

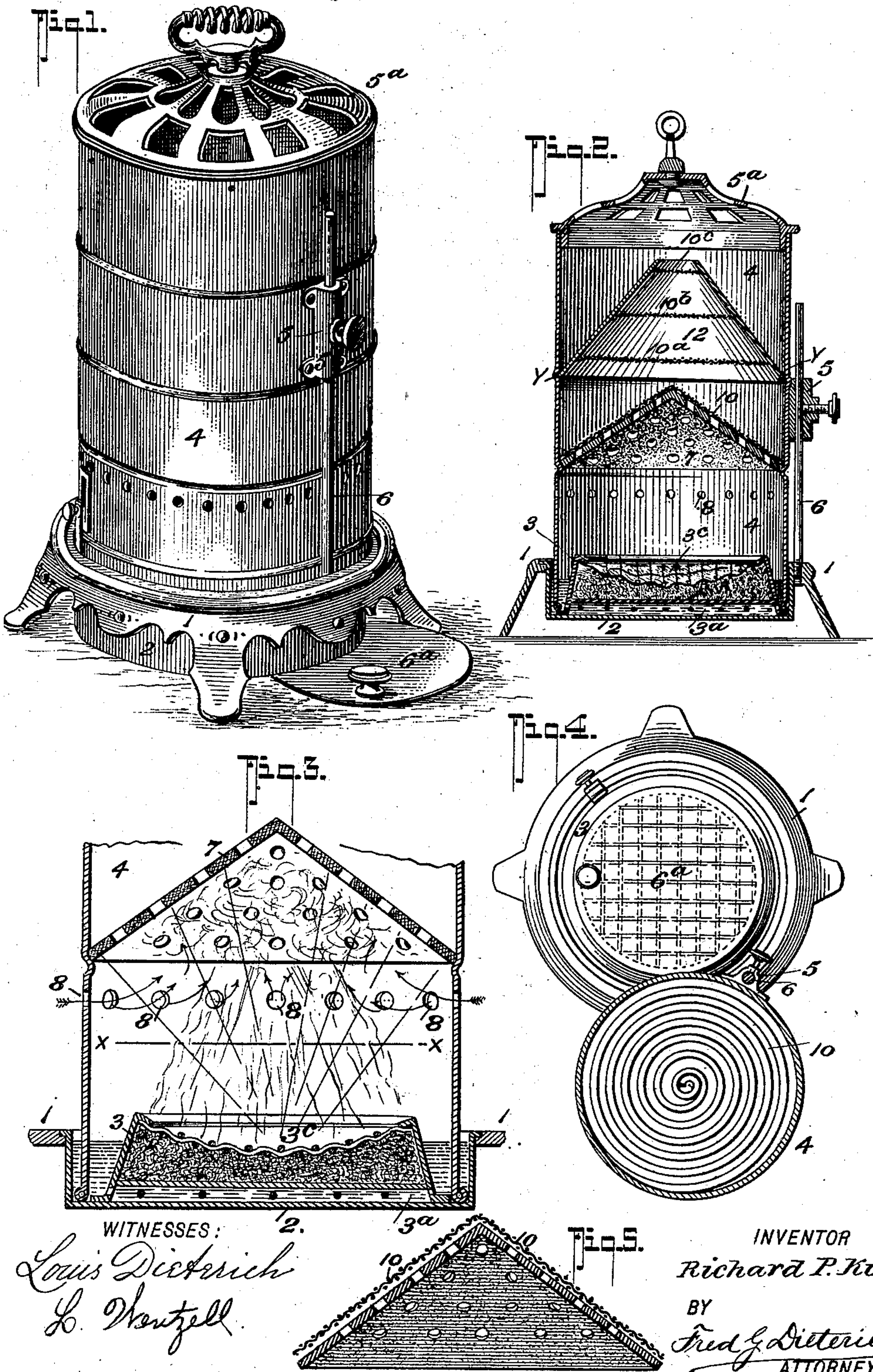
No. 666,104.

Patented Jan. 15, 1901.

R. P. KUHN.  
FORMALDEHYDE GENERATOR.

(Application filed Oct. 1, 1900.)

(No Model.)





# UNITED STATES PATENT OFFICE.

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## FORMALDEHYDE-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 666,104, dated January 15, 1901.

Application filed October 1, 1900. Serial No. 31,701. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD P. KUHN, residing at Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Formaldehyde-Generators, of which the following is a specification.

This invention relates to improvements in that type of formaldehyde-generating means such as is generally disclosed in my Patents No. 599,849, dated March 1, 1898, and No. 652,482, dated June 26, 1900; and it more specifically relates to improvements in the form of generator shown in my Patent No. 652,482, aforesaid, and that form shown in my co-pending application, Serial No. 21,209, filed June 22, 1900.

My present invention primarily has for its purpose to provide an improved coöperative arrangement of the conical diaphragm, the burner-pan, and the air-inlets whereby a greater oxidation of the alcoholic fumes is obtainable than has heretofore been possible with the forms of oxidizing-chambers shown in my other patents aforesaid and whereby the fumes from the pan will be caused to concentrate toward the center of the diaphragm and the danger of portions thereof leaking or escaping through the air-inlets and prematurely mixing with the air and escaping through the diaphragm before proper oxidation thereof has been effected is overcome, said arrangement of the conical disk, the burner-pan, and the air-inlets being such that the radiant heat-rays from the diaphragm will be caused to the more fiercely engage with the concentrated fumes from the burner and a more quick and positive absorption of such fumes effected prior to their commingling with the oxygen, which enters the oxidizing-chamber through the inlets under the diaphragm, said fumes by reason of their intensely-heated condition prior to their commingling with the air-currents being greatly induced by such air-currents to pass up in a compact volume under the diaphragm before being diffused by direct contact therewith.

Another object of my present invention is to provide additional means for increasing the efficiency of the generator, particularly for arresting any of the non-oxidized fumes

that pass up through the diaphragm and transposing the same into a formaldehyde without materially increasing the heated conditions of the oxidizing-chamber or the danger of creating combustion, said results in my present invention being secured by combining with the fibrous or heat-holding oxidizing-diaphragm a second oxidizing member formed of a metallic (iron) base with platinized surfaces.

This invention also comprehends in its complete make-up a novel coöperative arrangement of the conical fibrous platinized diaphragm with a platinized metallic mesh and a draft-cone, the latter serving a triple function: first, as a means for throwing back against the platinized surfaces a bulk of the fumes that pass up through and over the metallic platinized surfaces to positively transform such portions of the fumes as may have escaped oxidation; secondly, to serve as a draft-cone for centering the up-take of all of the fumes, and, third, as a deflector to prevent any back draft that may enter through the top of the oxidizing-chamber and retarding a proper and uniform outflow of the formaldehyde.

In its more subordinate features my present invention consists in certain details of construction and novel arrangement of parts, all of which will hereinafter be fully described, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved formaldehyde-generator. Fig. 2 is a vertical section of the same, the parts being shown in their operative or generating position. Fig. 3 is a detail view illustrating the specific correlation of the conical diaphragm, the burner-pan, and the air-inlets, the direction of movement of the fumes and the radiating heat-rays from the diaphragm being diagrammatically illustrated. Fig. 4 is a section taken practically on the line 4 4 of Fig. 2, the oxidizing-chamber being shown swung to one side and the muffler-plate resting upon the burner-pan. Fig. 5 is a detail view illustrating diagrammatically the correlation of the fibrous disk and the conical metallic platinized wire disk hereinafter referred to.



In the accompanying drawings, 1 designates a suitable iron base having an annular rim 1<sup>a</sup>, which forms the supporting-ledge for the water-pan 2, in which is held the burner-pan 3, said pan having a pendent annular perforated rim 3<sup>a</sup> to allow the water to circulate under the pan as well as around the sides thereof.

The casing 4 is made of sheet metal, has a cylindrical shape, and is of such diameter that its lower edge will fit down into the water-pan and surround the burner-pan when the parts are in their operative or generating position, as best shown in Figs. 2 and 3.

The casing 4 is held for vertical movement and to swing in a horizontal plane when its entire lower edge is raised in a plane above the base 1 and the burner-pan, and for such purpose said casing has a solid external member 5, vertically apertured to slidably fit on the standard or rod 6, secured at its lower end to the base 1, said rod forming the fulcrum-point from which the casing is adapted to be swung laterally to uncover the burner-pan, as clearly illustrated in Fig. 4. The purpose of mounting the casing 4 to rise in a vertical plane and swing laterally is to permit a quick muffling of the flame for heating the catalytic or platinized surfaces after they have been sufficiently heated. To effect such result, the casing is lifted until its lower edge is in a plane above the pan and sufficiently elevated to permit the insertion of the muffler-plate 6<sup>a</sup> (shown in Fig. 1) over the pan to choke the flame. (See Fig. 4.)

One of the advantages of supporting the casing in the manner shown and described is that the said casing can be swung partly or wholly from over the pan when it is desired to fill the burner-pan and the water-pan, and while the pans are being filled the casing can be lowered so its bottom edge will rest upon the base 1.

5<sup>a</sup> designates a cast-metal skeleton top detachably joined to the upper end of the casing by screws or otherwise, said top having a suitable ornamental handle, as shown.

The peculiar construction of the base, the cylindrical casing with its top, the general arrangement of the burner-pan and water-pan, and the manner of supporting the casing so that it can be raised vertically and swung laterally form *per se* no part of my present invention, as they are fully shown, described, and claimed in my copending application hereinbefore referred to. The general correlation of the burner-pan 3, the conical platinized or main oxidizing-diaphragm 7, and the air-inlets 8 in the present case is also like that shown in my copending application, the differentiating feature in the present case being in the detailed formation of the upper surface of the burner and the relative arrangement of the angles or pitch of the under oxidizing-surface of the diaphragm 7 and the air-inlets jointly with the upper surface of the burner. To clearly distinguish the said differentiating features, it should be stated that

in my other application and the patent referred to the upper surface or mesh of the burner is flat—that is, the same lies in a substantially horizontal plane. In practical use I have found that by reason of such flat surface the fumes from the pan pass up in substantially vertical lines, and by reason thereof a portion of the fumes would frequently leak out through the air-inlets before being oxidized and other portions thereof, especially near the walls of the casing, would commingle with the air-currents, escape the direct radiating-rays from the conical diaphragm, and pass up through the said diaphragm through the apertures near the peripheral edge thereof and be but partially oxidized or transformed into formalde gases, producing, as it were, a great waste, and thereby failing to effect all the results desired. To overcome this defect and to render the generator one of increased efficiency and more economical in its generating action, I have found from practical experiment that by making the upper or meshed surface of the burner concaved or dished, as indicated by 3<sup>c</sup>, the fumes therefrom will pass upward convergingly, as illustrated in Fig. 4, toward the center or apex point of the diaphragm 7, be thereby kept away from the walls of the casing and brought in a more compact volume in the direct lines of radiation from the diaphragm, and to further increase the concentration of the fumes, and also for creating a quicker transformation of the same to formaldehyde, I combine the said pan, the conical diaphragm, and the air-inlets 8 in such manner that the radiating heat-lines from the diaphragm will engage the fumes before they pass up into the zone of the air-currents, as shown by the arrows in Fig. 3, the contact-point being indicated by the line X X. By thus concentrating the fumes from the burner they are subjected to a more fierce heat by reason of the concentration of the rays from the diaphragm on the concentrated fumes, and, furthermore, by reason of an increased induction created thereby, which causes the air to be drawn inward toward the center of the diaphragm to the more thoroughly intermix with the fumes, the intermixed products will be the more thoroughly diffused over the oxidizing-surface.

While the correlation of the diaphragm and concaved pan has been found to greatly increase the efficiency of the generator, I have provided supplemental means for positively obtaining a maximum transformation of the fumes that pass from the pan. For this purpose I provide a supplemental oxidizing member in the nature of a wire screen having its surfaces platinized. This platinized metallic screen is placed above the fibrous or main oxidizing-disk 7 and is preferably in the nature of a conical hood, (indicated by 10 in Figs. 2 and 5,) whereby it can be readily fitted upon the top of the said disk 7, as clearly shown in Fig. 2. If desired, the said metallic platinized-wire oxidizing member may be



a spiral coil, as shown in Fig. 4, or the said member arranged in any manner that will serve to absorb or break up the fumes that pass through the disk 7 not entirely transformed into formaldehyde. I have discovered that the supplemental oxidizing member effects the best and most desirable results when made of iron wire platinized, for the reason that such form is very economical, and more particularly said supplemental oxidizing-surface will effectively serve to transform whatever fumes escape the main diaphragm without appreciably increasing the heat within the oxidizing-chamber, thereby avoiding danger of combustion, which is incident in the use of a number of diaphragms made up of fibrous or other heat-absorbing material.

In the use of my other type of generators referred to it sometimes happens that by tilting the same or from other causes a back draft through the top occurs, which not alone interferes with a proper transformation of the fumes, but tends to blow out the partially-oxidized gases. This I now prevent by fitting a draft-cone 12 in the top of the casing. The lower edge of the cone 12 has a diameter slightly greater than that of the cylinder 4, so that when slipped down into the said cylinder said lower edge will spring into engagement with and seat the groove X in the casing, as clearly shown in Fig. 2. To further provide for positively transforming all of the fumes that pass up from the diaphragms 7 and 10, additional platinized-wire screens 10<sup>a</sup>, 10<sup>b</sup>, and 10<sup>c</sup> are fitted within the cone 12, which forms the supporting member for the said screens 10<sup>a</sup>, 10<sup>b</sup>, and 10<sup>c</sup>. The cone 12 effectively retards any back draft that may enter in the top of the casing from passing down into the said casing and interfering with a proper transforming action of the disks, said cone also serving to concentrate the fumes as they pass up against the

several screens 10<sup>a</sup>, 10<sup>b</sup>, and 10<sup>c</sup>, and thereby transform any particle of the fumes that may leave the main disks 7 and 10 not wholly oxidized or transformed into formaldehyde.

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

1. In a formaldehyde-generator of the character described, the combination with the generating-chamber having an escape at the top, the burner at the bottom of the said chamber, and a platinized fibrous diaphragm in the said compartment; of a supplemental diaphragm, composed of a metal body having its outer surfaces only platinized, said supplemental diaphragm being disposed over the fibrous diaphragm and adapted to intercept the non-transformed fumes that escape through the fibrous diaphragm, for the purposes specified.

2. In a formaldehyde-generator of the character described the combination with the casing, and the conical fibrous diaphragm held therein; of a cone of platinized metallic surfaces disposed above the said diaphragm and detachably held upon the fibrous cone, substantially as shown and described.

3. In a formaldehyde-generator of the character described, the combination with the casing and the conical fibrous diaphragm; of a cone of platinized metallic surfaces disposed above the said diaphragm and a draft-cone disposed above the said metallic surfaces, for the purposes described.

4. In a formaldehyde-generating means of the character described, an oxidizing-diaphragm consisting of an iron wire having its surfaces platinized, for the purposes described.

RICHARD P. KUHN.

Witnesses:

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LOUIS DIETERICH.