No. 725,366. PATENTED APR. 14, 1903.

N. A. RENSTROM.

ACETYLENE GAS GENERATOR.

APPLICATION FILED MAY 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.

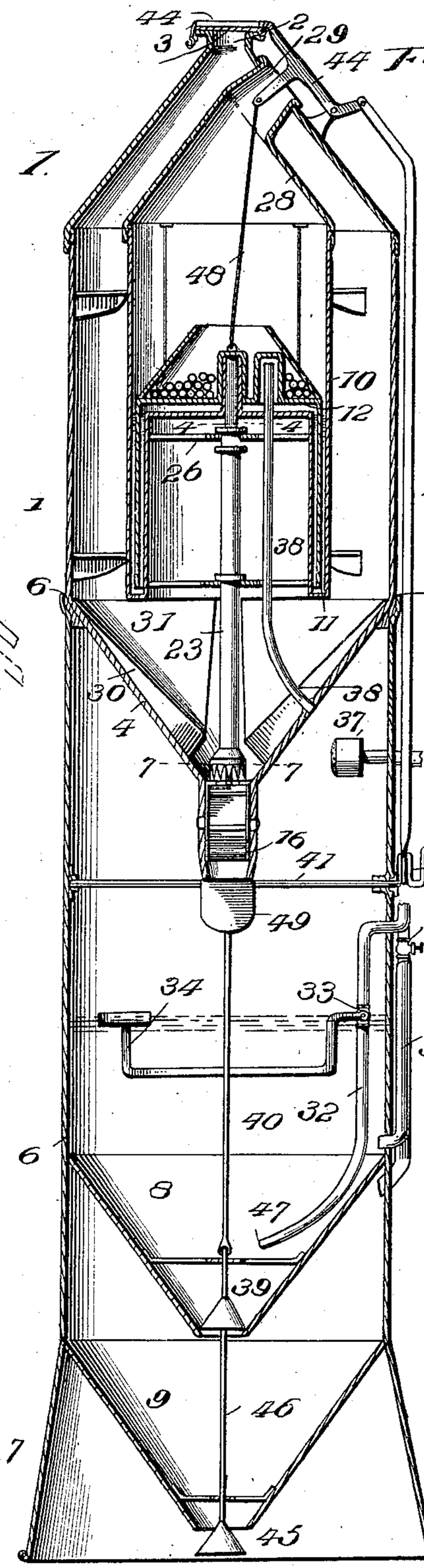


FIG. 2.

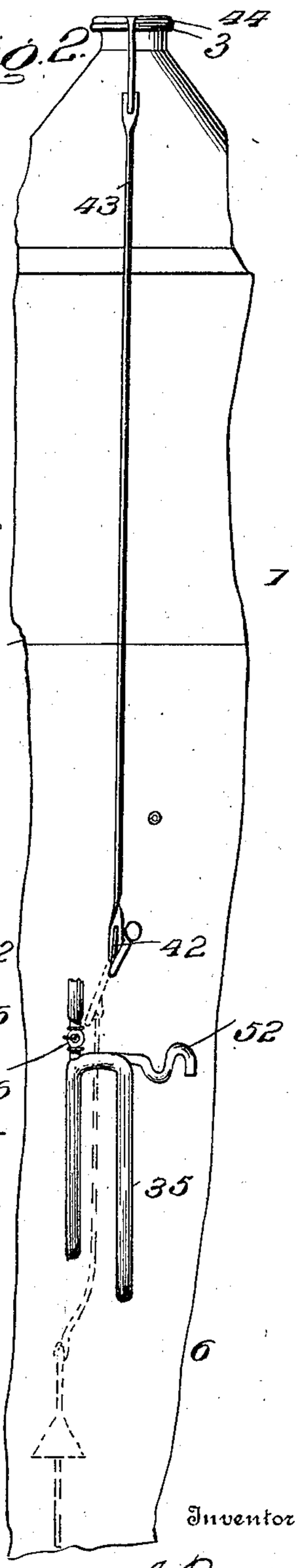
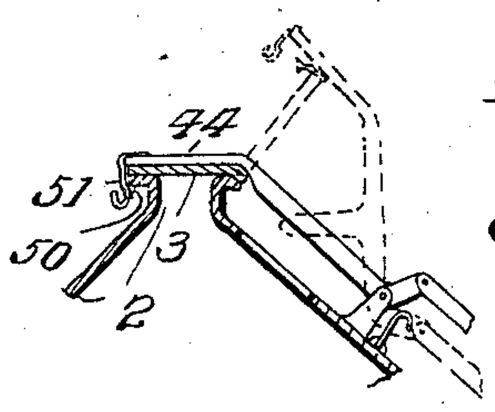


FIG. 8.



Witnesses

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ACETYLENE GAS GENERATOR.

APPLICATION FILED MAY 6, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

FIG. 3.

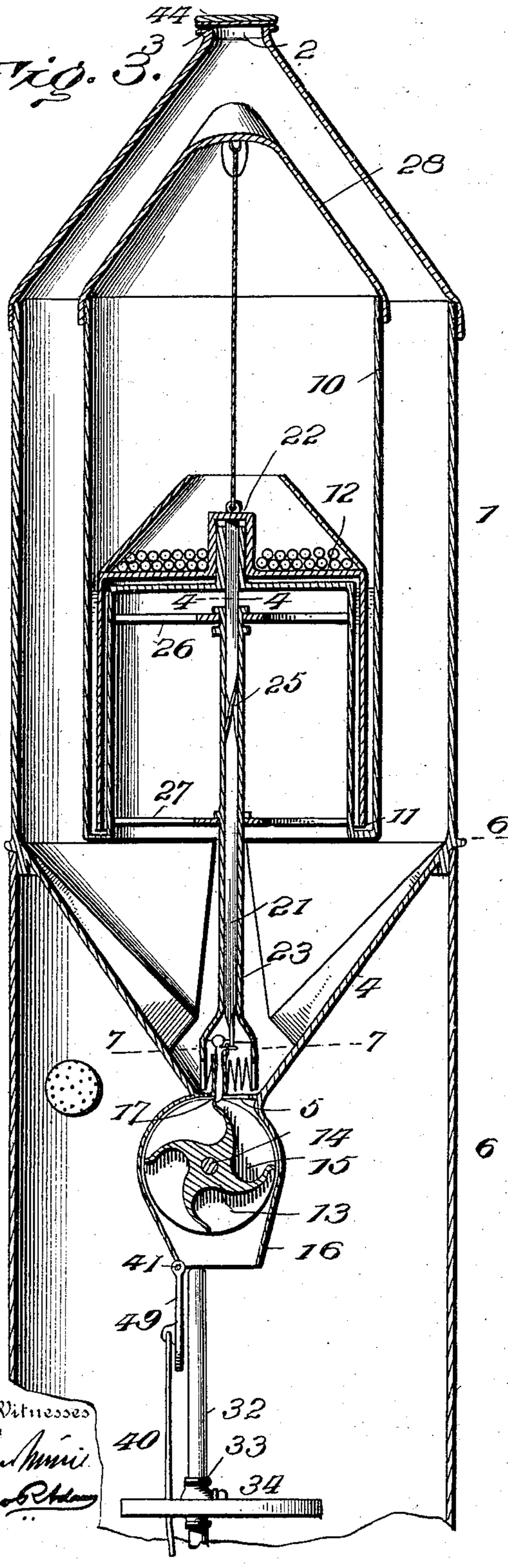


FIG. 4.

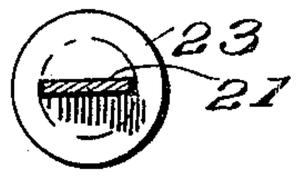


FIG. 5.

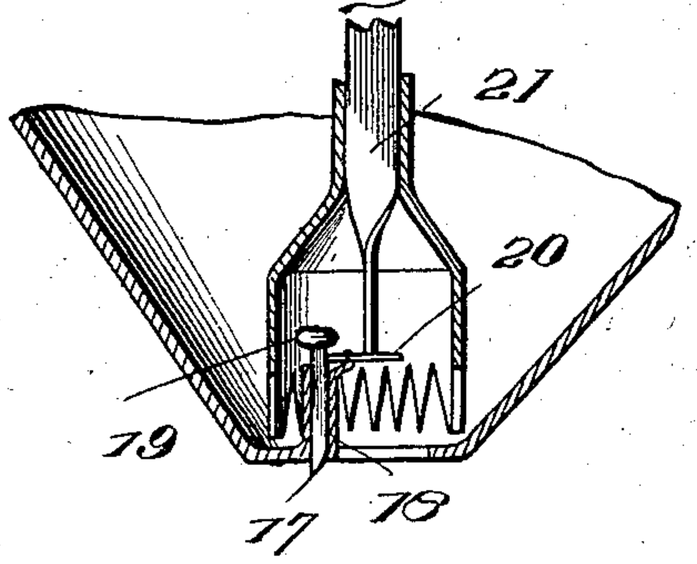


FIG. 6.

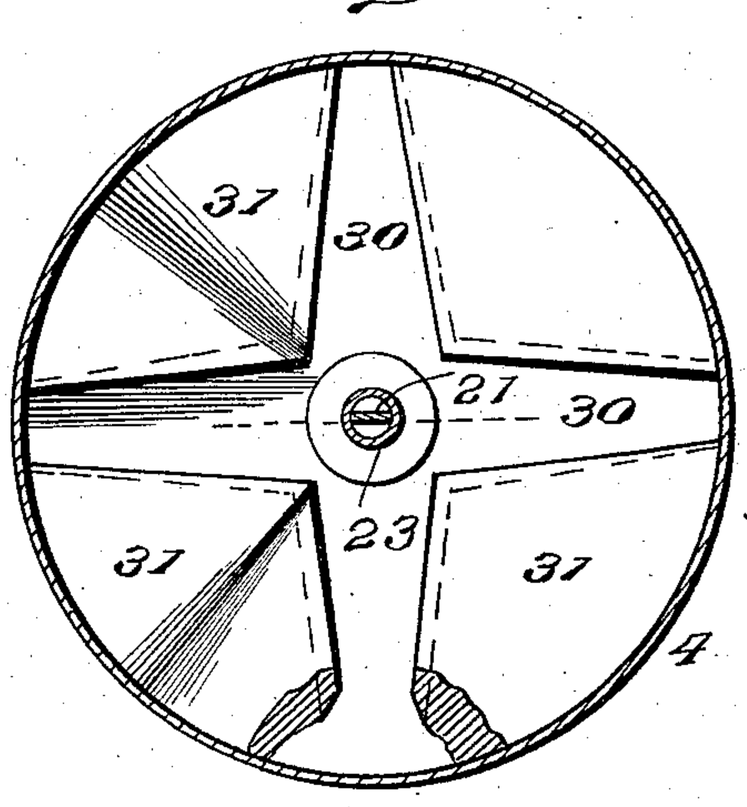
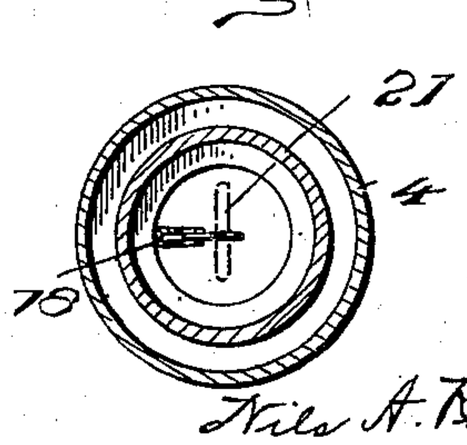


FIG. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

NILS A. RENSTROM, OF OMAHA, NEBRASKA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 725,366, dated April 14, 1903.

Application filed May 6, 1902. Serial No. 106,215. (No model.)

To all whom it may concern:

Be it known that I, NILS A. RENSTROM, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Acetylene-Gas Machines, of which the following is a specification.

My invention relates to the type of machine known as "carbid-drop" machines, and has for its object to provide a machine of simple construction that shall operate automatically with certainty and uniformity in the dropping of the carbid into the water, maintaining a supply of fresh water at a fixed level, and in discharging the slaked carbid.

A further object of my invention is to provide means for preventing the discharge of a dangerous quantity of gas and insuring a flushing of the generating-chamber each time the carbid-holder is opened for recharging.

My invention consists in certain novel features of construction, which will be hereinafter fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section through the machine. Fig. 2 is a detail side elevation of connections through which the generating-chamber is caused to flush each time the carbid-holder is recharged. Fig. 3 is a central vertical section through the machine in a plane at right angles to Fig. 2. Fig. 4 is a section on the line 4 4, Figs. 1 and 3. Fig. 5 is a sectional detail view of the carbid-agitator, the vertically-moving rod which imparts rotation to the agitator, and the detent for the carbid-bucket wheel, which is tripped by said rod. Fig. 6 is a horizontal section on the line 6 6, Figs. 1 and 3. Fig. 7 is a horizontal section on the line 7 7, Figs. 1 and 3; and Fig. 8 is a detail view showing a modification of the closure for the carbid-holder and the means which prevents the opening thereof until the parts have been secured to prevent discharge of gas.

1 represents the carbid-holder, having a charging-opening 2, closed by cover 3, and a conical bottom 4, terminating in a feed-opening 5.

6 represents the generating-chamber, upon which the carbid-holder is mounted and which is itself supported upon a base 7 and provided with two hopper-bottoms 8 9.

Centrally disposed within the carbid-chamber 1 is an expansion-chamber 10, formed with an annular well 11, in which a bell 12 works and is sealed by suitable liquid. I prefer to use oil for sealing the bell 12, owing to the fact that the expansion-chamber 10 is located within the carbid-holder and is completely surrounded by carbid when the machine is in use. By using oil all danger of explosion from leakage of the well 11 will be avoided.

The bell 12 rises and falls as gas is generated and is consumed and by its up-and-down movement operates the carbid-feed, as will now be described.

13 represents a bucket-wheel, which is journaled at 14, the buckets 15 thereof forming a continuation of the feed-opening of the carbid-holder to one side of and below the center of the wheel, and when the buckets are charged with carbid and the wheel is permitted to rotate they are caused to dump by gravity. This bucket-wheel is mounted in a housing 16 and comprises the specially-shaped buckets, which are in position to receive carbid when the radial wall forming the bottom extends substantially horizontally, while the adjacent wall forming the side of the bucket extends vertically and directs the carbid to one side of the center of the bucket, so that the wheel will dump by gravity.

17 represents a detent which engages the vertically-extending walls of the bucket, being mounted in a vertical socket 18 and caused to gravitate into engagement with the wheel by a weight 19 on its upper end.

20 represents a lifting-lever fulcrumed on the side of the socket, adapted to lift the detent 17, and depressed by the operating-rod 21, which extends upwardly from the carbid-holder and is connected at 22 with the bell 12. As the bell rises the detent 17 is left in engagement with the wheel to prevent its rotation while it is receiving its charge of carbid. When the bell falls, in consequence of the consumption of gas from the machine, the rod 21 presses on the lever 20, raising the detent 17, and permits the bucket-wheel to dump. The accumulation of gas which immediately follows raises the bell 12, which permits the

detent to settle and again hold the wheel in position to receive another charge of carbid.

23 represents an agitator which has an enlarged toothed lower end 24, through which carbid escapes into the discharge-opening 5. The rod 21 has a spiral twist 25, which works in a slot in the upper end of the agitator 23, and each time the bell rises or falls a partial rotation is imparted to the agitator, which stirs up the carbid and prevents its packing adjacent to the feed-opening. The agitator is fixed against vertical movement with the rod 21 by braces 26 27. It has, however, a slight vertical movement in these braces, which permits it to ride up, on and over an obstruction encountered by its lower end in the act of rotation.

It has been seen that the chamber containing the bell which regulates the movement of the parts, and which I call the "expansion-chamber," is located within the carbid-holder, so that it forms an annular space to receive the carbid. This chamber 10 has a conical top 28, which directs the carbid into the annular space. Said conical top has a lateral mouth 29, terminating in the conical wall of the holder 1, through which oil or other liquid employed for sealing the bell may be introduced. The entire holder 1 outside of the expansion-chamber will be filled with carbid, and the body of carbid will feed downward into the conical bottom. Granular substances of this character will not feed satisfactorily through a plain conical or hopper bottom, but will arch or pack therein and choke the feed. To overcome this difficulty, I have provided a conical bottom with downwardly-extending grooves or channels, which break the arch in the carbid and prevent its packing. To render these grooves more effective, they are made to enlarge inwardly and downwardly—that is to say, their side walls are undercut and diverge, so that a body of carbid lodging therein and having any tendency to pack will slide freely downward. These grooves are shown at 30, and the inwardly and downwardly enlarging feature will be seen best in Fig. 6. For convenience in manufacture I provide the bottom 4 in the form of a plain cone and then insert within it a series of blocks 31 of such shape as to give an interior the general form of which is conical, but which has the undercut and downwardly-enlarging grooves.

32 represents a water-supply pipe, which is controlled by a cock 33, having a float 34, that opens the cock or closes it as the water-level falls below or regains a predetermined level.

35 represents a novel construction of outlet or blow-off, through which a certain portion of water charged with the slaked carbid escapes each time a supply of gas is generated. This blow-off extends from a point well below the water-line above the bottom 8 upward to a point well above the water-line and thence downward into the space between the two bottoms. Each time there is a sudden increase of pressure, due to the generation of gas, a quantity of water with the slaked carbid held in suspension is forced up through the blow-off pipe and down beneath the bottom 8, where it is free to escape.

36 represents a branch from the water-supply, which may be turned on to flush the blow-off pipe 35 at will.

37 represents the outlet for gas to be consumed.

38 represents a pipe through which gas is communicated to the bell 12.

In slaking carbid to generate acetylene gas there is much solid matter that will not remain in suspension in the water for a sufficient length of time to permit its being blown off as described with reference to the remainder of the carbid. In my machine such solid particles collect around the valve 39, which closes the bottom 8, and to remove these solid particles at suitable intervals I connect the valve 39 with the lifting-rod 40, which is operated by a shaft 41, having a crank 42, to which is connected a rod 43, extending to the lever 44, which controls the cap or closure 3. Through these connections the valve 39 is raised each time the holder is opened for recharging it with carbid. At the same time a valve 45, connected by rod 46 with the valve 39, is drawn upward almost to its seat in the bottom 9 and retards the escape of water from bottom 9 sufficiently to prevent unsealing said bottom while the valve 39 is off its seat. While this is taking place the water-supply pipe 32 is of course open and is delivering a copious supply of water into the cone 8, and in order that this supply of water may thoroughly cleanse the cone 8 the pipe 32 is provided with a deflected portion 47, that directs the water against the hopper-bottom 8, which causes it to take a circling path. It is also desirable to guard against the escape of gas while the closure 3 is open. This will not take place to any extent if communication is cut off between the carbid-chamber and the holder and the feed of carbid is stopped. To provide for this, the lever 44 has a connection 48 with the bell 12, which holds the bell up while the lever 44 is in the position to release the closure 3, thus preventing discharge of carbid. At the same time the housing 16 is provided with a door 49, mounted on the shaft 41, and the rotation of said shaft closes said door 49 to cut off communication between the carbid-holder and the generating-chamber. For convenience the door 49 is utilized to establish working connection between the valves 39 and 45 and the shaft 41.

The lever 44 may either carry the cap 3 or it may simply be made to control the opening of said cap. I prefer the construction shown in Fig. 8, according to which the lever 44 rests down upon the cap 3 and each carries a spring-catch 50 or 51, of which the catch 50 engages the lip of the charging-opening 2 to hold the

cap closed, while the catch 51 engages over catch 50 and holds the lever down upon the cap. When it is desired to fill the carbid-holder, the lever 44 is first released and drawn upward, by which action the bell is secured in its elevated position and the door 49 is closed between the carbid-holder and the generating-chamber, and the cap 3 may then be opened and the holder charged. The parts cannot be restored to operative positions except the cap 3 be first closed, and hence all danger of generating gas while the machine is open or of permitting the escape of gas is thus obviated.

It is intended that the machine shall be set over a sewer-trap or otherwise connected with a sewer. It is also desirable that means be provided to prevent syphonic action in the blow-off pipe 35. In order to accomplish the last-named purpose and at the same time prevent the escape of sewer-gas into the room in which the machine is located, a gooseneck-trap 52 is introduced at the highest point of the blow-off pipe 35, as shown in Fig. 2.

Having thus described the invention, the following is what is claimed as new therein:

1. In an automatically-operating acetylene-gas machine, the combination of a carbid-holder, an expansion-chamber located concentrically within the carbid-holder and leaving a space for the reception of carbid entirely surrounding it, mechanism within the expansion-chamber having connections through which it actuates an automatically-operating portion of the machine; said carbid-holder having a charging-opening at top, the said expansion-chamber having a conical top which directs the carbid downward.

2. In an acetylene-gas machine, the combination of the carbid-holder having a conical bottom and a discharge-opening at the bottom thereof, an expansion-chamber mounted concentrically within the holder and having a conical top and a charging-opening at the top of the holder, substantially as set forth.

3. In an acetylene-gas machine, the carbid-holder having a conical bottom with downwardly-extending grooves or channels in the conical inner surface of said conical bottom.

4. In an acetylene-gas machine, a carbid-holder having a conical bottom with grooves or channels in the conical inner surface of said conical bottom; said grooves or channels enlarging inwardly and downwardly, for the purpose set forth.

5. In an acetylene-gas machine, a carbid-holder having a conical bottom with a discharge-opening at the lower end thereof, blocks or raised portions mounted upon the inner surface of said conical bottom, and of a shape which produces a conical inner support for the carbid with downwardly-extending grooves or channels therein.

6. In an acetylene-gas machine, the combination of a carbid-holder having a feed-opening at its bottom, a vertically-disposed agitator having a vertical movement, and means for rotating the agitator upon its vertical axis.

7. In an acetylene-gas machine, the combination of a carbid-holder having a discharge-opening, an agitator upon the vertical axis adjacent to said discharge-opening, a vertically-moving bell, and a rod connected with said bell and having a screw or spiral connection with said agitator, whereby it rotates the latter as the bell rises and falls.

8. In an acetylene-gas machine, the combination of a carbid-holder having a discharge-opening, and means for controlling the feed of carbid therethrough, a detent for said carbid-controlling means and a bell located within the carbid-holder, and having connection through which it releases said detent.

9. In an acetylene-gas machine the combination of a carbid-holder having a discharge-opening, means for controlling the feed of carbid therethrough, an agitator adjacent to the discharge-opening of the carbid-holder, means connected with the agitator controlling the feed-controlling means, and an expansion-chamber operating the agitator and the feed-controlling means simultaneously.

10. In an acetylene-gas machine, the combination of a carbid-holder, means for controlling the discharge of carbid therethrough, a detent controlling said discharge means, an agitator adjacent to said discharge means, and a bell having connections through which it rotates the agitator, and releases the detent in its vertical movement, as explained.

11. In an acetylene-gas machine, the combination with a carbid-holder, of the feeding-wheel having pockets forming a continuation of the feed-opening of the carbld-holder to one side of and below the center of the wheel, and a detent holding the wheel against rotation, operated by the bell to release the feed-wheel and permit it to rotate.

12. The combination with a carbid-holder having a discharge-opening, and a generating-chamber having a flushing-opening, of a shaft mounted in the generating-chamber, a door for closing the carbid-holder discharge-opening, mounted on the shaft, a valve for closing the flushing-opening of the generating-chamber, and a lift-rod depending from the door, in the generating-chamber, to the flush-valve.

13. The combination of a generating-chamber, the carbid-holder located above the generating-chamber, having communication with said chamber, and having a feed-opening, a bell controlling the feeding of the carbid from the holder into the generating-chamber, means for closing communication between the holder and the chamber, a cap for closing the feed-opening of the carbid-holder, and means for simultaneously lifting the carbid-holder cap and the bell, and closing the communication between the holder and the chamber each time the holder is open for charging.

14. In an acetylene-gas machine, the combination of a generating-chamber having a

flushing-valve, the carbid-holder above the generating-chamber having communication with said chamber, a bell controlling the feeding of the carbid from the holder into the generating-chamber, a door closing communication between the holder and the generating-chamber, and a lever controlling the opening of the carbid-holder, having connections through which it lifts the bell, closes the door between the holder and the generating-chamber, and opens the flushing-valve, each time the holder is open for charging, substantially as set forth.

15. In an acetylene-gas machine, the combination of the blow-off pipe leading from below the water-line in the generating-chamber to a point above said water-line and terminating outside of said chamber, a suitable water-supply pipe and a connection between the water-supply pipe and the blow-off pipe through which the latter is flushed.

16. In an acetylene-gas machine, the combination with the generating-chamber, of a blow-off pipe leading from a point below the water-line in said chamber to a point above said water-line, and thence to a point above the body of water in the chamber, but outside of the chamber, and a trap communicating with said blow-off pipe for breaking the siphon therein.

17. In an acetylene-gas machine, the combination of a generating-chamber, a double bottom in said generating-chamber, valves in the respective bottoms of the chamber, a carbid-holder above the generating-chamber containing means for automatically feeding the charge of carbid into the generating-chamber, a blow-off pipe leading from a point below the water-line and above the upper bottom in the generating-chamber to a point above the water in said chamber, and then discharging into the lower chamber, and through which a portion of the water contained in the generating-chamber is discharged each time a quantity of gas is suddenly generated, substantially as herein set forth.

The foregoing specification signed this 5th day of May, 1902.

NILS A. RENSTROM.

Witnesses:

EDWIN S. CLARKSON,

HERVEY S. KNIGHT.