

UNITED STATES PATENT OFFICE

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FEEDING APPARATUS FOR CHEMICALS

Application filed May 3, 1927. Serial No. 188,569.

My invention is concerned with certain new and useful improvements in feeding apparatus for chemicals, which I have shown as substituted for a fundamentally different apparatus having the same function in my application No. 525,566, filed December 29, 1921, for an acetylene generator, in which the feed of the carbide is effected at necessary intervals to maintain the desired pressure, by the gradual rise and sudden fall of a small gas bell through which all the gas being drawn from the generator must pass, the sudden fall being effected by the sudden escape from the bell of the gas under pressure contained therein when the bell has been raised by the gas pressure high enough to lift its open bottom from the sealing liquid necessarily employed and in which it is ordinarily immersed.

In my improved construction, while still retaining an element rising and falling as before, I simplify its construction and improve its durability in operation by dispensing with the sealing liquid and employing other and different means for permitting the sudden escape of the gas from beneath the piston, to which a bell may be attached, as will be hereinafter fully described and claimed.

To illustrate my invention, I annex hereto a sheet of drawings, in which the same reference characters are used to designate identical parts in both the figures, of which,—

Fig. 1 is a central vertical section through the upper portion of an acetylene generator to which my invention has been applied; and Fig. 2 is a central vertical section through the receptacle containing the piston, but on a much larger scale.

10 is the generating chamber of the customary type containing water, into which the carbide is dropped from the carbide holder

11 occupying the upper portion of the cylindrical top 12 of the casing. Secured in one side of the casing beneath the carbide chamber 11 is a pressure regulator 13 containing a diaphragm opposed by a spring and acted on by the pressure of the gas in the generating chamber so that the position of the rod 14 projecting therefrom and secured at its outer end to the diaphragm is controlled by the pressure of the gas in the tank 10. This rod

14 is pivoted at its outer end to the lever 15 fulcrumed at 16 in a suitable bearing piece 17 connecting the lower conical wall 18 of the carbide chamber with the lower end of the cylindrical casing 12. The lever 15 has pivoted on its lower end a mushroom valve 19 which co-operates with the circular outlet for the carbide forming the lower end of the cylindrical bottom portion 18, and this valve stands at a distance from the outlet opening which varies with the pressure of the gas in the generating chamber 10, and it will be understood that the lower the pressure of the gas, the wider the space between the valve 19 and the opening, so that the carbide will escape in greater quantities each time the valve 19 is vibrated so as to thereby increase the amount of gas generated and thus raise the pressure. When the pressure is high, the valve 19 stands closer to the outlet so that less carbide can escape each time the valve 19 is vibrated. The valve 19 has secured to its under side a rod 20 which extends through the short pipe 21 let into the side of the cylinder 12 and connected to the T 22, which has the short pipe 23 secured in its upper portion. The upper end of the pipe 23 is screwed into the boss 24 formed on the lower end of the chamber 25, the upper end of which is closed by the head 26 secured thereto by the bolts and nuts 27. An outlet elbow 28 is screwed into the top of the head, and is connected by the pipe 29, elbow 30 and pipe 31 and connection 32 with the top of the gas washing chamber 33, in which the gas passes through water in the customary manner, and is led therefrom by the outlet pipe 34 to the cutting or welding tool, or whatever apparatus is employed in connection with the generator.

The apparatus thus far described is identical with that shown in my application No. 124,878, filed July 26, 1926, to which reference is made for fuller disclosure of the details of construction.

The outer end of the rod 20 passes through the eye 35, constituting the lower end of the vertical rod 36 extending up through the pipe 23 and into the chamber 25. A nut 37 on the end of the rod 20 holds the vertical rod

36 in place. The upper end of the rod 36 preferably has secured thereon between the nuts 38 and 39 a conical valve 40, a bell 41 and a piston 42, the bell and piston being preferably formed of aluminum so as to be light and readily moved by the pressure of the gas which rises through the pipe 23 and preferably passes through a pipe 43 secured concentrically with the pipe 23 in the bottom of the chamber 25 and extending up for about two-thirds of the depth of the chamber, where the upper end preferably forms a seat for the valve 40. Assuming that the parts are in the position shown in Fig. 2 of the drawings, in which the valve has just been closed by the sudden descent of the piston 42 and the bell 41, the pressure of the gas rising through the pipe 23 and tube 43 will lift the valve 40 from its seat and will fill the bell 41 and escape from underneath the bottom and engage the underside of the piston 42, which fits somewhat snugly in the lower portion of the cylindrical chamber 25, so that the pressure of the gas tends to raise the piston 42 and thereby the bell 41 somewhat slowly, as there is a little leakage of the gas around the edge of the piston 42. The bell 41 and the attached piston thus move upward somewhat slowly, lifting the rod 36 and tilting the rod 20. Near the upper end of the casing 25, its internal diameter is suddenly increased by the offset 44 formed therein, and the instant that the piston 42 passes the offset, the gas accumulated under pressure beneath it is free to escape suddenly, and as it does, it allows the piston, bell, valve 40 and rod 36 to fall suddenly, and this movement transmitted to the rod 20 serves to swing the valve 19 sufficiently so that the particles of carbide caught between the valve 19 and the edges of the outlet are free to drop off and down into the water in the chamber 10. This operation will, of course, be repeated automatically at a rate that will depend upon the amount of gas that is being drawn off from the washing chamber 33, and the entire apparatus constitutes a very effective means for controlling the pressure of the generated carbide and keeping it substantially uniform.

While I have shown as a preferred form of my invention a structure employing the refinements shown, including the tube 43, the valve 40 and the bell 41, it will be understood that they are not essential to the fundamental mode of operation, which resides in the slow upward movement of the piston 42, due to the gradual escaping of the gas about its edges, until it reaches the offset 44, where it can escape so rapidly that the pressure beneath the piston is suddenly released to such an extent that it can fall back to its lowermost position, after which the cycle of operations is repeated.

While I have shown and described my invention as embodied in the form which I at

present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

While I have herein shown and described some features of the structure embodied in my generic application No. 525,566, filed December 29, 1921, I do not herein claim anything that can be claimed in the aforesaid application, No. 525,566, but reserve all common subject matter for said aforesaid generic application.

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

1. In a device of the class described, the combination with a closed receptacle having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of a bell therein through the open bottom of which the entering gas rises, and an imperforate piston at the top of the bell of the shape of the horizontal cross section of the receptacle and extending substantially to the wall thereof with which it co-operates to prevent the rapid passage of the gas from the inlet opening to the outlet opening, the receptacle having an enlargement in its internal dimensions toward the upper end thereof so that when the piston reaches the enlargement the gas under pressure beneath it can escape suddenly and permit the bell to fall quickly.

2. In a device of the class described, the combination with a closed receptacle circular in its horizontal internal cross section having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of a bell therein through the open bottom of which the entering gas rises, and an imperforate circular piston at the top of the bell extending substantially to the wall of the receptacle with which it co-operates to prevent the rapid passage of gas from the inlet opening to the outlet opening, the receptacle suddenly increasing in its internal diameter near the upper portion thereof so that when the piston reaches the increased diameter the gas beneath can escape suddenly and permit the bell to fall quickly.

3. In a device of the class described, the combination with a closed receptacle having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of a tube extending upwardly from the inlet opening toward the top of the receptacle, a bell therein which the gas enters through the tube, and an imperforate piston at the top of the bell of the shape of the horizontal cross section of the receptacle and extending substantially to the wall thereof with which it co-operates to prevent the rapid passage of gas from the inlet opening to the outlet opening, the receptacle having an enlargement in its internal dimensions toward the upper end

thereof so that when the piston reaches the enlargement the gas beneath it can escape suddenly and permit the bell to fall quickly.

5 4. In a device of the class described, the combination with a closed receptacle having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of a tube secured in the inlet opening and extending upwardly therefrom, a bell therein which
10 the rising gas enters through the tube, an imperforate piston at the top of the bell of the shape of the horizontal cross section of the receptacle and extending substantially to the wall thereof with which it cooperates to prevent the rapid passage of gas from the inlet
15 opening to the outlet opening, said receptacle having an enlargement in its internal dimensions so that when the piston reaches the enlargement the gas beneath can escape suddenly and permit the bell to fall quickly.

5 5. In a device of the class described, the combination with a closed receptacle having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of an
25 imperforate piston therein of the shape of the horizontal cross section of the receptacle and extending substantially to the wall thereof with which it co-operates to prevent the rapid passage of the gas from the inlet
30 opening to the outlet opening, said receptacle having an enlargement in its internal dimensions so that when the piston reaches the enlargement the gas beneath can escape suddenly and permit it to fall quickly.

35 6. In a device of the class described, the combination with a closed receptacle having an inlet opening in its bottom and an outlet opening in its top and a vertical wall, of an
40 imperforate piston therein of the shape of the horizontal cross section of the receptacle and extending substantially to the wall thereof with which it co-operates to permit the gradual ascent of the piston under the pressure of the ascending gas, said receptacle and piston
45 being designed so that the gas passes suddenly upward past the piston when it has reached a certain height so that the piston can fall rapidly.

In witness whereof, I have hereunto set my
50 hand this 14th day of April, 1927.

PARMER DORSEY.