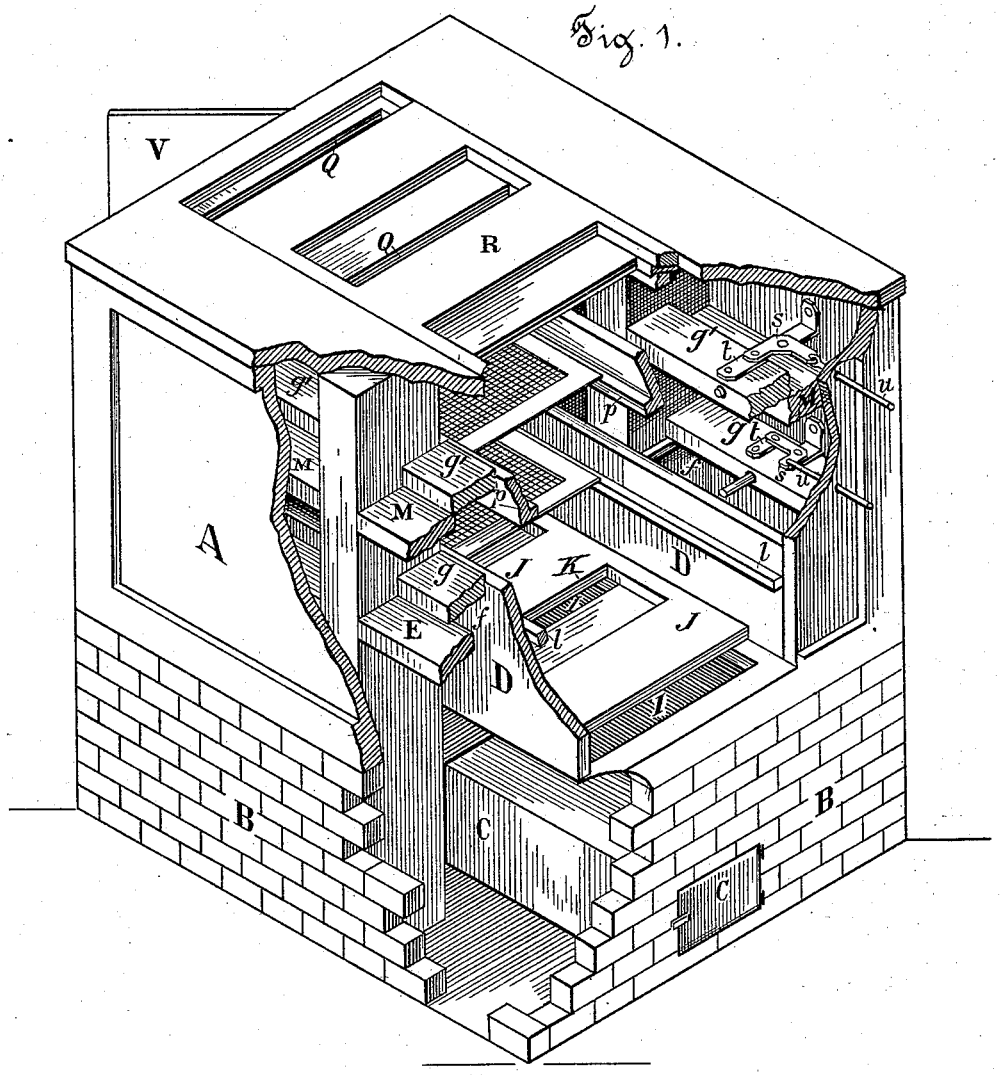
W. BUTTS.
Fruit-Drier.

No. 217,510. **Patented July 15, 1879.**

Fig. 1.



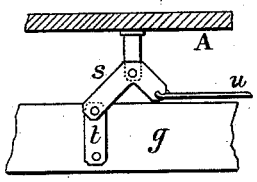


Fig. 2.

Witnesses:
W. Floyd Duckett
H. D. Henderson.

Inventor
William Butts
per J. L. Boone
Attorney

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2 Sheets—Sheet 2.

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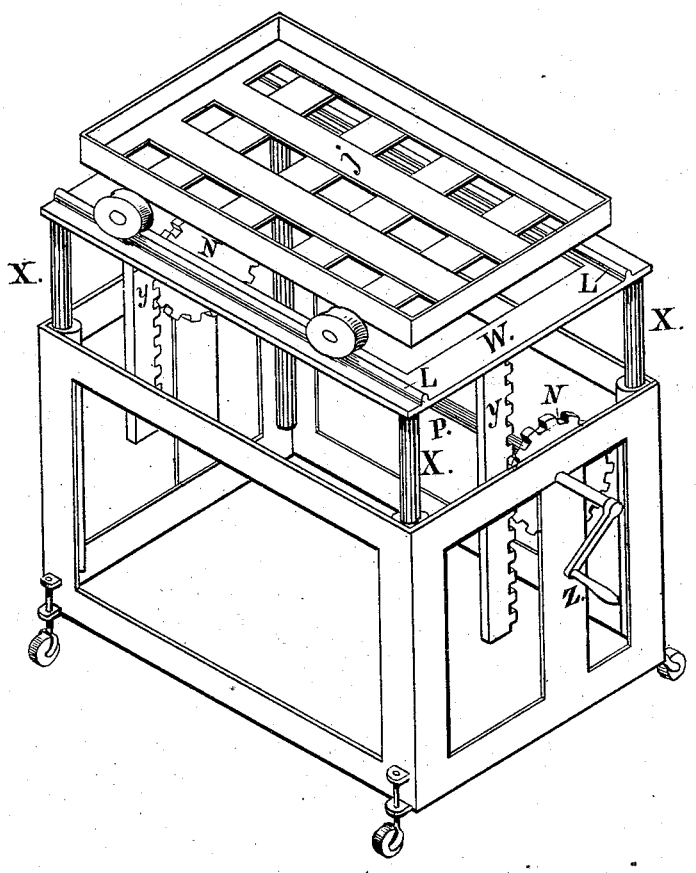

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM BUTTS, OF PETALUMA, CALIFORNIA.

IMPROVEMENT IN FRUIT-DRIERS.

Specification forming part of Letters Patent No. **217,510**, dated July 15, 1879; application filed February 24, 1879.

To all whom it may concern:

Be it known that I, WILLIAM BUTTS, of the city of Petaluma, county of Sonoma, and State of California, have invented a new and useful Improvement in Fruit-Driers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the drawings accompanying this specification, and forming a part of the same.

My invention has reference to an improved fruit, vegetable, and hop drier; and it consists of the devices and arrangements hereinafter described.

Referring to the accompanying drawings, Figure 1, Sheet 1, is a perspective of the fruit-drier with front portion cut away, showing disposition of shelves and registers inside. Fig. 2 is a detached view of bell-crank movement to open or close the register. Fig. 3, Sheet 2, is a perspective of car for handling the fruit-trays.

Let A represent the house or structure inside of which the drying-chamber is arranged. This structure can be made of any desired size, from that of a small box up to that of a large room. I build this structure upon a brick or other suitable foundation, B, which may be either under or above ground, and which is of sufficient height to provide a considerable space underneath the chamber. Inside of this basement I construct the furnace C, which will heat the air in the entire space underneath the drying chamber or house.

The drying-chamber I make to extend directly through the middle of the room or structure from end to end, and on each side of it I construct a series of side chambers, with valved openings, through which the heated air from the basement or furnace-room is admitted into the drying-chamber.

I first construct a low wall, D, on each side of the drying-chamber, which extends from the floor upward a short distance along the entire length of the room or structure, and I secure a horizontal shelf, E, upon this wall, which extends back to and abuts against the main wall of the building or room. In this horizontal shelf I make an opening, *f*, and I arrange a horizontal slide or valve, *g*, so that it can be moved forward to cover the opening or back to uncover it, as desired. The space underneath this first shelf communicates freely with the hot-air space underneath the structure, the floor being cut away, so that a free passage of the hot air into this side chamber or box is permitted. The floor of the drying-chamber extends from this low wall on one side to the low wall on the opposite side, and it is made with transverse openings I I I at intervals. A sliding floor, J, rests upon this first floor, and it has openings K K K, similar to those in the lower floor, so that by sliding the upper floor in one direction the openings will be uncovered, so as to admit hot air directly into the chamber through the floor, and by sliding it in an opposite direction the openings will be closed, so as to make a tight floor and prevent the entrance of hot air through it, the whole forming a register in the floor of the drying-chamber. This floor-register I only require under certain circumstances, hereinafter explained; ordinarily, therefore, it is kept closed.

On the inner side of each of the low walls D, I secure a rail or ledge, *l*, which will support the lowermost series of trays.

At a short distance above the horizontal shelf E, I secure another horizontal shelf, M, on each side of the chamber, so that the two shelves will be opposite each other, and in this shelf I also make an opening similar to *f*. In the lower shelf I also arrange a horizontally-sliding valve, *g'*, similar to *g*, on the lower shelf, so that it can be thrown forward and cover this opening, or be thrown back and uncover it, in the same manner as described for the horizontal shelf E. On the edge of each of these opposite shelves I secure or form a rail or ledge, *p*, for supporting the second series of trays. I then arrange as many other horizontal shelves at intervals apart, one above another, as the height of the room or structure will admit, so as to make as many supporting-ledges as desired. The top or roof of the structure above the drying-chamber I also construct with openings Q and a sliding cover, R, which is provided with openings in the same manner as above described for the floor.

It will be noticed that between each two side shelves a side chamber is formed by the above-described arrangement, into which the heated air is first admitted, and that the in-

flow of air is directly upward into this side chamber instead of into the main chamber, as has heretofore been the case. This prevents the heated air from impinging directly against the trays and fruit when it first enters the chamber, which, it has been discovered, has the effect of drying the fruit unevenly, and often of scorching or burning it where it first impinges; but by admitting it first into the side chambers it flows gently and gradually out into the main chamber, and the effect is uniform. Again, by closing the openings through the shelves on each side alternately the heated air is compelled to travel across under one series of trays and up through the opening on the opposite side, thence across between the next two trays, thence upward again, and so on back and forth between the trays from bottom to top; or if I find that the heat is too great on the lower trays, I open the valves on both sides above the inlet-openings in the lower shelves, so that the heated air passes directly upward. In fact, by this arrangement of side chambers and valved openings I can perfectly control the temperature in any part of the chamber, so as to dry the substance under treatment in a perfectly-uniform manner.

For operating each of the valves *g g*, I employ a bell-crank, *s*, one arm of which is hinged to the inside wall of the structure, opposite the middle of the shelf, while the opposite arm is connected with the shelf by a link, *t*. A rod, *u*, has one end attached to the angle of the bell-crank, while its opposite end passes through the end of the structure. By pulling upon this rod the valve is closed, and by pushing it in the valve is opened, the two operations being accomplished by a longitudinal movement of the rod. This allows me to handle the valves easily without requiring any large hole for the hot air to escape through, as the rods can pass through a stuffing-box, which will close the opening perfectly tight.

At each end of the drying-chamber I arrange two or more doors, V, so that I can get at any particular shelf or series of trays without opening the doors opposite the other shelves, and thus prevent any excessive escape of hot air. In case I want to dry quickly I open the floor and roof registers, which will allow a free and voluminous passage of heated air up through the chamber; or I can open the registers more or less, as required; but this is seldom necessary.

I have also devised a novel carriage and car for handling the filled trays in putting them into and taking them out of the drying-chamber, for which I propose to make a separate application.

I thus provide a drying apparatus in which the heat can be regulated, directed, and managed with the most perfect ease, so that substances can be dried without danger of being scorched or unevenly dried.

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

1. A drying-chamber having horizontal shelves E M arranged on each side of it, in each of which shelves is an opening, *f*, which can be closed by a valve, *g*, substantially as and for the purpose described.

2. The combination of horizontal shelves E M, arranged on each side of the main drying-chamber so as to form intermediate side chambers or recesses, into which the heated air is admitted through horizontal openings *f*, substantially as and for the purpose specified.

3. The horizontal shelves E M, arranged on each side of the drying-chamber, with their horizontal openings *f*, valves *g*, and ledges or rails *l p*, substantially as and for the purpose described.

4. The valves *g*, operated by means of the bell-crank *s*, link *t*, and rod *u*, substantially as above specified.

5. A drying-chamber having the low wall D on each side at the bottom of the chamber, said wall having a valved cover, E, the space underneath said cover communicating with the furnace-chamber, and having one or more horizontal shelves, M, arranged at intervals above said cover, to each of which is attached a rail or ledge, *l p*, combined and arranged to operate substantially as above described.

6. A drying-chamber having a floor-register and a roof-register, and having horizontal side shelves, E M, each of which is provided with a valved opening, substantially as and for the purpose specified.

In witness whereof I hereunto attach my hand and seal.

WM. BUTTS. [L. S.]

Witnesses:
W. FLOYD DUCKETT,
W. F. CLARK.