April 12, 1927. 1,624,639

J. T. THOMASEN

FRUIT DRIER

Filed Oct. 26. 1926 2 Sheets-Sheet 1

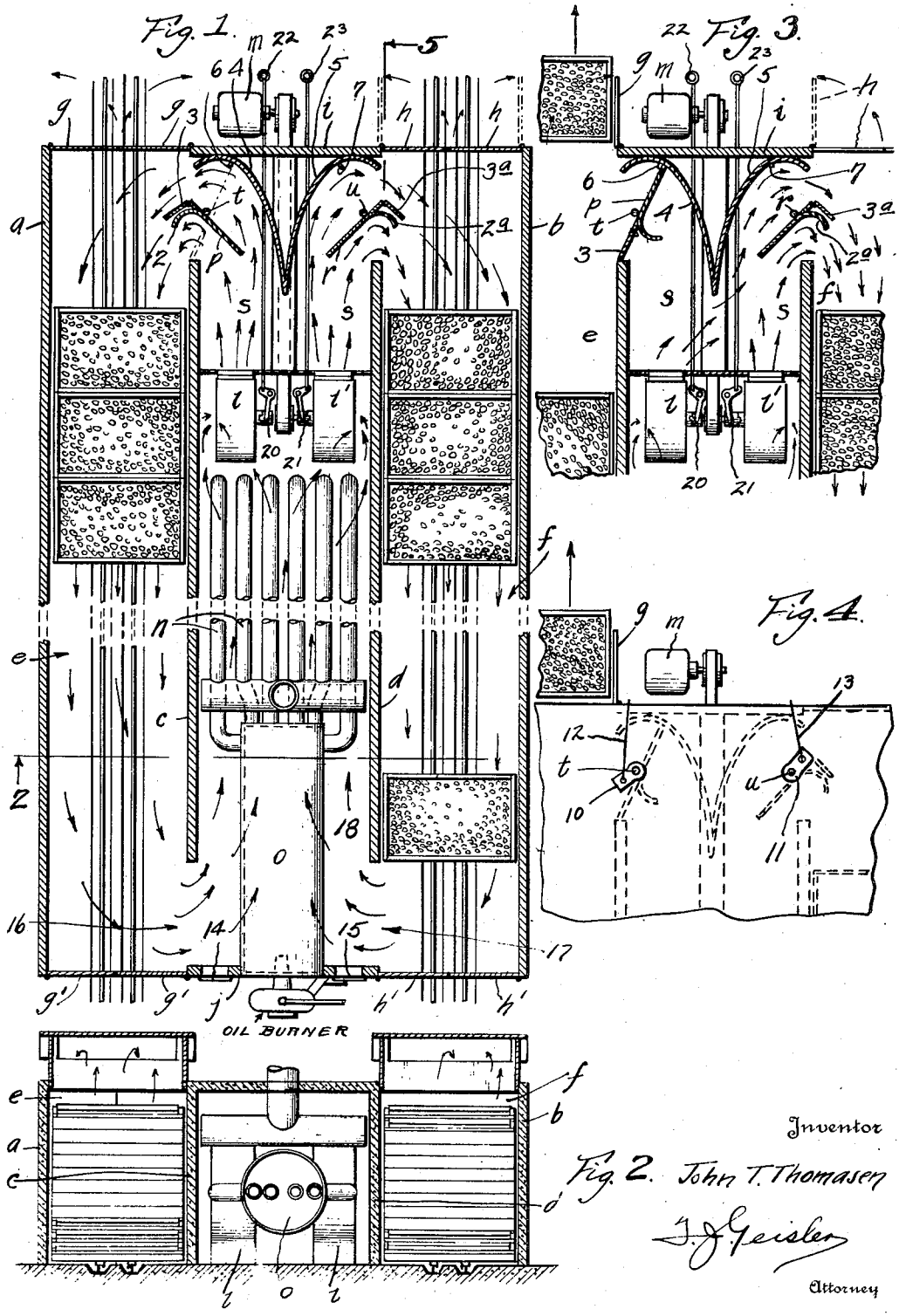


Fig. 2.

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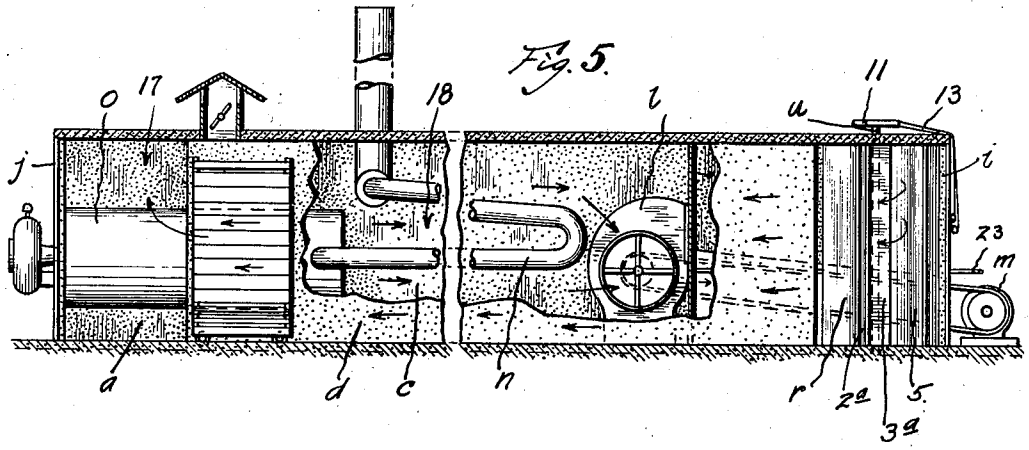
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FRUIT DRIER

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Fig. 5.



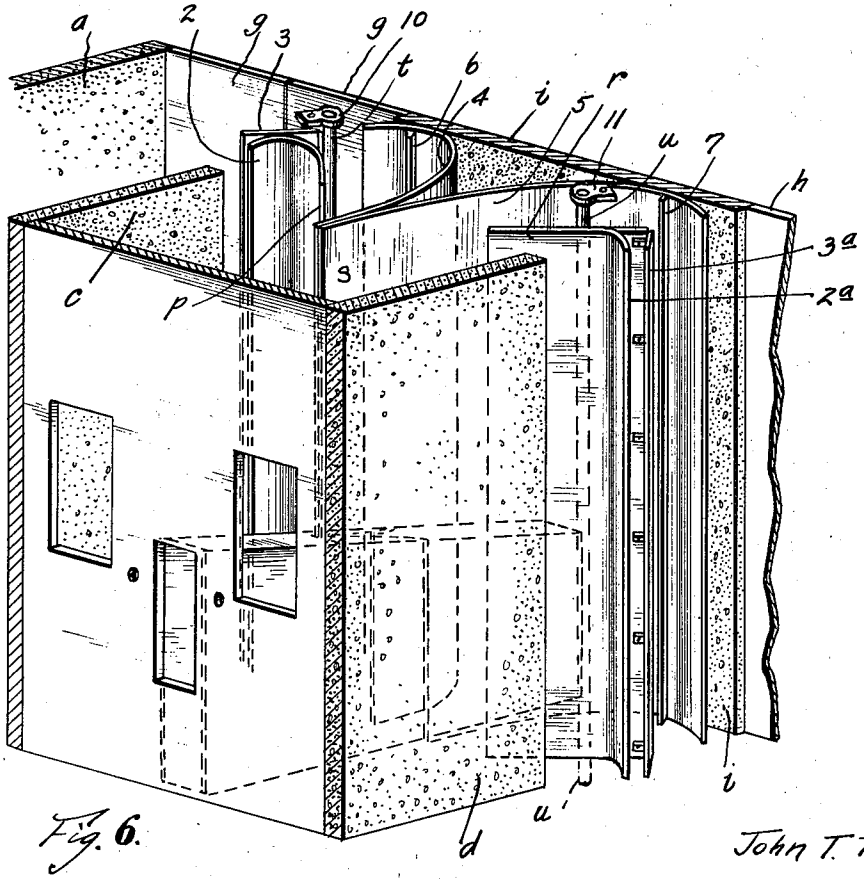


Fig. 6.

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UNITED STATES PATENT OFFICE.

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FRUIT DRIER.

Application filed October 26, 1926. Serial No. 144,302.

My invention relates to fruit driers, especially to that type comprising elongated parallel drying chambers—also known as tunnels—located on either side of a passage-way in which the air heating and circulating devices are located.

The outlet end of my fruit drier is provided with doors through which the fruit being dried may be inspected, and removed when sufficiently dried and these doors, for convenience are usually located at that end of the drier towards which the heated air is driven in its passage through the drying chambers.

When one of said doors is opened, the hot air following the path of least resistance rushes out and is wasted, which increases the fuel cost and lowers the efficiency of the fruit drier.

Also, since the minimum temperature within the fruit drier, when used, for example, for drying prunes, is approximately 165 degrees Fahrenheit, the work of the attendant who opens the door and enters the drying chamber is very arduous.

The object of my invention is so to improve these fruit driers that but little of the hot circulating air will escape to the outside when the doors of the fruit drier are opened, in that way effecting a considerable saving in fuel cost, increasing the efficiency of my fruit drier, and rendering the work of the attendant easier.

A particular object of my invention is to provide doors for controlling the openings through which the intermediate passage-way communicate with the drying chambers, so that when an outside door of the fruit drier is to be opened, the door controlling the adjacent one of said openings may be closed, and thus the hot circulated air may be cut off from the drying chamber from which the dried fruit is to be removed, and circulated only through the other drying chamber.

A further object of my invention is to provide deflector walls at the outlet end of my fruit drier, and to arrange the said interior doors so as to cooperate therewith in deflecting the hot air currents into the drying chamber. Hence, in case an outside door of a drying chamber is opened without the interior door from the intermediate passageway being closed, the air will not tend to rush outside, following the line of least resistance, and be wasted; and at the same time will not strike the attendant, who enters, in the face, to his great discomfort. Further, said arrangement of the interior doors and deflector walls facilitates the circulation of the hot air from the intermediate passage-way through the drying chambers. The described arrangement prevents the undue waste of the heated air and enables the fruit drier to be operated at its highest efficiency.

Also so to arrange and adapt the said doors controlling the said communicating openings that the pressure of the air currents will tend to swing to one side a hinged section of the doors, respectively, when positioned for opening, and to straighten out said hinged section again when the doors are positioned for closing.

A further object of my invention is to provide means for operating the said doors from the outside; thus eliminating the necessity of an attendant entering the drying chamber to open and close said doors; also so to arrange the means for circulating the heated air thru the drying chambers that either thereof may be used alone if desirable or necessary.

I attain my said objects by providing a fruit drier comprising a housing divided by partitions into parallel drying chambers separated by an intermediate passage-way in which the heat generating and air circulating means are located in the communicating openings between such intermediate passage-way and said drying chamber located at that end of the drier towards which the circulated heated air is directed, I provide deflector walls converging at their interior ends to the medial line of said intermediate passage-way and the outer ends of said deflector walls terminating into diverging return bends respectively.

In each of the communicating openings between the intermediate passage-way and the drying chambers, respectively, I provide a door pivoted on a vertical axis and adapted in part to be opened and closed by the force of the air circulated in the drier and to resist opening by such force when the door is placed in its closed position. I also preferably provide means for operating the door from the exterior of the housing.

The details of construction and operation of said features of my invention and others incidental thereto are hereinafter fully described with reference to the accompanying drawings, in which:

Fig. 1 shows a diagrammatic plan view

of the interior of my fruit drier illustrating the construction and arrangement of the said deflector walls and the doors cooperating therewith for controlling the openings by which the intermediate passage-way and the respective drying chambers are connected at the outlet end of the drier housing; the arrows indicating the path taken by the heated air as it is circulated through the drier;

Fig. 2 shows a transverse section of my fruit drier taken on the line 2—2 of Fig. 1, thus showing the heating device located in the intermediate passage-way and the drying chambers located on both sides of the latter, trucks carrying grades of fruit to be dried being shown as located in drying chambers;

Fig. 3 shows a fragmentary diagrammatic plan similar to the portion of my drier as shown in Fig. 1 with the left hand door controlling the opening through which the intermediate passage-way communicates with the left hand drying chamber arranged in its closed position and the outer door of the housing of the drying chamber at the left hand side being open; this figure further illustrates that by the closing of the door referred to, the heated circulated air is deflected into the right hand drying chamber;

Fig. 4 shows a fragmentary plan or top view of the discharge or outlet end of my fruit drier and illustrates means for operating doors operating from the exterior of the housing, the doors which control the openings connecting its intermediate passage-way with the drying chambers respectively; the said doors and the deflector walls with which they cooperate being shown in dotted outline, and the doors positioned as shown in Fig. 3;

Fig. 5 shows a fragmentary longitudinal section taken on the line 5 of Fig. 1 thus on the right hand side of the partition d; the parts are broken away to illustrate details of construction; and

Fig. 6 shows a fragmentary perspective of the outlet end of my fruit drier with the roof removed and illustrates more clearly the construction of the doors and serves further to illustrate the arrangement of the deflective walls and of the doors cooperating therewith both referred to.

Referring now to Figs. 1, 2, and 3, my fruit drier comprises an elongated housing provided with outside walls a and b, inner longitudinal walls c and d which form with the walls a and b the fruit drying tunnels or chambers e and f. The doors g and g' which open outward are provided at each end of the drying chamber e and similar doors h and h' are provided for the drying chamber f. End walls i and j close the space between the doors g and h and g' and h' at the respective ends of the drier.

Fans l and l' driven by a suitable motor m located outside the drier draw the heated air from off the flue pipes n which lead from the furnace o, which is preferably an oil burner. Clutches 20 and 21 are provided on the shafts of the fans l and l' and are operated from the outside by rods 22 and 23 so that when one or the other of the drying chambers are not in use the fan on that side may be thrown out of gear.

The doors p and r located in the lateral openings between the hot air chamber s and the drying chambers e and f are pivoted at approximately their longitudinal centers on upright posts t and u and are each provided with a curved deflector plate 2 and 2^a and a hinged section 3 and 3^a, respectively.

Companion outwardly diverging parabolic deflector walls 4 and 5 are so arranged at the end of the hot air chamber s as to divide the hot air forced from the hot air chamber by the fans into two currents, one going into each drying chamber. Outstanding flanges 6 and 7 are fixed to the inner sides of the deflector walls 4 and 5 so as to form an abutment for the doors p and r when rotated into a closed position as shown in Fig. 3.

The posts t and u upon which the doors p and r are pivoted are provided on their upper extremities which extend through the roof of the drying chamber with cross members 10 and 11 which are operable from the outside by ropes 12 and 13 connected thereto as shown in Figs. 4 and 5.

The mode of operation of these doors and deflectors is best explained by describing the method of drying the fruit from the time it enters the drier at one end until it is taken out dried, at the other end.

The arrows indicate the paths taken by the air under various conditions determined by the deflectors and the positions of the doors p and r.

The trucks loaded with fruit are run in at the receiving end and the drying chambers are filled with trucks to a point at the outlet end as shown in Fig. 1 just before the lateral openings into the hot air chamber s in which the doors p and r are located, and to a point in the receiving end just past the lateral openings 16 and 17 into the flue chamber 18, in which special doors are also provided but not shown, as they do not constitute a part of my present invention.

The heat is then turned on and the fan started. Adjustable dampers 14 and 15 are provided in the flue chamber 18 for supplying fresh air as needed from the outside. The outside doors g and h and g' and h' have been closed and the doors p and r are open, in the position as shown in Fig. 1.

The air being drawn over the flue pipes

n is heated and is forced against the curved deflector walls 4 and 5 and deflected into the drying chambers e and f toward the receiving end of the drying chambers.

The doors p and r and especially the deflector plates 2 and 2^a serve to deflect that part of the hot air not coming in contact with the deflector walls 4 and 5. The hinged sections 3 and 3^a are adapted to swing outward from the hot air chamber when the doors are in this position so as not to interfere with the movement of the air. Thus, at this point in the operation, the air is deflected toward the receiving end.

After the air leaves the hot air chamber, and is deflected by the curved deflector walls, the doors p and r, and the deflector plates 2 and 2^a, the latter also preventing the hinged sections 3 and 3^a from being blown by the current of air into a position so as to form a longitudinal extension of the said door, which would tend to obstruct the passage of the air as it is deflected into the drying chambers where it passes over the fruit, drying it, and through the drying chambers to the openings 16 and 17 where it is drawn into the hot air chamber again.

Naturally, the fruit at the outlet end dries the fastest and is ready to be taken out first.

When the prunes are ready to take out, which will be known to those skilled in the art, one drying chamber is opened at a time, but first, the door p for instance, is closed from the outside by the ropes 12, and as the said door is rotated anti-clockwise, the air current will swing the hinged section 3 so as to form a longitudinal extension of the door p and the said section will then abut against the wall c, the door p closing at the same time against the outstanding flange 6, thus tightly closing the lateral opening to the drying chamber e as shown in Fig. 3.

The door p having been closed and the hot air shut off from the drying chamber e, the air is deflected by the curved deflector wall 5 into the drying chamber f, and the chamber e can be opened without any loss of hot air to the outside, or discomfort to the attendant who may now enter and remove the trucks of dried fruit, and replace those removed with fresh fruit at the receiving end, moving the remaining trucks forward along the tunnel to the position occupied by those removed, after which the doors g and g' will be closed, the door p opened by rotating clockwise, and the hot air will again be turned into the said chamber.

The dried fruit may be removed from and replaced in the other drying chamber in a similar manner, the door r being first closed from the outside and the doors h and h' then opened.

In case the attendant wishes to open a drying chamber door without closing the interior door, the deflector wall and arrangement of the interior door tends to deflect the hot air into the drying chamber and away from the outside door, then enabling him to do so with only a negligible loss of hot air to the outside, and also no discomfort to himself.

The clutches 20 and 21 on the respective shafts of the fans l and l' are provided so that if for any reason it is desirable to use only one drying chamber the hot air can be completely cut off from that drying chamber for the time and thus effect a saving in fuel and power.

I claim:

1. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, heat generating means located in said intermediate passageway, independently operable means for circulating the heated air thru each of said drying chamber individually and doors controlling the communication of the intermediate passageway with the drying chambers respectively.

2. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, heat generating means located in said intermediate passageway, independently operable means for circulating the heated air thru each of said drying chambers individually and the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, and a door pivoted on a vertical axis in each of said lateral outlets.

3. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, and a door pivoted on a vertical axis in each of said lateral outlets.

4. In a fruit drier a housing divided by

partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, the outer ends of said deflector walls terminating in diverging return bends, respectively, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, and a door pivoted on a vertical axis in each of said lateral outlets.

5. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, a door pivoted on a vertical axis in each of said lateral outlets, and each door being provided with a hinged section adapted to be automatically swung to one side of the plane of the door, in the open position of the door, by the force of the air circulated in the drier, and to resist similar movement in the closed position of the door.

6. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, a door pivoted on a vertical axis in each of said lateral outlets, each door being provided with a hinged section adapted to be automatically swung to one side of the plane of the door, in the open position of the door, by the force of the air circulated in the drier, and to resist similar movement in the closed position of the door, and to resist similar movement in the closed position of the door, and each door being further provided with a lateral supplemental deflector adjacent to said hinged section.

7. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passage-way in the outlet end of the drier, the interior ends of said deflector-walls converging to the medial line of said intermediate passageway, the outer ends of said deflector walls terminating in diverging return bends, respectively, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, a door pivoted on a vertical axis in each of said lateral outlets, each door being provided with a hinged section adapted to be automatically swung to one side of the plane of the door, in the open position of the door, by the force of the air circulated in the drier, and to resist similar movement in the closed position of the door, and each door being further provided with a lateral supplemental deflector adjacent to said hinged section.

8. In a fruit drier a housing divided by partitions into two parallel drying chambers separated by an intermediate passageway, heat generating and air circulating means located in said intermediate passageway, outwardly curved deflector-walls located in said intermediate passageway in the outlet end of the drier, the interior ends of said deflector walls converging to the medial line of said intermediate passageway, the ends of said partitions adjacent said outlet end and the interior ends of said deflector-walls being arranged to constitute lateral outlets from said intermediate passageway, a door pivoted on a vertical axis in each of said lateral outlets, each door being provided with a hinged section adapted to be automatically swung to one side of the plane of the door, in the open position of the door, by the force of the air circulated in the drier, and to resist similar movement in the closed position of the door, and means for operating the door from the exterior of the housing.

JOHN T. THOMASEN.