(No Model.)

2 Sheets—Sheet 1.

C. W. KITTS.

FRUIT DRIER.

No. 345,701. Patented July 20, 1886.

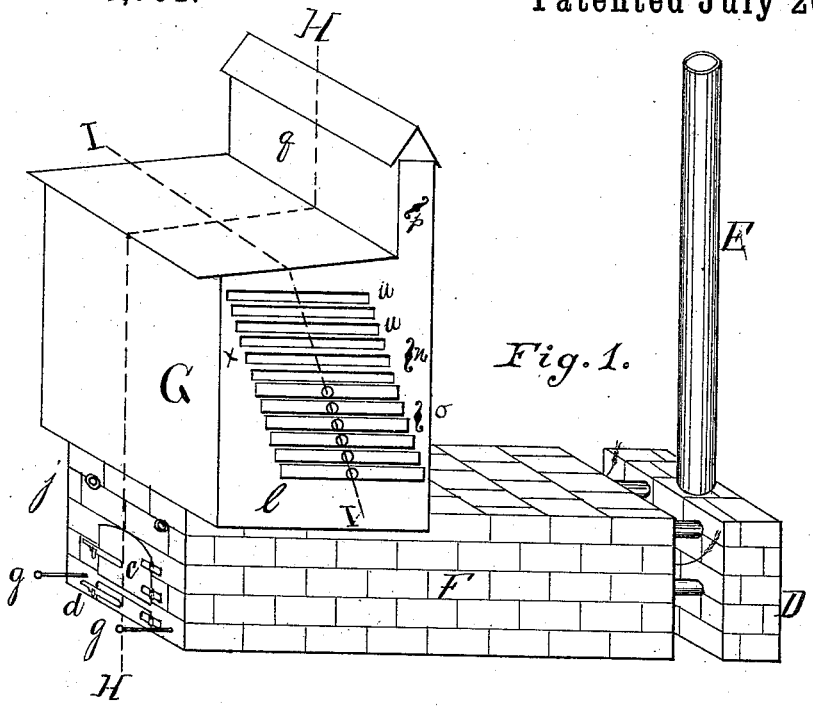

Fig. 1.

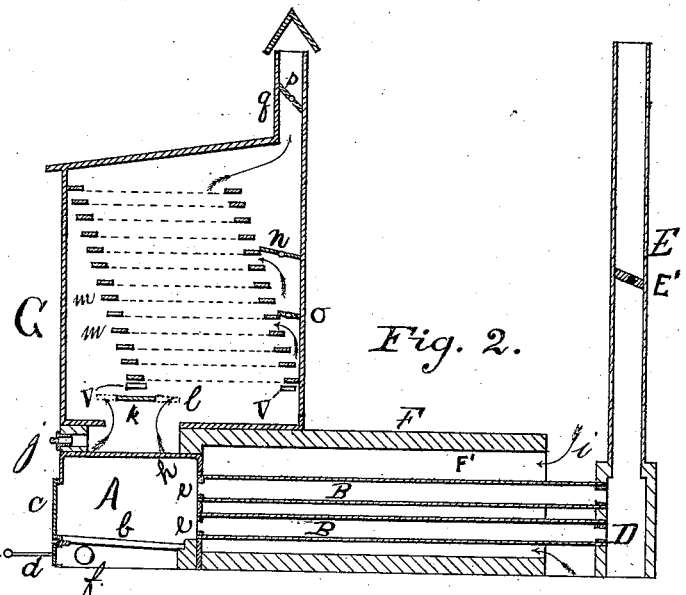

Fig. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

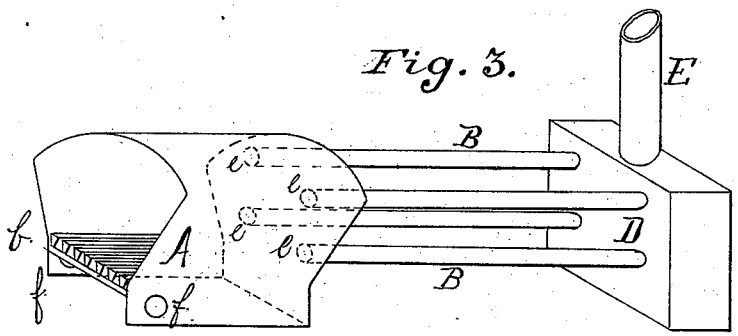


Fig. 4.

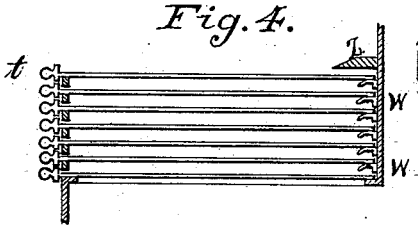


Fig. 5.

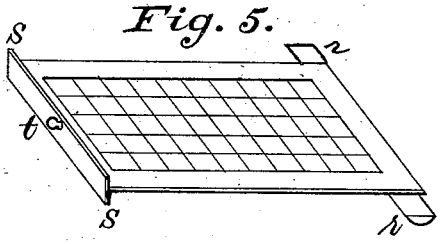


Fig. 6. Fig. 7.

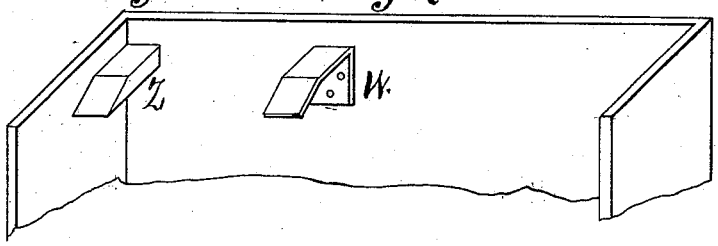
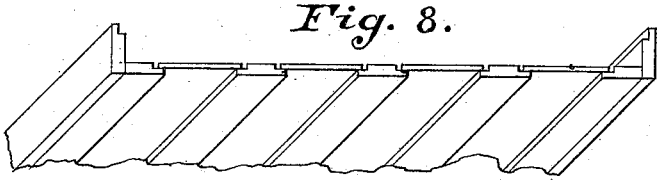


Fig. 8.



WITNESSES

John Cammett

A. L. Coombs

INVENTOR

Charles Warren Kitts

UNITED STATES PATENT OFFICE.

CHARLES WARREN KITTS, OF GRASS VALLEY, CALIFORNIA.

FRUIT-DRIER.

SPECIFICATION forming part of Letters Patent No. 345,701, dated July 20, 1886.

Application filed April 22, 1884. Serial No. 128,827. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WARREN KITTS, a citizen of the United States, residing in the town of Grass Valley, in the county of Nevada and State of California, have invented a new and useful Machine for Evaporating, Preserving, and Drying Fruits, Vegetables, and Meats, of which the following is a specification.

My invention relates to improvements in fruit and vegetable preserving machines having removable screens or drying-trays, whereon is placed the material to be treated, through and around which hot air is circulated, thereby changing the water contained in the material treated to vapor and carrying the same off.

The objects of my invention are to provide an apparatus substantial, easy, and cheap in construction, simple and effective in operation, durable, and wherein the value of fuel may be utilized to the utmost and the material treated subjected to a uniform degree of heat, and wherein all portions of the drying-chamber will be of equal temperature, and the current of heated air or draft will be strong, thereby adding greatly to the capacity of the machine. I attain these objects by the mechanism illustrated in the accompanying drawings, in which similar letters of reference indicate like parts.

Figure 1 is a perspective view of the machine complete, with six frames or trays in place and six openings above, in which the trays or frames are to be inserted. Fig. 2 is a vertical longitudinal section of Fig. 1 through line H H. Fig. 3 is a perspective view of the fuel chamber or furnace, with the escape-flues for the smoke, forming the air-heating apparatus. Fig. 4 is a partial view of cross-section of drying-case through line I I, showing position of drying frames or trays and the manner they are supported at back edge. Fig. 5 is a perspective view of drying-frame. Figs. 6 and 7 show means of guiding to place and supporting drying trays or frames when in drying-chamber. Fig. 8 shows manner of construction of the walls and other exterior parts of the drying-case.

The construction of my improved drier-chamber, heater, trays, and the arrangement thereof, are as follows: The furnace A, Figs. 2 and 3, is preferably made of cast or wrought iron in the manner and form shown in drawings, with either cast-iron or open bottom in the same. Three or four inches above the bottom are placed grate-bars *b*, upon which to place the fuel, the part above grates forming fuel chamber and that below forming an ash-pit. The furnace and ash-pit are provided with doors *c d*, Fig. 1. The back of the furnace is so constructed as to have a number of holes, *e e*, Fig. 3, with horizontal projecting lips, like a stove-pipe hole. On these lips, around the holes *e e*, will be slipped the horizontal pipes B, made of sheet-iron, which may be made heaviest near the furnace, and getting lighter as they extend away therefrom. I have, however, shown in the drawings pipes of uniform thickness, as ordinarily such pipes will answer my purpose. The pipes are open at both ends, which, in any number desired, shall at their other ends fit on similar lips around similar holes in a plate forming the front side of the chamber D, or they may be built in the brick-work thereof. From the chamber D a smoke-stack, E, arises, with a damper, E′, in it to govern the draft.

The furnace A has near its front end, at the bottom edge, opening into the front end of the ash-pit, dampers or ventilators *f*, through which the supply of air to support combustion is admitted by dampers operated by handles projecting through the brick-work. (Marked *g g*, Fig. 1.)

The furnace and flues, as shown in Fig. 3, are inclosed in a brick casing, F, (shown in Figs. 1 and 2,) leaving a space or hot-air chamber, F′, between the furnace and flues and the walls of the brick casing, except that at the rear end of furnace A. The bridge supporting the top of the brick casing F rests on top of furnace at *h*, thereby forming a support, and preventing the air from rushing up into the drying-case G without first encircling the furnace A. The front end of furnace A is even with front end of brick casing F, which is built up close about the furnace A, as shown in Fig. 1.

The chamber D is set a little distant from the rear end of brick casing F, leaving an aperture, *i*, Figs. 1 and 2, through which the air travels into the casing F, and thence along and among the wrought-iron flues B, striking the rear end of furnace A. Thence a portion goes

forward and enters valves or dampers *f*, to support combustion in the furnace A, and the balance ascends up over the furnace A and enters drying-chamber in the case G.

Above the furnace A, I have arranged valves *j*, in Figs. 1 and 2, through which cool air may be admitted to temper the heated air ascending into the drying-chamber in case G.

At the bottom of the drying-chamber is a sliding deflector, *k*, Fig. 2, to prevent the heated air from impinging too directly or strongly against the material to be dried. This deflector may rest on ledges at front and back of case, and thus be placed in any position desired. I leave a vacant space, *l*, in drying-chamber, below lowermost tray, to allow the heated air space to circulate to make degree of heat uniform. One side of the lowermost tray is set nearly or quite against the side of the drying-case, (right side in drawings.)

If in practice, to secure uniform results, it is necessary, a small space may be left between edge of first tray and side of drying-chamber. This would insure uniform draft under lowermost tray. Each succeeding tray is placed either a little farther to the right or left, according to which side the lowest tray is set against, thus progressing until the upper tray rests against the side of the drying-case opposite the one the side of the lowermost tray rested against, the arrangement of the trays being shown in Figs. 1 and 2, in which is shown a vertical series of horizontal trays arranged in different vertical planes, each tray (except the bottom one) overlapping that just below it. By this arrangement the heated air is readily caught and directed through the trays. By this arrangement of the trays the greatest freedom from obstruction to the passage of the heated air will exist where the degree of heat throughout the drying-chamber will be nearly uniform, and where each tray-load of material to be dried will have its own independent proportion of new, dry, heated air.

In the event only a small number of the trays are in use, I have provided the dampers *n* and *o*, which can be used to cause all the heated air to pass through the upper one-third or two-thirds of the series of trays. I have likewise provided a damper, *p*, on the flue *q*, to regulate the escape of the heated and moisture-ladened air.

By means of the above-described apparatus I obtain a heating and drying machine which is very simple and easy of construction, durable and effective without machinery, accomplishing an eccelerated draft of air through the material to be dried, and likewise obtaining the full heating capacity of the fuel consumed, and not discharging the smoke and vapors of combustion as hot as the air contained in drying-chamber, which is to be avoided.

I first direct the air to be heated on the coolest part of the tubes or flues B through the aperture *i*. Thence the air passes along inside the hot-air chamber F′ and about the flues B, continually striking hotter portions; thence against the rear end of the furnace A, around the sides and over the top of which the air is compelled to pass by reason of the bridge-wall *h*, and the current caused by the air entering the chamber of furnace, A through the dampers *f*. From around the furnace the air ascends into the drying-chamber G, being tempered by the admission of cold air through valves *j*, if necessary, fills the space under and at the side of the trays, and thence passes up through and between the trays to the exit-flue *q*, thereby causing a rapid circulation of heated air, with a very uniform degree of heat, throughout the drying-chamber, and consequently a rapid evaporation of water contained in the material to be dried.

Fig. 5 shows the construction of the drying frame or tray. At both inside corners on the under side are placed blocks or feet *r*. These feet are to raise the tray-frame, so when slid in it will not strike the fruit on the one below, and will raise the hind cross-piece, so it will strike on the inclined points of supports W and Z. (Shown in Figs. 6 and 7.) On the front edge of the tray-frame is fastened a piece at right angles with frame. (Designated S.) This piece is to be slightly longer and wider than the slot-openings *u* in front of drying-case. When the tray is inserted in the orifice, the feet *r* will rest on the sides of the frame below. When pushed in, the back edge will strike on the inclined parts of the supports W Z, which are fastened on the back or in back corners of drying-case. On being pushed farther the frame runs up on the level surface of support W or Z and rests there, not then touching tray below. The piece S completely covers the orifice *u*, thus saving a door. The knob *t* serves to afford a grip to handle tray by. The supports W and Z are secured to the inner rear wall of the drying-chamber. They consist of brackets having plain upper faces on which the trays rest, and inclined fronts that guide the trays into position.

From front to back of chamber G at the lowermost edge of lowest opening, *w*, (there being one for each tray,) there is placed at either edge of opening a cross-piece, V, for the first tray to run in on, all the other trays having the frame of the tray next below to rest on, the foot *r* projecting on one side being to reach over and rest on the tray below, which it might not otherwise do on account of the trays not being directly one above the other. The distance between the extremities of the feet *r* should of course not be as great as the length of the front piece, S.

The walls, top, and flue *q* of the drying-case G are preferably made of wood paneled, as shown in Fig. 8. This saves lumber and labor, and allows for the alternate shrinking and swelling of the material.

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

1. The combination, substantially as set forth, of the drying-chamber, the furnace located under the drying-chamber, the smoke-stack, the flues leading from the furnace to the smoke-stack, and the casing or hot-air chamber inclosing the furnace and flues, said casing having an inlet at its outer end for supplying all the heated air that is admitted to the drying-chamber, and a communication leading from the hot-air chamber to the drying-chamber.

2. The combination, substantially as set forth, of the drying-chamber, the furnace, the smoke-stack, the flues leading from the furnace to the smoke-stack, and the hot-air chamber inclosing both the flues and furnace, said chamber having an air-inlet at its outer end, and a communication, *f*, between the hot-air chamber and ash-pot of the furnace, whereby hot air is supplied to the fire, and a communication between the hot-air chamber and the drying-chamber.

3. The combination, substantially as set forth, of the drying-chamber, the furnace located under the drying-chamber, the smoke-stack, the flues leading from the furnace to the smoke stack, and the casing or hot-air chamber inclosing the furnace and flues, said casing having an inlet at its outer end for supplying all the heated air that is admitted to the drying-chamber, a communication leading from the hot-air chamber to the drying chamber, and the normally-closed valves for admitting cool air to the drying-chamber to reduce the temperature.

4. The combination of the furnace, the hot-air chamber, the drying-chamber having an opening to admit hot air from the hot-air chamber, and the adjustable deflector, narrower than the opening, located over the opening, whereby the air may be deflected to either side of the drying-chamber, or may be divided into two currents.

5. The combination, substantially as set forth, of the drying-chamber, its casing having overlapping tray-openings, and a vertical series of trays arranged horizontally in the drying-chamber in different vertical planes, so that each successive tray overlaps on one side the tray just below it, and each tray being independently removable through the casing.

6. The herein-described tray, consisting of the combination, substantially as set forth, of the main frame, the front piece, S, and the feet *r*, that project sidewise from the rear end of the tray.

7. The combination, substantially as set forth, of the drying-chamber, a tray, a bracket attached to the rear wall of the chamber that supports the tray at its rear end, said bracket having a level upper surface and an inclined front to guide the tray into position.

CHARLES WARREN KITTS.

Witnesses:
JOHN CAMMET,
A. L. COOMBS.