G. F. H. BARTLETT.
Ozone-Generator.

No. 205,340. Patented June 25, 1878.

Fig: 1.

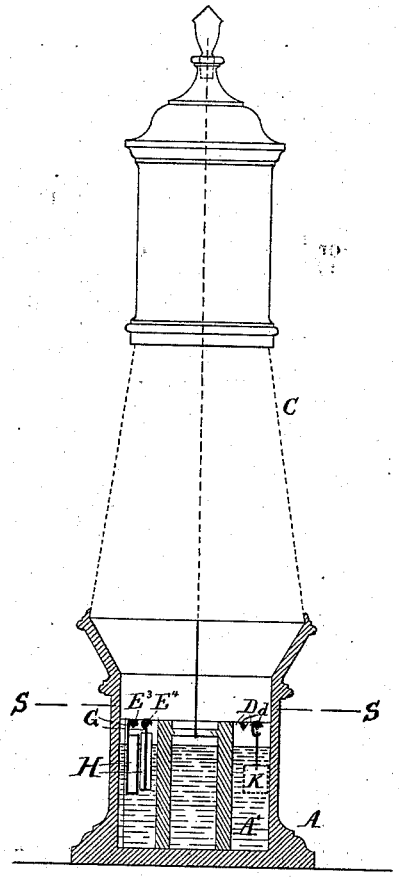


Fig: 3.

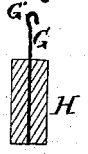


Fig: 4.

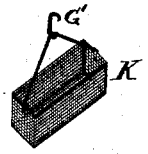
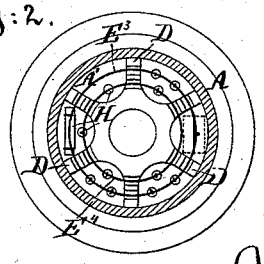


Fig: 2.



Witnesses:

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Inventor:

G. F. H. Bartlett

by his attorney

D. S. Stetson

UNITED STATES PATENT OFFICE.

GEORGE F. H. BARTLETT, OF BUFFALO, NEW YORK.

IMPROVEMENT IN OZONE-GENERATORS.

Specification forming part of Letters Patent No. **205,340**, dated June 25, 1878; application filed May 1, 1877.

To all whom it may concern:

Be it known that I, GEORGE F. H. BARTLETT, of Buffalo, Erie county, in the State of New York, temporarily residing in the city and county of New Haven, in the State of Connecticut, have invented certain new and useful Improvements relating to Apparatus for Producing Ozone, of which the following is a specification:

I produce ozone in the well-known manner by the slow oxidation of phosporus with a limited supply of air.

The apparatus may be varied greatly in form and proportions, but I prefer the general construction described in the patent to F. W. Bartlett, dated February 15, 1876, No. 173,386.

The extraordinary nature of phosphorus involves difficulties which my invention seeks to avoid. By peculiar provisions I support the phosphorus so that, in case of ignition of any part, that part will be immersed in water.

In a large apparatus I support a number of independent pieces by independent supports, either or all of which will yield when the the heat rises much above the usual temperature. A sufficient quantity of water being provided immediately below, the yielding of the support causes the phosphorus to sink and be extinguished.

When my improvement is fully carried out, I support the separate pieces of phosphorus on a structure in the form of a ring, or of two or more rings mounted concentrically one within the other. The rings and also the supports extending down therefrom to the several pieces of phosphorus are easily fusible—as, for example, the well-known alloy of bismuth, lead, and tin.

In order to utilize the fragments of phosphorus precipitated by the melting of the supports, I provide a cradle or foraminous dish, which may be attached to the ring by means of a fusible support similar that for supporting the pieces of phosphorus.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a central vertical section. Fig. 2 is a horizontal section on the line S S in Fig. 1. Fig. 3 is a section through one of the details on a larger scale, and Fig. 4 is a corresponding perspective view of another detail.

Similar letters of reference indicate corresponding parts in all the figures.

A is the base or foot, in the form of a tight dish to hold water. A′ designates the hollow interior or chamber in which the phosphorus is exposed to the air and the ozone generated, which rises and is discharged through the porous distribing-surface C, while fresh air enters slowly through said surface, in accordance with the aforesaid Bartlett patent of 1876.

In working the apparatus water is applied to the interior up to the level indicated in the drawing, Fig. 1. Suitable passages (not represented) opening into the apparatus below the water-line may be made available to supply water and to exchange the water at intervals.

E^3 E^4 are rings of fusible or ignitible material, supported upon the dividing partitions or wings D, as represented, guided by notches *d*. Upon each of the rings E^3 E^4 are hooked at at intervals slender strips or wires G of fusible metal, on the lower ends of which the phosphorus sticks H are attached by having been previously cast in molds around the fusible metal in the same manner as the oleaginous matter is caused to envelop the wick in a candle.

I find that a coating of varnish, and especially that known as "gold lacquer," is useful to preserve the fusible metal from being affected by the acid.

The hooks G′ should be bent at a uniform length from the upper end of the several sticks of phosphorus, so that when placed in position and the water-level lowered to the proper point the phosphorus of all the sticks will be exposed at once.

Provisions being made, by clock-work or otherwise, (not represented,) for slowly lowering the surface of the water, the upper ends of all the sticks of phosphorus H will be gradually exposed to the air and oxidized away by the well-known slow oxidization which occurs in such cases, and will produce the desired ozone with its necessary adjunct of the undesirable phosphorous acid. The ozone will mingle with the atmosphere through the

strainer C above, and be utilized in the apartment in which the machine is used. This will go on producing ozone and causing the phosphorous acid to fall within the apparatus or to be transformed into a neutral salt in the fibrous strainer without any considerable elevotion of temperature, and consequently without affecting the fusible metal of the several suspensory strips G. But the moment one of the phosphorus sticks H, through any chance, commences to oxidize too fast, and assumes a condition approximating to active combustion, an elevation of temperature occurs, which melts off the fusible metal suspending that stick in which the mischief occurs. The defective stick of phosphorus, thus liberated from all connection to the suspending-ring, instantly sinks and is entirely immersed in the water, and the incipient inflammation extinguished before it has had time to fairly commence.

The liberation by this means of a stick of phosphorus, even if through any chance it be delayed until a fierce combustion has actually commenced, will rarely communicate its fire to any other piece. Care being taken that the phosphorus sticks be suspended at proper distances apart, and preferably with a partition or wing, D, between each and its neighbor, the fire will always be extinguished before communicating to the neighboring pieces. The defective fragments of phosphorus thus liberated collect at the bottom of the vessel, and, unless provision is made for their utilization, cause considerable waste. To obviate this, I construct a cradle, K, of perforated sheet metal or wire-gauze, thickly plated with platinum, or formed altogether of platinum or other refractory material capable of withstanding the acid, and expose its contents gradually above the water-surface. It is suspended by ties of fusible metal, which melt the moment active combustion occurs. This cradle is useful to consume the short pieces and irregular fragments which result from the occasional falling of the partially-consumed molded masses H.

What I esteem the best fusible metal is the well-known alloy—eight parts bismuth, five parts lead, and three parts tin.

Molding the phosphorus in the form of a slender rod sticking to and surrounding the support G is not only a convenient means of attachment, but insures that the heat shall be transmitted directly and instantly to all sides of the support the moment the temperature rises.

A good fusible metal is made with bismuth, 15; lead, 8; tin, 4; and cadmium, 3. This melts at about 140° Fahrenheit.

Modifications may be made in many of the details by any good mechanic without departing from the principle of the invention. Some portions of the invention may be used without the others. Thus the cradle may be dispensed with altogether, and the fragments of phosphorus which would be utilized thereon may be remolded. The notches *d* in the wings or divisions D may be replaced by holes extending through, or may be dispensed with entirely, if preferred. Other modes than simply hooking may be used for attaching the fusible connections G upon the rings of frames E^3 E^4. Notches in the latter may be used for determining the proper positions of the several connections G, and consequently of the phosphorus sticks H.

The rings E^3 E^4 need not be perfectly round. Only one ring E^3, or a greater number than two, may be used. One or both these rings may be refractory metal, so long as the supports G are fusible or ignitible. The phosphorus sticks may be held without molding them upon the support G. The latter may, for example, be made of sufficient length and coiled around separately-molded sticks of phosphorus. The phosphorus may be in other forms than sticks. The phosphorus and its supports may be raised by clock-work or other means, instead of lowering the surface of the water.

An obvious modification to which I attach much importance is the substitution of a combustible for a fusible support corresponding to my support G. I believe that woolen yarn, or a yarn of cotton treated with some chemical to make it just sufficiently incombustible to prevent its blazing, may be used with good effect. In such case the phosphorus, being melted or otherwise attached to the lower end, will be removed by slow oxidation without affecting the support; but the moment the temperature rises and the phosphorus commences to burn the string will burn off, and drop the phosphorus without its blazing up and communicating any fire to its neighbors. The yielding supports may serve with the several masses of phosphorus suspended in a common field without being partitioned off, as shown.

I claim as my invention—

1. In combination with a water-containing vessel and provisions for slow admission of air and for the discharge of ozone, the yielding supports G, adapted each to immerse its quantity of phosphorus on the generation of any considerable heat, as herein specified.

2. The phosphorus sticks H, molded upon the yielding supports G, as and for the purposes herein specified.

3. In combination with the water-vessel A and ozone-distributing surface C, the open-work cradle K and suitable supporting means, as a means for holding loose fragments of phosphorus and controlling their emergence from the water, as herein specified.

In testimony whereof I have hereunto set my hand this 4th day of April, 1877, in the presence of two subscribing witnesses.

GEO. F. H. BARTLETT.

Witnesses:

THOMAS D. STETSON,

CHAS. C. STETSON.