No. 618,015. Patented Jan. 17, 1899.

E. F. SMITH.

ACETYLENE GAS GENERATOR.

(Application filed Oct. 9, 1897.)

(No Model.)

Fig. 1.

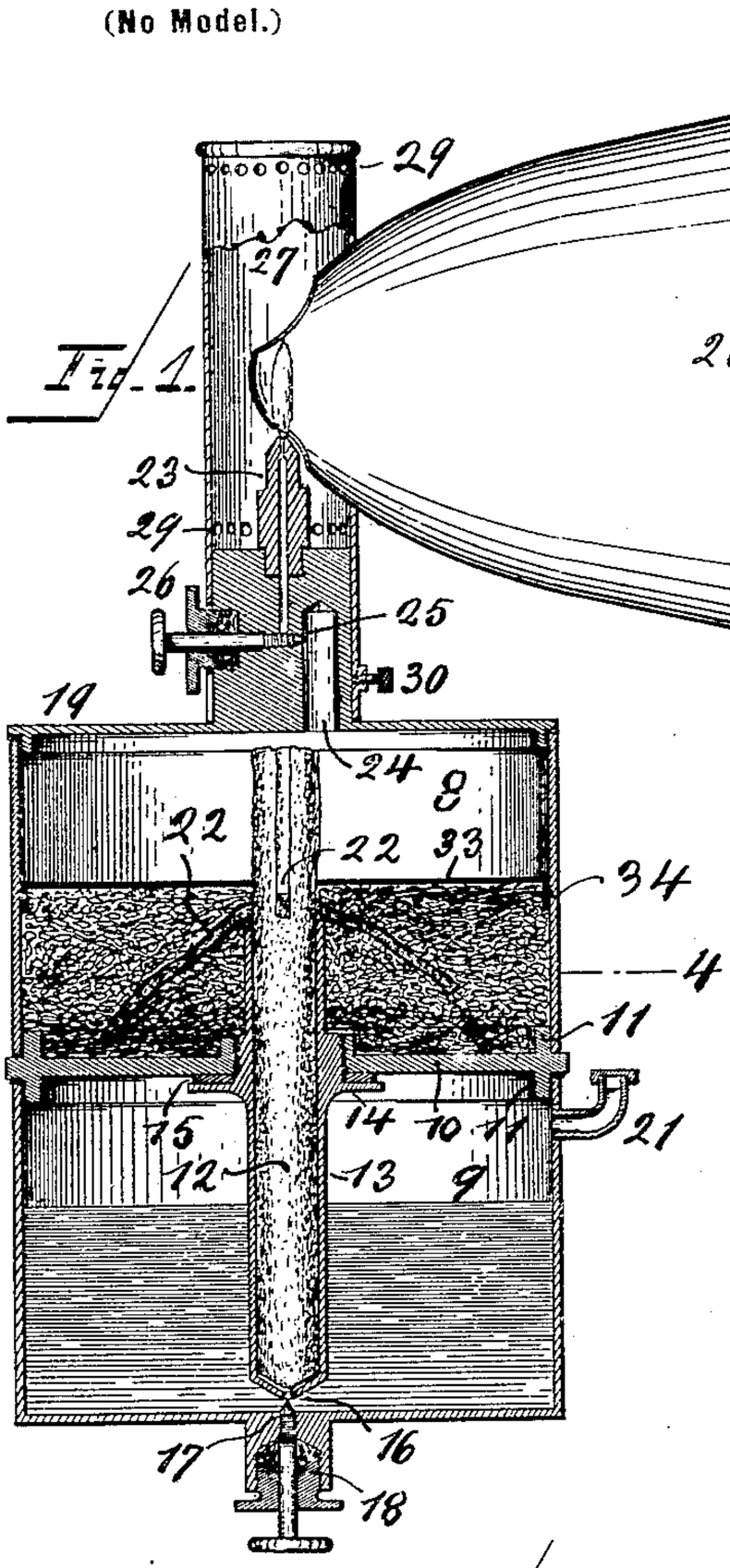


Fig. 2.

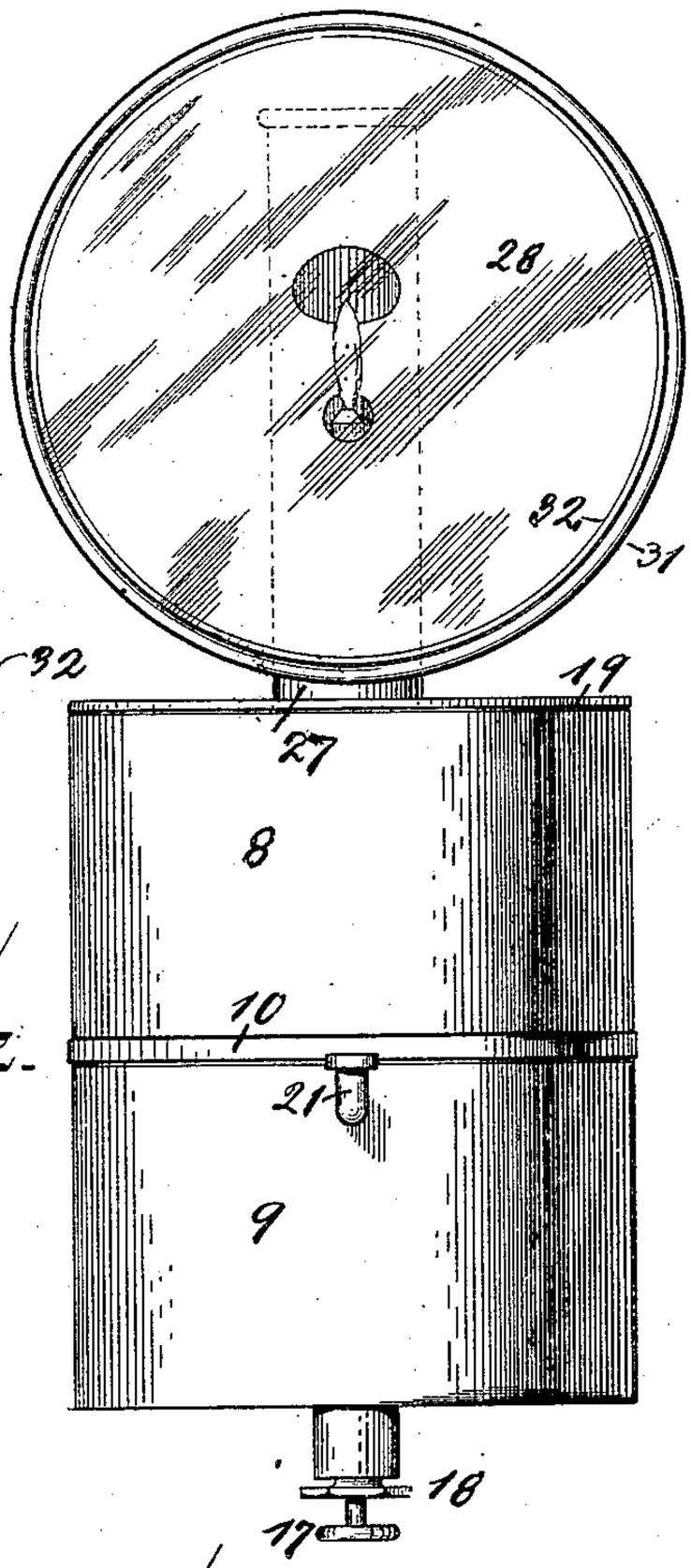


Fig. 3.

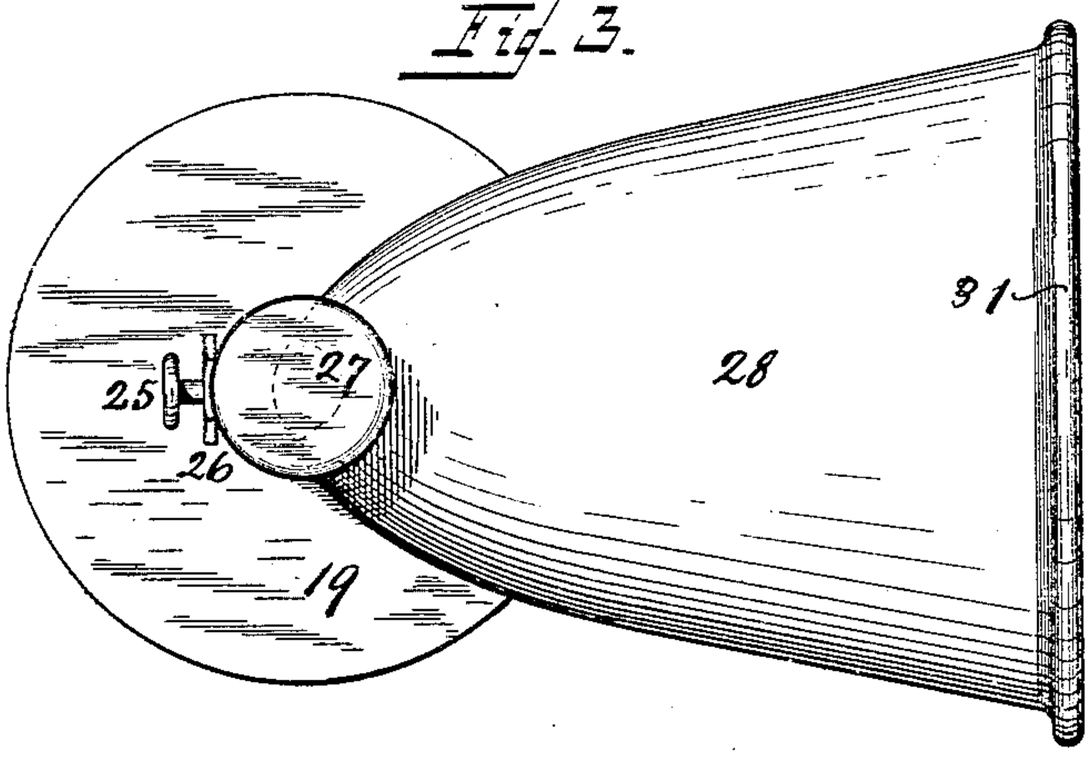
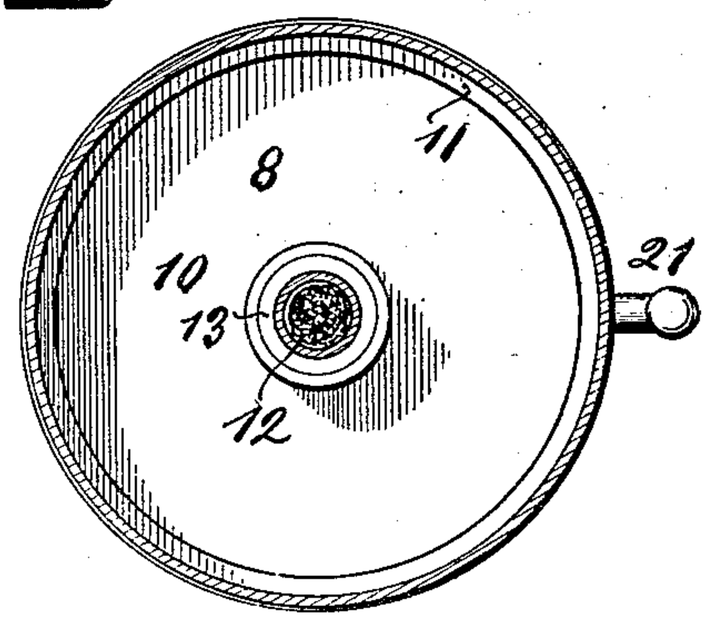


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 618,015, dated January 17, 1899.

Application filed October 9, 1897. Serial No. 654,623. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. SMITH, a citizen of the United States, residing at Cincinnati, Hamilton county, State of Ohio, have invented a certain new and useful Acetylene-Gas Generator; and I do declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to an improved apparatus for generating acetylene gas, which, as is well known, is evolved when certain chemicals like, for instance, carbid of calcium are brought in contact with water, when the action of the latter upon the former produces the desired result.

My invention relates to the particular manner and construction whereby the water is fed to the chemicals and which is of a kind to produce an even and uniform supply, resulting in a correspondingly even and uniform generation of gas of unvarying pressure, which burns with a steady flame.

It also relates to means whereby this water-supply is used to control the generation of the gas.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section of the generator with superimposed burner and reflector attached, the whole comprising a complete lamp. Figs. 2 and 3 are respectively front and top views of Fig. 1. Fig. 4 is a horizontal section on line 4 4 of Fig. 1.

My generator consists substantially of two compartments, one for the chemicals and the other for the water, the two so located with reference to each other that the one with the water occupies a lower position than the one containing the carbid. In practice I use a cylindrical vessel horizontally divided by a partition 10 into two compartments, as shown in Fig. 1, where 8 indicates the compartment for the carbid, while 9 is the one for the water. This arrangement admits also of a convenient and compact construction—as, for instance, the two compartments might be formed in one piece and partition 10 secured inside, or the latter may be made sufficiently strong and provided with flanges 11 11, to which the shells comprising the compartments are secured. Since these parts are by preference made of metal, any other applicable construction may be used.

The water is fed from below to the carbid above by means of a wick 12, which secures a constant and even supply at all times, no matter how much of the former has been consumed. This wick is of absorbent material, which passes through an opening in partition 10 and extends downwardly into the body of the water and upwardly into the body of the carbid. Felt is a good material for the purpose, while blotting-paper in form of a wad gives also satisfactory results. The disturbing action of gravitation is thereby avoided, since the water is raised by capillary attraction only, and the generation of gas and steadiness of flame dependent thereon are not influenced by the diminishing pressure of a decreasing water-supply, as is the case when all or part of the latter is carried above the carbid. To better sustain this wick in position, I provide a socket for it in form of a tube 13, which is secured within the opening of partition 10 in any suitable manner. As shown, a screw connection is used. A flange 14 is also provided on tube 13 to permit use of a washer 15 between it and partition 10 to obtain a tight joint, which prevents leakage of gas. In the lower otherwise-closed end of tube 13 is an opening 16, through which the water passes to the wick. It is controlled by a needle-valve 17, seated in the bottom of compartment 9 and accessible from the outside, as shown. A stuffing-box 18 is provided thereat to prevent leakage. Means to permit access to each compartment are provided to permit them to be charged with their respective contents. For such purpose and in case of com-

partment 8 the top 19 of the latter is removable. In case of compartment 9 a fill-opening 21 is provided. The generation of gas is started by opening of valve 17, which permits the water to saturate the wick, from which it passes to the carbid above. Passage through all parts of the body of this latter is also by capillary attraction between the particles.

As is well known, the saturated carbid forms a residue in shape of an amorphous lime, the affinity of which for water is not as great as that of the carbid, and the supply of water to the as yet unexposed carbid which must necessarily pass through such residue is apt to be impeded thereby. To prevent such, tube 13 is carried to a considerable extent above partition 10, so that only the upper part of wick 13 comes in contact with the carbid, and the latter receives thus the water from above. Residue commences thus to form from the top on down, so that the water after being raised by the wick instead of having to ascend through such residue passes therethrough to the unconsumed carbid beyond with a downward movement, whereby gravitation aids the movement of the water, and thus offsets the impaired action by capillary attraction due to the reduced affinity for water of the residue. This passage may be facilitated by providing lateral feeders 22, reaching from the upper part of the wick through the carbid and disposed downwardly. They may consist of separate pieces attached to the wick or be formed by cutting strips out of the side thereof. This limited contact between carbid and water-supplying surface obtained by the upwardly-extended tube 13 prevents also the rapid evolution of gas, which would otherwise take place at the beginning if the whole of such water-supplying surface were at once engaged and which evolution would quickly and steadily diminish as the water permeates the carbid, requiring constant attention and frequent regulation of the burner-supply in order to maintain a steady flame. As it is, the water is admitted very slowly to the carbid and to the top of the same, as explained, so that as the absorptive capacity of the carbid is reduced by the formation of residue such reduction is offset by increased contact with the water-supplying surface of the wick, which increased contact is due to the increase of volume of the chemicals caused by the water absorbed and which causes them to expand and rise on the wick slowly, involving more and more of the free surface thereof. Where gas is thus generated on a large scale to supply a number of burners, a pipe is provided leading from compartment 8 to supply them. When only one burner is used, the latter is preferably mounted on top of the generator, as shown at 23, and fed by a short supply-pipe 24. The supply to the burner is controlled by a suitable device—as, for instance, by a needle-valve 25, seated in the enlarged wall of pipe 24. A stuffing-box 26 is provided where the shank of this valve passes to the outside. When the lamp is not used and the burner closed, then valve 17 should also be closed to prevent further generation of gas and consumption by permeation of carbid. The flame may be open or protected by a chimney 27, which may be of glass when no reflector is used. Where one is used—as, for instance, in cases where this lamp is used as a headlight for locomotives, street-cars, or as a bicycle-lamp—then in such case the chimney is of metal, and the reflector 28 is secured thereto. The chimney, with the reflector, is slipped over the boss formed by the enlarged pipe 24, being cut out to clear stuffing-box 26, and is held in place by a set-screw 30. Suitable air-holes 29 are provided in the chimney. The reflector is preferably formed on a parabolic curve and closed in front by a glass plate set within a bead 31 and held in place by a wire 32, sprung into place in the same bead in the front of it.

Means for supporting and fastening the lamp are provided in accordance with the particular use to which it is put. When used for indoor purposes or as a table-lamp, a suitable base is provided. When used as a headlight for cars or as a bicycle-lamp, the means for support and attachment are accordingly changed. In the latter case and in all such cases where the lamp is subject to motion and incident jars an interior cover 33 is used to prevent the carbid from being thrown promiscuously about. This cover has a flange 34 on its edge, which fits the interior diameter of compartment 8 sufficiently close to be held in place, but not so tight as to prevent expansion of the carbid, which takes place as soon as the latter commences to absorb the water supplied by the wick. The fit is also sufficiently loose to permit free passage upwardly of the generated gas, which passes up around its edge and through the opening provided for the wick.

Having described my invention, I claim as new—

1. In an acetylene-gas generator, the combination of two compartments one below the other and separated by a horizontal partition, the water-supply being all in the compartment below such partition, while the chemicals are supported above the same, an opening in the partition and a wick-supporting socket depending therefrom downwardly into the water-supply, a wick in said socket reaching upwardly into the upper compartment and a controllable water-inlet to such socket.

2. In an acetylene-gas generator, the combination of two compartments, one below the other, and separated by a horizontal partition, the water-supply being all in the compartment below the latter, while the chemicals are supported above the same, an opening in such partition, a wick supported therein and depending downwardly into the water-supply and reaching also upwardly into and through the carbid-supply, the lower part of

that portion of the wick which is above the partition and passes through the lower part of the carbid being inclosed, so that only the upper layers of the latter are in contact with the wick.

3. In an acetylene-gas generator, the combination of two compartments, one below the other and separated by a horizontal partition, the water-supply being all in the compartment below the partition, while the carbid is above the same, an opening in such partition, a wick-supporting socket supported therein, depending downwardly into the water-supply and extending upwardly from said partition into the carbid-supply, a wick contained in such socket and projecting above the upper end of the same, so as to come in contact only with the upper strata of the carbid thereat and a controllable water-inlet at the lower end of such socket.

4. In an acetylene-gas generator, the combination of two compartments, one below the other, a partition separating them, a socket communicating with both compartments and adapted to contain absorbent material supported on the partition, means to control access to the socket from below and an outlet for the gas.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

EDWARD F. SMITH.

Witnesses:
C. SPENGEL,
ARTHUR KLINE.