Dec. 31, 1935. E. D. PURKETT 2,026,189

DRYING APPARATUS

Filed May 11, 1933 2 Sheets-Sheet 1

Fig. 1.

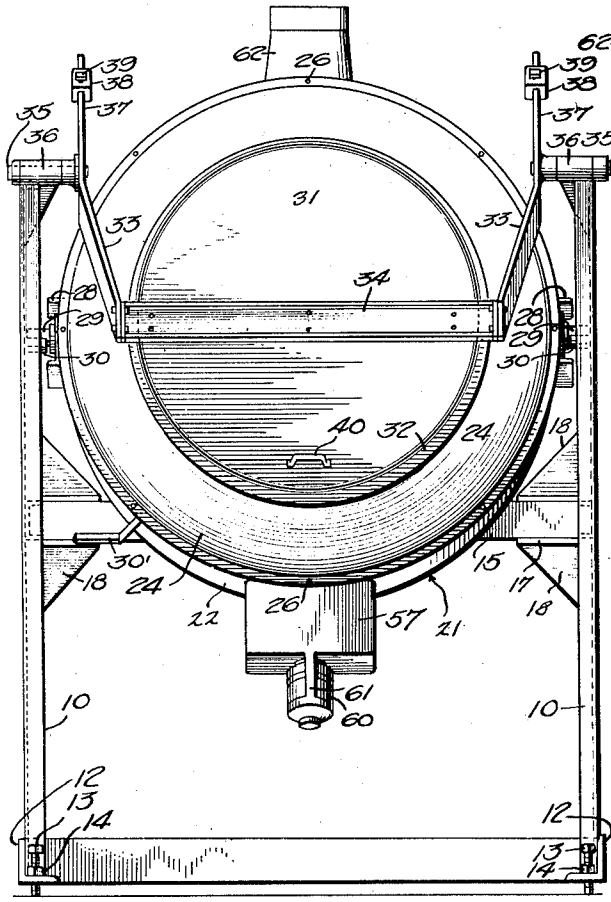
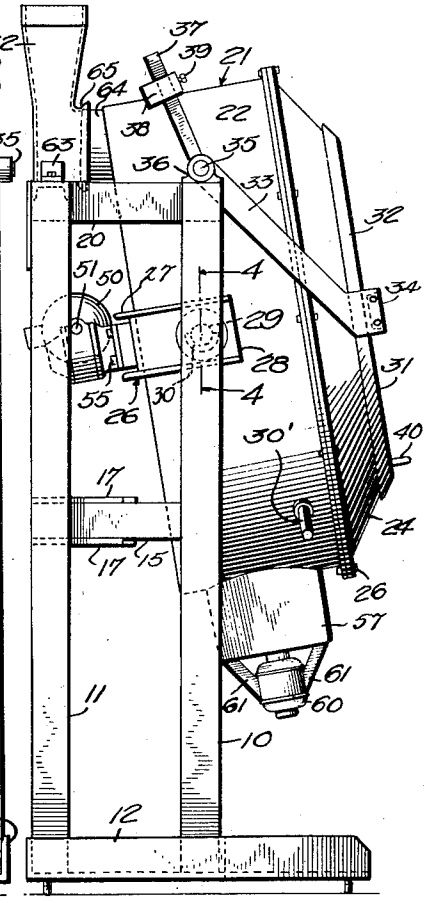


Fig. 2.



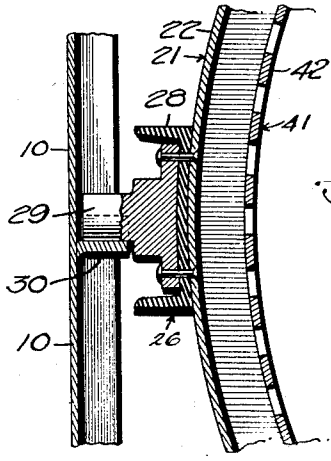


Fig. 4.

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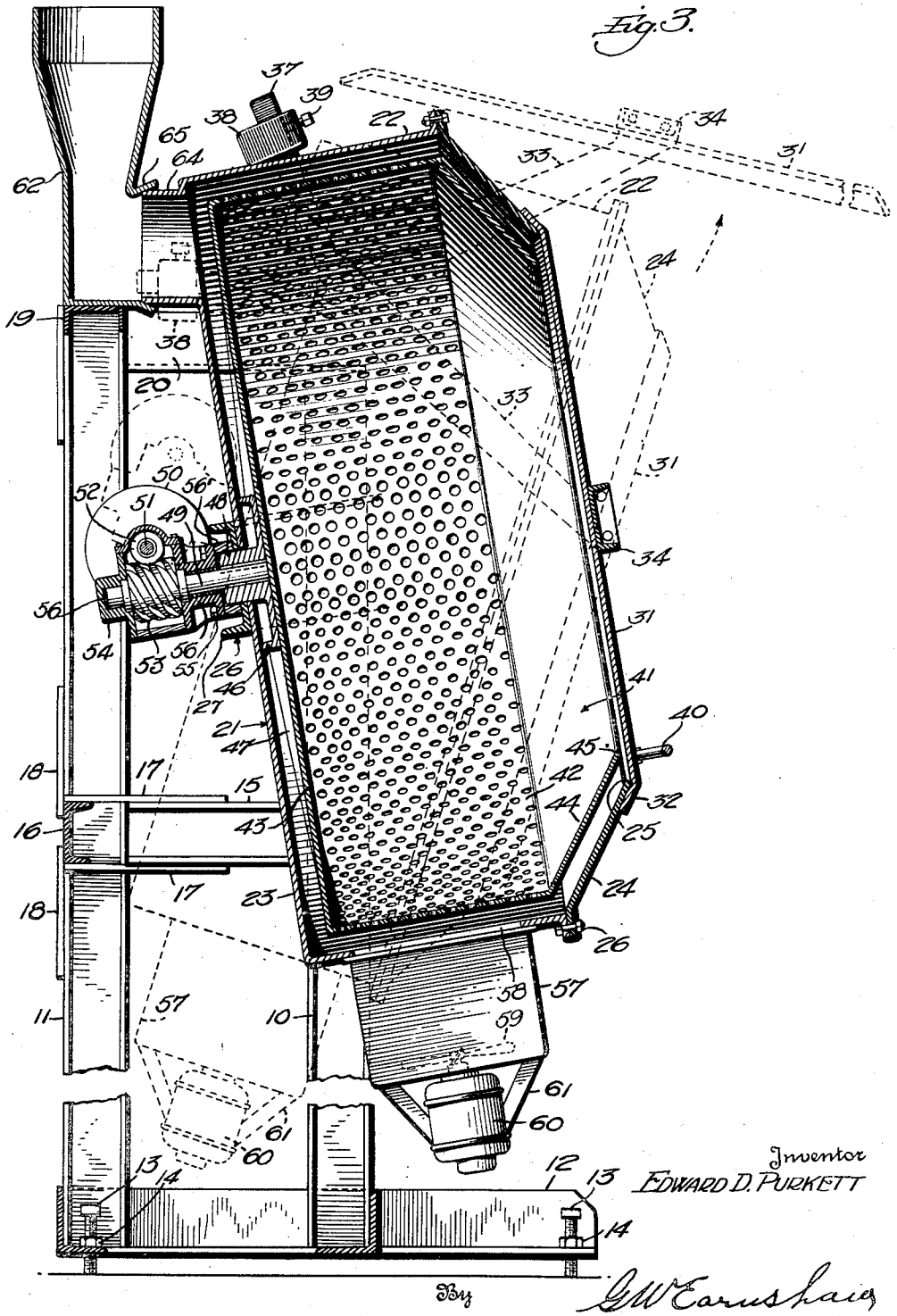
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DRYING APPARATUS

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Fig. 3.



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UNITED STATES PATENT OFFICE

2,026,189

DRYING APPARATUS

Edward D. Purkett, Joplin, Mo., assignor to Purkett Laundry Company, Joplin, Mo.

Application May 11, 1933, Serial No. 670,603

7 Claims. (Cl. 34—5)

This invention relates to drying apparatus, and more particularly to drying tumblers for laundry use.

In my copending application Serial No. 662,159, filed March 22, 1933, I have disclosed a novel form of laundry shake-out tumbler in the form of a cylinder having a large axial opening through which the clothes are introduced and removed. The tumbler is adapted to be revolved either with the axis horizontal or slightly inclined with the axial opening facing upwardly, during which operation the clothes are tumbled in the drum to loosen or shake them out. The tumbler is then adapted to assume a position with the axis inclined in the opposite direction whereby the axial opening faces downwardly, and during rotation of the tumbler in such position, the clothes are elevated and fall through the axial opening without handling.

The present invention embodies the same general principle of operation of the tumbler except that it provides means for heating and drying the clothes. Accordingly, an important object of the invention is to provide a drying apparatus particularly adapted for use in laundries wherein the introduction of clothes into the drier and the removal of the clothes therefrom is greatly facilitated without danger incident to the necessity for the handling of hot clothes by laundry operators.

A further object is to provide a rotating perforated or screened drum adapted to contain the clothes and to provide heating means for the drying drum, the apparatus involving novel structural features which facilitate the placing of the clothes in the drier and the discharging of the clothes therefrom.

A further object is to provide air circulating means for the drier having a stationary take-off stack normally connected to the apparatus, the drying means being tiltable to a discharging position disconnected from the stack without disturbing the latter.

A further object is to provide a drying drum normally rotatable in a given position and tiltable to a second position to discharge clothes therefrom, the drier including a heat retaining casing surrounding the drying drum and provided with a movable cover adapted to be opened when the drum is in its second position to permit the clothes to be discharged therefrom.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have shown one embodiment of the invention. In this showing:

Figure 1 is a front elevation,

Figure 2 is a side elevation,

Figure 3 is an enlarged central vertical sectional view taken axially through the drying drum, parts being shown in elevation, and,

Figure 4 is an enlarged detail sectional view on line 4—4 of Figure 2.

Referring to the drawings, the numerals 10 and 11 designate forward and rear pairs of standards supported upon a suitable base structure 12. The elements forming the standards and base may be made in any desired structural form, and it is preferred that channel iron members be employed for the standards and angle iron members for the base structure. Set screws 13 having lock nuts 14 are threaded through the corner portions of the base structure in order that the apparatus may be adjusted within reasonable limits as to height, and may be level.

Intermediate their height, the forward and rear standards are connected by channel iron braces 15, and the two rear standards 11 are connected by a similar brace 16. These braces may be connected to their associated standards 11 in any suitable manner. In the drawings, the braces 15 are shown connected to the braces 16 by gusset plates 17, while similar plates 18 connect the braces 16 to the standards 11. The upper ends of the standards 11 are connected by a channel iron brace or cross member 19 and the upper end of each standard 10 is connected to the upper end of one of the standards 11 by a horizontal brace 20.

It will be apparent that the standards and associated elements form a supporting frame work the forward portion of which is open since the standards 10 are not connected to each other. In such open space a casing indicated as a whole by the numeral 21 is arranged. This casing includes a cylindrical imperforate outer wall 22 and a rear wall 23 arranged at right angles to the axis of the wall 22. The forward portion of the casing is provided with a relatively wide conical ring 24 forming a relatively large central opening 25 for a purpose to be described. The conical ring 24 may be secured to the cylindrical wall 22 by suitable bolts 26 or other fastening elements.

The casing 21 is supported in a substantially U-shaped member 26, which may be formed of channel iron, as shown. The member 26 includes a base portion 27 extending across and secured to the casing wall 23, and parallel arm portions 28 extending across opposite portions of the cylindrical

wall 22 and secured thereto. The arm portions 28 carry trunnions 29, as shown in detail in Figure 4, and these trunnions are supported in substantially U-shaped bearings 30 carried by the standards 10. The bearings 30 may be welded or otherwise secured to the standards 10 as will be apparent. The trunnions 29 support the casing 21 and associated elements for swinging movement about the axis of the trunnions for a purpose to be described. The casing 21 is provided with a suitable handle 30' to facilitate movement of the casing in the manner to be described.

The opening 25 of the casing is provided with a cover 31 having conical edge portions 32 fitting the conical ring 24. The cover 31 is supported by a pair of upwardly and rearwardly extending arms 33 connected to each other by a transversely extending channel iron member 34 arranged against and secured to the cover 31. The arms 33 carry stub shafts 35 at their upper ends journaled in bearings 36 supported on the upper ends of the standards 10. Each arm 33 is provided with an upwardly and rearwardly extending weight supporting arm 37, and a weight 38 is slidable on each arm 37 and adapted to be secured in adjusted positions thereon by a set screw 39. The weights 38 serve as counterweights for the cover 31 and a handle 40 may be secured to the cover 31 to facilitate the opening and closing thereof.

A drying tumbler indicated as a whole by the numeral 41 is arranged within the casing 21. The tumbler includes a perforated cylindrical wall 42, a rear imperforate wall 43, and a conical forward wall 44 corresponding generally in shape to and slightly spaced from the conical ring 24 of the casing. The entire tumbler is slightly spaced from the various walls of the casing 21 for a purpose to be described. The center of the conical wall 44 forms a relatively large opening 45 through which clothes or other articles are introduced into or discharged from the tumbler. While the wall 42 has been described as being perforated, it will be apparent that the invention is not in any sense limited to the particular structure shown, since a portion or all of the wall 42 may be provided with screening for a purpose to be described.

The rear wall 43 of the tumbler is provided with a hub member 46 having radial spiders 47, and the hub and spiders are secured to the wall 43. The hub member 46 is provided with a hollow trunnion 48 within which is keyed a shaft 49. The shaft 49 transmits rotary movement to the tumbler and power for such rotation is furnished by a suitable motor 50 supported with respect to the U-shaped member 26. Reduction gearing of any desired type is connected between the motor 50 and the shaft 49. In the present instance, the motor shaft 51 is illustrated as being provided with a worm 52 meshing with a worm gear 53 to which the shaft 49 is connected, and the transmission elements are preferably arranged in a suitable casing 54. The motor 50 may be rigidly connected to the housing 54 and the latter is secured to the U-shaped member 26 by bolts 55. The shaft 49 is supported by bearings 56 carried by the casing 54. These bolts also may pass through a spacing member 56' in which the trunnion 48 is rotatable.

Means are provided for forcing heated air through the casing 21 and through the tumbler 41. A heater 57 of any desired type is arranged beneath the casing 21, and the latter is provided with an opening 58 through which heated air may pass upwardly through the casing. The heater 57 is preferably provided with electrical heating elements therein (not shown) and the heated air is forced upwardly into the casing by means of a suitable fan 59. This fan is driven by a motor 60 supported by the heater casing 57 by suitable brackets 61.

A stack connection 62 is supported upon the cross member 19 and is secured thereto by suitable brackets 63. The upper end of the stack connection is adapted to be connected to a suitable stack to carry off heated air passing from the casing 21. This casing normally occupies the position shown in Figure 3 and is provided with an outlet flue 64 which normally is arranged substantially horizontally. The flue 64 extends into a conical inlet 65 formed in the lower end of the stack connection 62 and the swinging movement of the casing 21 about the axis of the trunnions 29 in one direction is limited by contact between the elements 64 and 65.

The operation of the apparatus is as follows:

The casing 21 is fixed against rotation with respect to the axis of the shaft 49 by the arrangement of the trunnions 29 in their bearings, but it will be apparent that the casing may swing about the axis of the trunnions. The tumbler 41 rotates on the axis of the shaft 49 and is driven by such shaft through the medium of the motor, worm 52 and worm wheel 53. Assuming that the tumbler 41 is being rotated in the manner referred to and it is desired to load the tumbler, the operator swings the cover 31 to the dotted line position shown in Figure 3. It will be noted that the weight arms 37 project upwardly at a relatively slight angle to the vertical when the cover is in closed position and under such conditions the cover overbalances the weights 39 and remains in closed position. However, the swinging of the cover to open position swings the weights 38 substantially to horizontal position under which condition the weights overbalance the cover to hold it in open position.

The clothes or other articles are then dumped into the tumbler through the axial opening 45 in the conical wall 44, whereupon the cover 31 is again moved to closed position. The rotation of the tumbler 41 about the axis of the shaft 49 causes the articles in the tumbler to be constantly lifted and dropped at one side thereof, and this action tends to shake or loosen the clothes to facilitate the drying thereof.

Air is heated in the heating device 57, and the motor 60 operates the fan 59 to cause an upward draft of heated air to pass into the casing 21. As previously stated, the walls of the casing 21 are relatively close to the walls of the tumbler 41, and the space thus provided between these two units, while substantially continuous around the tumbler 41, is insufficient for the passage of all of the heated air to the top of the casing 21. Accordingly a substantial portion of the air is forced to pass upwardly through the perforations of the tumbler 41 to intimately contact with the articles therein. The air passing around the tumbler 41 maintains the latter in a heated condition and the drying action is carried out relatively rapidly through the contact of the articles with the heated walls of the tumbler and in contact with the heated air passing through the perforations of the tumbler. The heated air containing the moisture of evaporation from the wet articles passes upwardly from the top of the casing 21 through the flue 64 and thence out of the building through the stack connection 62 and the stack associated therewith. Accordingly it will be ap-

parent that a highly efficient drying action is provided.

The discharging of clothing or other articles from the tumbler 41 is greatly facilitated with the present apparatus. When a bundle of clothing or other articles has been suitably dried, the cover 31 is swung upwardly to the dotted line position shown in Figure 3, whereupon the handle 30 is grasped to swing the casing 22 in a clockwise direction to the dotted line position shown in Figure 3. Under such conditions, the upper extremity of the opening 45 will lie horizontally outwardly of the lower extremity of such opening, and during the continued rotation of the tumbler 41, articles within the tumbler will be elevated in much the same manner as is true during the drying operation except that as the clothes fall by gravity, they fall through the opening 45 to be thus discharged from the tumbler into a basket or other portable receptacle. After the tumbler is unloaded, it is again swung to the operative position shown in solid lines in Figure 3, whereupon it is loaded with wet clothing, and the cover 31 is moved to the closed position. From the foregoing, it will be apparent that the present apparatus provides a particularly efficient drying action due to the proper distribution of heated air around and through the tumbler and due to the tumbler action which tends constantly to shake or loosen the clothing to facilitate the drying action. The apparatus may be readily loaded with wet clothing and dry clothing may be discharged therefrom without being directly handled by the operator, and the danger of burns with the present types of laundry drying apparatus is substantially eliminated. The operation of the cover 31 is readily carried out due to the simple movement required and the counterbalancing of the door or cover, and the counterweights 38 hold the door in open position when moved to such position. The weight of the door and the arms 33 overbalance the counterweights when the door is in closed position whereby the door remains in the latter position without the provision of any fastening elements. It also will be apparent that the casing 21 is readily moved to unloading position, and back to its loading or normal position, and when moved to the latter position, the engagement of the flue 64 with the conical opening 65 limits the movement of the parts referred to. In this connection attention is invited to the fact that the parts which are bodily movable about the axis of the trunnions 29 are overbalanced to bias such parts to the normal position shown in solid lines in Figure 3, the weight of the motor 50 and associated parts being usually sufficient for this purpose. In any installations where the motor and transmission are insufficient to bias the casing 21 to normal position, additional counterweighting may be employed. In other words, when the parts are in the position shown in Figure 2 and in the solid line position shown in Figure 3, the common axis of the trunnions 29 is arranged to the right of the center of gravity of the parts which rotate bodily around the axis of the trunnions 29, and accordingly the parts remain in the position referred to without the use of any latching or fastening means.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. Drying apparatus comprising a cylindrical foraminate article holder having a relatively large opening in one side thereof, a cylindrical casing surrounding said article holder and provided with a relatively large opening arranged adjacent and registering with the opening in said article holder and substantially in a common plane therewith, a cover for said openings, means for circulating a heating medium through said casing, a motor carried by said casing for rotating said article holder on an axis passing through said openings at right angles thereto, means between the ends of said casing for supporting said casing on a pivot axis transverse to said first named axis to permit said casing and said article holder to swing to a position with said openings inclined with respect to the vertical and horizontal and facing downwardly, said casing being provided with an outlet opening adjacent the top thereof, and a stack connection having an inlet end normally communicating with said outlet opening.

2. In a drying apparatus, a drying unit comprising a cylindrical foraminate article holder, a cylindrical casing surrounding said article holder, means for circulating a heating medium through said casing and said article holder, said casing and said article holder being provided in one end with adjacent registering openings, and means for rotating said article holder on an axis at right angles to and passing through said openings, a cover for said openings, and means for supporting said casing on a pivot axis transverse to said first named axis and intermediate the ends of said casing to permit said unit to tilt to a position with said openings inclined to the vertical and horizontal and facing downwardly, said pivot axis being arranged to one side of the center of gravity of said unit to bias the latter to a position with said openings inclined from the vertical and facing upwardly.

3. Drying apparatus comprising a foraminate article holder, a casing surrounding said article holder, means for circulating a heating medium through said casing and said article holder, said casing and said article holder being provided with adjacent registering openings, a cover for the opening in said casing, a bearing carried by said casing, a shaft rotatable in said bearing and connected to said article holder, said bearing having its axis arranged at right angles to and passing through said openings, a motor carried by said casing for rotating said shaft, and means for supporting said casing on a pivot axis transverse to said first named axis and between the ends of said casing to permit said casing to tilt to a position with said openings inclined to the vertical and horizontal and facing downwardly, said pivot axis being arranged to one side of the vertical plane of the center of gravity of said casing, said article holder and said motor, whereby said casing is biased from said first named position to a position with said openings inclined from the vertical in the opposite direction.

4. Drying apparatus comprising a foraminate article holder, a casing surrounding said article holder, said casing and said article holder being provided with adjacent registering openings, a cover for the opening in said casing, means for rotating said article holder on an axis at right angles to and passing through said openings, means for supporting said casing on a pivot axis

transverse to said first named axis to permit said casing to tilt to a position with said openings inclined to the vertical and horizontal and facing downwardly, said casing being biased from said first named position to a position with said openings inclined from the vertical in the opposite direction, said casing being provided with a bottom opening, heating means carried by said casing for forcing a heated medium into said casing through said bottom opening, the top of said casing being provided with an outlet opening for the heating medium, and a stationary stack connection having an inlet opening normally arranged against a portion of the upper end of said casing and communicating with said outlet opening when said casing is in said second named position.

5. Drying apparatus comprising a foraminate article holder, a casing surrounding said article holder, said casing and said article holder being provided with adjacent registering openings, a cover for the opening in said casing, means for rotating said article holder on an axis at right angles to and passing through said openings, means for supporting said casing on a pivot axis transverse to said first named axis to permit said casing to tilt to a position with said openings inclined to the vertical and facing downwardly, said casing being biased to a position with said openings inclined from the vertical in the opposite direction, said casing being provided with a bottom opening, means for forcing a heating medium into said casing through said opening, the top of said casing being provided with an outlet opening for the heating medium, and a stationary stack connection having an inlet opening normally arranged against a portion of the upper end of said casing and communicating with said outlet opening, said casing being slightly spaced from said article holder to provide a passage for the heating medium of insufficient cross-sectional area to permit the passage therethrough of all of said heating medium whereby a portion of the latter is forced through said article holder.

6. Drying apparatus comprising a cylindrical foraminate article holder having a relatively large opening in one side thereof, a cylindrical casing surrounding said article holder concentric therewith and provided with a relatively large opening arranged adjacent and registering with the opening in said article holder, means for circulating a heating medium through said casing, means for rotating said article holder on an axis passing through said openings at right angles thereto, means for supporting said casing on a pivot axis transverse to said first named axis to permit said casing and said article holder to swing to a position with said openings inclined with respect to the vertical and horizontal and facing downwardly, a cover for the opening in said casing, and means for pivotally supporting said cover independently of said casing for movement to an open position out of the path of movement of said casing around said pivot axis.

7. Apparatus constructed in accordance with claim 6 wherein the weight of said cover is adapted to hold it in closed position, said cover being provided with biasing means for holding it in open position when moved to such position.

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