secured on the top of the generator 1 is a carbid-receptacle 2, preferably having inclined side walls 3, as shown, for the better feed of the carbid and having a reduced portion or spout 4 extending through the top 5 of the generator. Extending from the spout 4 through the wall of the generator 1 is a pipe 6, having on its outer end a removable cap 7, said pipe being inclined downwardly and the purpose thereof being to provide means for removing carbid from the carbid-receptacle 2 if for any reason the machine should become inoperative or for reasons of safety it be desired to render the same incapable of operation. The spout 4 is preferably rectangular in cross-section.

Pivotally mounted at one end to the lower end of the spout 4, as indicated at 7^a, and at what I will term the "rear" side of said spout is a curved plate 8, which projects a considerable distance beyond the front side of the spout and at its outer end is bent downward to provide a lip 9, the purpose of which will presently be explained.

The numeral 10 indicates a chute comprising a curved bottom 11 of slightly-greater length than the plate 8 and having sides 12, provided with forward curved edges 13. The sides 12 extend above the lower end of the spout 4 and embrace opposite sides thereof, as shown, and the chute as a whole is pivot-

ally mounted on the spout 4, at the front side thereof, by means of a rod 14, passed through the sides 12 and the walls of the spout 4, said rod being located at about the longitudinal center of said chute.

The numeral 15 indicates a curved metal flap or apron, the curvature of which is similar to that of the curved edges 13 of the sides 12, said apron being pivotally secured, as indicated at 16, to the front side of the spout 4 immediately above the sides, at the chute, and in such manner that said apron will normally rest upon the curved edges of the chute and operate as a closure for the same. The lower end of the apron 15 is weighted, as indicated at 17. Pivotally mounted at one end toward the upper end of the apron 15 and at one side thereof, as indicated at 18, is an arm 19, which is cut away on its under side or edge to provide a shoulder 20, which normally engages a stud 21 on the side of the chute. This stud is conveniently provided by extending the end of the rod 14 through the side of the chute. Near the rear edge of the side 12 having the stud 21 I provide a projection 22, which in a certain movement of the chute, hereinafter explained, is adapted to engage the under edge of the arm 19 and lift it out of engagement with the stud 21.

Secured on the under side of the bottom 11 of the chute 10 and projecting outward from the same is a relatively long arm 23, having secured on its outer end a weight 24.

In the top 5 of the generator is provided a relatively large opening 25, over which is secured in any suitable manner a flexible diaphragm 26, preferably of rubber, although leather or other suitable material may be used for this purpose. A housing or cover 27 extends over the diaphragm 26 and is hermetically secured to the top 5. (See Fig. 2.) A chain 28 is secured at one end in any suitable manner to the center of the diaphragm 26 and at its other end is secured to the weighted arm 23 at a suitable point intermediate its ends.

The operation of the parts thus far described will be described later on.

Within the generator 1 I provide a relatively long narrow casing 29, one side of which is formed by the wall of the generator, said casing extending above the water-line in the generator and downward to near the bottom thereof.

The numeral 30 indicates a filling spout or funnel communicating with the lower end of the casing 29 through the wall of the generator, as shown at 31, and by means of which water may be supplied to said casing.

Extending downward in the casing 29 to near the bottom thereof is a tube 32, which at its upper end and near the upper end of the casing 29 communicates with the gas-space of the generator through the wall of said casing.

A pipe 33 communicates through the wall of the generator with the interior of the casing 29, near the upper end thereof, and constitutes the safety escape-pipe of the generator. A pipe 34 communicates through the wall of the generator with the gas-space thereof and constitutes the service-pipe of the generator. A short pipe 35 connects the pipe 33 with the pipe 34 outside of the generator, and at the point of connection of pipe 35 with pipe 34 I provide a three-way valve 36. (Shown in detail in Fig. 3.) On the stem of the valve 36 I secure a bell-crank lever having a long arm 37 and a short arm 38. The long arm 37 has a right-angular projection 39, which normally extends over a screw-cap 40, covering the filling-orifice of the carbid-receptacle 2.

The numeral 41 indicates a shaft extending across the generator at right angles to the weighted arm 23 and provided centrally of its length and immediately beneath the weighted arm 23 with a relatively wide lever-arm 42, which is adapted to be turned by the shaft 41 into engagement with the weighted arm 23 to lift the same, as hereinafter explained. The shaft 41 is journaled at one end in a bearing 43 within the generator and at its opposite end extends through a stuffing-box 44 and is provided with a crank 45. A link 46 connects the outer end of the short arm 38 of the bell-crank lever with the outer end of this crank.

The numeral 47 indicates the filling spout or funnel for supplying water to the generator and which is provided with a valve 48. Secured intermediate its ends on the stem of this valve is a lever 49. A link 50 connects the outer end of the crank 45 with one end of this lever, while from the opposite end thereof depends a pivoted rod 51, having a bifurcated end engaging the screw of the sluice-valve, as in my prior construction referred to.

The operation of the apparatus will now be described. In the position of the parts shown in Figs. 1 and 2 the valve 48 closes communication between the filling-spout 47 and the interior of the generator, and the arm 39, extending over the cap 40, prevents the removal of said cap until the arm has been moved from above it. In order to supply carbid to the apparatus, therefore, the long arm 37 of the bell-crank lever is turned to one side in the direction indicated by the arrow in Fig. 2, thereby carrying the arm 39 from over the screw-cap 40, which may be removed and carbid be poured into the receptacle 2. This movement of the arm 37 also turns the valve 36 to open communication between the generator and the escape-pipe 33 and close communication between the generator and the service-pipe 34, so that if the generator has previously been in use any gas therein may pass out through the escape-pipe before the cap 40 is removed. In the movement of the arm 37, above described, the shaft 41 will be turned to raise the lever-arm 42, which in turn, engaging the under side of the weighted arm 23, will push said arm upward, and thereby turn the chute 10 to the position shown in Fig. 4, and the valve 48 will be turned so

that water may be supplied to the generator, if necessary, the height of the water being indicated by the dotted line *w*. The casing 29 is supplied with water to about the height indicated through the filling-spout 30, thus sealing the lower end of the tube 32. Referring again to Fig. 4, it will be seen that the plate 8 , the lip 9 of which always rests upon the bottom of the chute, will have been raised with said chute to occupy a substantially horizontal position, so that as the carbid falls through the spout 4 onto the curved plate 8 it will simply rest on and be supported by said plate, and any tendency of the superimposed body of carbid in the receptacle 2 and spout 4 to force the carbid off of said plate and out of the chute will be more than offset by the resistance of the weighted apron 15, closing the mouth of the chute. The receptacle 2 having been supplied with carbid and the generating-chamber 1 with water, the arm 37 is again turned to the position shown in Figs. 1 and 2. In this movement of the arm and through the mechanism described the valve 48 will be closed, the lever-arm 42 lowered out of engagement with the weighted arm 23, and the valve 36 turned to open communication from the generator through the service-pipe 34. As the lever-arm 42 is turned out of engagement with the weighted arm 23 the latter will fall, turning the chute upon its pivot 14 and carrying the mouth or feed side of the chute downward. As this occurs the plate 8 will also be lowered, permitting the carbid to fall over the edge thereof onto the bottom of the chute between the lip 9 and apron 15. In the continued downward movement of the forward end of the chute it will move away from the apron 15, being pivoted on a different center from the latter, which cannot fall farther, owing to the fact that the shoulder 20 will engage the stud 21 and hold the apron stationary. This position of the parts is shown in Fig. 5. Furthermore, in this movement of the chute the bottom 11 thereof will be moved from under the carbid between the lip 9 and apron 15, and the forward edge of said bottom will constantly approach the lip 9, and as said lip is relatively stationary as a result the carbid will be forced off of the bottom 11 and fall through the space afforded between the apron 15 and forward edge of the bottom 11 into the generator. This forced feed of the carbid will continue until sufficient gas has been generated to cause the diaphragm 26 to rise, when the forward edge of the chute will move away from the lip 9 and toward the apron 15 and the fall of the carbid into the generator be prevented. In Fig. 4 I have shown by dotted lines the extreme raised position of the diaphragm, in which the weighted arm 23 would be carried to the same height as when raised by means of the lever-arm 42. In practice, however, the diaphragm will rarely, if ever, reach this extreme position, but will vibrate or pulsate between such position and the extreme depressed position. (Shown in Fig. 6.) This is due to the fact that the amount of carbid fed at any one downward movement of the diaphragm and chute is relatively small and the pressure of gas generated thereby just sufficient to raise the diaphragm far enough to carry the chute slightly above the feed position. In other words, the position of the diaphragm will not in operation vary greatly from that shown in Fig. 5. By providing for the successive and more or less rapid generation of small volumes of gas I can the better proportion the generation to the consumption, as will be evident, and should the flow of gas be shut off at the burners at any time immediately after a discharge of carbid it will be seen that no large volume of gas will be generated to remain in the generator until the machine is again brought into operation.

Referring to Fig. 6, I have, as previously stated, shown a position of the parts in which the diaphragm is supposed to have been ruptured and permitted the arm 23 to fall to its lowest position. Suppose the diaphragm and other parts to be in the position shown in Fig. 5 when the rupture of the diaphragm occurs. Then as the weighted arm 23 falls the projection 22 on the side of the chute will raise the arm 19 until the shoulder 20 is lifted out of engagement with the stud 21, when the weighted apron 15 will at once fall and close the feed-opening of the chute. The weight 17 is sufficient to withstand any pressure of the carbid against the apron 15 tending to push the latter away from the chute. As the above-described movement of the parts would necessarily be very rapid, only the small amount of carbid in front of the lip 9 could be discharged into the generator before the fall of the apron would occur to close the chute. It will be understood, of course, that when the machine is in operation the lever-arm 42 is always in the lowered position, (shown in Fig. 5,) so that the weighted arm 23 is free to rise and fall under the action of the diaphragm.

Referring now to Fig. 1, should an excessive pressure of gas for any reason be created in the generator the water would be forced by the gas out through the lower end of the tube 32, and the gas passing out through such lower end will bubble up through the water in the casing 29 and escape through the pipe 33. In the position of the parts shown in Figs. 1 and 2 the valve 36 is in the position shown in Fig. 3, in which the service-pipe 34 communicates through said valve with the generator and is closed to communication with the pipe 35, leading to the escape-pipe 33.

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

1. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a hinged tilting support for the carbid within the generator, a stop-plate resting upon said support at the rear of the body of

carbid thereon, and means actuated by variations in the pressure of the gas generated to move said support relatively to said stop-plate, whereby the carbid will be forced off of said support into the generator.

2. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and communicating with the interior thereof, a pivoted support for the carbid within the generator, a hinged tilting stop-plate resting upon said support at the rear of the body of carbid thereon, and means actuated by variations in the pressure of the gas generated to rock said support upon its pivot in a direction toward the stop-plate, whereby to force the carbid off of said support into the generator.

3. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and communicating with the interior thereof, a hinged tilting concave support for the carbid within the generator, a pivoted stop-plate resting upon said support at the rear of the body of carbid thereon, and means actuated by variations in the pressure of the gas generated to move said support relatively to said stop-plate, whereby to cause a positive mechanical forced feed of the carbid in regulated quantities into the generator.

4. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and communicating with the interior thereof, a hinged tilting concave support for the carbid within the generator, a pivoted concave stop-plate resting upon said support at the rear of the body of carbid thereon, and means actuated by variations in the pressure of the gas generated to rock said support upon its pivot in a direction toward the stop-plate, whereby to positively and mechanically force the carbid in regulated quantities off of said support into the generator.

5. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a support for the carbid in the generator, means actuated by variations in the pressure of the gas generated to cause a positive forced feed of the carbid into the generator, and a yielding medium bearing against said support for controlling the feed of the carbid.

6. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a pivoted support for the carbid within the generator, a weighted arm connected to said support, a movable diaphragm operatively connected to said arm and exposed to the pressure of the gas generated, and means operated in the movement of said diaphragm to force the carbid off of said support into the generator.

7. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a pivoted support for the carbid, means actuated by variations in the pressure of the gas generated for rocking said support upon its pivot, and means coacting with said support for causing a positive feed of the carbid in one movement of the support and for preventing the feed of the carbid in the opposite movement of said support.

8. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a pivoted support for the carbid having a feed-opening, a pivoted apron normally closing said feed-opening, a stop for said apron, and means actuated by variations in the pressure of the gas generated for rocking said support upon its pivot.

9. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a pivoted support for the carbid having a feed-opening, a pivoted apron normally closing said feed-opening, a stop for said apron, a weighted arm connected to said support, and a movable diaphragm operatively connected to said weighted arm and exposed to the pressure of the gas generated.

10. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and having a spout extending through the top thereof, a plate pivotally mounted on said spout, a chute also pivotally mounted on the spout and supporting said plate and having a feed-opening, a pivoted apron normally closing said feed-opening, a stop for said apron, a weighted arm connected to said chute, and a movable diaphragm operatively connected to said arm and exposed to the pressure of the gas generated.

11. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and communicating with the interior thereof, a plate pivotally mounted at one end beneath said receptacle and at its opposite end having a lip, a chute also pivotally mounted beneath said receptacle and supporting the free end of said plate, said chute having a feed-opening, a pivoted apron normally closing said feed-opening, and means actuated by variations in the pressure of the gas generated for rocking said chute upon its pivot.

12. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and having a spout extending through the wall thereof, a plate pivotally connected at one end to one side of said spout and projecting beyond the opposite side and at its outer free end having a lip, a chute pivotally mounted on said spout and normally supporting the free end of said plate and projecting beyond the same, said projecting portion of the chute having a feed-

opening, a pivoted apron normally closing said feed-opening, a stop for said apron, and means actuated by variations in the pressure of the gas generated for rocking said chute upon its pivot.

13. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a pivoted support for the carbid having a feed-opening, a pivoted apron normally closing said feed-opening, a stud, an arm pivotally secured to said apron and having a shoulder engaging said stud, a projection on said support adapted to engage the free end of said arm, and means actuated by variations in the pressure of the gas generated for rocking said support upon its pivot.

14. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle communicating with the interior thereof, a plate pivotally mounted at one end beneath said receptacle and having at its opposite end a lip, a support also pivotally mounted beneath said receptacle and supporting the free end of said plate, said support having a feed-opening, a pivoted apron normally closing said feed-opening, a stud, an arm pivotally secured to said apron and having a shoulder engaging said stud, a projection on said support adapted to engage the free end of said arm, and means actuated by variations in the pressure of the gas generated for rocking said support upon its pivot.

15. In an acetylene-gas generator, in combination with the generating-chamber, a carbid-receptacle mounted thereon and having a spout extending through the wall thereof, a plate secured at one end to one side of said spout and projecting across the mouth thereof beyond the opposite side thereof and having at its free end a lip, a chute pivotally mounted on said spout and supporting said plate on its bottom by means of said lip and having its bottom and sides normally extending beyond said lip, a pivoted apron normally resting against the forward edges of said bottom and sides to close the chute, a fixed stud, an arm pivotally secured at one end to said apron and intermediate its ends having a shoulder detachably engaging said stud, a projection on said chute adapted to engage the free end of said arm, and means actuated by variations in the pressure of the gas generated for rocking said chute upon its pivot.

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

THOMAS A. BRYAN.

Witnesses:
HOWARD R. PYLE,
CHAS. L. SKINNER.