

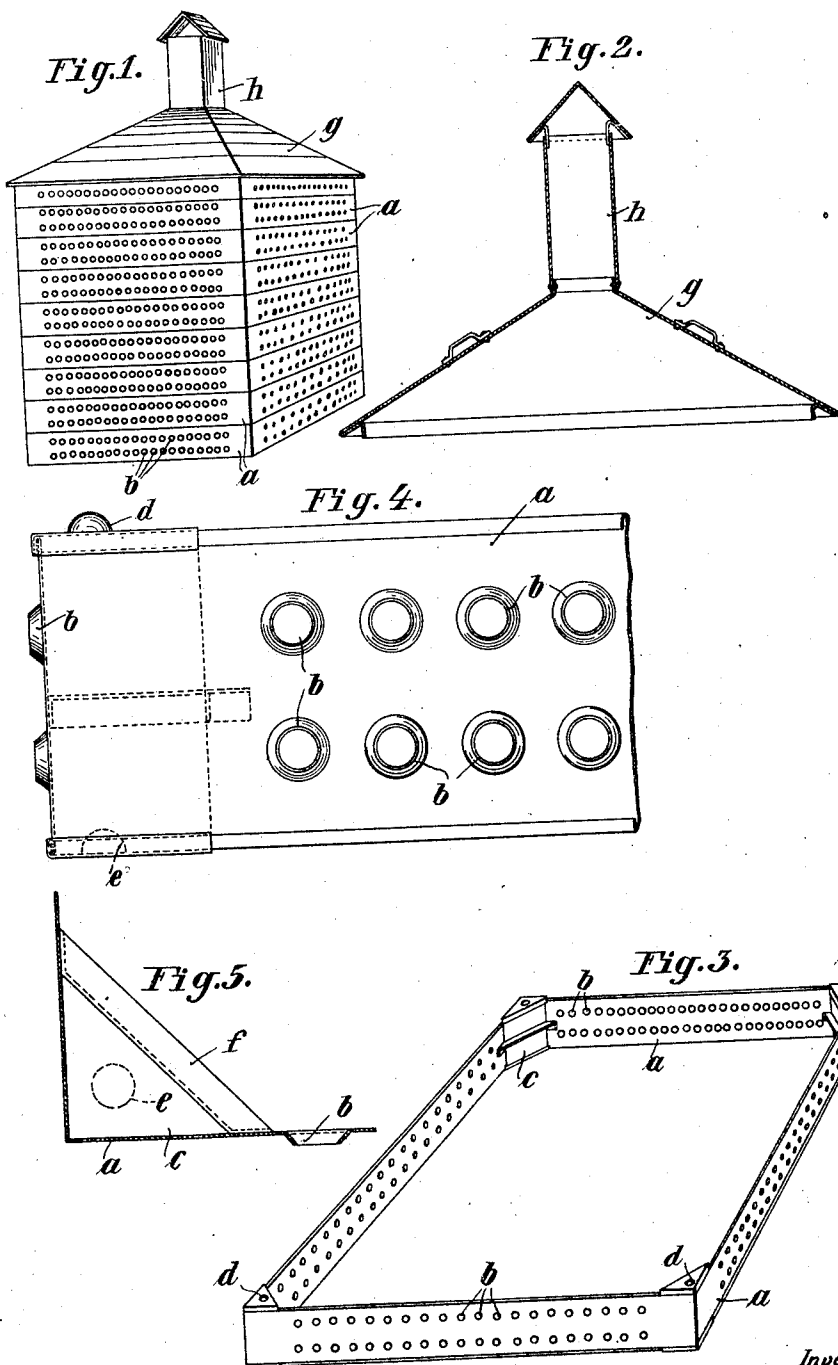
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SUN DRYING MEANS FOR VEGETABLE MATERIAL

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SUN-DRYING MEANS FOR VEGETABLE MATERIAL.

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To all whom it may concern:

Be it known that I, BRUNO MÜLLER, a citizen of Germany, and a resident of 171 Weserstrasse, in the city of Berlin-Neukolln, Germany, have invented certain new and useful Improvements in Sun-Drying Means for Vegetable Material, of which the following is a specification.

This invention refers broadly to improvements in means of drying and evaporating vegetable material in which the desiccation is effected exclusively by the utilization of sun heat, and more particularly to means of facilitating the desiccating process by a judicious application of airing, and thereby to essentially improve the condition and keeping qualities of the products obtained, and to generally improve and facilitate the drying operation.

In the process of sun drying or sun curing as previously conducted the material to be operated upon, thus for example copra, cocoa, coffee, castor plant (*Ricinus*), fruit, tobacco and the like was exposed upon trays or supports of wire netting or upon wooden supports or trays which for the curing and drying operation were generally placed upon the ground side by side of each other, or in the case of wooden supports with roofing, the trays were arranged to be moved to the outside by means of guide rails or the like. The drying or curing period usually varied between from 4 to 7 days but the quality of the product obtained was not always unobjectionable, and there was the serious drawback that upon the occurrence of rainy weather all the trays had to be suddenly removed to a place of safety, while with the recurrence of sunshine they had to be brought back into the open air. Aside from the serious inconvenience that this procedure called for a great amount of help it is very often impossible to protect all trays in proper time. If, however the goods to be desiccated or cured, have become wetted only once by the rain, the quality of the product is very considerably impaired. This is true particularly for the drying of copra and of other vegetable products, and it is one of the chief objects of my invention to overcome the difficulties referred to. In tropical climates the rain as a rule sets in very suddenly and lasts but a few minutes, and in view thereof the labor required for the removal to safety and for the re-exposure of the material has to be taken into

account as a very important item of the costs of manufacture, aside from the impossibility of the perfectly satisfactory execution of this operation. It is one of the important objects of my invention to provide sun drying and curing means of easy and convenient manipulation and construction which makes it possible to utilize the sun rays in the most perfect and intensified manner, so as to produce the desiccation, curing or evaporizing of the fruit or the like in a very short period of time.

In the practice of my invention, and in view of the objects hereinbefore specified I may proceed by superimposing a plurality of drying frames or trays, and combining them with a roofing of sheet metal into a closed unit or metal casing which is exposed to the irradiation of the sun. By means of the rapid and strong heating of the metal surfaces which are rapidly and thoroughly heated by the sun rays the desiccating action is greatly increased. Then, the material to be treated is at all times perfectly protected from rain and inclement weather; the entire work of removal to safety is dispensed with and any risk of impairing the quality of the goods is effectually avoided.

There is no need of heating passages in the drying means in accordance with my invention, merely vent holes or airing apertures being required, which constitutes a very important difference even in the structure and external shape of the new drying means as distinguished from artificially heated drying kilns. The entire drying device according to this invention is made up of any desired large number of metal frames or trays which are placed on top of each other and of a covering hood or roofing with a discharge passage also made of metal, so that the sun rays will always be made to act upon metal surfaces, mostly sheet iron, and their heat is completely absorbed thereby. By this means a temperature is produced in the interior of the unit which, as shown by experiments is considerably above the outside temperature. In order to still further enhance this action the outer surfaces may be dark colored by a suitable paint or pigment, by black or brown tints or the like. The time required for the finishing drying is thereby considerably shortened, and there is the additional advantage as compared with the drying by sun rays in the open that the drying goods are always

protected from rain, and there is no further necessity to remove them to a sheltered place upon any occurring rain by time consuming labor as in the previous drying and sun curing methods. The dimensions of the drying device may be made to correspond to the requirements in a very simple manner by a suitable selection of the superimposed frames or trays.

The invention is more fully illustrated upon the accompanying drawing showing by way of example one form of embodiment of the principles of my invention in Figure 1 in a side elevation of the entire unit of drying means, Figure 2 showing the roof diagrammatically transversely cut; Figure 3 is a perspective view of the sheet metal frame; Figure 4 is a side view and Figure 5 is a representation of a corner connection of the frame referred to.

The box shaped metal frames *a* are provided at their sides with a plurality of apertures having turned out rims *b* which, for the purpose of stiffening are preferably outwardly conically shaped. At all corners of the frame a wooden block *c* of substantially triangular shape is suitably fitted on the top of which there is a substantially semi-circular stud or projection *d*, while at its bottom side there is a corresponding socket *e*. At the interior side wall of the corner blocks *c* there is an angle iron *f* which is riveted at its two ends to the walls of the frame, and serves as a support for the trays or beds of the material to be dried. The metal frames *a*, after having been charged with the material are superimposed vertically in such a manner that each of the studs *d* is made to engage with a socket *e* at any one of the corners of the frame.

The superimposed frames constitute the heating body proper. The frames may be of quadrangular, rectangular or any desired round configuration, and may be manufactured of any suitable metal. The roofing or hood *g* serves both for the heating and for the protection from rain. The passage *h* provides for the escape of the air saturated with moisture by the drying operation. The warm fresh air is free to flow through the apertures *b* in the frame both vertically upwards as well as horizontally through the drying beds which are likewise provided with holes. The air and the water vapor are discharged or drawn off at the top through the passage *h*. The outwardly projecting rims *b* are preferably so shaped that only the upper portion is punched out and turned outwards. Among other points of superiority the novel drying means described present the following advantages as compared with other sun drying and curing devices: 1, considerable acceleration of the drying process; 2, highest degree of protection from rain and inclement weather; 3, most

simplified operation and uniform drying; 4, easy mounting and adaptability and but little space required; 5, superior quality of the dried product; 6, low purchase price; 7, reduction of the variations of temperature.

The invention has been shown and described herein only in its broad aspects, and it is obvious that variations and modifications may occur to better adapt the invention to varying conditions of its application, and without deviating from the spirit of my invention.

I claim:—

1. The process of sun-drying and curing vegetable material and the like, which process consists in keeping and shielding said material by heat conveying means, adapted for the absorption of the calorific portion of the sun rays, and causing outside air to pass through the material laterally and upwardly during the treatment, and in separate superimposed streams.

2. Sun drying and curing apparatus, comprising a substantially closed metal casing, superimposed layers of goods in said casing, and lateral airing and ventilating means in said casing for each layer of material.

3. Sun drying and curing apparatus, comprising a substantially closed metal casing adapted for the absorption of sun rays, a substantially roof-shaped hood forming the top of said casing, venting means in said hood, and lateral venting means in the sides of said casing opposite each layer of material, and means in said casing, adapted to support layers of material under treatment.

4. Sun drying and curing apparatus, comprising a substantially closed metal casing adapted for the absorption of sun rays, supporting blocks in the corners of said casing, a plurality of supporting frames for the material superimposedly arranged within said casing and resting on said blocks, and engageable holding means in the blocks and in the frames.

5. Sun drying and curing apparatus, comprising a substantially closed metal casing, adapted for insolation, a plurality of superimposed receiving and supporting frames in the casing, venting passages in the casing and in the frames, and outwardly projecting nipples around said passages.

6. Sun drying and curing apparatus, comprising a substantially closed metal casing, adapted for insolation, a plurality of superimposed receiving and supporting frames of substantially equal size in the casing, venting passages in the casing and in the frames, and outwardly conically reduced projecting nipples around said passages.

7. Sun drying and curing apparatus, comprising a substantially closed exteriorly dull black casing, adapted for insolation, a plurality of superimposed receiving and supporting frames within the casing, lateral

venting means in the casing and in the frames, and means to hold said frames in position within the casing.

5 8. Sun drying and curing apparatus, comprising a substantially closed metal casing adapted for insolation, a plurality of supporting frames for the material under treat-

ment in the casing, venting passages for the casing and the frames, the upper half sections of said passages being punched out, 10 and substantially roof-shaped outwardly projecting rims on said punched out portions.

BRUNO MULLER.