



# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN FRUIT-DRIERS.

Specification forming part of Letters Patent No. 177,032, dated May 2, 1876; application filed April 3, 1876.

*To all whom it may concern:*

Be it known that I, OSCAR F. TIFFANY, of the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Fruit-Driers; and I do hereby declare that the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

My invention relates to machines for drying fruits, vegetables, meats, &c.; and it consists in a certain combination and arrangement of air-passages with the furnace and drying-chamber, as hereinafter more fully described and claimed. It also consists in two or more parallel chambers or drying-passages, arranged one above the other, communicating through hatchways, and provided with elevators, and a furnace located below the lowest chamber, and a draft-stack above the upper chamber, as hereinafter more fully described and claimed. It also consists in V-shaped roofs or ceilings of the drying-chamber, combined with gutters arranged immediately beneath them, and communicating with other gutters, for carrying off the water of condensation to the outside of the chambers.

Figure 1 is a vertical longitudinal section of my fruit-drier. Fig. 2 is a transverse section. Fig. 3 is a transverse section through the hot-air chamber, exposing the furnace.

Referring by letter to the drawing, let A represent the heating-furnace, surrounded by a hot-air chamber, 1, formed by a casing, 10, and having an outlet, 2, and a damper, *b*, for regulating the flow of hot air into the passage C. A cool-air passage, *d*, is located directly above this furnace, and leads from the exterior to the passage C, and is provided with a damper, *e*, for regulating the flow of air, which, in passing over the furnace, is somewhat heated before mingling with the highly-heated air in the passage C. The slide *f* is used for closing the outer end of the flue *d*, when desirable.

This construction of air-flues has great advantages, in saving fuel, and a perfect regulation in temperature. The cool air, in passing through *d*, becomes heated to a desirable degree from the caloric of the same furnace that

furnishes the intensely-hot air, and, passing over the diaphragm *x*, absorbs some of the heat from the current in passage 2, so that the two currents approach a mean temperature as they approach the end of the diaphragm, where they mingle. The flue *d* insulates the furnace from the machine above it, and obviates danger from fire by direct contact.

The upper casing *g* is provided with two or more parallel drying-chambers, *h h' h''*, arranged one above the other, and having communicating hatchways *i i* at their alternate ends, so that they will communicate with each other and with air-passage C by means of a damper, 3. The upper chamber is provided with a stack or exit-flue, 4. The frames which convey the fruit through the chambers consist of several perforated metallic plates or shelves, *l*, supported upon a truck-frame by the corner-posts *m*, and arranged so that the lower shelves may be slid from under the upper, for convenience in loading and unloading the car. These cars are passed into the lower drying-chamber through a door, *n*, at the end opposite the furnace, and set upon the tracks *o*, which are laid upon the several floors of the drying-chambers, so that the cars will be easily moved along as others are passed in.

The temperature of the air within the drying-chamber lessens as the distance from the furnace increases; and for the purpose of shifting the loaded trucks, so that the requisite degree of temperature and moisture may be obtained, I provide an elevator, *p*, at each end of the passage, which is arranged to work through the hatchways *i*, and be operated by ropes and pulley-wheels, or other suitable means, from the outside of the drier. These elevators are provided with short tracks, corresponding with the tracks of the drying-chambers, so that when the elevators are raised or lowered to a level with either floor the trucks may be withdrawn and elevated to the next upper passage, while the cars are moved forward on the main tracks.

Movable hatches R R close, or partially close, the hatchways *i i*, as desired, in order to regulate the amount of heated air to be admitted to the chambers.

In order to carry off the water which arises from the condensation of the saturated atmos-

phere within the drying-passages, I provide V-shaped metallic roofs or ceilings *s*, beneath which, and parallel thereto, are arranged the gutters *t*, connecting with other spouts *u*, which lead through the wall to the outside of the casing.

Portions of the sides of the drier I prefer to construct of glass, for the admission of light and the heat of the sun, and to enable the observation of the condition of the fruit.

By the arrangement of the draft devices for my fire-box I am enabled to make an intense heat to effect a slight draft through the drier, or a heavy draft through the drier effected only by a slight heat, the draft through the fire-box and the draft through the drier being entirely independent of each other. Openings 5 and 6, controlled by dampers, (not shown,) furnish air to the hot-air chamber around the fire-box A. An opening, 8, controlled by a damper (not shown) in the wall of the fire-box, communicates the outer air to a pipe, 9, leading direct to the draft of the fire-box. By this means none of the air from the hot-air chamber passes through the fire-box.

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

1. The combination, in a drier, of a furnace or heater, a surrounding hot-air chamber, and

a superposed fresh-air passage, the two latter adapted to conduct their contents to the drying-chamber in parallel lines, and to discharge them together into the drying-chamber after they are commingled.

2. The diaphragm *x*, having above it the opening *d* to the outer air and damper *e*, in combination with the hot-air chamber 1 and opening 2, provided with a damper, *b*, substantially as described, and for the purpose set forth.

3. In a fruit-drier, a series of horizontal drying-chambers, *h h' h''*, arranged in different planes, provided with tracks *o o*, elevators *p p*, and doors *n, n', n'', n''', r, and r'*, communicating at alternate ends by means of hatchways *i i*, closed by movable hatches *R R*, in combination with a furnace, A, located below the lowest chamber, and a draft-stack above the upper chamber, as described.

4. The V-shaped ceiling or roof *s* of a fruit-drying chamber, in combination with the longitudinal parallel gutters *t*, passing immediately beneath each angle of the roof, and the side gutters *u*, to conduct the water outside the drier, as set forth.

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Witnesses:

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