T. SUZUKI.

DRYING APPARATUS.

APPLICATION FILED JAN. 17, 1912.

1,043,982.

Patented Nov. 12, 1912

4 SHEETS—SHEET 1.

Fig. 2.

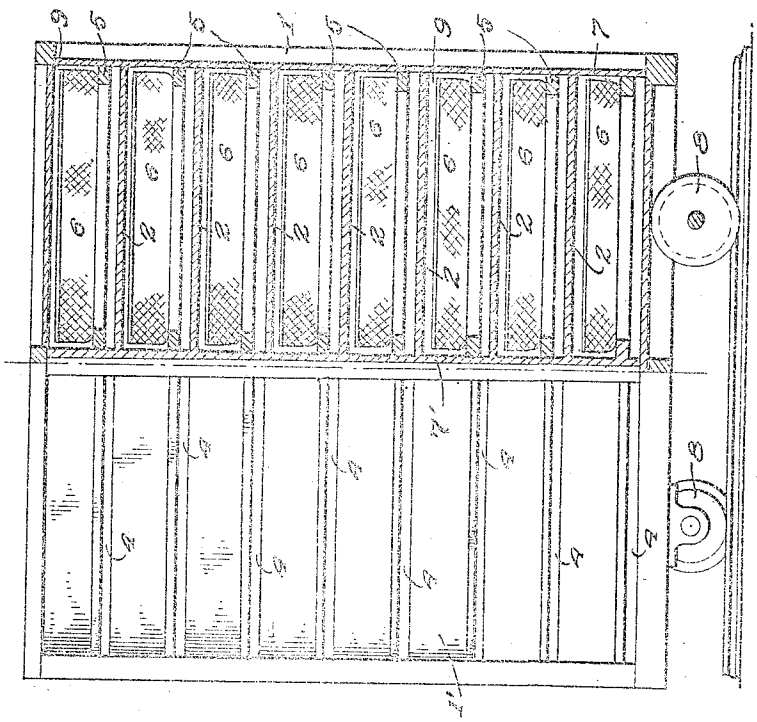
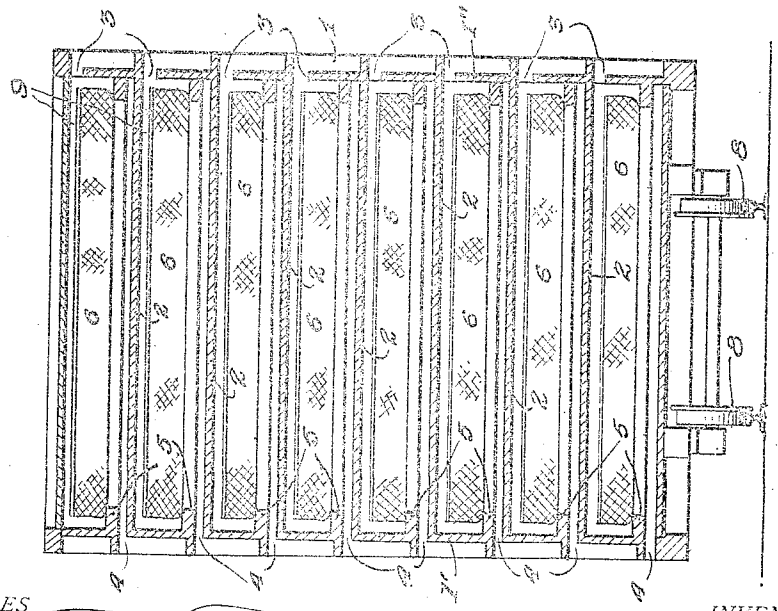


Fig. 1.



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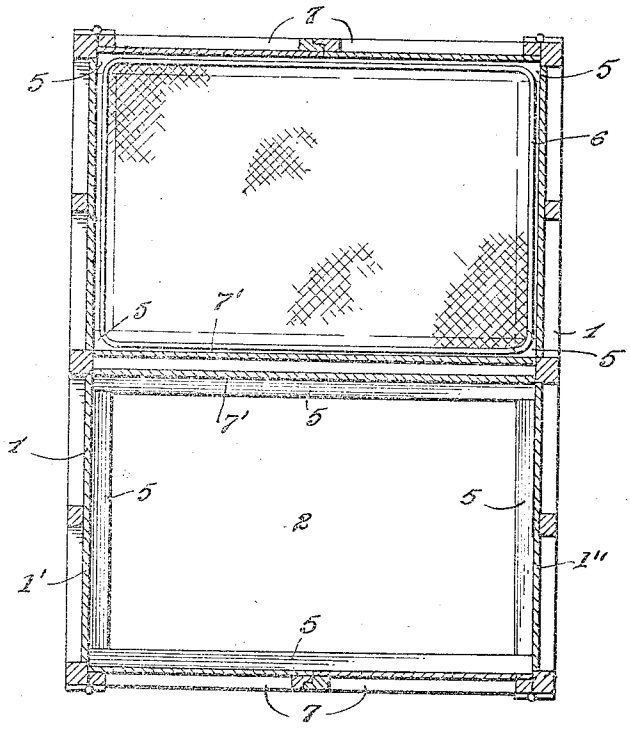
4 SHEETS—SHEET 2.

Fig. 3.



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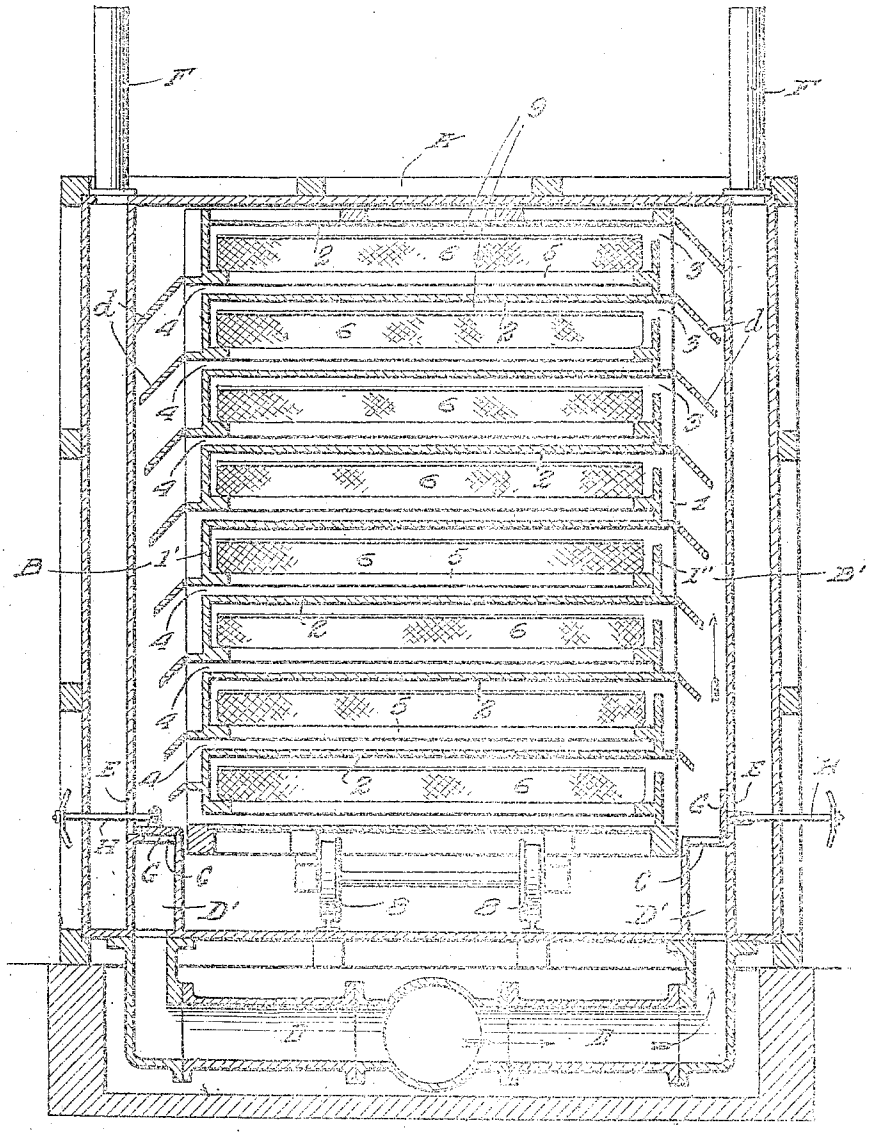
4 SHEETS—SHEET 3.

Fig. 2.



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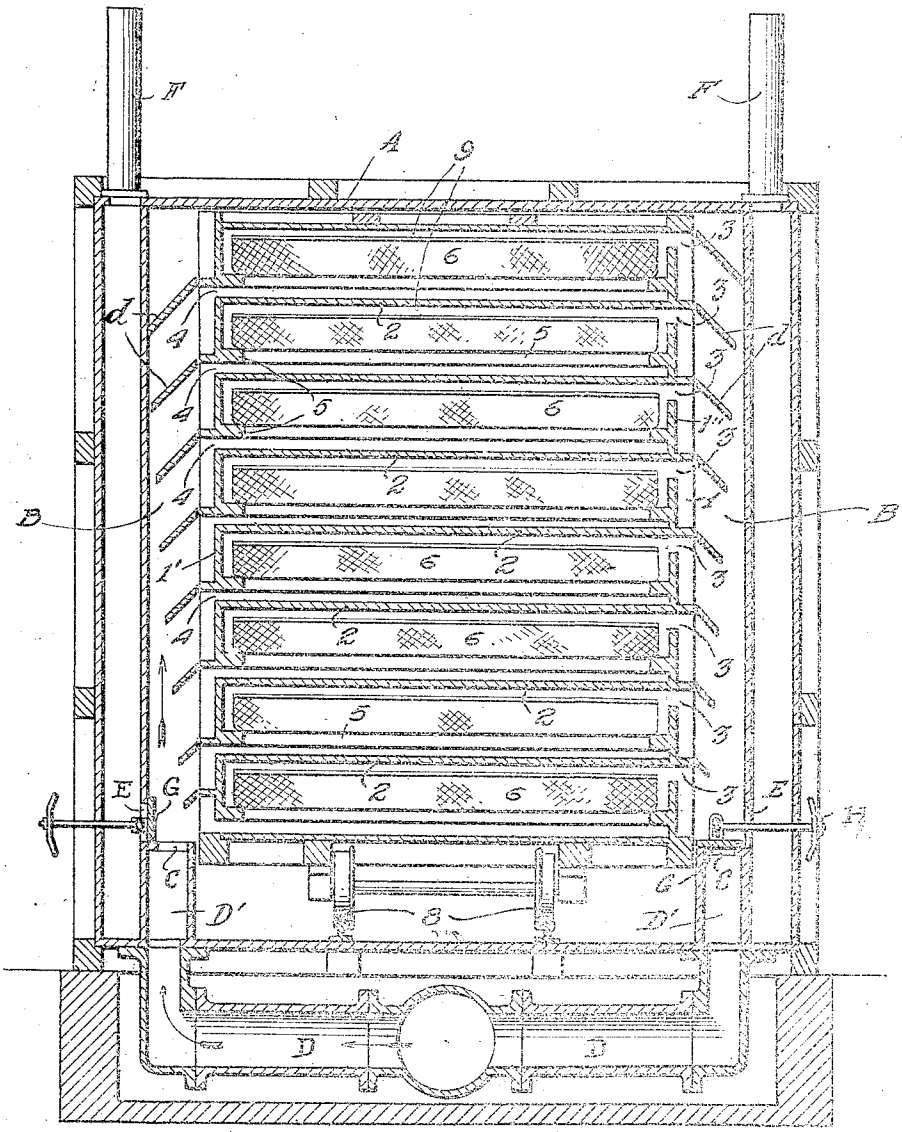
4 SHEETS—SHEET 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

TOZABURO SUZUKI, OF TOKYO, JAPAN.

DRYING APPARATUS.

1,043,982. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed January 17, 1912. Serial No. 671,689.

To all whom it may concern:

Be it known that I, TOZABURO SUZUKI, a subject of the Emperor of Japan, residing at No. 401 Jiheishinden, Suna-Mura, county of Minami Katusushika, prefecture of Tokyo, Japan, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a specification.

My present invention relates to drying apparatus and more particularly to means for desiccating the material by a drying gas, such as hot air, passing through the layers of material treated.

The principal objects of my invention are to provide apparatus adapted to thoroughly and uniformly dry the material in as short a period of time as possible, without materially affecting the quality, color, luster, or other characteristics of the material which it is desired to preserve.

Other objects of my invention are to facilitate the operation of my invention by disposition and coaction of parts, and to prevent gases from passing through or coming into contact with materials being treated, after the gases have become diffused with moisture in the desiccating of the material.

In the drawing, forming a part of this specification: Figure 1 is a transverse sectional view through what is hereinafter termed "a conveyance for the materials treated." Fig. 2 is a view partly in side elevation and partly in longitudinal section of the conveyance. Fig. 3 is a sectional plan view through the conveyance. Fig. 4 is a sectional view through the conveyance and its enveloping casing, and showing air being delivered to the conveyance in a predetermined direction. Fig. 5 is a view similar to Fig. 4 indicating the air traveling in a direction counter to that shown in said figure.

Similar characters refer to similar parts throughout the views.

A conveyance 1 is provided with a plurality of floors 2 which extend between oppositely disposed walls 1′ and 1″ and between walls 7′ and suitable doors 7 at right angles to the said walls 1′ and 1″. The said floors 2 divide the conveyance into a plurality of compartments 9, access to which is gained through doors 7, and within each compartment I provide ledges 5, disposed slightly above the said floors 2, adapted to receive trays 6 of openwork material for containing the materials to be treated. I prefer to mount the said conveyance upon wheels 8, to facilitate transportation, and also, to provide two tiers of compartments 9, as clearly shown in Figs. 2 and 3 of the drawing, so that a set of doors 7 may be disposed at each end of the conveyance and in this way a compact conveyance having a maximum capacity for materials to be treated, consistent with its magnitude is provided.

The walls 1″ are provided with a plurality of ports 3, one for each compartment 9, disposed subjacent to the floors 2, while the opposite wall 1′ is provided with a plurality of ports 4 subjacent to the floors 2, and below the said ledges 5 of the compartments. By this disposition of ports, a current of air may traverse the compartment, for instance, entering port 3, pass through the trays 6 and layers of materials thereon, and find egress through port 4, or vice-versa.

Means for conveying, controlling and directing the gaseous currents for drying purposes, is disclosed in Figs. 4 and 5 of the drawing, in connection with the beforementioned conveyance. This means includes a casing A enveloping the conveyance 1; conduits D for the gaseous fluids; and exhaust ducts F communicating with the chamber containing the conveyance 1 through ports E.

The relative size of the conveyance 1 to its receiving chamber formed by casing A is such as to provide passages B and B′ at the sides adjacent the walls 1′ and 1″ of the conveyance, and within said casing deflecting plates *d* are provided and so disposed that one margin of each plate will be alined with the upper margin of one of the ports 3 and 4. These plates *d* extend downwardly toward the adjacent walls of the casing A and each subjacent plate is reduced in size in the order from top to bottom, for a purpose to be subsequently described.

In order to provide for the economical consumption of the desiccating qualities of the gas, conduits D open into distributing ducts D′, ports C of which open closely adjacent to the lowermost compartment of the conveyance 1, and these ports C are so disposed below the deflecting plates *d* that the gas rising from the distributing ducts D′ is caught by said plates and uniformly distributed into the chambers 9. As shown in the drawings, the ports C and E are closely adjacent and a valve G is adapted to con-

trol either of said adjacent ports through its handle H.

I may find it desirable to connect the valve G which controls communication of ports C or E with the passages B and B′, to operate in unison, that is, to operatively connect the valve G that when the port C is open to passage B′, as shown in Fig. 4, then the port E at the opposite side of the conveyance 1 is open to the passage B, or vice-versa, as disclosed in Fig. 5 of the drawing.

The operation of the device is as follows: The trays containing the material to be treated are placed within the compartment 9, access thereto being gained through doors 7. The conveyance is then wheeled or otherwise transported into casing A with the deflecting plate *d* registering as described. Gaseous fluid, as for instance hot air, adapted to desiccate the materials on the trays, is admitted into one of the passages formed adjacent the conveyance. For instance, in Fig. 4 of the drawing, gaseous fluid finds ingress through port B to passage B′; is uniformly distributed by plates *d* through ports 3; traverses through chamber 3, passing through the layers of materials on the trays, finds egress therefrom through port 4, and is conducted down passage B through port C open thereto, and out through ducts F. When the valves G are actuated to the position shown in Fig. 5 of the drawing, then the current travels in a counter direction as previously described, and the materials treated become uniformly dried.

It is to be noted that the gaseous currents do not skim over the materials, but pass through layers formed by the same; that after having once passed through one of the chambers 9 the moisture ladened fluid finds egress without propagating about the materials treated, but is conducted away, and, that by means of the conveyance 1 and its receiving chamber A the former may be disposed to receive the currents of desiccating gases and utilize the maximum drying qualities thereof, in its passage through the apparatus.

I claim:—

1. In a drying apparatus, the combination of conducting means for gaseous currents, a conveyance including a plurality of superposed chambers provided with means for receiving the materials treated and having ports in its opposite walls above and below the said receiving means, said conveyance being disposed with its ports communicating with said conducting means, and mechanism for directing the currents of gaseous fluids to the said chambers of said conveyance, through the ports thereof at either side of said opposite walls, said currents passing through the material treated and finding egress from the chamber through the said ports in the wall opposite to that which they enter, substantially as and for the purpose set forth.

2. In a drying apparatus, the combination of a casing provided with inlet ports adjacent oppositely disposed walls thereof and exhaust ports adjacent said inlet ports, a conveyance including a plurality of superposed chambers provided with means for receiving the materials treated and having ports in its opposite walls above and below the receiving means, said conveyance being of a size relative to said casing to be received thereby, and to provide passages between the walls of said conveyance having ports, and the said walls of said casing having inlet and exhaust ports adjacent thereto, means for delivering gaseous fluid to the said inlet ports of the said casing, and means for controlling said inlet and exhaust ports of said casing, substantially as and for the purpose set forth.

3. In a drying apparatus, the combination of a casing, means providing a plurality of chambers within said casing, provided with supports for receiving the material to be treated and having ports open above and below said supports at opposite sides of the chambers, said means being spaced apart from the walls of said casing to provide two oppositely disposed passages therebetween, said ports being open to said passages within said casing, and means for conveying gaseous fluid to either one of said passages and exhausting it from the other, said fluid passing through the layers of materials upon the said supports in the said chambers, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

TOZABURO SUZUKI.

Witnesses:
J. K. Caldwell
M. Namber.