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ACETYLENE GENERATOR.

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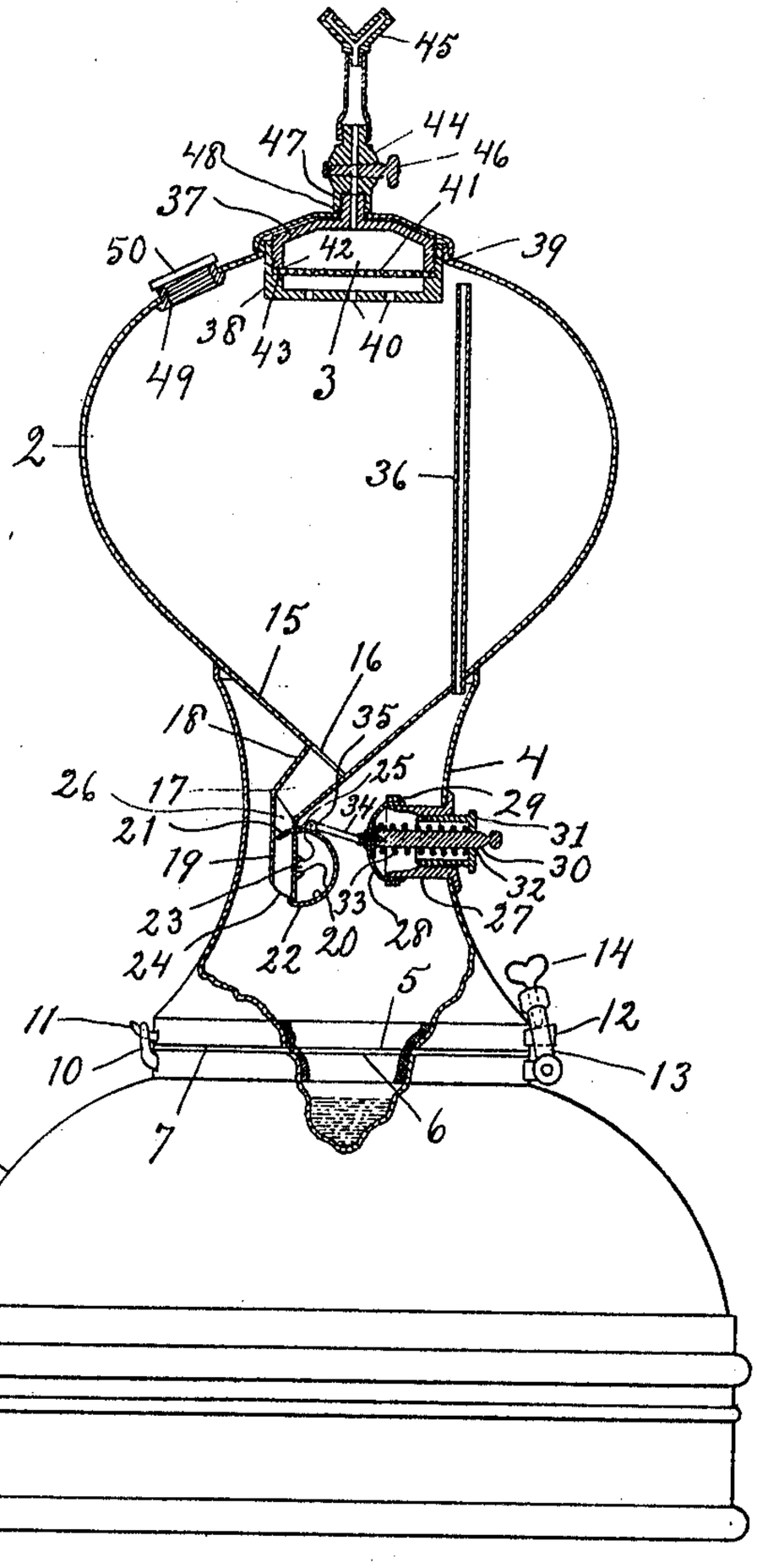

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ACETYLENE-GENERATOR.

978,266. Specification of Letters Patent. **Patented Dec. 13, 1910.**

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To all whom it may concern:

Be it known that I, CHARLES W. BECK, of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Acetylene-Generators, of which the following is a specification.

This invention relates to improvements in acetylene generators and refers more specifically to improvements in that type of generators wherein pulverulent carbid is fed to a saturating chamber in graduated quantities, regulated and determined by the gas generated and consumed.

The salient objects of the present invention are to provide an extremely simple and reliable carbid feeding mechanism which is not likely to become clogged in operation; which is capable of feeding carbid of ununiform size without substantially affecting the rate of gas generation, which is so constructed and arranged as to be practically unaffected by the amount of carbid contained in the hopper whether it be much or little, which operates in such manner as to maintain the discharge passage through which the carbid is fed closed at all times, the successive quantities of carbid being trapped through the discharge chute, to provide an improved mechanism actuated by the gas generated for operating the feed mechanism, which is extremely compact, is capable of ready adjustment to determine the pressure required to operate it, is so constructed as to dispense with the usual expansible and collapsible gas holder and is located in close proximity to the feed mechanism so as to be directly connected with the latter, and in general to provide a simplified and improved generator of the character described.

To these ends the invention consists in the matters hereinafter described and more particularly pointed out in the appended claims and the same will be readily understood from the following description, reference being had to the accompanying drawing, wherein the single figure illustrates, partly in axial section and partly in side elevation a generator embodying my invention.

Referring to the drawings, 1 designates as a whole a lower receptacle forming the base portion of the generator adapted to contain liquid and constituting a saturating or generating chamber within which the carbid is immersed or plunged to generate the gas.

2 designates as a whole an upper member constituting a hopper or carbid chamber, the extreme upper portion of said chamber, however, being occupied by a gas chamber 3 into which the gas is filtered from the upper part of the hopper. The upper member 2 is united with and supported upon the lower member 1 by means of a contracted or waist-like member 4, desirably having concave sides as shown, the several members referred to being united with each other to form a symmetrical whole. In the preferred embodiment shown herein the lower member 1 is detachably united with the waist portion 4 so as to afford a ready means of obtaining access to the generating chamber for filling and cleansing. Conveniently said parts are detachably united by having their meeting marginal faces 5 and 6 respectively made of sufficient width to receive between them a rubber or analogous packing ring 7; said parts being held together at one side by means of an interlocking loop 10 and prong 11 and upon the opposite side by means of a lug 12 with which is adapted to engage a pivoted loop 13, the latter being provided with a clamping screw 14 threaded through its engaging part and arranged to impinge upon the lug so as to additionally compress the packing ring after the parts have been engaged.

The upper member 2, preferably and as shown herein is provided with downwardly tapering or converging side walls, which are continued inwardly beyond the intersection of the hopper with the upper end of the waist member 4, as indicated at 15, a feed passage or discharge aperture 16 being formed at the apex of the hopper; which opening communicates with a discharge chute 17, preferably and as shown herein bent intermediate of its length; the upper portion 18 thereof being formed in continuation with one side of the slope of the hopper bottom and the lower portion 19 thereof extending vertically downward. The object of giving said chute the bent form described is to in part obviate the downward pressure of the body of carbid upon the feed mechanism arranged to control the lower part of said chute as will now be described.

Upon one side of the lower portion of the chute is pivotally mounted a C-shaped valve member 20, the opposite end portions whereof 21, 22, respectively, form cut-off members adapted to control the chute passage; these cut-off portions being preferably formed concentric with the pivotal axis 23 of said valve member. The lower cut-off portion 22 is arranged to slide across the lower end of the discharge chute to close the latter, the end portion of said chute being formed on a curve concentric with the axis of the valve member as indicated at 24. The upper cut-off portion or member 21 is arranged to reciprocate through an opening 25 formed in the side of the chute so as to close the passage through the latter at a point some distance from its lower end; it being understood that the C-shaped valve member will be made of a width equal to the width of the chute so as to fit between the side walls 26 of the latter and thus completely close the passage when the upper end of the valve member is thrown forwardly into bearing with the interior of the front side of the chute or in the position shown in the drawings. The length of the arc of the C-shaped valve member is such with relation to the depth of the chute it controls from front to rear that when the valve member is oscillated to one limit of movement, as for example, forwardly, the lower end of the chute will be completely uncovered while the upper cut-off member will completely close the passage through the chute and vice versa when the valve member is oscillated to its opposite limit the lower end of the chute will be completely closed and the upper cut-off portion completely withdrawn from the chute, so that the oscillation of the valve member operates to feed the carbid through the chute in successive charges, substantially in the manner of the well known shot-pouch feed.

In order to provide mechanism whereby the movements of the valve member are effected by the pressure of the gas as the latter is generated and consumed, I provide at one side of the generator in a position laterally opposite or directly in rear of the valve member a tube-like housing 27, which is desirably seated in the side wall of the contracted waist portion as indicated clearly in the drawing. The inner end of this housing is closed by means of a flexible impervious diaphragm 28 secured at its periphery to the end of the housing in such manner as to form a gas tight joint, conveniently by means of a confining ring 29. With the central portion of said flexible diaphragm is connected a guide rod 30 which extends axially through the housing and projects out through the side wall of the generator; the outer end of the tubular housing being closed by means of a screw cap 31 which is centrally apertured as indicated at 32 for the passage of the outer end of the guide rod. The guide rod is constructed to fit loosely in the aperture 32 so as not only to permit a free reciprocatory movement of the guide rod but also to afford vantage which places the interior of the housing in communication with atmospheric pressure.

33 designates a coiled expansion spring arranged concentrically upon the guide rod 30 and interposed between the diaphragm at one end and the end wall of the screw cap 31 at its opposite end, the length of this spring being such as to tend to normally force the flexible diaphragm inwardly to its farthest limit or that shown in the drawings.

34 designates a connecting rod or link having one end pivotally connected with the central portion of the diaphragm 28 and its opposite end likewise pivotally connected with a lug 35 upon the valve member; the arrangement being such that when the diaphragm is forced inwardly to its limit by the expansion spring 33, the valve member will be oscillated forwardly so that its upper cut off portion 21 will close the passage through the chute, but when the flexible diaphragm is forced back by the pressure of gas to its opposite limit of movement, the valve member will be oscillated into its reversed position so that its lower cut-off member 22 closes the lower end of the chute. Inasmuch as the expansion spring 33 rests at one end against the screw cap 31, it will be obvious that the pressure of gas necessary to force back the diaphragm in the manner described may be regulated and determined by adjusting said screw cap inwardly or outwardly as required.

The gas generated in the generating chamber rises within the waist portion of the generator and is conveyed thence to the upper part of the carbid hopper so as to be dried by passing it over the body of carbid therein, a stand pipe 36 being to this end arranged to communicate at its lower end with the upper part of the waist chamber and extending thence upwardly within the hopper and opening at a point near the top of the latter. Within the upper end of the carbid hopper is arranged the filtering chamber hereinbefore referred to, said chamber being conveniently formed by means of a pair of cap-like members 37, 38, threaded to fit together as indicated at 39; the lower member being provided with a plurality of inlet ports 40 through which gas is admitted to the filtering chamber from the upper part of the hopper. In order to filter the gas a filtering diaphragm 41 is stretched across the chamber, said diaphragm being conveniently secured in position to partition the chamber by having its periphery interposed

between the end margin 42 of the upper member 37 and a corresponding annular shoulder 43 upon the lower member.

The generator when embodied as in the present instance in a table lamp, will be provided with a suitable nozzle 44 terminating in the usual burner tip 45, the nozzle being desirably provided with a gas cock 46. In the present instance, the upper member 37 of the filtering chamber is provided with a threaded nipple 47 which projects out through a suitable aperture 48 in the top wall of the generator and receives the correspondingly threaded lower end of the nozzle 44, thus not only supporting the filtering chamber, but at the same time providing a convenient means for attaching the nozzle to the generator. The carbid hopper is desirably provided with a filling aperture 49 closed by a screw cap 50.

The operation of the generator constructed as described is probably entirely obvious, but may be briefly described as follows: Suitable quantities of liquid and carbid having been charged into the generator chamber and carbid hopper respectively and the generator closed, generation of gas is inaugurated by simply taking hold of the guide rod 30 of the valve actuating mechanism and drawing it back against the tension of the spring to permit carbid to fill that part of the chute between the upper and lower cut-off members. The operating rod is then allowed to spring back whereupon the carbid in the lower part of the chute is discharged into the generating chamber and a volume of gas thus generated. It may be necessary to repeat this operation several times until the volume of gas generated is sufficient to force the diaphragm outwardly so as to hold the lower end of the discharge chute closed, after which the operation will be automatic. That is to say, as the gas is consumed the pressure will be lowered and the diaphragm 28 gradually forced inwardly by the expansion spring until carbid begins to escape from the chute, whereupon the volume of gas will be renewed and the diaphragm forced back so as to interrupt the feeding of carbid. This operation will be automatically continued as long as the gas is withdrawn from the generator. As soon, however, as the consumption of gas is interrupted, or the escape of gas prevented by closing the cock 46, the pressure of the gas will hold the valve mechanism immovable and in position to prevent the further escape of carbid.

It will be seen from the foregoing description that I attain the several objects of the invention and provide an extremely simple, compact and convenient apparatus. It is to be noted also that a generator embodying this invention is extremely safe for the reason that should the valve mechanism fail to operate properly for any reason whatever, the carbid could not be accidentally discharged into the generator chamber since one or the other of the cut-off members of the valve is always in position to close the passage between the hopper and generating chamber and it is only by the reciprocations of the valve that the carbid is permitted to flow. By locating the valve operating mechanism in the manner shown, I am enabled to dispense with the usual expansible and collapsible gas holder heretofore commonly employed in generators of this type and at the same time reduce the operating connections and mechanism to a minimum.

While I have described a preferred embodiment of the invention, yet it will be obvious that the details of construction may be modified without departing from the principle of the invention and I do not wish therefore to be limited to the details shown herein except to the extent that such details are made the subject of specific claims.

I claim as my invention:

1. In an acetylene generator, the combination with a lower generating chamber, an elevated carbid hopper and a discharge passage affording communication between the hopper and generating chamber, of a valve mechanism controlling said discharge passage and comprising two cut-off members located at intervals apart and adapted to alternately close the discharge opening, and means for actuating said valve mechanism comprising a tubular housing seated in the side wall of the generator chamber between the hopper and the liquid holder and at a point laterally opposite the valve mechanism, a flexible diaphragm closing the inner end of said housing, a screw cap closing the outer end of said housing, said diaphragm being within the generating chamber and subject to the pressure therein, a guide rod having one end operatively connected with the central portion of said diaphragm and extending through the housing and out through the screw cap, a coiled expansion spring surrounding said guide rod and interposed between the diaphragm and screw cap and a link connecting said diaphragm with the valve mechanism, substantially as described, and the valve will be positively closed as the pressure increases, whereby predetermined quantities of carbid will be fed and the feed chute will be closed when the pressure exceeds a certain point and when it falls below a certain point.

2. In an acetylene generator, the combination of a lower generating chamber, an upper carbid hopper, a contracted intermediate waist portion constituting a gas chamber and a discharge chute connected with the lower end of said hopper and extending within the waist portion, of means for con-

trolling the flow of carbid through said chute comprising a C-shaped valve member pivotally mounted adjacent to said chute, having its opposite ends arranged to reciprocate across the passage through said chute in alternation, and means for actuating said valve member comprising a tubular housing seated in the side wall of the waist portion of the generating chamber at a point laterally opposite said valve member, a flexible diaphragm extending across and closing the inner end of said housing, and being within the generating chamber and subjected to the pressure therein, a spring acting upon said diaphragm to force it inwardly and a link operatively connecting the diaphragm with the valve member, substantially as described.

3. In a carbid feed acetylene generator, the combination of a carbid hopper, a liquid holder below the hopper, a gas chamber being formed between the carbid hopper and the liquid holder, a discharge chute depending from the hopper within the gas chamber, a pivoted valve having an upper and a lower part adapted to alternately close the chute and cut off the flow of carbid, a flexible diaphragm within the gas chamber, and means positively connecting the diaphragm to the valve whereby the gas pressure will actuate the diaphragm to positively close the valve, a spring for normally forcing said diaphragm inward, and a device connected to the diaphragm and extending to the outer side of the casing, whereby the diaphragm may be positively vibrated in either direction, and the valve manually operated to feed any desired amount of carbid.

4. In a carbid feed mechanism the combination of a carbid hopper provided with a discharge chute, a valve in said chute and consisting of two members rigidly connected together and separated a suitable distance, a pivot for said valve midway between the valve members, said valve members being curved on an arc struck from said pivot and operating to alternately close the chute, a diaphragm within the generator, a spring for forcing said diaphragm inward and a link connecting said diaphragm with the valve, whereby said valve will be operated in one direction by gas pressure and in the other direction by spring pressure to feed predetermined quantities of carbid and to maintain the feed chute closed when the gas pressure exceeds a certain point and when it falls below a certain point.

5. In a carbid mechanism the combination, of a carbid hopper with a discharge chute, a valve in said chute and consisting of two members rigidly connected together and separated a suitable distance, a pivot for said valve midway between the valve members, said members being curved on an arc struck from said pivot and operating to alternately close the chute, a diaphragm within the generator, a spring for forcing said diaphragm inward and a link connecting said diaphragm with the valve whereby said valve will be operated in one direction by gas pressure and in the other direction by spring pressure to feed predetermined quantities of carbid and to maintain the feed chute closed when the gas pressure exceeds a certain point and when it falls below a certain point, and means for varying the tension of the spring operating on the diaphragm against gas pressure.

6. In an acetylene gas generator the combination of a lower generating chamber, an upper carbid hopper, a discharge chute connected to the lower end of the hopper, a valve arranged in said chute and consisting of two members separated a suitable distance, a pivot for said valve midway between the members, said members being curved on an arc struck from said pivot and being arranged to alternately close the chute whereby predetermined quantities of carbid may be fed, means controlled by said gas pressure for actuating said valve whereby the chute will be closed when the pressure exceeds a predetermined point and when it falls below a predetermined point.

7. An acetylene gas generator, comprising a generating chamber, a carbid hopper above the chamber, a valve consisting of two members separated a suitable distance and located on opposite sides of a pivotal point, said members being adapted to permanently close the discharge passage, means located in the generating chamber and subjected to the gas pressure therein to move said valve, means operating against the gas pressure to move said valve when the pressure is reduced below a predetermined point, means extending horizontally outward through the wall of the gas generating chamber, whereby the valve may be manually operated.

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