No. 652,409. Patented June 26, 1900.

# J. W. TALLMADGE.

## ACETYLENE GAS GENERATING APPARATUS.

(Application filed Dec. 26, 1899.)

(No Model.) 3 Sheets—Sheet 1.

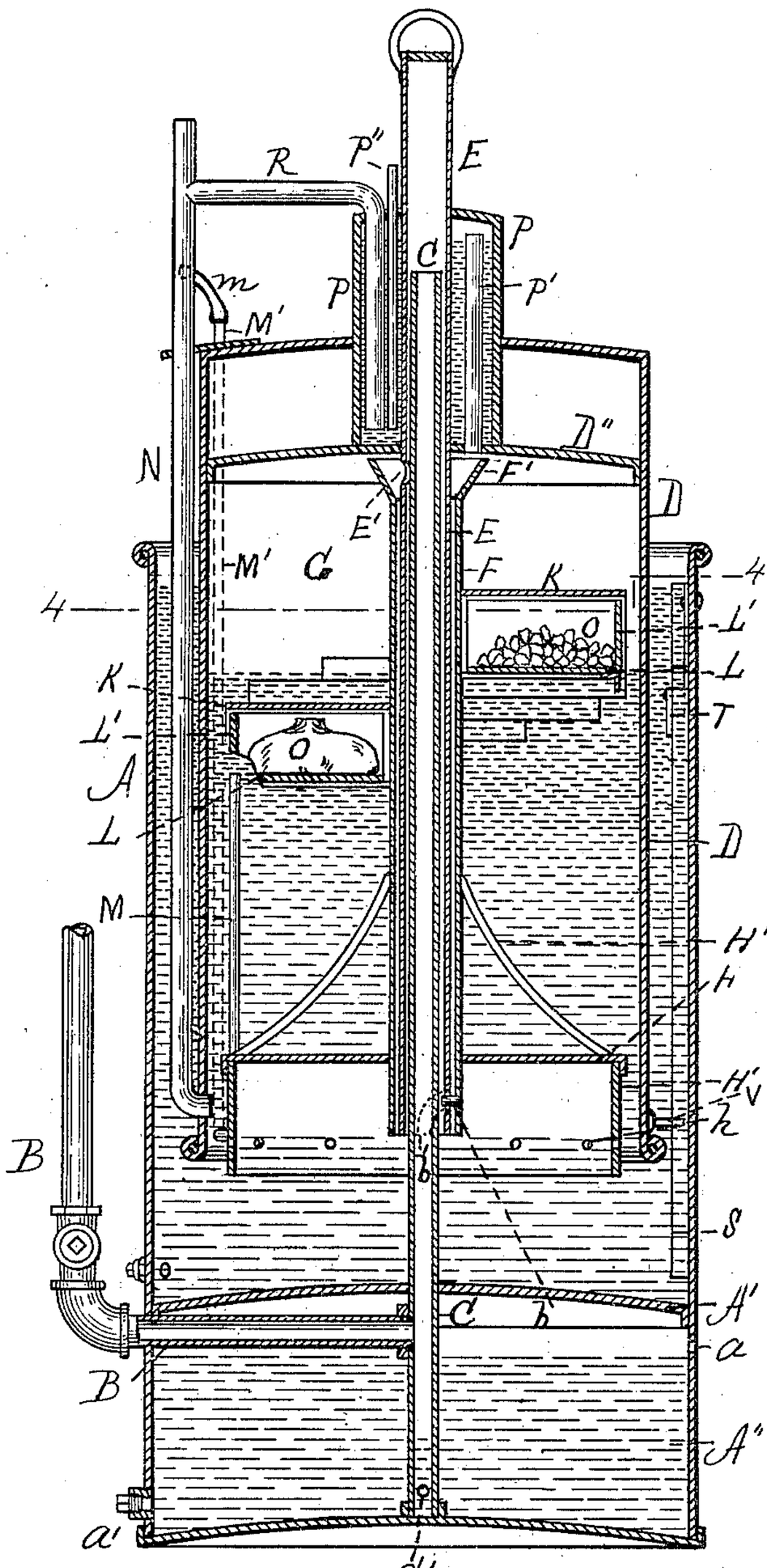


Fig. 1.

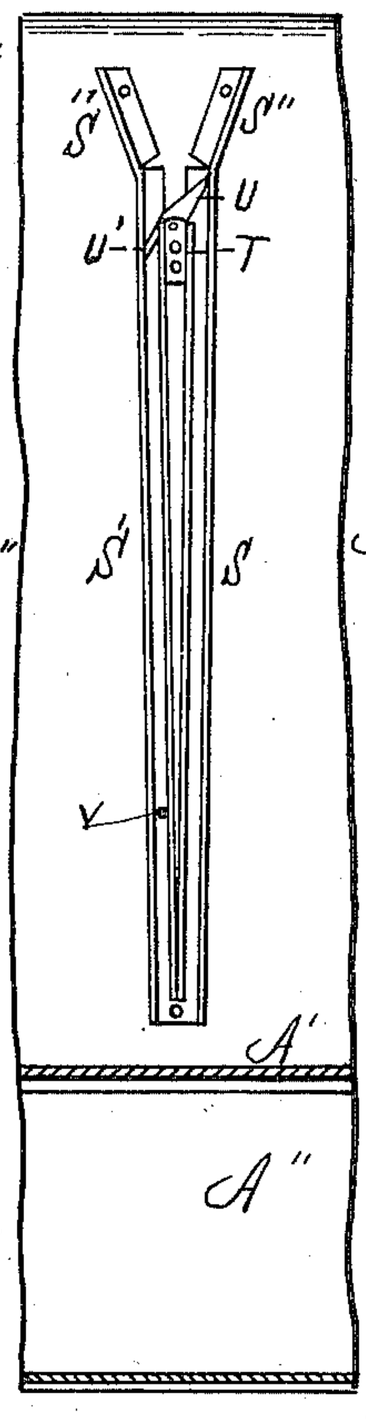


Fig. 2.

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## ACETYLENE GAS GENERATING APPARATUS.

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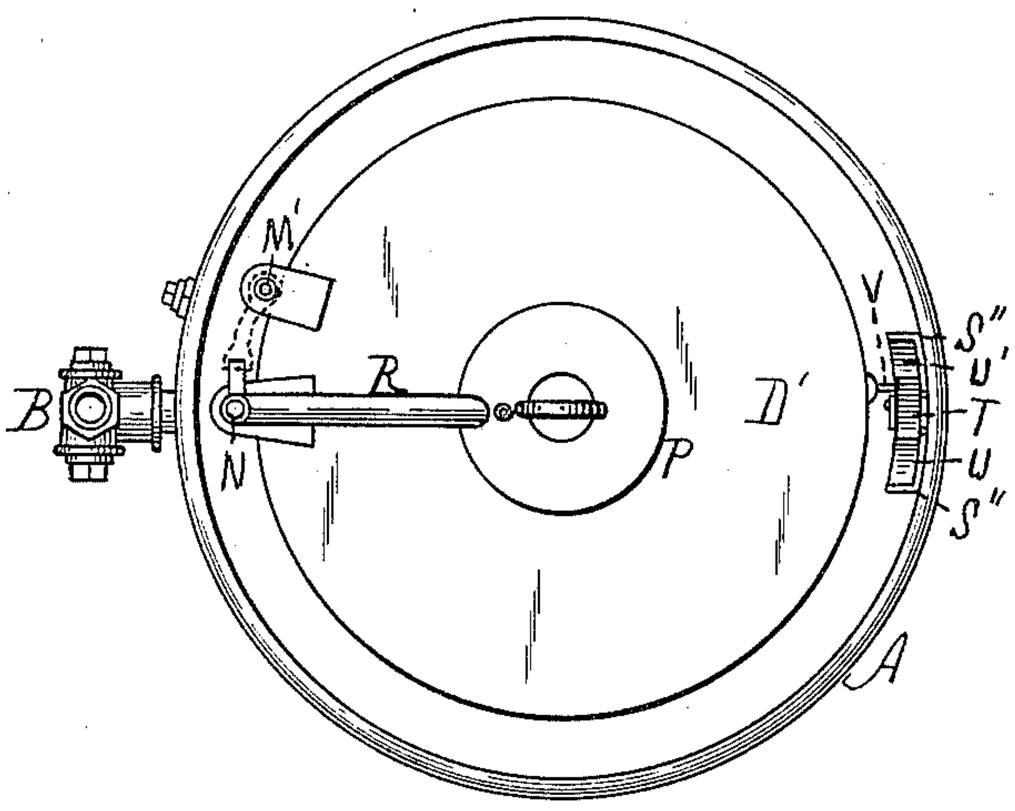


Fig. 3.




Fig. 4.

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## ACETYLENE GAS GENERATING APPARATUS.

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(No Model.) 3 Sheets—Sheet 3.

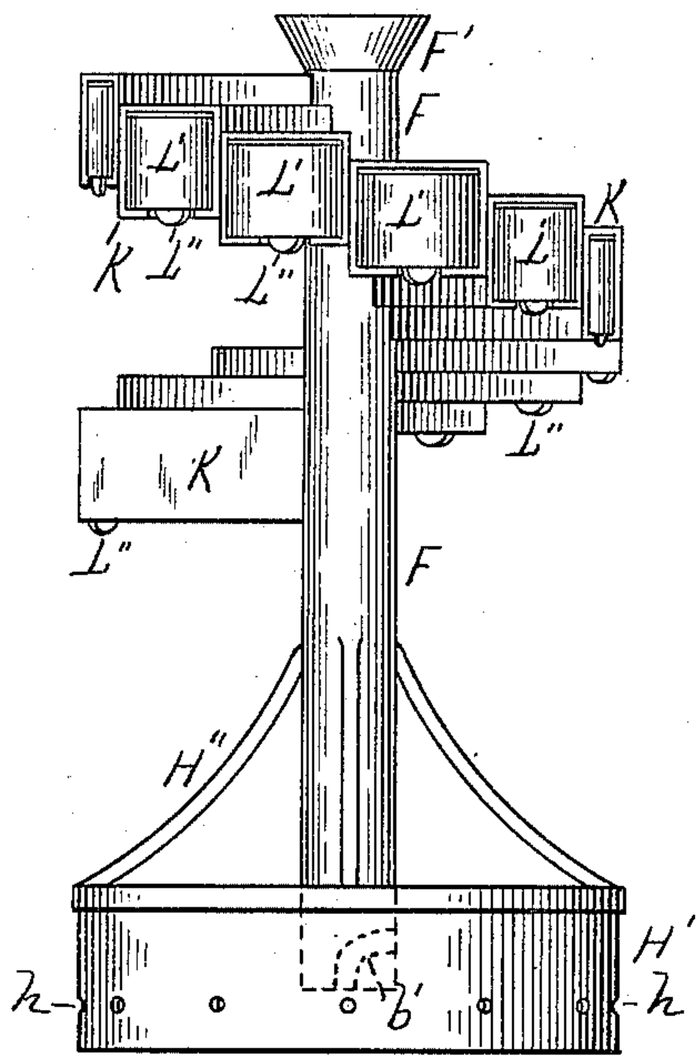


Fig. 5.

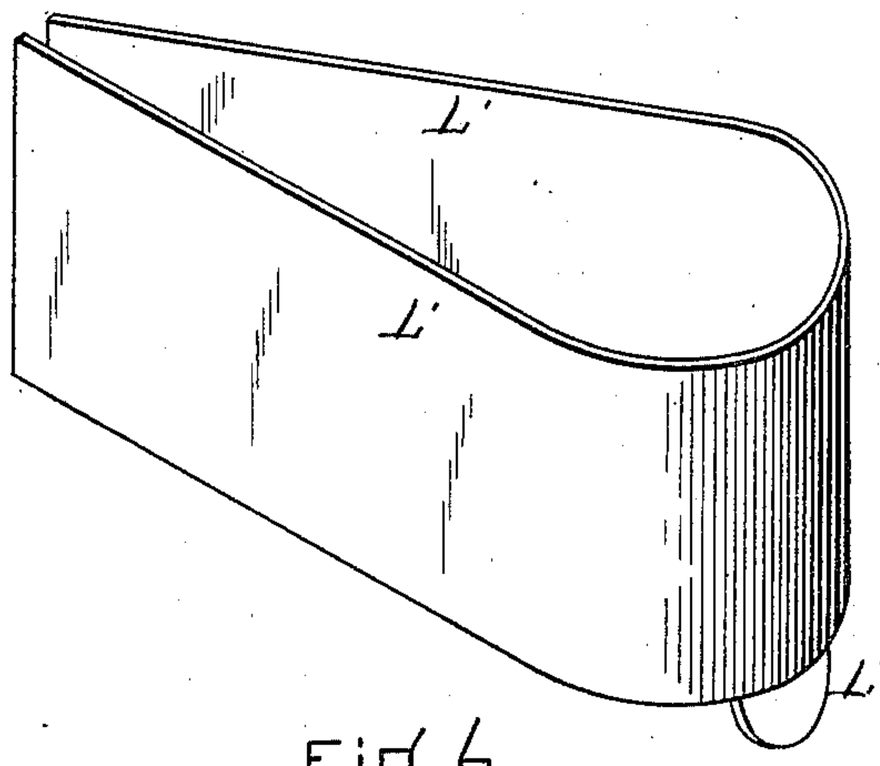


Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## ACETYLENE-GAS-GENERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 652,409, dated June 26, 1900.

Application filed December 26, 1899. Serial No. 741,553. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. TALLMADGE, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Acetylene-Gas Apparatus, of which the following is a specification.

This invention relates to apparatus for the manufacture of acetylene gas by the application of water to carbid, the supply of water being automatically controlled by the pressure of the gas generated from the carbid, especially to that class of apparatus in which the water is brought into successive contact with a number of comparatively-small quantities of carbid each arranged in a compartment or a receptacle by itself; and the invention or improvement consists of certain novel constructions and arrangements of parts fully described below, whereby the operation or process is facilitated and a high degree of safety attained.

The nature of the invention is described in detail below and illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section of an acetylene-gas apparatus embodying my invention. Fig. 2 is a detail in elevation of a portion of the inside of the tank, illustrating a locking device. Fig. 3 is a plan view of the apparatus, the water not being illustrated. Fig. 4 is a horizontal section taken on line 4, Fig. 1. Fig. 5 is an elevation of the float and nest of carbid-receptacles removed. Fig. 6 is a perspective view of one of the carbid receptacles or drawers.

Similar letters of reference indicate corresponding parts.

A represents the water-tight tank, open at the top and divided by the horizontal partition A′ into a main compartment and a smaller lower compartment A″, the latter being for the purpose of receiving the condensation from the house-supply pipe B. This compartment A″ is provided with a vent *a* at the proper height and a plugged outlet *a′* for drawing off the liquid.

C is a central vertical pipe resting on the bottom of the tank and extending up through the partition A′ to a suitable point above the top of the main portion of the tank. This pipe has an opening below the partition A′, whereby it connects with the house-supply pipe, and a smaller opening C′ into the compartment A″. The condensation flows from the pipe B into the pipe C and thence through the hole C′ into the compartment A″, the pressure of the downflowing gas in the pipe C keeping the level of the liquid in said pipe lower than the level in the compartment A″, the level in said compartment being regulated by the vent-hole *a*.

D is the bell, of suitable diameter to enter the tank A, formed with the top D′ and partition D″ at a short distance below the top, as shown in Fig. 1, and rigid on the pipe or tube E, which extends well down toward the lower end of the bell for steadying it and up through its upper end, being closed at the top.

F is a sleeve set around the lower portion of the pipe E and removably secured thereto near its end in any desired manner, such as by an ordinary pin and slot. The upper portion of the sleeve F is preferably flaring at F′, and opposite such flared portion the pipe E is provided with an opening E′, whereby connection is made with the air or gas chamber G in the bell. The sleeve F is provided near its lower end with the float H, whose sides H′ are formed with perforations *h* and which is preferably braced to the sleeve at H″. The float contains water up to the level of the perforations *h*; but above said level the float contains air, as shown in Fig. 1. This float is so set that its lower edge is a little lower than the bell, so that when the bell, with the sleeve locked to it, is removed and the whole placed upon the upper edge of the tank the float only will touch such edge and the bell can be rotated, the float remaining stationary by friction, and thus the bell and the float disengaged and the former lifted in order that the carbid-receptacles (below described) can be reached. The engaging contrivance or lock between the float and the bell is mentioned above, and consists of a pin *b*, Fig. 1, on the sleeve F and a slot (indicated by dotted lines *b′* in Figs. 1 and 5) in the pipe E, such locking device being of course not new in itself considered. The float being below the carbid-receptacles is always immersed and constitutes a gas-governor, governing the

pressure of the gas and holding up the weight of the carbid.

The carbid-receptacle holder consists of a series of V-shaped cases K, each forming a compartment open at its outer end and with its inner end rigidly secured to the sleeve F. These cases are preferably secured together, as well as to the sleeve, and are arranged spirally and radially with regularity around said sleeve, as indicated in Figs. 4 and 5, so that they come in contact with the water successively and with perfect regularity. In each of these cases or compartments K there is a slidingly-arranged drawer consisting of a bottom L and sides L', said sides being preferably formed of an integral sheet of metal bent into the shape illustrated in Fig. 6, the whole being adapted to substantially fit into one of the compartments and being provided with the downwardly-extending handle L''. Within each drawer is a bag O, Figs. 1 and 4, of textile or porous material, filled with carbid. These bags of carbid are previously prepared and uniformly filled, so that the weight of the carbid is the same.

M M' are the two portions of a vertical U-shaped pipe, Figs. 1 and 4. The upper end of the portion or leg M is within the bell D on a level with the bottom of the lowest carbid-receptacle. Thence the pipe extends down vertically along the inner surface of the bell, through it, and up vertically along the outer surface—the inside portion being lettered M and the outside portion or leg M'—and its outer end is connected by a flexible tube *m* with a blow-off pipe or safety-pipe N, the lower end of which extends into the interior of the bell. When the bell is lowered into the tank of water, the air therein passes out through the pipe M M' into the blow-off pipe N until the upper end of the portion M descends below the surface of the water, when the water enters and it operates as a trap. While the apparatus is working this pipe is constantly acting as a trap. After the bell has been removed the upper end of the flexible tube *m* is removed from the pipe N and the water is blown out of the pipe M M' before the bell is again placed in position. This contrivance obviates all necessity for blowing off the air through the burners, and thus getting air into the house-pipes.

P is a water-tight closed structure mounted on the partiton D'' and extending up through the top D' of the bell. This structure contains water, as shown, and a vertical pipe P' extends from an opening in the partition D'' to a point in the upper portion of the structure P.

A pipe R connects with the blow-off pipe N and extends through the top into the structure P to a point at the lower portion thereof. A filling-pipe P'' extends from the outer air down into the structure P. When the bell is lifted out of the tank, the air enters through the pipe R and is forced through the water in the structure P and passes down through the pipe P' into the chamber G, thus allowing the bell to be lifted without the use of a check-valve and adding to the safety of the appliance. In lifting the bell so much air is taken in that the gas becomes non-ignitible when the apparatus is opened, owing to the distance which the bell must be lifted, such distance being determined by the distance between the carbid-receptacles and the float H. When the bell is in position, the structure P, with its contents, constitutes a trap.

On the inner surface of the tank A are a pair of grooved ways S S', (see Fig. 2,) converging at their lower ends and with their upper portions sufficiently apart to receive between them a bracket T, to which is pivoted a latch consisting of a heavy end U and a light end U', extending across the ways S S', which have their inner flanges removed at these points for the purpose. The upper ends of these ways are flared, as shown at S''. A pin V, Figs. 1, 2, 3, and 4, extends radially from the outer side of the bell D, near the lower end thereof. When the bell is inserted in the tank, the pin V slips by the downwardly-extending lighter end U' of the latch and into the way S' and then descends gradually as the masses of carbid are acted upon. When the carbid has been exhausted, the pin V is at the bottom of the way S', and by slightly rotating the bell it is turned under the way S, and as the bell is lifted out lifts and slips under the heavy portion U of the latch. Thus while the apparatus is operating the latch U prevents the bell from being lifted out, and it cannot be lifted until all the carbid has been immersed and the gas exhausted. Hence the gas and the air cannot become mixed and safety is insured.

By providing horizontally-sliding drawers for the carbid instead of receptacles which must be lifted off vertically I save "head-room" in lifting the bell. This is a great advantage in large machines, which are, say, four feet in height, so that there is about twelve feet lift.

In operation the tank is first nearly filled with water. The structure shown in Fig. 5 is then placed on slats or bars laid across the top of the tank. Next the drawers L L' are supplied with carbid and are slid into position in the cases K. The bell D is then placed upon said structure and locked to it, as above described. The whole is then raised to remove the slats or bars and lowered into the tank, causing air to pass out through the pipes M', *m*, and N until the bell sinks sufficiently to bring the lowest carbid-receptacle into contact with the water, when the trapped portion of the pipe M M' will fill with water and prevent further escape of gas through it. All air is thus extracted, and when the burners are lighted a full-sized flame is obtained. As the gas is burned off the masses of carbid in the different receptacles come successively

in contact with the water as the bell descends against the sustaining power exerted by the air above the perforatons *h* in the float H. When the burners are closed, the gas formed in the machine from whatever moisture there may be from the carbid which is being operated on at the time of closing lifts the bell, taking the carbid out of the water, and the generation of gas ceases.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described for the manufacture of acetylene gas, the combination with the tank A, bell D and vertical pipe C; of the sleeve F; a spirally-arranged series of carbid-receptacles secured to the sleeve near its upper end; and a float independent of said carbid-receptacles and secured to the sleeve near its lower end at a considerable distance below the carbid-receptacles, substantially as described.

2. In an apparatus of the character described for the manufacture of acetylene gas, the combination with the tank A, bell D and vertical pipe C; of the sleeve F; a spirally-arranged series of carbid-receptacles secured to the sleeve near its upper end; and a float H, H′ secured to said sleeve near its lower end and at a considerable distance below the carbid-receptacles, said float being formed with a series of perforations *h* at an appreciable distance above the bottom thereof, substantially as set forth.

3. In an apparatus of the character described for the manufacture of acetylene gas, the bell D supporting a series of carbid-receptacles; the tank A; a blow-off pipe extending from the bell up through the tank; and the U-shaped pipe M, M′ extending through the vertical wall of the bell and with its shorter leg M opening at its upper end inside the bell at about the level of the lowest carbid-receptacle and with its longer leg extending up on the outside of the bell and adapted to be connected with the blow-off pipe, substantially as described.

4. In an apparatus of the character described for the manufacture of acetylene gas, the combination of the bell D and pipe E; the sleeve F, carbid-receptacles secured thereto and float H, H′ secured to the lower end thereof, the sides of said float extending below the lower end of the bell; and means for detachably connecting said bell and float, substantially as and for the purpose set forth.

5. In an apparatus of the character described for the manufacture of acetylene gas, the tank D; a pair of grooved ways secured to and extending down the inner side of said tank and open at their lower ends; a latch locking one of said ways against a descending bolt and leaving the other way unlocked; and the bell D provided on its outer vertical side with a pin or bolt adapted to be moved down one of the ways and up the other, in combination with means carried by said bell for supporting carbid and generating gas, substantially as described.

6. In an apparatus of the character described for the manufacture of acetylene gas, the bell D provided with the outwardly-extending pin or bolt V; means carried by said bell for supporting carbid and generating gas; the tank A; the ways S, S′ secured to the inner side of said tank and with their lower ends connected; and the latch comprising the heavier end U and the lighter end U′ and pivotally secured between the ways, said heavier end resting normally against and closing one of said ways, substantially as set forth.

7. In an apparatus of the character described for the manufacture of acetylene gas, the tank; the bell D provided with the partition D″; the closed receptacle P extending from said partition up through the top of the tank; the vertical pipe P′ opening at its lower end into the gas-chamber and at its upper end into the receptacle; the inlet-pipe P″ opening at its lower end into the receptacle; the blow-off pipe N extending from the interior of the bell to a point above the same; and the pipe R connecting the interior of the receptacle P with the blow-off pipe, substantially as described.

8. In an apparatus of the character described for the manufacture of acetylene gas, the bell; a series of carbid-receptacles; a regulating-float, said float being below the carbid-receptacles and normally immersed in the water; a rigid connection between the float and the carbid-receptacles; and a connection between the bell and the carbid-receptacles, substantially as set forth.

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Witnesses:
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