

E. W. KLUCHANSKY.
 SUBLIMATION APPARATUS.
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1,304,572.

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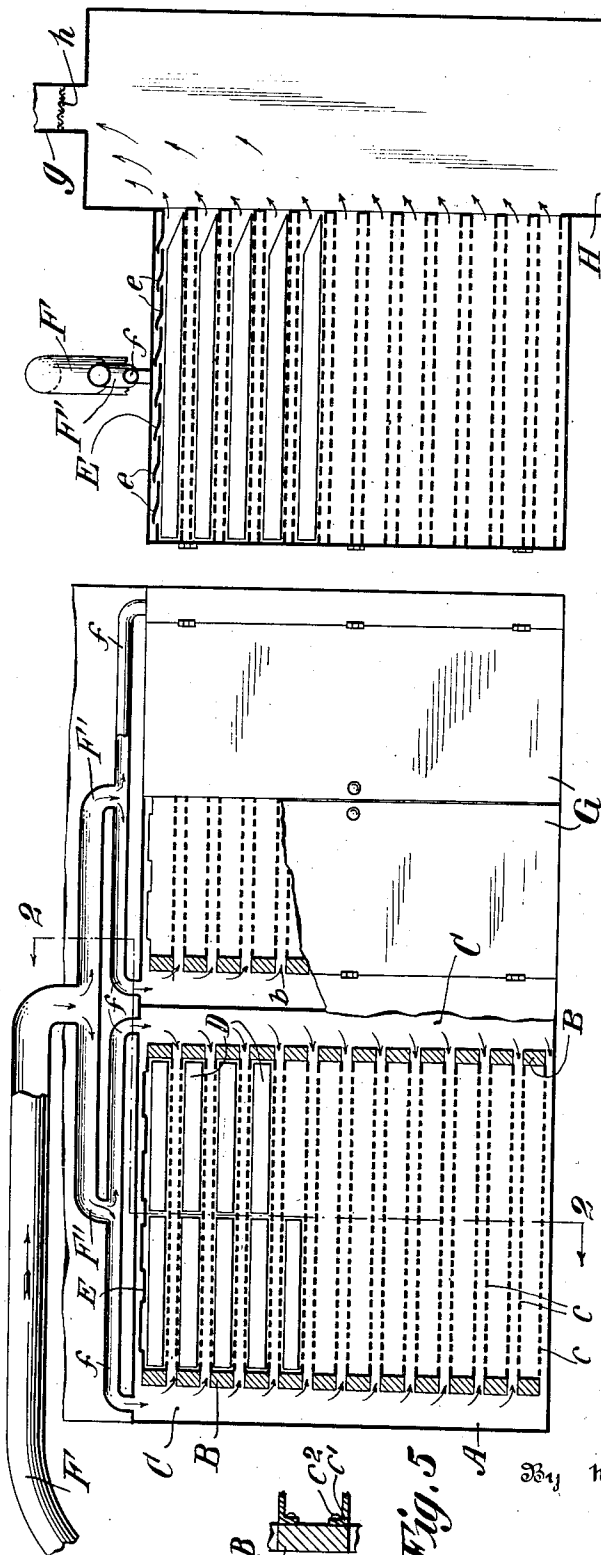


Fig. 1.

Fig. 2.

Fig. 3.

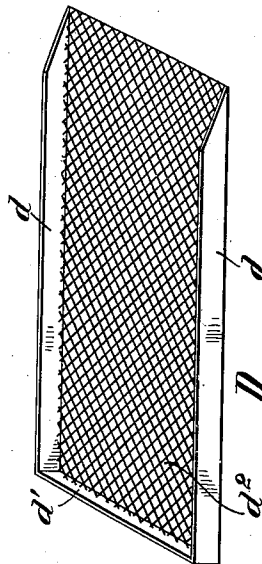


Fig. 4.

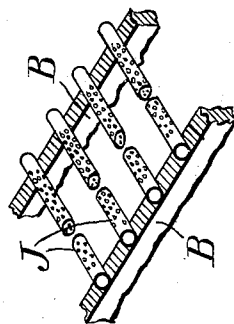


Fig. 5.



By his Attorney

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SUBLIMATION APPARATUS.

1,304,572.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EUGENE W. KLUCHANSKY, a subject of Russia, residing in the city of New York, borough of Manhattan, county and State of New York, have invented a certain new and useful Sublimation Apparatus, of which the following is a specification.

This invention is a sublimation apparatus, adapted particularly for the sublimation of salicylic acid and other chemical products which it is desired to purify by sublimation, and, more especially, by the direct heating of the materials through the medium of hot air.

The object of the invention, speaking generally, is to enable the sublimation operation to be carried out in a simple, efficient and economical manner. With this object in view, among the features of the invention, though not the exclusive ones, may be mentioned the following. Improved means whereby the apparatus may be quickly charged for operation; improved means whereby the material under treatment is quickly and thoroughly subjected to the action of hot air under slight pressure; an improved form of tray for holding the crude material; improved means for separating the sublimed product from the current of hot air, and improvements in the combination and sub-combination of said elements, and in the general construction of the apparatus.

Speaking generally, the apparatus, in its preferred form, embodies, a unit, or plurality of units, consisting of a chamber or casing, walls, spaced from the sides of the casing, whereby main air channels or passages are formed between the upright sides of the casing and the walls, said walls being provided with slots or openings through which hot air is introduced in the space intermediate the walls. Supported between and preferably by the walls, are a series of pairs of perforated plates or screens, and between the members constituting each of said pairs are positioned trays having open tops and perforated bottoms, the bottom members of the pairs serving to support the trays.

Hot air, heated to a point above the vaporizing temperature of the material to be sublimed, is supplied to the chamber, whereupon it is directed through the main air passages and thence through the slots or openings in the walls, whereupon it comes into

intimate contact with the material on the trays and carries it off in the form of vapor. The mixed air and vapor is allowed to enter a sublimation chamber, wherein the chemical is condensed, and the air, after filtration, to free it of any entrained sublimate, escapes from the apparatus. The sublimed product may be removed from the sublimation chamber, as desired, and without, necessarily, interfering with the operation of the sublimation process.

Features of the apparatus, other than those described, will appear from the herein detailed description of the apparatus, taken in conjunction with the accompanying drawings and appended claims.

Referring to the drawings, Figure 1 is a front elevation of two units, one unit being shown in section with several trays positioned therein, and, showing, also, the hot air trunk and its distributing connections.

Fig. 2 shows one of the units in sectional side elevation and, also, the sublimation chamber and associated elements.

Fig. 3 is a perspective view of an individual tray.

Fig. 4 shows a fragmental perspective of a modified form of construction for supporting the trays and diffusing the hot air, and

Fig. 5 is a detail of one of the features embodied in Fig. 1.

As the several units are all of the same construction, a description of one will suffice for a description of all. Referring to the drawings, A is a substantially closed vaporizing chamber interiorly of which are substantial upright walls B provided with openings or slots *b*, whereby main air passages C are formed intermediate the side walls of the chamber A and the interior upright walls B, the openings or slots *b* of the latter serving to introduce air into spaces intermediate said walls. Supported by the walls are a series of perforated plates or screens *c*, and between the members of each pair of screens, and supported by the bottom screen, is a tray D having side walls *d* and a front wall *d'* and a perforated bottom *d''*, and having an open back, as shown in Fig. 3. The screen *c* may be secured to the walls B in any suitable manner as by flanging the ends, as shown at *c'* in Fig. 5, bolts *c''*, or equivalent means, extending through the flanges and into walls B. The upper part of the chamber is provided with an air baffle E,

consisting of a series of overlapping plates *e e*, as clearly appears in Figs. 1 and 2.

F represents a main hot air inlet or trunk, having branches *F' F'*, as shown in Fig. 1, whereby hot air is introduced into chamber A, each of the branches *F'*, as shown, having sub-branches *f* leading to the air passages C formed between the walls of the chamber and the partitions B. Each of chambers A is provided with doors G, whereby ready access is had to the interior of the chambers for the purpose of introducing the trays, carrying the material, therein, and for removing the empty trays therefrom.

The back of the apparatus is directly connected with a sublimation chamber H, having an air exit *g*, over the inlet of which is a screen *h*, composed of burlap or similar material, whereby any vapor entrained in the air screen is filtered out therefrom prior to the exit of the air from the sublimation chamber. Positioned near the bottom of the sublimation chamber are two manually operated valves *i j*, respectively, the former of which is normally open, while the latter is normally closed, thereby permitting the sublimed material to deposit in the spaces between the valves. When it is desired to remove the material from the sublimation chamber, without interfering with the process, the valve *i* is closed, and the valve *j* opened, whereupon the material in the bottom of the chamber falls, by gravity, upon a traveling conveyer I, whence it is carried to any desired location.

From the foregoing description of the apparatus its operation will be readily understood, but it may be briefly described as follows. The material to be sublimed, *e. g.*, crude salicylic acid, having been placed on the trays D, said trays are introduced into chamber A. The doors of the apparatus having been closed, hot air is introduced therein at the desired temperature, depending upon the particular material operated upon, whereupon said material is vaporized and carried by the air current into the sublimation chamber H, where the refined chemical is deposited, the freed air escaping through air exit *g*, after having been first filtered by its passage through the filter *h*. The sublimed material may be removed from the apparatus in the manner hereinbefore described.

It will be observed that by providing the various air passages, as described, and positioning the trays D, which, as described, have open-work bottoms, on the perforated supports in chamber A, air is thereby brought into very intimate contact with the material on said trays, both at the top and bottom thereof, with the result that said material is very thoroughly and expeditiously vaporized.

In Fig. 4 I have shown a modified way of

supporting the trays. In this form, the upright walls B are provided with openings through which extend perforated pipes J, on which the trays D rest, instead of on perforated screens, or plates, as heretofore described. In this modified form of construction, perforated air pipes will also be positioned upon the trays, whereby the material on the trays is subjected to the action of the hot air both from above and below.

It will be understood that detailed changes may be made in the construction of the apparatus, as described, such as the substitution of equivalents, without departing from the spirit of the invention, the scope of which is as broadly new as is commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a sublimation apparatus, a substantially closed chamber, a hot air inlet to said chamber, upright walls within the chamber and spaced from the sides thereof, whereby air passages are formed between the sides of the chamber and the upright walls, said walls being provided with openings whereby air may enter from the air passages into the spaces between said walls, perforated supporting members extending between the walls, and perforated trays supported on said members whereby hot air is brought into intimate contact with the material on the trays both on the top and bottom thereof.

2. In a sublimation apparatus, a substantially closed chamber provided with a hot air inlet, upright walls within the chamber and spaced from the sides thereof, whereby air passages are formed between the sides of the chamber and the upright walls, said walls being provided with openings whereby air may enter from the air passages into the spaces between said walls, a plurality of pairs of perforated members extending between and supported by the walls, trays, having perforated bottoms, positioned between the members of each of said pairs of perforated members, whereby hot air is introduced above and below the material on the trays and is caused to circulate therethrough.

3. In a sublimation apparatus, a substantially closed chamber, a hot air inlet to said chamber, upright walls within the chamber and spaced from the sides thereof, whereby air passages are formed between the sides of the chamber and the upright walls, said walls being provided with openings whereby air may enter from the air passages into the spaces between said walls, a plurality of pairs of screens supported by the walls, trays, having perforated bottoms and front and side walls but no rear wall, resting on the bottom screen of each pair of screens, where-

by hot air is introduced above and below the material on the trays and is caused to circulate therethrough.

4. In a sublimation apparatus, a substantially closed chamber, a hot air inlet to said chamber, an air-baffle in the upper part of the chamber, upright walls within the chamber and spaced from the sides thereof, whereby air passages are formed between the sides of the chamber and the upright walls, said walls being provided with openings, whereby air may enter from the air passages into the spaces between said walls, perforated supporting members extending between the walls, and perforated trays supported on said members whereby hot air is brought into intimate contact with the material on the trays both on the top and bottom thereof.

5. In a sublimation apparatus, a substantially closed chamber, a hot air inlet thereto, upright walls therein, spaced from the sides of the chamber, forming main air passages between the sides of the chamber and said walls, perforated chambers forming secondary air passages extending between the main air passages and adapted to form supports for trays, and perforated trays positioned on said perforated chambers, in combination with a sublimation chamber having an air exit, means for filtering the air prior to its entry into said exit, and means for removing the sublimed material without interfering with the continuity of the process.

6. A sublimation apparatus embodying a vaporizing chamber, means for introducing hot air therein, a plurality of perforated trays positioned within the chamber, perforated conduits within the chamber from which hot air is forced through the material in the trays both from the top and bottom thereof, in combination with a subliming chamber into which the mixed current of air

and chemical vapor is introduced and wherein the latter is condensed, and means for removing the sublimed material without interfering with the sublimation process.

7. A sublimation apparatus embodying a vaporizing chamber, means for introducing hot air therein, a plurality of perforated trays positioned within the chamber, perforated conduits within the chamber from which hot air is forced through the material in the trays both from the top and bottom thereof, in combination with a subliming chamber into which the mixed current of air and chemical vapor is introduced and wherein the latter is condensed, means cooperating with the subliming chamber for entraining any vapor carried by the air current, and means for removing the sublimed material without interfering with the sublimation process.

8. In a sublimation apparatus, a plurality of vaporizing chambers, a main hot air trunk common to said chambers and having a separate branch for supplying hot air to each of the chambers, each of said branches being connected to two sub-branches which enter each chamber and means within the chamber for supporting a series of trays in spaced relation.

9. In a sublimation apparatus, a plurality of vaporizing chambers, a main hot air trunk common to said chambers and having a separate branch for supplying hot air to each of the chambers, each of said branches being connected to two sub-branches which enter each chamber, means within the chamber for supporting a series of trays in spaced relation and a baffle within the chamber for distributing the air therein.

In testimony whereof I have signed my name to this specification.

EUGENE W. KLUCHANSKY.