(No Model.)

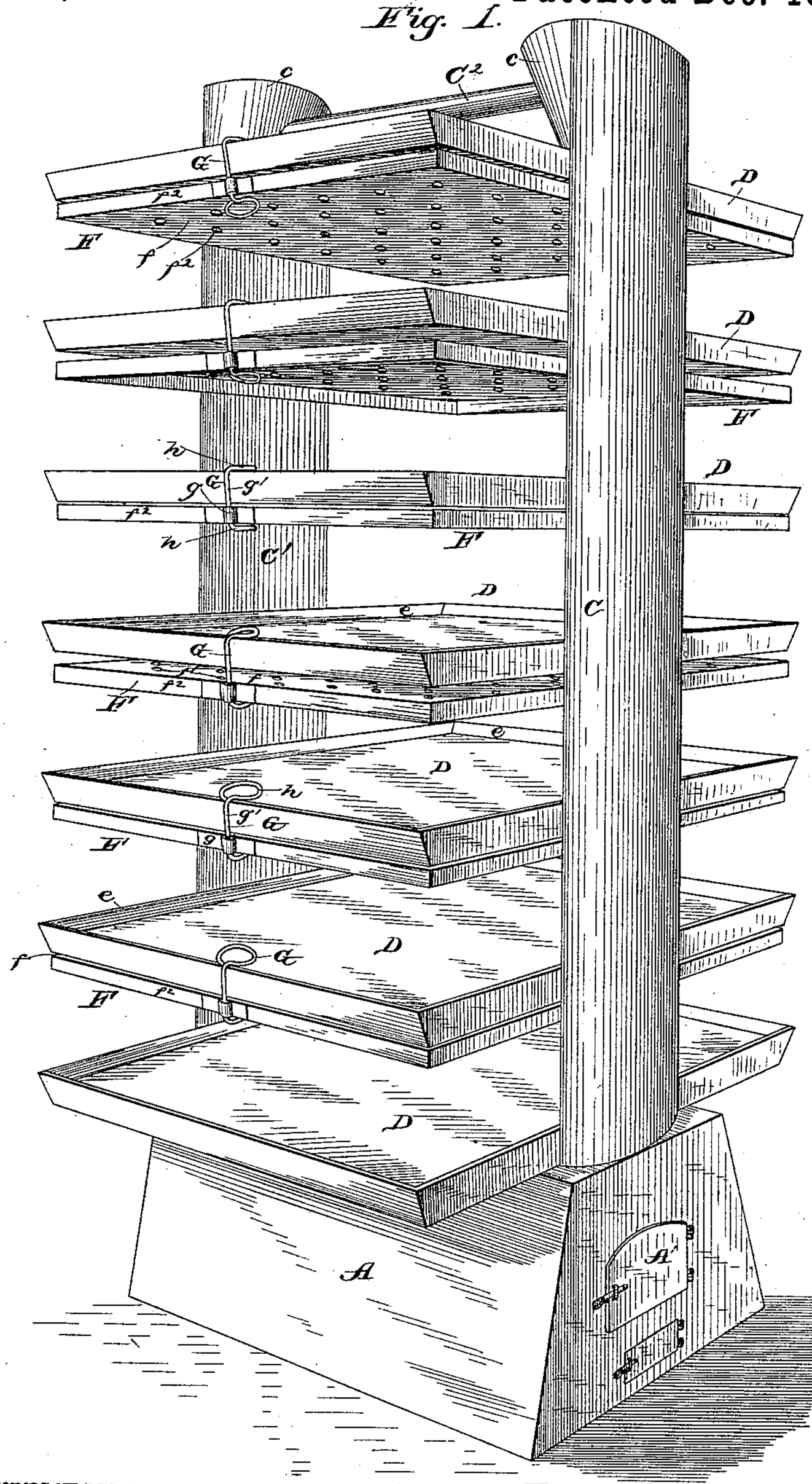
2 Sheets—Sheet 1

J. R. DEW.

FRUIT DRIER.

No. 332,596. Patented Dec. 15, 1885.

Fig. 1.



WITNESSES

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(No Model.)

2 Sheets—Sheet 2.

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FRUIT DRIER.

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Fig. 2.

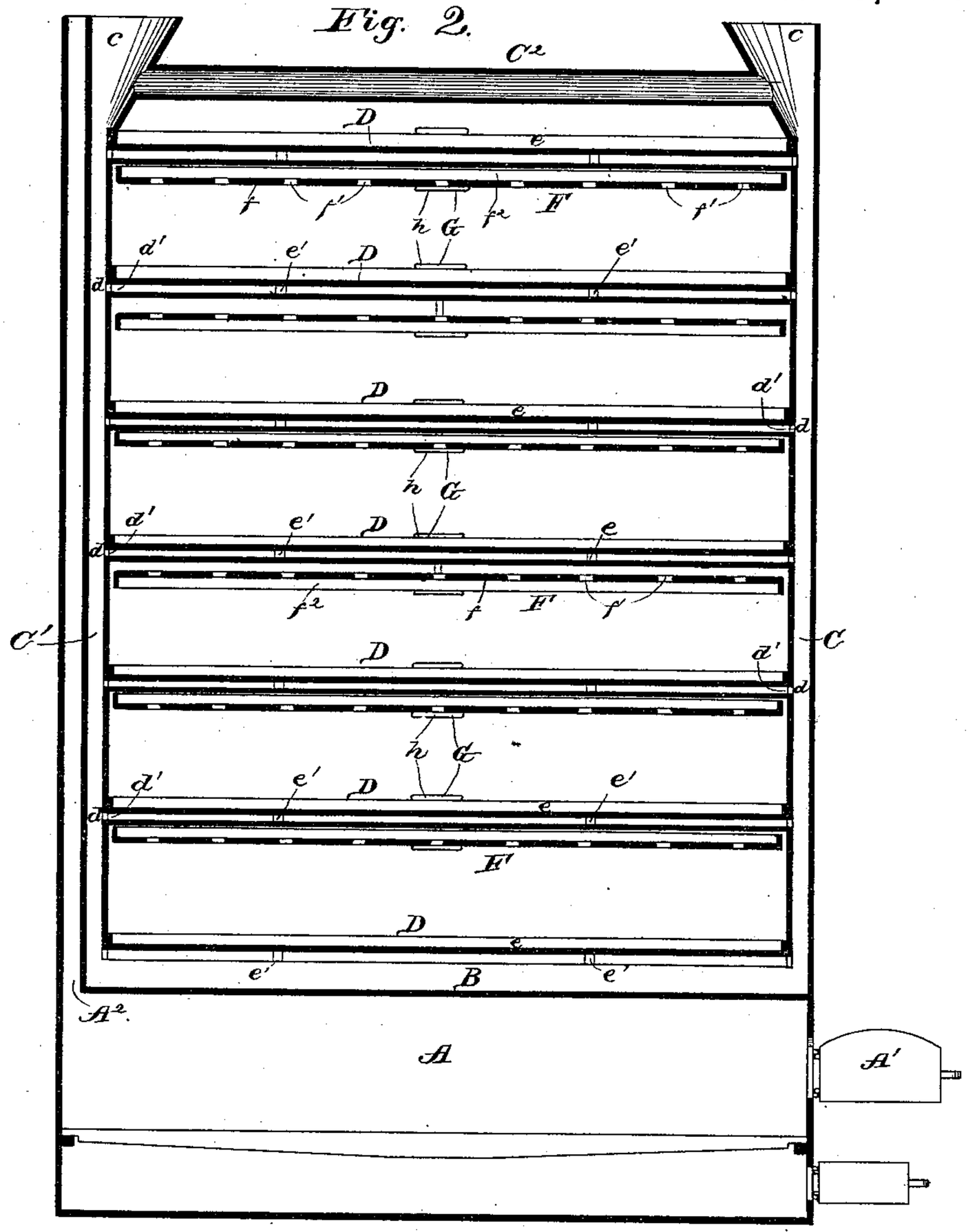
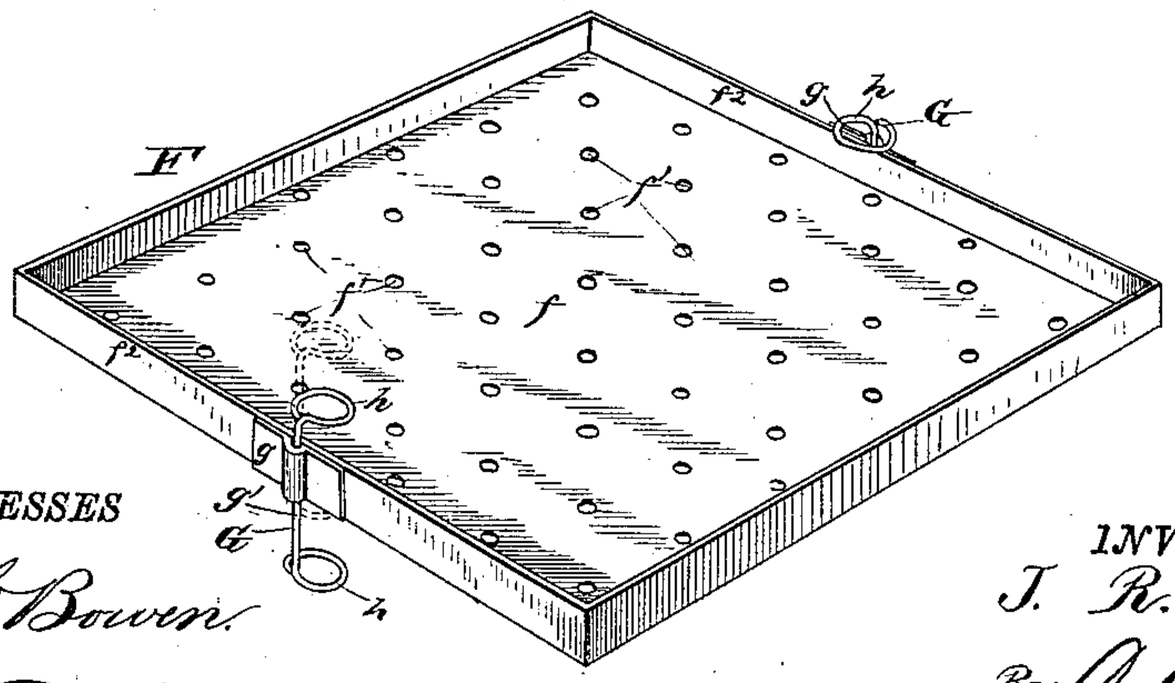


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH R. DEW, OF KNOXVILLE, TENNESSEE.

FRUIT-DRIER.

SPECIFICATION forming part of Letters Patent No. 332,596, dated December 15, 1885.

Application filed September 12, 1885. Serial No. 176,926. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH R. DEW, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented new and useful Improvements in Fruit-Driers, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in fruit-driers; and the novelty consists in the construction, combination, and arrangement of parts, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

The object of my invention is to provide a drier which shall maintain a constant circulation throughout the drier-chambers and pipes thereof; which shall thoroughly and evenly heat the drying shelves or chambers; which shall utilize the entire heating-surface of the heating or drying shelves for the purpose of drying or evaporating the fruit; which shall thoroughly and uniformly and economically evaporate the fruit, and which shall combine simplicity, strength, and durability of construction with thorough effectiveness and economy in operation and comparative cheapness of manufacture.

I have shown an embodiment of my invention in the annexed drawings, in which Figure 1 is a perspective view of my improved drier. Fig. 2 is a vertical central sectional view, and Fig. 3 is a detail perspective view of one of the removable drying-shelves.

Like letters of reference indicate corresponding parts in all the figures of the drawings, referring to which, A designates the furnace of my improved drier; B, the water chamber or boiler thereof, arranged above the furnace; C C′, the vertical stand or water pipes arranged at each end of the boiler or water-chamber and communicating therewith at their lower ends, and D a series of hollow drying-pans arranged between the stand-pipes, at a short distance from each other and in communication with the said stand-pipes, to permit the water from the pipes to flow into the said hollow drying-pans, and thus provide water-chambers through which a constant circulation between the stand-pipes is maintained. The furnace A is provided at one end with a hinged or pivoted door, A′, for the admission of fuel and air for combustion, and at its opposite end it has a chimney or exit for the passage of the products of combustion, A^2. This chimney is arranged on the outer vertical face of one of the stand-pipes, preferably the pipe C′, and extends throughout its entire height, thus utilizing the waste heat from the smoke and other products of combustion, which would otherwise escape, to heat the water in said stand or water pipe. The upper ends of the stand-pipe are provided with an enlarged or flaring funnel-shaped mouth, *c*, for convenience in pouring the water into the pipes and boiler of the apparatus; and the upper ends of said pipes C C′ are connected together by means of a horizontal transverse pipe, C^2, for conducting or conveying the water from one pipe to another to maintain circulation between the pipes. The drying shelves or chambers D are arranged at proper intervals or distances apart, and are supported by any suitable means on the inner faces of the stand-pipes, which are preferably made flat on their said inner faces and have openings or ports *d*, which register or coincide with similar openings, *d′*, in the chamber or shelf, to permit the water to flow from the pipes into the chamber of each shelf, which are arranged in a horizontal position and extend or project beyond the stand-pipes at each side thereof, as clearly shown in Fig. 1. Each shelf is provided at its edges with an upturned flange or rib, *e*, for the purpose of increasing the strength thereof and preventing the fruit from falling off, and at or near its middle it is provided with a brace or strengthening-rod, *e′*, which connects the two walls of said chamber together to prevent them from becoming warped or twisted by the action of the heated water in the chambers. If desired, a series of such brace-rods may be employed; or other means for preventing warping or twisting of the walls may be substituted. The water chambers or shelves and the boiler are preferably made shallow, the former for the purpose of quickly utilizing the heat from the water to heat the pans and evaporate or dry the fruit, after which the cold or partly-cooled water descends through one of the stand-pipes to the boiler; and the said boiler is made shal-

low, so that the water therein will become quickly heated and ascend through the stand-pipe C′ to the water-chambers of the drying-shelves, the water passing through the pipe C′ by reason of it being heated by the escaping products of combustion through its chimney, and being heated on its passage through said pipe to the water-chambers.

F designates a detachable drying tray or pan arranged beneath and suspended from the drying-shelf, each shelf of the series thereof having one of the detachable trays. Each tray F comprises a plate, *f*, having a series of apertures or perforations, *f′*, and an upturned flange or rim, f^2, at its edges, and a suspending device, G, at its sides, by means of which it is suspended from the shelves at the lower under surface thereof, thus utilizing the heat from such under surface of the shelves, which would otherwise be lost, for evaporating the fruit on the detachable trays or pans F. Each side edge of the tray has secured thereto a loop or bearing, *g*, for the passage of the connecting-bar *g′* of the suspending rings or flanges *h* of the fastening device G. The connecting-bar *g′* is free to slide up or down in the bearing *g*, and to revolve therein to cause the rings or flanges *h* to engage the upper surface of the shelves D and the lower faces of the tray F, to suspend the same from said shelf, as will be very readily understood by reference to the drawings. Each ring or flange of the fastening loop or device is arranged in the same plane at opposite ends of the connecting-bar thereof, and the said fastening or suspending rods or loop and the bearing thereof are arranged on the outer faces of the side flanges of the tray, at or near the middle thereof. The tray and the shelf to which it is attached are of the same size, and when the tray is attached or suspended from the shelf so that the flanges f^2 thereof are uppermost the tray is held or pressed tightly into engagement with the lower face of the shelf. The tray in this position brings the fruit thereon into closer range of the heat radiating therefrom to more rapidly accomplish the drying operation; but when it is desired to subject the fruit to the action of the heat for a longer period the tray is reversed—that is to say, the side on which the flanges f^2 are arranged is turned downwardly—thus permitting some of the heat from the lower face of the drying-shelf to escape at the side edges thereof; whereas when the flanges of said tray were in engagement with the shelf the heat therefrom was confined within the tray, as in a chamber, and conducted to act directly upon the fruit thereon. The steam and other gases arising from the fruit on the trays during the evaporation or drying thereof escape through the apertures *f′* in the bottom.

The operation of my invention is obvious from the foregoing description, taken in connection with the drawings. Water is poured into the stand-pipes through the funnel-shaped mouths thereof until the boiler, water-chambers of the drying-shelves, and the stand-pipes are filled, and the fire is then started in the furnace, the fruit or other substance to be dried having been first placed properly upon the shelves and trays. The water in the boiler and the stand-pipe C′ becomes heated quickly and circulates through the chambers, while the cold water therefrom is displaced and returns into the boiler through the pipe C, where it is heated and passed to the chambers again, this operation being continued and maintaining a constant circulation. The steam arising from the heated water escapes through the mouths of the stand-pipes and the heated water circulates through the chambers of the drying-shelves, thoroughly and uniformly heating the walls thereof, which thus acts upon the fruit on the upper wall thereof and that on the detachable tray suspended therefrom on its lower surface.

In a former patent of mine, No. 320,543, dated June 23, 1885, I employ a series of evaporating-shelves communicating with side pipes, which in turn are in communication with the steam-space of a boiler, thus heating the chambers by live steam; but I have found by experience that water can be more quickly heated, retains the heat for a longer period, is economical in the consumption of fuel, and does not require the feeding of water thereto so often, while at the same time it serves to efficiently and thoroughly heat the chambers of the drying-pans more rapidly than can be done with steam.

I do not desire to limit myself to the peculiar construction of suspending device for the detachable tray F, as I am aware that other devices can be substituted therefor with perhaps better results.

Various slight changes in the form and proportion of parts and details of construction may be made without departing from the principle or sacrificing the advantages of my invention, the essential features of which will be readily understood from the foregoing description, taken in connection with the drawings.

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

1. In a fruit-drier, the combination of a boiler, water stand-pipes in communication therewith at each end, and having an open mouth or upper end for introducing the water therein, and a series of drying-shelves arranged between and supported by the water-pipes and having a shallow chamber communicating at its middle with the water-pipes, whereby a constant circulation of water is maintained through the boiler, the water-pipes, and the chambers of the drying-shelves and steam permitted to escape through the open mouth of the water-pipes, substantially as described.

2. In a fruit-drier, the combination of the

boiler, water-pipes communicating therewith at the lower ends and having open flaring mouths at the upper ends, a transverse pipe, C^2, connecting the water-pipes at their upper ends, and a series of drying-shelves arranged between and supported by the water-pipes, and having a shallow water-chamber provided with brace-rods e', and having an opening at the middle of each side wall which communicates with the water-pipes, substantially as and for the purpose set forth.

3. In a fruit-drier, the combination of a furnace, a boiler arranged above the same, stand-pipes C C′ in communication with said boiler, a chimney or exit to the furnace arranged within the casing of the stand-pipe C′, and a series of drying-shelves having a water-chamber in communication with the stand-pipes, substantially as described.

4. In a fruit-drier, the combination of a drying-shelf and a perforated tray having an annular flange and detachably and reversibly suspended from said shelf, as set forth.

5. In a fruit-drier, the combination of the drying-shelf, a tray provided with an annular flange arranged beneath the shelf and reversible, and suspending devices loosely journaled in bearings at the ends of the tray and having arms to clamp the shelf and tray together, substantially as described.

6. A fruit-drier comprising a furnace, a boiler arranged above the same, stand-pipes connecting with the boiler, a chimney to the furnace arranged within the shell of one of the stand-pipes, a series of drying-shelves arranged between and supported by the stand-pipes, and having a water-chamber communicating centrally with said pipes, a series of trays or pans arranged beneath the drying-shelves, and a clamping bar or rod journaled at each side of the trays and having flanges to engage the shelf and tray to suspend the latter in position, all arranged and adapted to serve substantially as and for the purpose described.

7. In a fruit-drier, the combination, with a drying-shelf and the heating-chamber thereof, of a tray or pan arranged beneath the shelf and having a flange adapted to bear against the lower face of the drying-shelf and reversible, and clamping devices to suspend the tray from the shelf, substantially as described.

8. The combination, in a fruit-drier, of a drying-shelf having a heating-chamber, a reversible tray or pan having a projecting annular flange, and a suspending device loosely journaled in bearings secured to the tray at each side thereof and having arms adapted to clamp the shelf and tray together, substantially as described.

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

JOSEPH R. DEW.

Witnesses:
JOHN MARTIN,
GEO. ADNEY.