

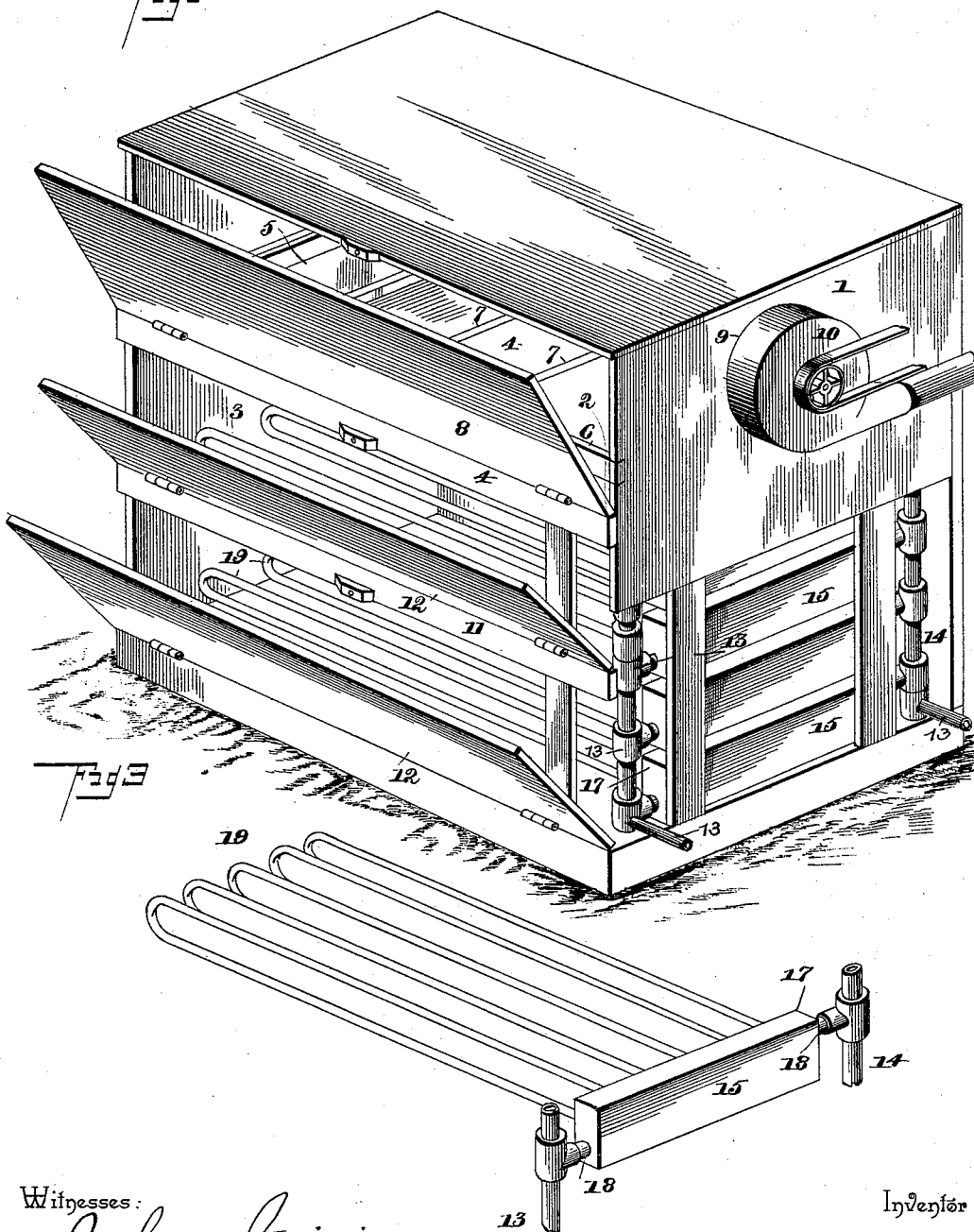
(No Model.)

2 Sheets—Sheet 1.

J. W. DOTY.  
FRUIT EVAPORATOR.

No. 477,856.

Patented June 28, 1892.



Witnesses:

*John Smirre*  
*W. S. Duval*

By his Attorneys,

*J. W. Doty*

*C. A. Snow & Co.*

Inventor

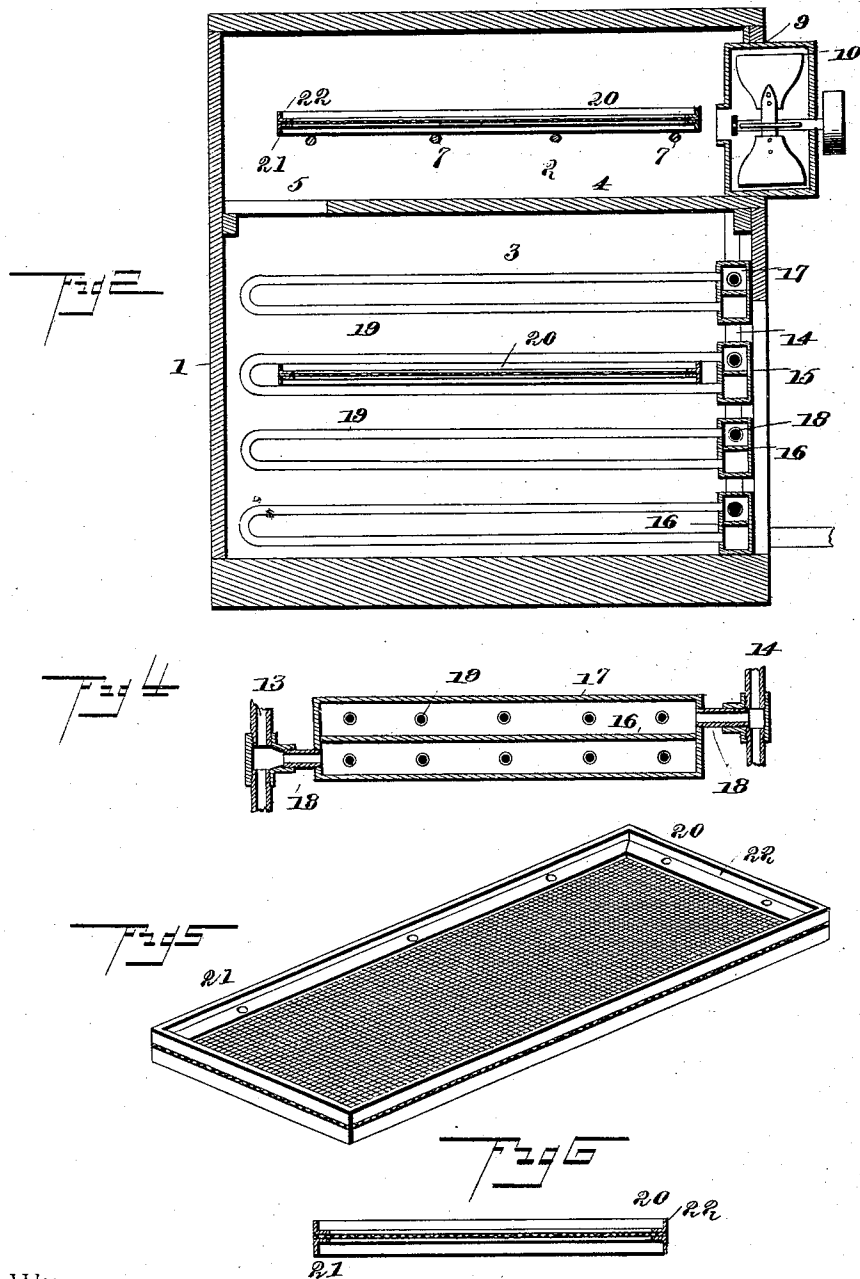
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# UNITED STATES PATENT OFFICE.

JOSEPH W. DOTY, OF LOCKPORT, NEW YORK.

## FRUIT-EVAPORATOR.

SPECIFICATION forming part of Letters Patent No. 477,856, dated June 28, 1892.

Application filed May 21, 1890. Serial No. 352,633. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH W. DOTY, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented a new and useful Fruit-Evaporator, of which the following is a specification.

This invention has relation to fruit-evaporators of that class employing steam as the drying agent; and among the objects in view are to thoroughly diffuse or equalize the air in all parts of the drier, and also to equalize the heat, to secure a horizontal circulation of air and return through all compartments of the drier, and to so arrange the coils for conducting the steam as to bring all portions of the fruit into close contact therewith, and, finally, to secure a positive and continuous circulation of steam from the boiler through the drier and back again to the boiler, thus avoiding all waste of steam and to thoroughly utilize all heat radiated from the steam-pipes for the drying of the fruit within the evaporator.

With these general and other minor objects in view the invention consists in certain features of construction hereinafter specified, and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a drier constructed in accordance with my invention. Fig. 2 is a vertical longitudinal section. Fig. 3 is a perspective of the headers and their coils. Fig. 4 is a longitudinal vertical section through one of the headers and the adjacent portions of the steam supply and exhaust pipes. Fig. 5 is a perspective of the evaporator-tray. Fig. 6 is a transverse central section of the tray.

Like numerals of reference indicate like parts in all the figures of the drawings.

The drier-case 1 may be of any suitable size and shape and is divided into an upper compartment 2 and a lower compartment 3 by means of a horizontal partition 4, provided at one end with an opening 5, formed transversely in the partition and serving as a means of communication between the two compartments. The upper compartment 2 is provided with a transverse bar 6, arranged above its bottom, and said bar is connected to the rear wall of the casing of the drier by a series of

horizontal bars 7, thereby forming a shelf for the support of drying-trays. The front of the compartment 2 is closed by means of a door 8, the lower edge of which is hinged to the front edge of the horizontal partition 4, said door being adapted to close upward and secured in position by an ordinary lock or turn-button. The end of the upper compartment 2 is provided with an opening 9, said opening being located at that end of the compartment opposite to which is located the transverse opening 5, and in the opening 9 there is mounted an exhaust-fan 10, operated by any suitable motor. (Not shown.) The lower compartment is in this instance provided at its front with a transverse strip 11, and hinged to the upper edge of the strip and to the floor of the case are upwardly-closing doors 12, vertically opposite each other, the free edges of the doors being provided with ordinary fastening devices.

The end wall of the casing below the opening 9 is removed opposite the compartment 3 and at each side of the same rise steam-pipes 13 and 14, the former being the exhaust-pipe leading to the boiler (not shown) and the latter being the steam-supply pipe leading from the boiler. Interposed between the two pipes and spaced a short distance apart is a series of steam-headers 15, each of said headers being divided into non-communicating compartments by means of a horizontal partition 16. The upper compartment 17 is by a short pipe 18 connected at one end to the supply-pipe 14, and so on throughout the series, each upper compartment being thus connected. The opposite ends of the lower compartments are similarly connected to the exhaust-pipe 13 by means of short connecting-pipes 18. 19 represents a U-shaped steam-coil, a series of such coils being provided for each header, the upper terminals of each series being connected to the upper compartment of the header and the lower or return terminal being connected to the lower compartment of its header, so that steam passing through the supply-pipe is distributed first into all of the upper compartments of the headers, from thence passes into the coils and is conducted horizontally across the entire drier, and is then returned by the lower terminals of the coils

to the lower compartment, and then partially-condensed steam is returned to the exhaust or return pipe 13 and carried back to the boiler, to be again vaporized and circulated. In this manner it will be apparent that there will be a constant circulation from the boiler to the drier throughout the same and back to the boiler. The U-shaped coils formed in several series provide a ready support for the series of evaporating-pans 19, which may be readily removed, as will be apparent. The heat radiated from the pipes rises and passes through the opening 5 into the upper chamber 2 of the drier, and its exit is induced by means of the rapidly-revolving exhaust-fan 10, so that it is carried in a horizontal line directly across the entire width and length of the upper chamber.

Various forms of evaporating-pans may be employed; but I have in the drawings shown and will now describe one that is especially adapted for use in a drier of the above construction. The pan consists of a metal frame 20, the bottom of which has its edges secured to the horizontal center of the frame and is perforated or reticulated. The frame in this instance is formed of opposite L-shaped sheet-metal sections 21, the L portions being arranged face to face and embracing at opposite sides the edges of the reticulated bottom and being securely riveted together, thus forming outer surrounding flanges 22, projecting at each side of the bottom. Such a construction, while extremely strong and durable, permits of a most thorough evaporation of the fruit, in that the heat has contact therewith at all points of the same and in an equal manner, as will be readily understood. The flanges preserve the fruit from contact with the hot steam-pipes, and thus any liability of burning the same is avoided and simply a gentle and gradual drying takes place.

The headers 15 are spaced apart, so as to permit the entrance of air through said spaces. In this manner it will be apparent that the air will be drawn in horizontal planes across the evaporating-pans, and after reaching the opposite end of the casing it ascends to the upper compartment, through which the air is drawn in an opposite horizontal plane. All vertical movement through the pans is thus avoided.

Having thus described my invention, what I claim is—

1. In an evaporator, the combination, with the outer casing, of a vertical series of horizontally-disposed hollow headers spaced apart,

each subdivided by a horizontal partition into non-communicating compartments, a supply-pipe connected to each of the upper compartments of the headers, an exhaust-pipe connected to each of the lower compartments, a series of horizontal coils laterally disposed and having their upper terminals connected to the upper compartment of their respective header and their lower terminals to the opposite compartment, and a series of pans mounted upon the coils between their branches, substantially as specified.

2. In an evaporator, the combination, with a series of horizontally-disposed coils connected with a steam-supply, of an evaporating-pan mounted within and supported by the series of coils and comprising a perforated bottom and opposite metallic L-shaped flanges projecting above and below the bottom and adapted to rest upon the coils, substantially as specified.

3. The combination, with the case of an evaporator having an opening at one end, of a steam-supply and a steam-exhaust pipe vertically disposed and arranged opposite each other at the sides of the opening and connected with a boiler, a series of horizontal headers spaced apart and subdivided into non-communicating compartments, pipes connecting the upper compartment with the supply-pipe, similar pipes connecting the lower compartments with the exhaust-pipe, and series of U-shaped coils having their upper terminals connected with the upper compartments and their lower terminals with the lower compartment of their respective headers, substantially as specified.

4. In a drier, the combination, with a casing provided with a horizontal partition dividing the casing into an upper and lower drying-compartment, and below said partition provided at one end with an opening, of a series of heating-coils located in the lower compartment opposite the opening and terminating at their opposite ends vertically below an opening formed in the partition, and an escape located in the end wall of the upper compartment above the opening in the lower compartment and at the opposite side of the casing, at which the partition has its opening, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOSEPH W. DOTY.

Witnesses:

W. O. TODD,  
J. P. SMITH.