

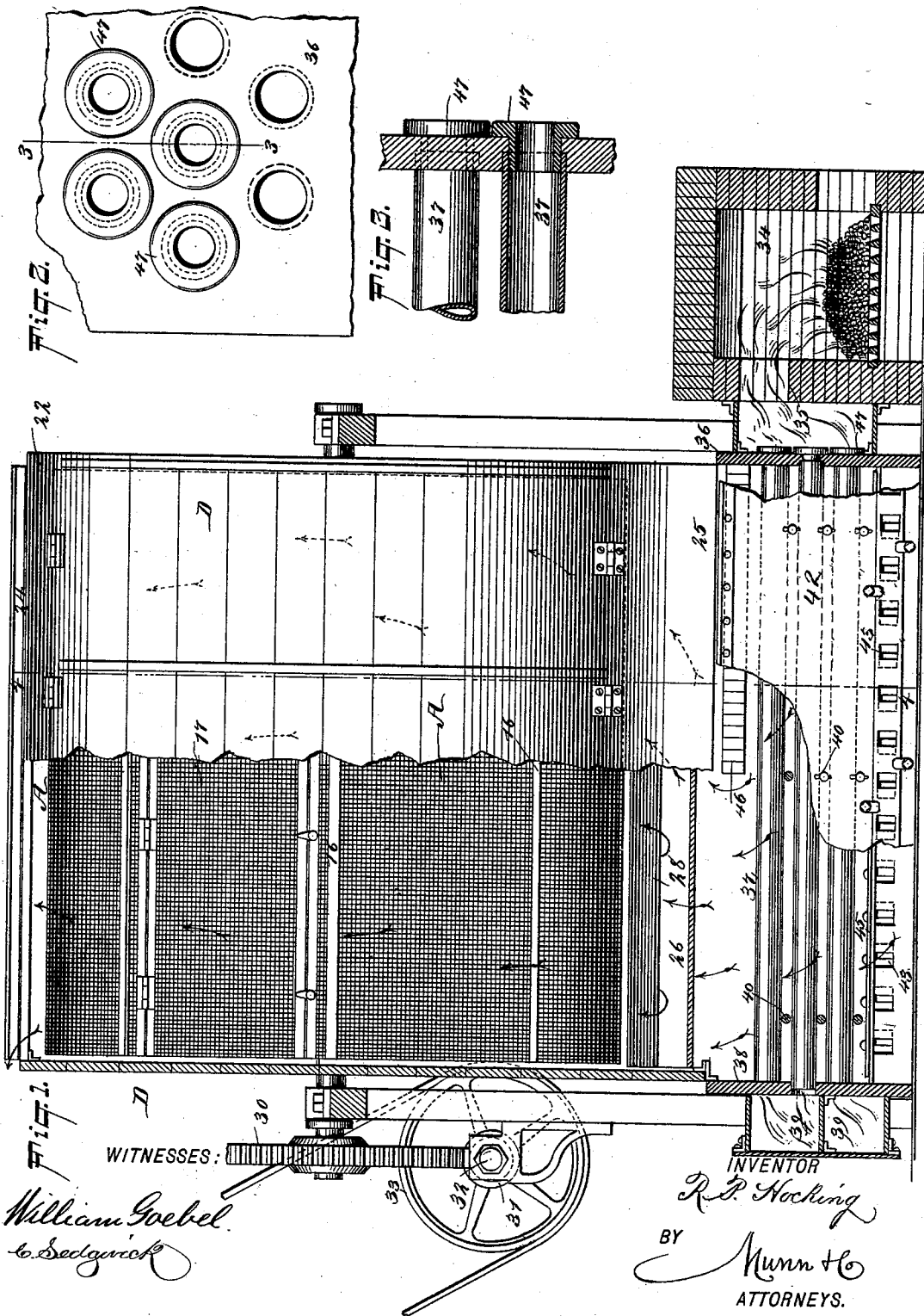
(No Model.)

2 Sheets—Sheet 1.

R. P. HOCKING.
COFFEE DRYING APPARATUS.

No. 521,859.

Patented June 26, 1894.



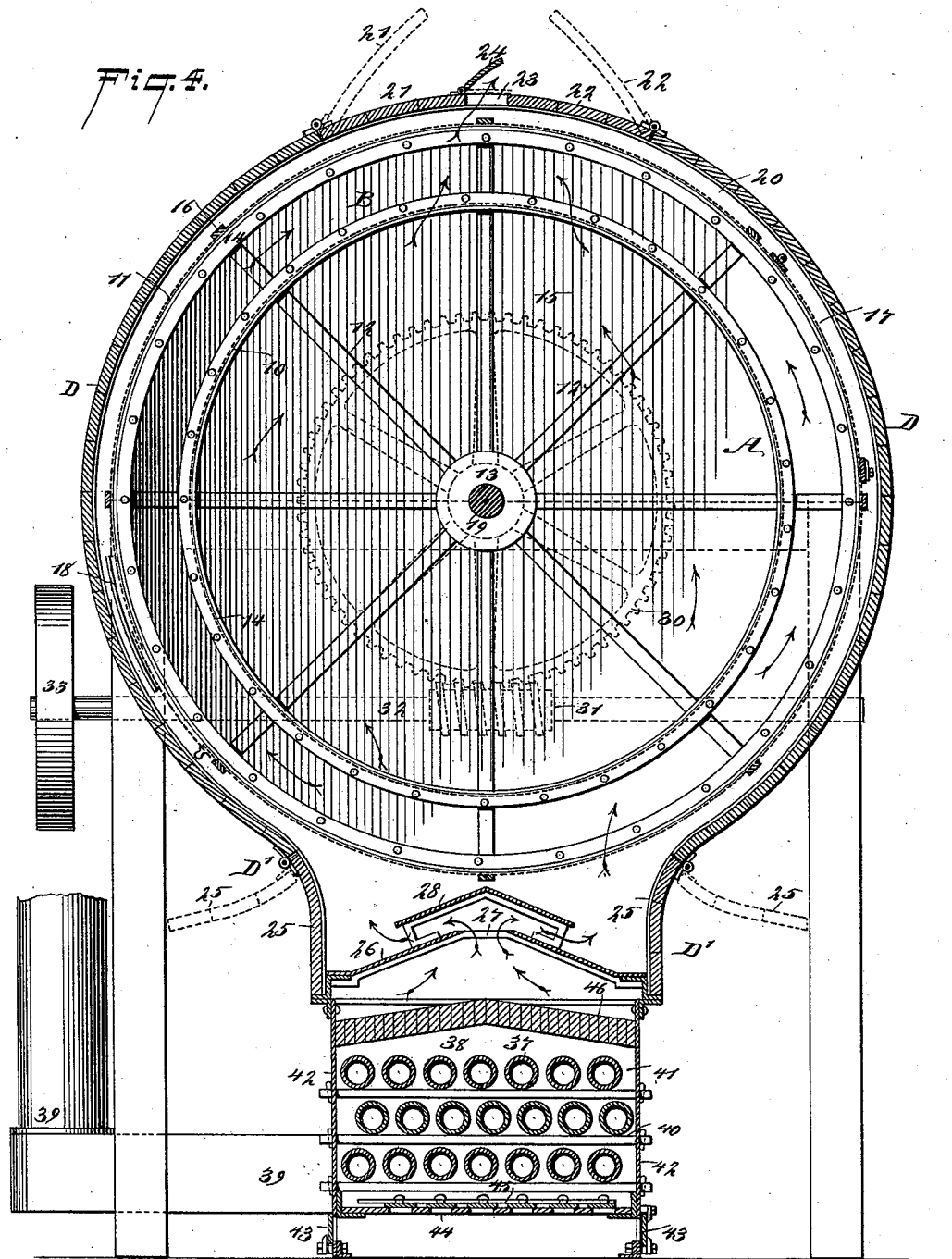
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WITNESSES:

William Goebel
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UNITED STATES PATENT OFFICE.

RICHARD P. HOCKING, OF MAYAGUEZ, PORTO RICO.

COFFEE-DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 521,859, dated June 26, 1894.

Application filed June 20, 1893. Serial No. 478,285. (No model.)

To all whom it may concern:

Be it known that I, RICHARD P. HOCKING, of Mayaguez, Porto Rico, have invented a new and Improved Coffee-Drying Apparatus, of which the following is a full, clear, and exact description.

My invention relates to an improvement in apparatus for drying coffee, and it has for its object to provide an apparatus especially designed for drying the fruit of the coffee tree after the red shell has been removed from the berry, which apparatus will be of exceedingly simple, durable and economical construction, being so made that the berry will be subjected to constantly recurring currents of heated air, which after impinging upon the berry will find a speedy exit from the apparatus, the exit of the air being under complete control.

A further object of the invention is to so construct the drying chamber of the apparatus that as said chamber is revolved the berries contained therein will constantly change position, thereby presenting every portion of their surface to the drying agent.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus, a portion of the casing being broken away disclosing the drying cylinder, and likewise a portion of the furnace wall is broken away disclosing the interior. Fig. 2 is an outer face view of a portion of the flue sheet of the drying furnace. Fig. 3 is a vertical section taken through the flue sheet, and practically on the line 3-3 of Fig. 2; and Fig. 4 is a vertical transverse section taken through the entire apparatus, practically upon the line 4-4 of Fig. 1.

The main feature of the invention consists in the construction of the drying cylinder A. The said cylinder may be of any diameter required and of any desired length, and it consists of two concentric walls, an inner wall 10 and an outer one 11. The space between these two walls may be made as wide as nec-

essary, and the said space constitutes a drying chamber B. Preferably this drying chamber is without partitions, being continuous, but if in practice it is found desirable, one or more partitions may be placed within the drying chamber, dividing it into one or more compartments; or the partitions, if used, may extend but partially the length of the cylinder, thereby forming deflecting plates to compel the articles dried to travel in a circuitous path.

The detail construction of the cylinder A, is practically as follows: At each end arms 12, are projected from a hub 13, forming thereby a spider, and the arms are adapted to support rings or bands 14, secured to the arms in any suitable or approved manner; and a head 15, is securely bolted to each set of end rings, and a wire cloth forming the outer and inner walls of the cylinder is secured at its ends upon said rings; if in practice it is found desirable attachment is made to the heads also.

The wire cloth is held in place, when it is used, and is stiffened to a greater or less degree, by a series of longitudinal strips or bars 16, which strips or bars extend from one edge to the other at desired intervals apart. The inner wall 10 of the drying chamber B of the cylinder, is preferably unbroken; that is to say, it is continuous,—but the outer wall 11, is usually provided with two doors designated respectively as 17 and 18, both of which may be hinged doors, or both of them may be sliding doors; or as illustrated in the drawings one may be a hinged door and the other may be a sliding door, the hinged door being adapted to cover the opening through which the material to be dried is entered, while the sliding door is located over the opening at which the material is to make its exit; these doors extend from end to end of the cylinder, and are preferably placed opposite one another in order to balance the cylinder when it is revolved.

The cylinder is secured upon a shaft 19, and the said shaft is journaled in the ends of a casing D. The casing is of practically the same shape as the cylinder, except at its lower end, where a neck D', is formed extending vertically downward below the cylinder; and between the outer wall of the cylinder and

the inner wall of the circular portion of the casing D a space 20, is provided, enabling the cylinder to revolve freely within the casing and at the same time permitting a circulation of air around the cylinder.

The casing is usually provided at the top with two doors 21 and 22. These doors are ordinarily hinged, and are adapted to be carried upward and outward. The doors 21 and 22, while they are located opposite one another and are adapted jointly to cover a feed opening in the casing, do not approach one another closely, as a space 23 intervenes between them, as shown best in Fig. 4. This space is adapted as an exit opening for the heated air or heating agent after it has performed its work upon the article to be dried; and in order that the amount of air escaping may be regulated to suit various conditions, and various material to be dried, the opening 23 may be entirely or partially closed by a gate 24, serving in the nature of a valve, as shown in Fig. 4, said gate being pivoted or hinged to one of the doors of the casing.

The neck D' of the casing is provided at opposite sides with a door, said doors being designated as 25, which doors are adapted to fold upward and outward, as shown in dotted lines, and permit whatever material may be delivered to the neck section of the casing to escape at its sides. The neck of the casing is provided with a floor 26, which is pitched from the center downward in direction of its edges, the pitch being at opposite sides, or in direction of the doors 25. This flooring is provided with a longitudinal opening 27, preferably located at its center, as shown in Fig. 4; and the opening is normally covered by a pitched hood 28, erected upon the flooring 26 and extending from end to end of the casing, the sides of the hood or those portions facing the doors 25 in the casing being open, as the heating agent, whatever it may be, as shown by the arrows in Fig. 4, is adapted to pass up through the flooring opening 27 into the hood and then out into the casing through the side openings in the hood, and from the lower portion of the casing the heating agent will pass through the cylinder, entering the drying compartment with greatest force at the bottom and sides of the cylinder; and after the drying agent has performed its function, it will pass off through the exit opening 23 at the top of the casing.

In this manner the currents of heated air, for example, will be constantly passing through the drying chamber over and around the material contained therein; and after acting upon the material the heated air will pass out through the casing to make room for other currents, thereby subjecting the material to be dried to substantially the same temperature at all times.

As the cylinder is adapted to be revolved, the berries or other material contained in the drying chamber of the cylinder, will be constantly shifted, and therefore different surfaces will

be constantly presented to the heating agent to be properly acted upon by it.

The cylinder may be revolved in any suitable or approved manner; in the drawings the mechanism employed for that purpose consists of a worm wheel 30, which is mounted upon one end of the shaft 19; the said worm wheel is in mesh with a worm 31, located upon a drive shaft 32, which shaft may be provided with a driving pulley 33, when the shaft is to be driven by a motor; or a crank may be connected with the shaft, or the equivalent thereof, to enable it to be revolved by hand.

Any approved form of furnace, or other heat-generating device may be employed in connection with the casing and the cylinder. This furnace consists of a fire box 34, which is connected by a passage 35 with a tube sheet 36, the said tube sheet being adapted to receive one end of a series of pipes 37. The tube sheet 36, is generally placed below one end of the casing, and a second tube sheet 38 is located at the opposite end of the casing, receiving the opposite ends of the tubes; and the pipes passing through the tube sheet 38, are in communication with an off-take flue or flues 39, as shown in Fig. 1. The pipes or tubes 37 may be supported intermediate of their ends by suitable rods or bars 40. It will be understood that the pipes or tubes 37, are located within a compartment 41 located beneath the neck of the casing, the flue sheets constituting the ends of the compartment, while the sides 42, are constructed of metal plates, or are otherwise formed, as shown in Fig. 4. Cold air is admitted to the lower portion of the compartment through the medium of slides 43, located at the bottom portions of its sides; and the air after entering the bottom portion of the compartment is admitted to the upper portion in which the pipes 37, are located, through the medium of a grated partition 44, the openings being controlled by suitable slides 45, operated ordinarily from the exterior of the furnace. Thus it will be observed that the cold air will constantly enter the furnace, and will pass up around the tubes and become heated, and will then pass up through the opening 27 in the flooring of the casing and be directed to the cylinder.

It is obvious that the tubes will be much hotter at their ends at which the products of combustion enter than at their ends where the said products find an exit; and in order to prevent one portion of the cylinder receiving hotter currents of air than the other, a horizontal arch 46, is constructed over the upper row of pipes within the furnace below the flooring 26 of the casing, and this arch extends to a point above the longitudinal center of the furnace.

The tubes are made quite large in order that as large an amount as possible of heat-radiating surface may be obtained; and in order to reduce these pipes at their ends receiving the products of combustion to prevent said products entering the pipes in too

great a volume, reducing thimbles 47 are placed in the flue sheet 36, as shown in Figs. 2 and 3, and into the receiving ends of the tubes. These thimbles are flanged upon their outer faces, and therefore the flue sheet is reinforced around the openings through which the products of combustion are passed into the tubes.

In the operation of the drier, the material to be dried is placed within the drying chamber B by opening the door 17, for example, of the cylinder when it is opposite the doors 21 and 22 of the casing, the latter doors being open; and the material is discharged from the cylinder by opening the cylinder door 18, when that door is over the hood 28 in the bottom of the casing, and the lower doors 25 in the casing neck being open the material discharged from the cylinder will strike upon the inclined surface of the hood 28 and will slide from thence to the inclined surface of the floor, by which it will be conducted to the openings disclosed by opening the doors 25.

I desire it to be understood that various details of the invention may be changed and equivalents may be employed without materially affecting the spirit of the invention. It is evident that the heated air may be passed into the cylinder at other points than at the bottom; as for example, the cylinder shaft may be made hollow and contain perforations and serve as a conductor for the heated air. In this event the current of air could only pass through the upper portion of the cylinder.

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

1. In a drier for coffee and other articles the combination with a cylindrical revoluble drying chamber having its side walls constructed of a perforated or reticulated material, the drying chamber being provided with an inlet door and a discharge door, of a casing encircling the cylinder and provided with inlet and outlet doors, means substantially as described for passing a heating agent through the drying chamber, an opening formed in said casing for the escape of the heating agent passed through the drying chamber, and a valve arranged at said opening to regulate the amount of the heating agent escaping therefrom, substantially as shown and described.

2. In a drier for coffee and other articles a casing provided with a valved opening and having inlet doors at its top and outlet doors at its lower end, a cylinder held to revolve within the casing and provided with an annular drying chamber having its side walls perforated or reticulated, the outer side wall of the drying chamber being provided with

an inlet door and a discharge door arranged on opposite sides thereof, and a furnace adapted for heating air and communicating with the interior of the casing below the drying chamber, substantially as shown and described.

3. In a drier for coffee and other articles, a cylinder mounted to revolve and provided with a drying chamber having doors for the admission and discharge of the material to be dried, a casing surrounding said cylinder and also provided with inlet and discharge doors, a flooring formed in said casing below the cylinder and provided with an opening for the admission of the heating agent to the drying chamber, a hood arranged above the said opening to deflect the heating agent to the sides of the drying cylinder and means for passing the heating agent through the drying chamber substantially as shown and described.

4. In a drier for coffee and other articles, the combination with the revoluble drying chamber having its side walls perforated or reticulated, the outer wall being provided with an inlet and an outlet door for the material, of a casing encircling said drying chamber and provided with inlet doors and a valved opening at its top and having a neck at its lower end extending downward and provided with doors arranged on opposite sides thereof, a flooring located in the neck of the casing and inclining from the center in opposite directions, the flooring being provided with an opening for the admission of hot air to the drying cylinder and a furnace adapted for heating the air substantially as shown and described.

5. In a drier for coffee and other articles a revoluble cylinder provided with an annular perforated or reticulated drying chamber, inlet and outlet doors formed in the outer wall of said chamber, a casing surrounding the cylinder and provided at its top with inlet doors for the material to be dried and a regulating valve for the exit of the heating medium, the said casing having a neck at its lower end extending downward and provided with doors on opposite sides thereof, the neck of the casing being further provided with a floor inclined in opposite directions from the center toward the doors and having an opening for the admission of hot air to the drying chamber, a hood arranged over the opening in the floor, said hood being inclined from the center in opposite directions, and a furnace adapted to heat the air substantially as shown and described.

RICHARD P. HOCKING.

Witnesses:

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EDGAR TATE.