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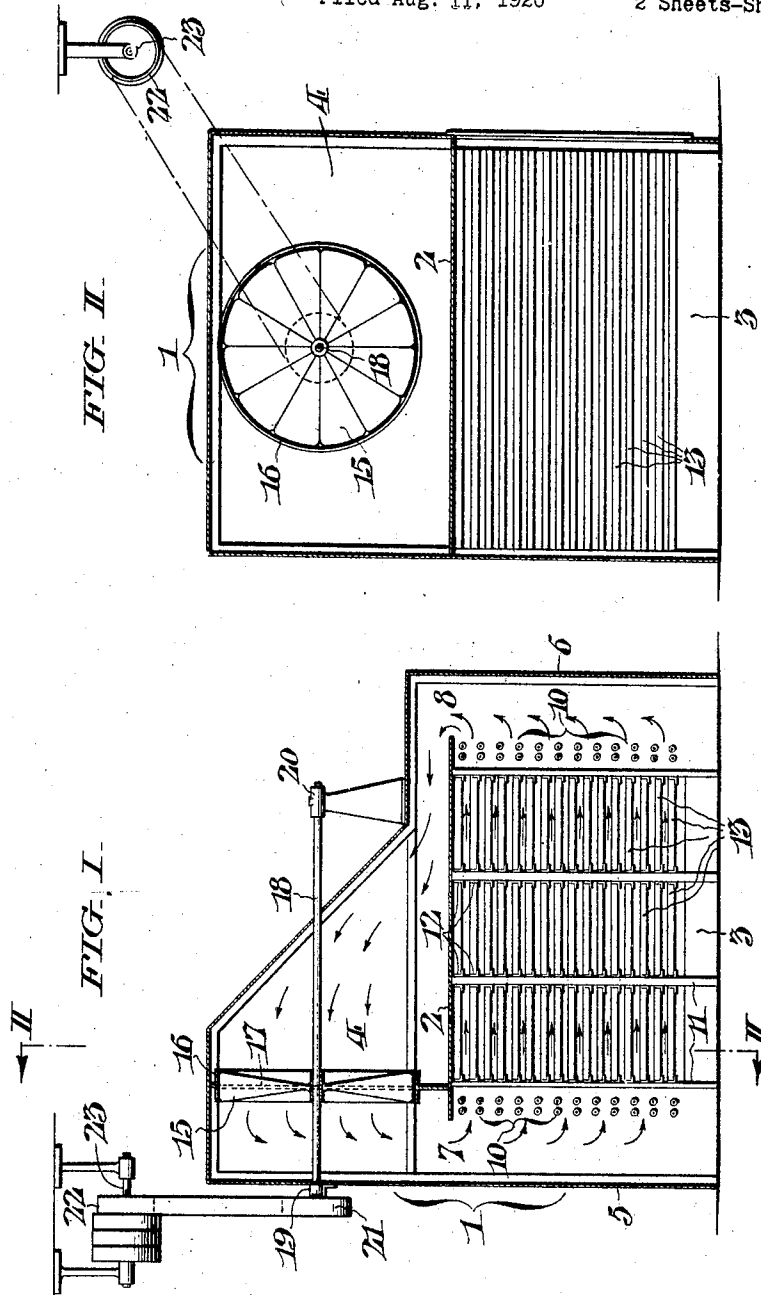
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1,532,097

DRYING MACHINE

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2 Sheets-Sheet 1



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UNITED STATES PATENT OFFICE.

THOMAS ALLSOP AND WALTER W. SIBSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE PHILADELPHIA DRYING MACHINERY COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DRYING MACHINE.

Application filed August 11, 1920. Serial No. 402,842.

To all whom it may concern:

Be it known that we, THOMAS ALLSOP and WALTER W. SIBSON, citizens of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Drying Machines, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to machines useful in drying materials capable of being supported on trays, such for example as chemical products, vegetables, fruits, etc., and more particularly to the type in which the direction of flow of the drying medium is reversed at intervals so that the same may be caused to impinge from opposite sides upon the materials under treatment in order to secure uniformity in drying.

The object of our invention is to insure that the temperature of the drying medium impinging upon the articles is the same regardless of the direction of approach. This we accomplish by disposing the materials to be dried in the spaces between a number of heating coil banks located at intervals within a drying chamber, a suitable by-pass being provided by way of which the drying medium may enter the drying chamber alternately from opposite ends under the action of appropriate propelling means.

The advantage of our invention will become apparent from the detailed description which follows.

In the drawings, Fig. I is a longitudinal sectional view through a drying machine conveniently embodying our invention.

Fig. II is a cross sectional view of the same along the plane of the arrows II—II in Fig. I.

Figs. III and IV are illustrations similar to Figs. I and II showing a slightly modified embodiment of our invention.

Referring first to the structure illustrated in Figs. I and II, it will be observed that the same is in the form of an enclosure 1 having the cross sectional configuration clearly shown in the former of said figures. The enclosure is subdivided by a horizontal diaphragm 2 into a drying chamber 3 and a co-extensive auxiliary passage 4. The diaphragm 2 terminates short of the end walls 5 and 6 of the enclosure 1 there-

by affording communication openings 7 and 8 between the drying chamber 3 and the auxiliary passage 4, so that the latter may be utilized as a return duct for an air circulatory course within the enclosure. A vertical bank of heating coils 10 is located in each end of the drying chamber 3. The space intermediate the coil banks 10, 10 is occupied by a columnar rack structure comprising a series of uprights 11, to which are secured angle bars 12, adapted for cooperation in pairs in sustaining a multiplicity of slidable, horizontal supporting trays 13 for the materials to be dried. As shown, these trays 13 are arranged in superposed relation and are at the same time suitably spaced apart to permit free flow of the drying medium between them. It is to be noted that the intervals between the trays 13 of the several columns of the rack structure are in alignment, thus establishing a series of continuous, horizontal channels between which the flow of the drying medium divides evenly when circulated, as suggested by the arrows in Fig. I. This circulation is maintained through the instrumentality of a rotary fan 15 mounted in a circular opening 16 of a vertical longitudinal partition 17, which spans the auxiliary passage 4. The fan 15 is secured upon a shaft 18 which extends to the exterior, and is journaled in bearings 19 and 20. To one end of the shaft is attached an actuating pulley 21 shown as being belted to a co-ordinative pulley 22 on an overhead power shaft 23.

By following the course suggested by the arrows in Fig. I, it will be apparent that the air traversing the drying chamber 3 is obliged, by reason of the arrangement of the trays 13, to subdivide evenly through the intervening horizontal channels, and, as a consequence, to impinge uniformly upon the materials supported by said trays. The same reasoning will obviously hold for circulation in the opposite direction. In either case, the distribution of the heating coil banks 10, 10 at different points in the course will be conducive toward maintaining the temperature in all portions of the circuit practically constant. However, the precise location of the coil banks 10, 10 with respect to the materials being treated, it will be seen, is such that the air is heated

to the proper temperature before entering the flow channels intermediate the supporting trays 13, 13 regardless of the direction of circulation. This feature is highly important when the character of the materials is such as to require occasional change in the direction of flow of the drying medium to obtain satisfactory results. For example in the case of the treatment of materials having a tendency to warp or crack, it is essential that the direction of flow be periodically reversed, whereby the drying medium may be caused to impinge upon them alternately from opposite sides so that uniform drying may be accomplished without danger of warping of the materials. Thus it will be seen that it is extremely important that the temperature under the aforesaid conditions be absolutely uniform.

The modified form of our invention shown in Figs. III and IV differs only slightly from the embodiment first described, and corresponding parts have therefore been identified with the same reference characters. Subdivision of the enclosure 1 and the general interior arrangement are the same as before, but, in this instance, the supporting trays 30, instead of being mounted in fixed racks are carried by trucks 31, 31, the trays being, however, placed in superposed relation and spaced apart so as to afford the aligned horizontal flow channels corresponding to those previously described in connection with the first embodiment. The modified structure differs still in one other particular in that an additional bank of heating coils 32 is interposed between the trucks 31, 31. If the capacity of the drier be such as to accommodate more than two trucks 31, additional coils would be interposed between each adjacent pair of trucks of the series. By such allocation of the heating coils at intervals within the drying chamber, the temperature in all parts of the same may be obviously maintained practically constant so that the materials under treatment in the intervals between the coil banks are, as a result, uniformly dried under the movement of the air within the structure.

Having thus described our invention, we claim:

1. A drying machine comprising a casing including a drying chamber and a communicating channel for the continuous circulation of air from the channel through the drying chamber and back, and air propelling means located in the channel exteriorly of the heating chamber, means within the heating chamber for supporting the materials to be dried, and heat radiating elements located at each side of the material supporting means and disposed within the path of air circulation.

2. A drying machine comprising a casing

including a drying chamber, and a communicating channel for the continuous circulation of air from the channel through the drying chamber and back, an air propelling means located in the channel, means within the drying chamber for supporting materials to be dried, and banks of heat radiating elements located at either side of the material supporting means and of substantially equal radiating capacity, the air propelling means being alternately actuable to force air through the drying chamber in one direction or the other, whereby to effect uniform drying of materials during the flow of air in either direction.

3. A drying machine comprising a casing including a drying chamber and a communicating passage for the continuous circulation of air from the passage through the drying chamber and back, an air propelling means located in the passage, a pair of end heat radiating elements of substantially equal radiating capacity located in the drying chamber, an intermediate heating element, and means located in the spaces between said elements for supporting the materials to be dried, the air propelling means being actuable to cause flow of the air through the drying chamber alternately in opposite directions, whereby the materials are subjected to cause uniform dehydration in either direction of flow.

4. A drying machine comprising a casing, including a drying chamber and a communicating return passage for the continuous circulation of air from the passage through the drying chamber and back, air propelling means located in the passage, heat radiating means located at the ends of the casing, the latter having a charging opening with a closure means therefor, and an article supporting means adapted to be placed in the casing through the charging opening with the sides, top and bottom of said supporting means being spaced from the walls of the casing to permit the circulation of air around said article supporting means.

5. A drying machine comprising a casing, including a drying chamber and a communicating return passage for the continuous circulation of air from the passage through the drying chamber and back, said passage being enlarged to form a fan casing, a partition located in said fan casing having an opening, a fan located in said opening, heating elements located within the drying chamber in spaced relation, and an article supporting means disposed between the heating elements.

6. A drying machine comprising a casing, a horizontal partition mounted therein defining a lower drying chamber and an upper passage, the ends of the partition being spaced from the ends of the casing to

form a continuous path for the circulation of air, the top wall of the casing being elevated at one point to form a fan casing, a transverse partition located in the fan casing and having an opening, a fan located in said opening, a pair of heat radiating elements located in the casing, one at each end of the drying chamber, said elements being of substantially equal radiating capacity, an intermediate heating element of lesser heating capacity, tray racks located between

said heating elements, and trays carried by the racks in superposed spaced relation to support materials to be dried.

In testimony whereof, we have hereunto signed our names at Philadelphia, Pennsylvania, this 10th day of August, 1920.

THOMAS ALLSOP.
WALTER W. SIBSON.

Witnesses:

JAMES H. BELL,
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