

Sept. 22, 1925.

1,554,914

E. H. GUTHIER

AIR DISTRIBUTOR

Filed Jan. 12, 1925

2 Sheets-Sheet 1

Fig. 1. A

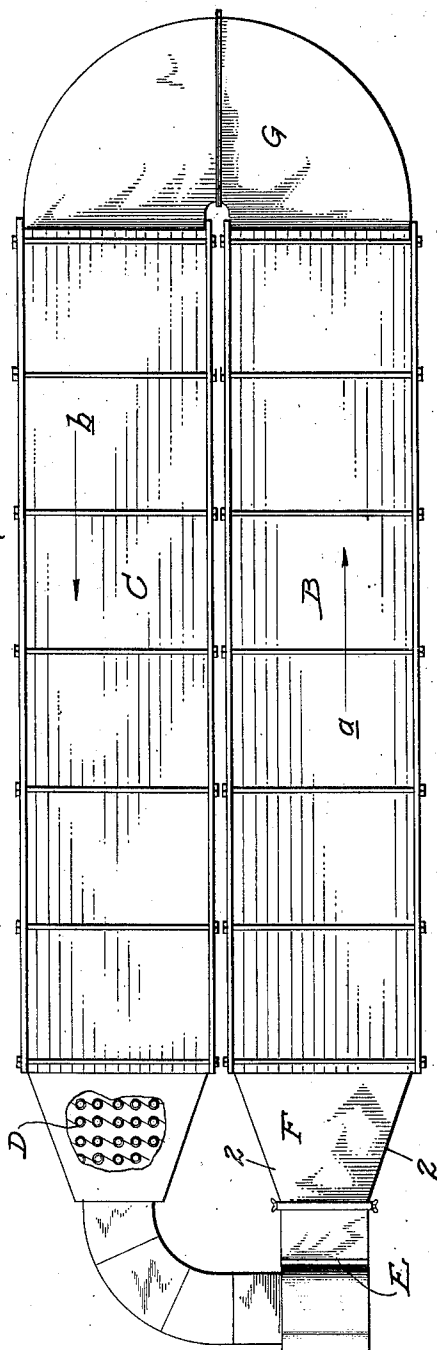
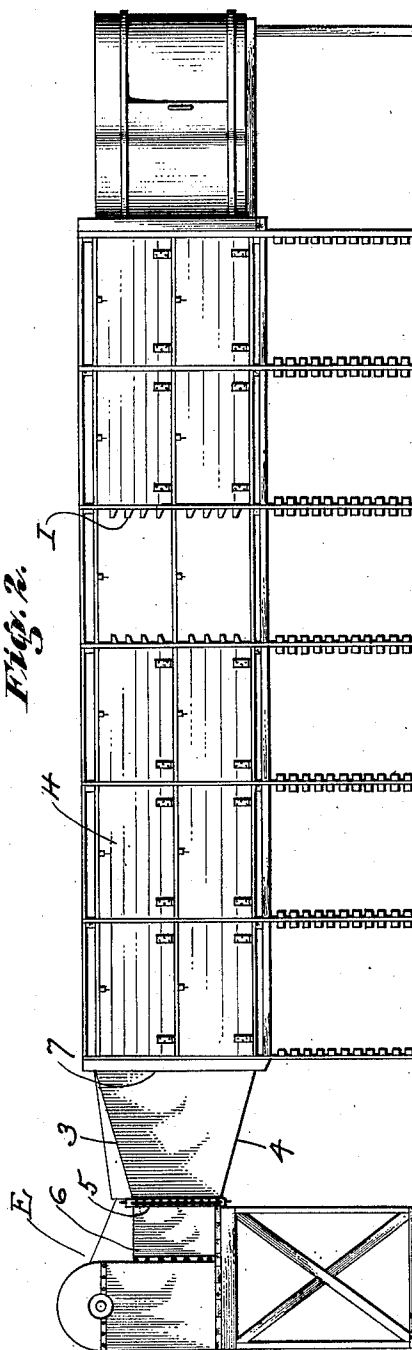


Fig. 2. I



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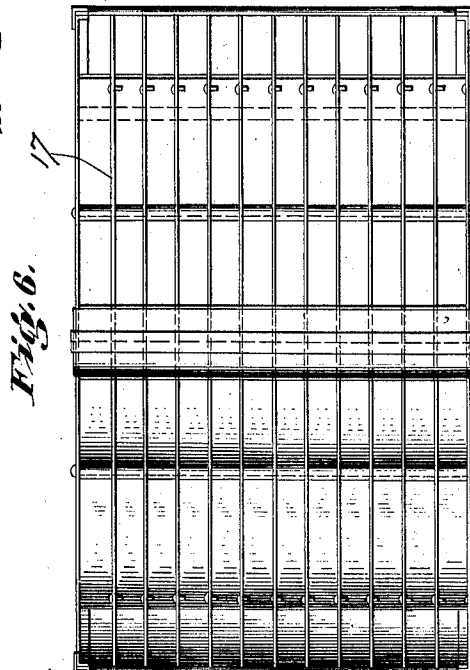
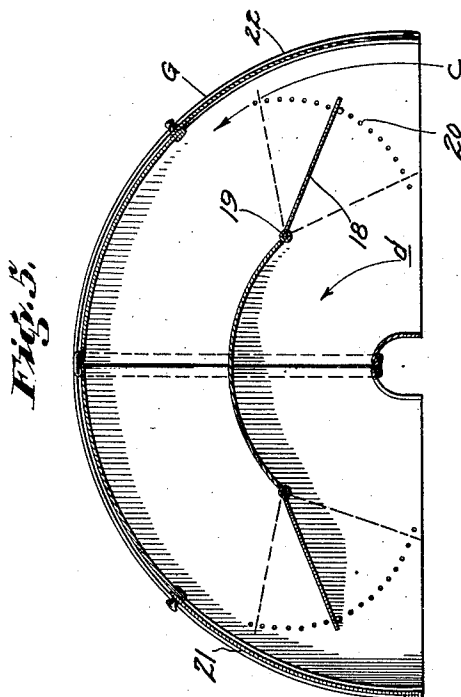
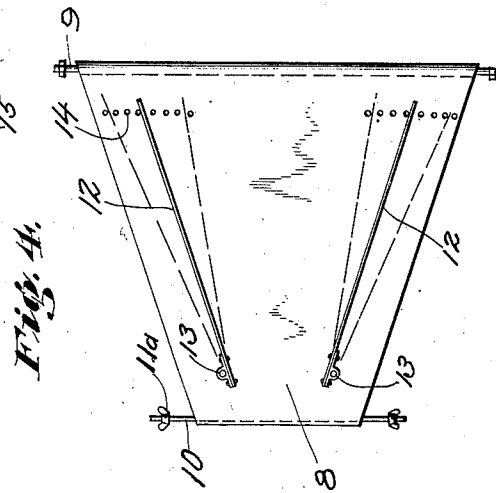
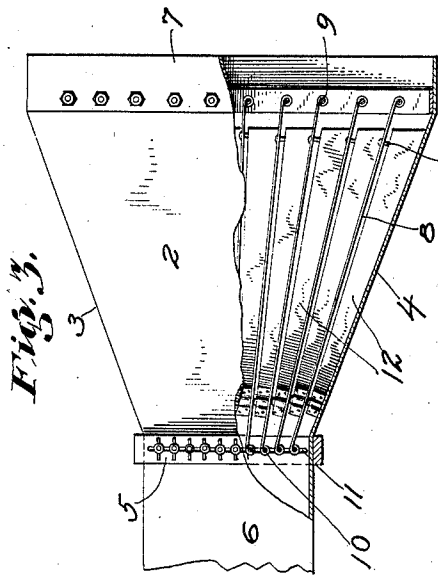
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

ERVIN H. GUTHIER, OF BERKELEY, CALIFORNIA.

AIR DISTRIBUTOR.

Application filed January 12, 1925. Serial No. 1,868.

To all whom it may concern:

Be it known that I, ERVIN H. GUTHIER, a citizen of the United States, residing at Berkeley, county of Alameda, and State of California, have invented new and useful Improvements in Air Distributors, of which the following is a specification.

This invention relates to an air distributing device for dehydrators and the like.

Despite the general success that has attended the dehydration of fruits, vegetables, nuts, and miscellaneous products, considerable trouble has been experienced in securing uniform drying among the several trays and devices commonly used to support the products being dried in the drying chambers. Non-uniformity in the drying of the product represents an appreciable economic loss in one or all of the following cases:

1. The material on some trays or portions of trays may become overdried or their quality injured before the remaining material is sufficiently dry.

2. If all the material in a regular charge be left in the dehydrator or drying chambers until all slowly drying portions are completely dried, the average drying time will be materially increased, resulting in reduced daily capacity and increased cost of operation per unit of product.

3. Products dried below the desired moisture content represent a loss in yield.

4. Uneven drying makes it difficult for an operator of a dehydrator to determine when a given charge should be removed.

All the above-mentioned difficulties are the direct result of unequal distribution of the heated air which is passed through the dehydrator.

The object of the present invention is to provide an air distributing device whereby a current of warm dry air delivered or circulated by means of a blower or like device may be equally and uniformly distributed among the several trays held in the drying chamber of a dehydrator; to provide an air distributing device of this character which may be quickly and readily distributed when occasion may demand, and further, to provide an air distributing device which may be readily applied to practically any dehydrator in use whether of the tunnel type or otherwise.

One form which my invention may assume is exemplified in the following description

and illustrated in the accompanying drawings, in which—

Fig. 1 is a plan view of a compartment type of dehydrator showing the application of the air distributing device.

Fig. 2 is a side elevation of the same.

Fig. 3 is a side elevation of the air distributing device, said side elevation being partially broken away.

Fig. 4 is a plan view of one of the horizontal plates disposed within the air distributing device shown in Fig. 3, said plan view also disclosing two of the vertical plates whereby horizontal distribution of the air is obtained.

Fig. 5 is a plan view of a modified form of the air distributing device.

Fig. 6 is an end view thereof.

Referring to the drawings in detail, and particularly to Figs. 1 and 2, A indicates in general a dehydrator which is known as of a compartment type. Two tunnels are employed as indicated at B and C, means are employed for heating the air as shown at D, means in the form of a blower indicated at E is employed for the purpose of maintaining the air in circulation, and means are employed for maintaining a uniform and equally distributed flow of air through the tunnels, the means employed being a distributing device generally indicated at F and a second distributing device generally indicated at G.

The tunnels are provided with side doors such as shown at H through which trays containing fruits or like products may be inserted or removed, and racks or shelves I are employed for the reception of the trays. The air will in this instance flow in the general direction of arrows *a* and *b* and the air distributing device generally indicated at F is therefore arranged between the blower E and the intake end of the tunnel B.

The air distributing device indicated at F forms the main feature of the present invention and particular reference will therefore be made to Figs. 3 and 4. The air distributing device consists of a casing constructed of sheet metal or the like, which consists of side sections 2 and top and bottom sections 3 and 4. These sections are flared as shown and a general pyramidically-shaped casing is thus obtained. The smaller end indicated at 5 is connected with the blower E through means of a pipe 6, and the larger

end indicated at 7 may be directly connected with the mouth of the tunnel B.

For the purpose of maintaining a uniform current of air through the tunnel B, both in a vertical and in a horizontal direction, a plurality of horizontally disposed distributing plates 8 are employed. These plates are pivotally supported at their forward ends on rods 9, which are secured between the side walls 2 of the casing. The opposite ends are also secured to rods as indicated at 10, but these rods extend through slots 11 formed in the side walls of the casing and they are threaded and provided with nuts 11^a. This method of supporting the inner ends of the horizontally disposed distributing plates permits vertical adjustment thereof and the air flow may thus be equally distributed between the plates 8 on a vertical plane. By again referring to Figs. 3 and 4, it will be noted that each horizontally disposed plate 8 carries a pair of vertically disposed plates or vanes 12. These plates are pivotally secured upon rods 13 at their inner ends and their outer ends are thus free to swing. Their angular position may thus be changed and as a series of perforations 14 are formed in each horizontal plate 8, it is possible to swing the vertical plates 12 about their pivots 13, so that any angular position desired may be assumed and the free or swinging ends may then be secured against further movement by inserting pins 15 or similar devices through the perforated portion 14.

The vertical plates or vanes 12 serve the function of distributing the air horizontally, and means are thus provided for distributing the air stream both horizontally and vertically and a uniform flow of air is thus obtained in the tunnel B; thus exposing all trays and the products supported thereby to the same air velocity and temperature with a result that uniform and equal drying is obtained.

Where a single tunnel is employed and where return circulation is desired, it is only necessary to connect the discharge end of the tunnel B with the heater D through means of a flue, pipe or the like, but where a double tunnel is employed, as shown in Figs. 1 and 2, a return duct or casing must be employed as indicated at G. This casing is practically identical with the casing F, the only difference being that the shape is of necessity considerably changed. The similarity resides in the fact that the casing G is provided with horizontally disposed plates, such as indicated at 17, which serve the function of distributing the air vertically throughout the tunnel, and each horizontal plate is in turn provided with vertical plates 18 pivotally supported as at 19. These plates are adapted to swing about their pivots 19 and they are secured when

adjusted by inserting pins in the perforations 20. (See Fig. 5.)

The air discharging from the tunnel B would have a tendency to follow the outer periphery of the casing G and most of the air would thus enter the tunnel C at one side thereof. This is, however, prevented by employing the plates 18. These are turned or swung to a position such as shown in Fig. 5 and they thus permit a portion of the air stream to flow through the casing G, between the plates 17, in the direction of arrow *c* and the remaining portion of air to flow in the direction of arrow *d*. Equal distribution is thus obtained both horizontally and vertically and the same results are obtained as in the case of the distributor generally indicated at F.

The casing G may be provided with one or more sliding doors, as indicated at 21 and 22, and these may be opened during the operation of the dehydrator to admit fresh air and to discharge a certain proportion of the moist air, as desired. This feature, however, forms no part of the present invention but is merely mentioned.

From the foregoing it can be seen that by providing air distributing devices as shown at F and G, it is possible to maintain a uniform flow and equal distribution of the air both horizontally and vertically and that this distribution is maintained in both the tunnels B and C. A uniform exposure of the product being dried is thus obtained and the economic losses caused by variation in air velocity and temperature are thus practically eliminated.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims. I similarly wish it understood that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or various uses may demand.

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

1. A device of the character described comprising a casing having an inlet and an outlet opening formed therein, a plurality of horizontally interspaced plates disposed within the casing, and a plurality of vertically disposed plates on each of the horizontal plates.

2. A device of the character described comprising a casing having an inlet and an outlet opening formed therein, a plurality of horizontally interspaced plates disposed within the casing, a pivotal support for one end of each plate, and a vertically adjustable support for the other end of each plate.

3. A device of the character described

comprising a casing having an inlet and an outlet opening formed therein, a plurality of horizontally interspaced plates disposed within the casing, a pivotal support for one
5 end of each plate, a vertically adjustable support for the other end of each plate, and a plurality of vertically disposed plates on each of the horizontal plates.

4. A device of the character described
10 comprising a casing having an inlet and an outlet opening formed therein, a plurality of horizontally interspaced plates disposed within the casing, a plurality of vertically
15 disposed plates on each of the horizontal plates, a pivotal support for one end of each vertical plate which permits a swinging movement of the opposite end of each vertical plate, and adjustable means for securing
20 the swinging ends against movement.

5. A device of the character described
25 comprising a pyramidically-shaped casing having an inlet opening formed at its smallest end and an outlet at its largest end, a plurality of horizontally interspaced plates
30 disposed within the casing, a pivotal support for that end of each plate which is positioned adjacent the discharge opening, a rod secured to the opposite end of each

plate, said small end of each casing being slotted to permit the rods to project there-
35 through, and means for securing the rods in the slotted casing to permit vertical adjustment of the plates about their opposite pivotal supports.

6. A device of the character described
35 comprising a pyramidically-shaped casing having an inlet opening formed at its smallest end and an outlet at its largest end, a plurality of horizontally interspaced plates
40 disposed within the casing, a pivotal support for that end of each plate which is positioned adjacent the discharge opening, a rod secured to the opposite end of each
45 plate, said small end of each casing being slotted to permit the rods to project there- through, means for securing the rods in the slotted casing to permit vertical adjust-
50 ment of the plates about their opposite pivotal supports, a plurality of vertically disposed plates carried by each horizontal plate, a pivotal support for one end of each vertical plate, and adjustable means for securing the opposite end of each vertical plate.

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