April 15, 1930. H. J. PAYNTER 1,754,483

ROTARY CAN END DRIER

Filed Feb. 2, 1927 4 Sheets-Sheet 1

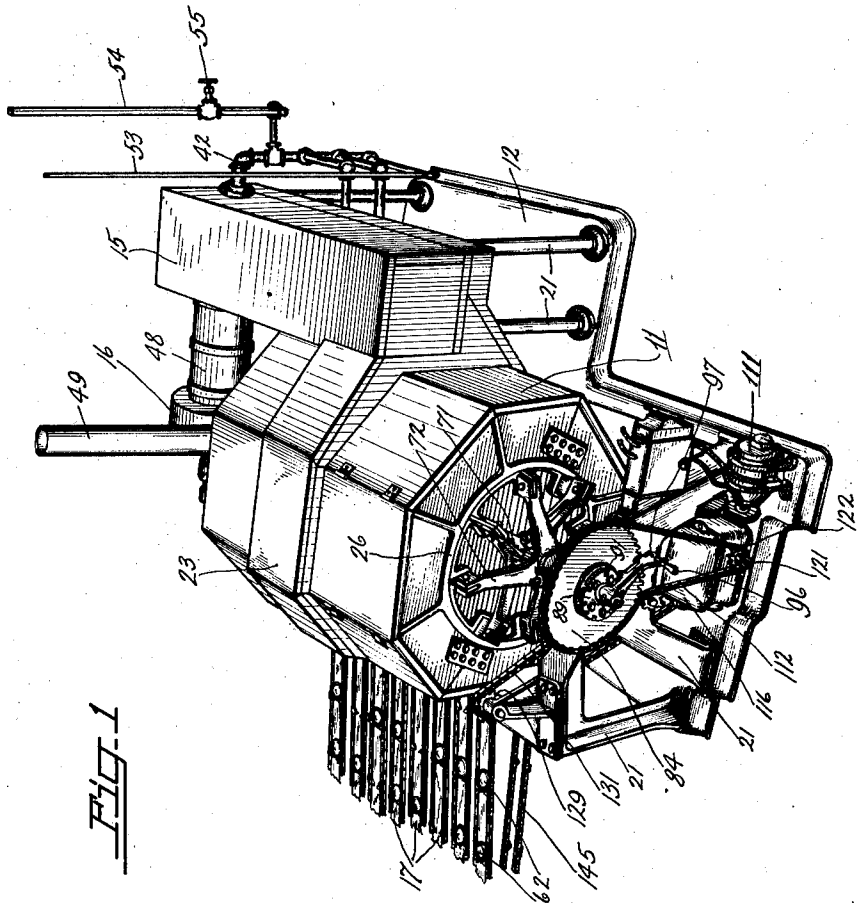


Fig. 1

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ROTARY CAN END DRIER

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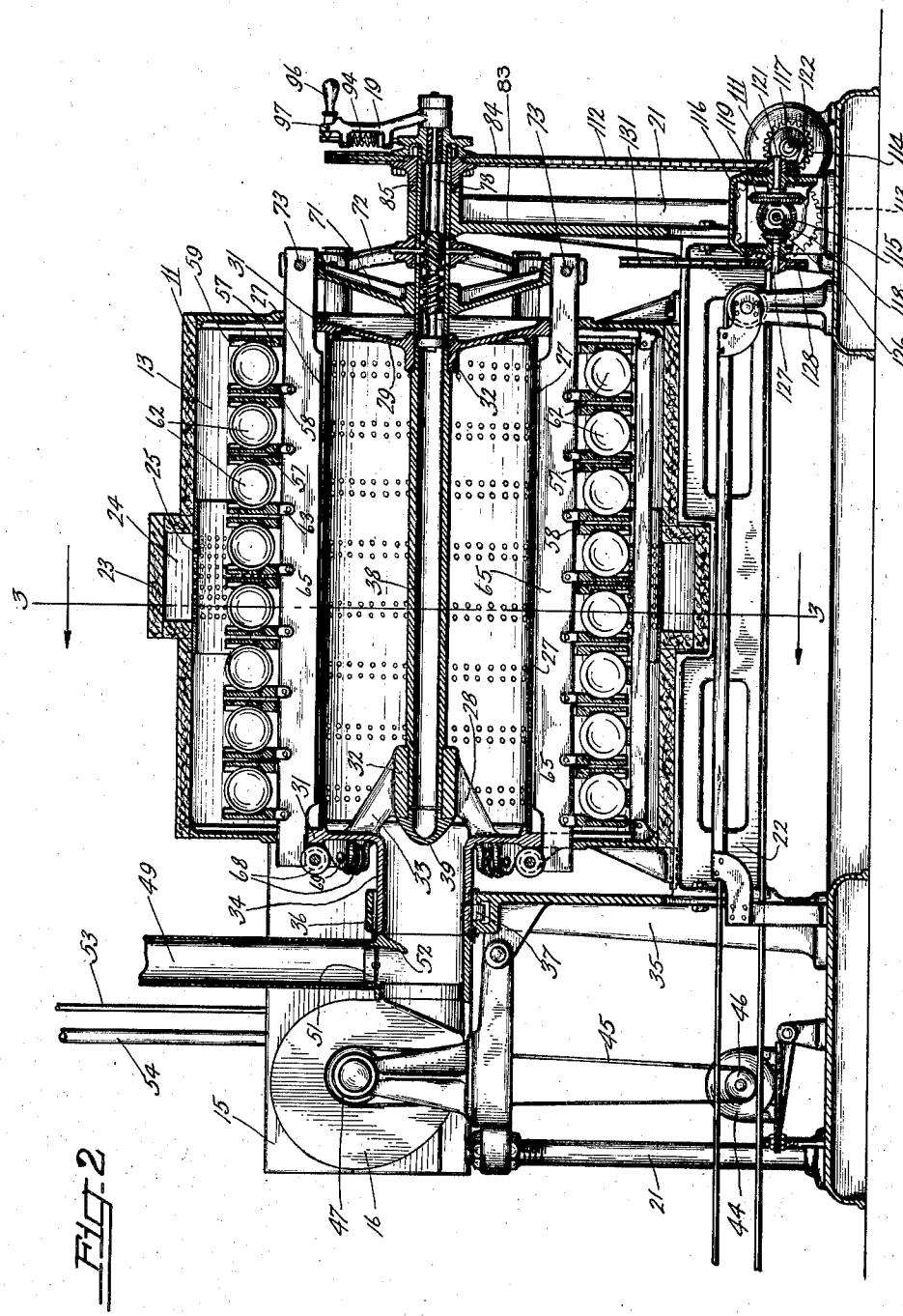


Fig. 2

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ROTARY CAN END DRIER

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Fig. 3

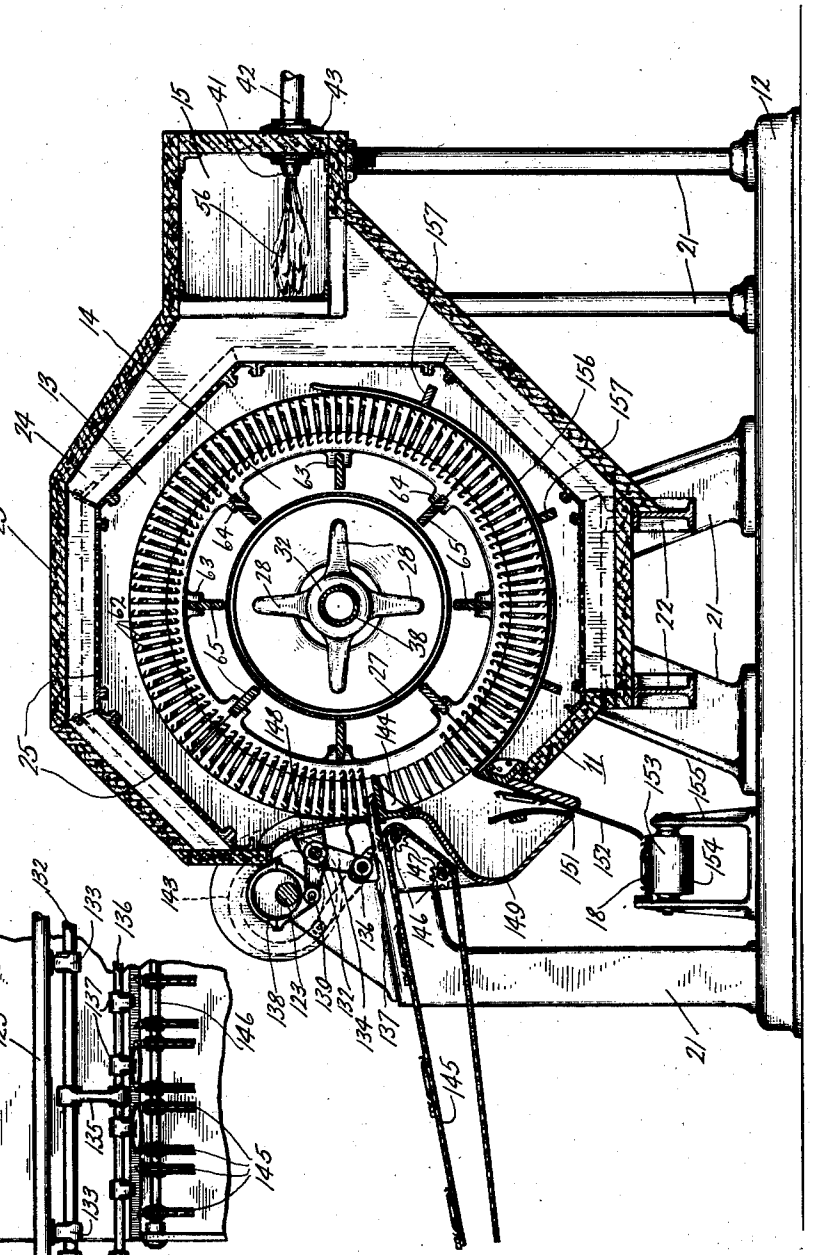


Fig. 4

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ROTARY CAN END DRIER

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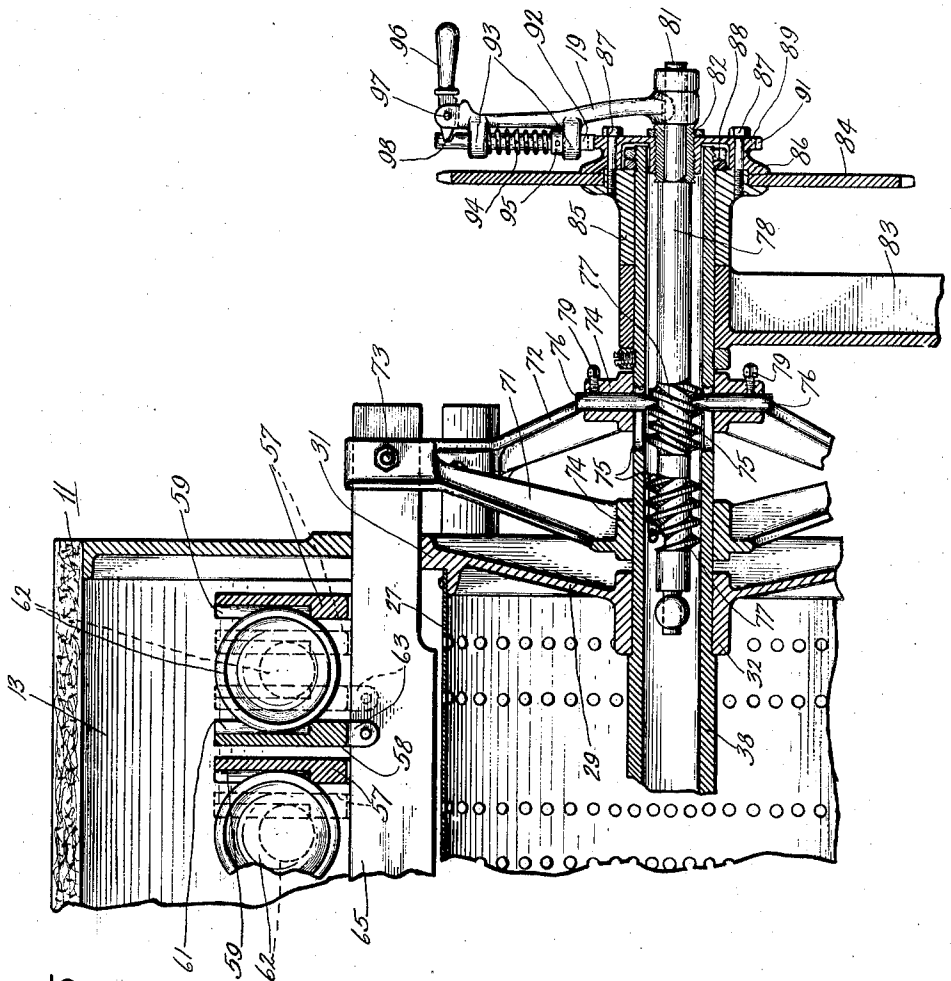


Fig-5

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UNITED STATES PATENT OFFICE

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ROTARY CAN-END DRIER

Application filed February 2, 1927. Serial No. 165,302.

This invention relates in general to drying machines and more particularly to a drying machine for drying can ends, or the like.

An important object of the invention is to provide an improved drying machine for drying can ends, and the like, of circular or non-circular shape and such a machine that may be adjusted to dry such can ends of any one of several sizes.

Another important object of the invention is to provide such a machine that is adapted to receive can ends from other machines, such as enamelling, lacquer spraying, gasket, or compound lining, or from any other machine that has performed an operation upon can ends that require subsequent drying or from a conveyor, and such a device that is adapted to handle a large number of can ends in a short period of time, or to receive can ends from one rapid machine or conveyor, or several relatively slower machines or conveyers.

Another important object of the invention is the provision of such a device in which the size of the heating chamber is materially reduced which results in a considerable saving of floor space and such a device in which the heating fluid or air is continuously re-circulated and dried during its circulation.

Another important object of the invention is to provide such a device that is adapted to separate the fumes from the circulating air by a natural draught or provided with means for removing a portion of the air containing fumes in circulation and supplying fresh air to the chamber and this by natural draught.

Another important object of the invention is the provision of a drier with an improved heating means and control so that articles such as can ends may be uniformly and speedily dried with a minimum amount of heat.

Another important object of the invention is the provision of a rotary drier which is so constructed and subdivided that it can carry a large number of articles and uniformly and thoroughly dry them in one complete revolution.

Another important object of the invention is the provision of a drier which is so constructed that all bearings or supporting movable parts are located outside of the action of the heat or so as not to be materially heated by the heating and drying means.

Another important object is to provide a drier for can ends that may be adjusted to dry can ends of different sizes and that may be adjusted through the aid of an index by means of a single crank.

Another important object of the invention is to provide a novel feeding means or mechanism for feeding can ends to a rotating conveying device and into can end receiving pockets therein that are successively presented to receive can ends.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Fig. 1 is a perspective view of a can end drying machine embodying my invention;

Fig. 2 is a longitudinal section of the device shown in Fig. 1;

Fig. 3 is a section taken substantially on line 3—3 in Fig. 2;

Fig. 4 is an enlarged detail view of the feeding mechanism and looking at the machine from the left in Fig. 3; and

Fig. 5 is an enlarged detail view of the mechanism shown at the right in Fig. 2 or the adjusting mechanism for adjusting the machine to articles or can ends of different sizes.

To illustrate my invention I have shown a machine particularly adapted for drying lacquered can ends, or can ends which have been treated with a liquid or semi-liquid material requiring drying. The machine includes a housing 11, supported on a base 12 and adapted to provide a drying chamber 13, in which a rotary can end conveying device 14 is or may be mounted. Desiccating or drying means for drying can ends are provided including an air drying chamber 15 and a fan 16 for causing circulation of air within the chamber 13. Feeding devices are provided for feeding can ends to the rotary conveyor

14 and these include a plurality of conveyors 17. A conveyor 18 may be arranged for conveying the can ends away from the drying machine. Adjusting devices are provided for adjusting the machine to receive can ends of different sizes including a crank 19. Suitable mechanism is also provided for operating the above mentioned conveyor parts in timed relation.

The housing 11 is of any suitable size and shape and in the present instance is shown substantially octagonal in cross-section and of sufficient length to contain the rotary conveyor or carrier 14 which in the present instance is adapted to convey the can ends received from eight separate conveyors to the chamber 13 for drying. The housing is supported on the base 12 in any suitable manner as by means of a plurality of legs 21 suitably secured to the base and to the housing. A main frame is provided beneath the housing and is supported on the legs 21. This frame comprises a pair of spaced I beams 22 extending beneath the machine and between its opposite ends substantially as shown (Figs. 2 and 3). A portion of the periphery of the housing 11 is interrupted by a housing 23 which is formed to provide a channel 24 that surrounds the conveyor 14 substantially as shown (Figs. 2 and 3) to receive and conduct air from the drying chamber 13. One or more perforated sheet metal plates 25 may be extended across the inner side of the channel 24 (Figs. 2 and 3) to restrict the air in passing into the channel so that it will be gathered more uniformly and from distributed points in the drying chamber 13. Each end of the housing 11 is provided with a large circular opening 26 (Fig. 1) through which the conveyor 14 may be positioned and the conveyor 14 is preferably provided with means to seal or close the openings 26 when assembled to substantially prevent the admission of atmospheric air into the chamber and the escape of heat from the chamber.

The conveyor 14 preferably comprises a central air distributing drum 27 (Figs. 2 and 3) mounted at its opposite ends on bushings 28 and 29 formed substantially in the shape of a wheel and each having a flange portion 31 and a hub portion 32. The portion 31 of the member 28 is preferably connected with the hub portion 32 through a plurality of arms or spokes 33 and the corresponding portions of the member 29 are preferably connected by a continuous web. The member 28 is also formed to provide a partial web portion having a tubular portion 34 extending therefrom. The portion 34 is preferably of sufficient strength to support one end of the drum or the rotating conveyor and of sufficient diameter to permit of the maximum required discharge of air into the drum 27. This end of the drum is supported through the portion 34 by a supporting post 35 having a bearing portion 36 formed to surround the tubular part 34 and provided with one or more rollers 37 for reducing friction. A tubular member 38 is arranged to extend between the hub portions 32 of the members 28 and 29 which may be secured to the hub portions in any suitable manner and a cap 39 is provided to close one end of this member. The opposite end of the member 38 is closed by the adjusting mechanism which will be later described. The desiccating or drying means in the present instance includes a jet nozzle 41 extending from a fuel pipe 42 that is suitably secured to the housing or to a wall of the heat chamber 15 substantially as indicated at 43 (Fig. 3).

The drying chamber 15 may be of any suitable size and a jet may be arranged to supply any desired quantity of heat for expanding the air within the housing. The fan 16 may be of any suitable type and driven in any suitable manner, such as by means of a motor 44 connected to drive the fan by means of suitable transmission mechanism. In the present embodiment a belt 45 is provided taking over a pulley 46 on the motor and a pulley 47 on the fan. A pipe 48 (Fig. 1) extends between the fan and the housing of the chamber 15, and the opposite or discharge end of the fan is connected to the portion 34 of the member 28 of the conveyor. A discharge pipe or flue 49 is preferably connected between the portion 34 and the outlet end of the fan and provided with a butterfly valve or similar damper 51 and a baffle 52 extending into the path of air passing from the fan to the portion 34. The chamber 15 communicates at or adjacent one of its ends with the channel 24 and with the pipe 48 at or adjacent its opposite end. Fuel may be supplied to the jet nozzle 41 in any suitable manner and any suitable material may be used for generating a flame. In the present instance I have shown an air pipe 53 and a gas pipe 54 suitably connected to deliver air and gas in the proper proportions to the pipe 42 and jet nozzle 41. A valve 55 may be connected in either or both the air pipe 53 or gas pipe 54 for controlling a flame 56 within the chamber 15.

To provide a means for conveying the ends about the drying chamber I provide devices mounted over the drum 27 or arranged thereabout (Figs. 2, 3 and 5) for receiving and carrying the can ends about the chamber, including a plurality of ring members 57 and 58, which may be formed of a solid piece or made up of several parts suitably secured together. The members 57 are slotted or otherwise formed to provide grooves or can receiving shelves, grooves, seats or slots 59 and the rings 58 are similarly formed to provide slots 61. The members 57 and 58 are suitably spaced apart and pockets for receiving can ends 62 substantially as shown (Figs. 2 and

5) are provided. The members 57 and 58 may be rigidly mounted in a fixed position where the machine is to be used on one particular size of can end. To permit of adjusting the machine to can ends of different sizes, I provide a means for adjusting the size of the end receiving pockets or the spacing of the members 57 and 58 to provide either larger or smaller pockets in accordance with the requirements. This is preferably accomplished by providing lugs 63 on each of the members 58 and similar lugs 64 on the members 57 and preferably one such lug at each end of each member where the members are formed in sections.

At least one longitudinal member or bar 65 is mounted to extend through the machine and through all of the members 57 or 58 that are to be controlled so that either the members 57 or 58 may be adjusted relative to the other, and to provide adjustment without changing the relative position of the can ends a plurality of the members 65 are provided and half or one set of these are attached to the lugs 63 of the members 58 and the other half or set are attached to the lugs 64 of the members 57 so that by moving the members 65 in opposite directions all of the members 58 are moved in one direction and the members 57 in an opposite direction to increase or decrease the spacing of the members 57 and 58 and thereby vary the size of the can end receiving pockets and maintain the pockets in line with the feeding conveyors 17. The members 65 may be supported in any suitable manner and in the present instance I have shown these members passing through slots formed in the head members 28 and 29 for supporting the ends of the drum 27. One end of each bar is preferably supported on an anti-friction roller 68 mounted on a bearing 69 on the member 28, and the other ends of the two sets of the members 65 are preferably carried respectively by two spiders 71 and 72. The spider 71 is formed and arranged for attachment to all of the members 65 that are attached to ring members 58, and the spider 72 is similarly formed and arranged for attachment to all of the members 65 that are attached to the ring members 57, the spiders being secured to the members 65 by means of bolts 73 or like fastening device. The spiders 71 and 72 are formed of radially extending arms, the number of which is determined by the number of members to be supported, and a hub 74 that is mounted over the tubular shaft 38 that extends through and from the end of the drum 27 and are slidable therealong. The arms are formed to one side of the plane of the bearing portions or hubs 74 of the spiders and in opposite directions substantially as shown (Fig. 5), the angle of the arms being determined by the desired degree of adjustment. The shaft 38 is provided with slots 75 through which pins 76 carried by the hubs 74 may extend to engage spiral threads 77 on a shaft 78 arranged within the tubular shaft 38. The pins 76 are preferably formed at their inner ends in accordance with the threads 77 and secured in adjusted position by means of set screws 79. The threads 77 are pitched in opposite directions and the crank 19 is suitably secured to an extended end 81 of the shaft 78 that extends through a supporting bushing 82. The end of the tubular shaft 38 extends through a bearing or support member 83 and beyond the bearing a sprocket wheel 84 is secured to a hub 85 in any suitable manner such as by clamping the sprocket thereagainst by a bracket 86 by means of studs 87 extending through the bracket 86 and having threaded engagement with the hub 85. The hub 85 is locked to the end of the tubular shaft 38 by lock nuts 88 or other suitable locking devices. A flange 89 of the bracket 86 is preferably provided with a plurality of notches 91 in which a latching device or pin 92 may engage, the notches 91 being spaced about the periphery of the flange 89 at predetermined points that are determined in accordance with the variation or difference between the can ends to be handled by the machine. The pin 92 is mounted in brackets 93 formed on the handle 19 and is held in the notches 91 by a spring 94 mounted over the pin between the bearings 93 and engaging a collar 95 that is suitably secured to the pin 92. A latch handle 96 is pivoted on the handle 19 as indicated at 97 and is formed to extend into a notch 98 in the pin 92 so that a lowering movement of the end of the handle will raise the pin 92. The conveying device 14 is preferably continuously driven through the sprocket 84 by means of an electric motor 111, or like power device, through suitable transmission devices connected to drive a chain 112 taking over the sprocket 84. In the present instance I have shown a pair of spur gears 113 and 114 connected to a shaft 115 supported in a housing 116, and to a motor shaft 117 respectively. A bevel pinion 118 is also suitably secured to the shaft 115 and arranged to drive a bevel gear 119 that is suitably secured to a shaft 121 mounted in the housing 116 and has secured thereto at its opposite end a sprocket 122.

A feeding mechanism is provided (Figs. 3 and 4) to project the can ends into the pockets in the conveyor 14 and the conveyors 17 deliver the can ends to the feeding device to be projected into the pockets. The mechanism for accomplishing this result includes a shaft 123 mounted in suitable bearings on two of the posts 21 or on the housing through a supporting bracket 124 one of which is preferably arranged at each end of the machine. The shaft 123 carries at least one eccentric 125 and preferably one at each end and is con-

tinuously rotated by the motor 111 through a bevel pinion 126 mounted on a shaft 127 in a housing 116 which shaft carries at its end a sprocket 128 that is arranged to drive a sprocket 129 (Fig. 1) on the shaft 123 through a sprocket chain 131. A shaft 132 that is rotatably mounted in two or more bearings 133 suitably secured to the housing or to the frame for supporting the shaft in operative position is arranged adjacent the shaft 123 and carries one or more rocking levers 134 that may be arranged along the shaft 132 in any suitable position and preferably at each end. Intermediate the ends of the shaft 132 one or more arms 135 may be provided for connecting the shaft 132 and a pawl shaft 136. The shafts 132 and 136 are also similarly connected by one of the arms of the rocking levers 134. A number of pawls 137 are arranged on the pawl shaft substantially as shown (Figs. 3 and 4) and suitably secured to the shaft 136. The pawls are either pinned or fastened with set screws to the shaft so that they will rotate or move with the shaft 136. An eccentric band 138 or strap of the eccentric 125 is pivotally connected to the rocking lever 134 as indicated at 139 (Fig. 3) so that rotation of the shaft 123 causes a swinging movement of the shaft 136 the extent of which is determined in accordance with the maximum size of can end or other article to be handled by the machine.

A disc cam 141 is suitably secured to an end of the shaft 123 and a cam roller arm 142 is similarly secured to the shaft 136. The cam roller arm 142 is provided with a suitable roller or otherwise formed to engage in a cam groove 143 in the cam 141, and the cam groove 143 is formed to hold the point of the pawls 137 up in the position shown (Fig. 3) during the backward movement of the pawl and to also lower the point of the pawl to engage the rear edge of a can end that is located on a shelf 144 arranged adjacent the conveyor 14 and formed to project slightly between the ring members 57 and 58. The can ends are brought to the shelf 144 and in position to be engaged by the pawls 147 by the conveyor 17 each of which include a conveyor chain 145 taking over sprockets 146 mounted on suitable shafts 147 that are in turn suitably mounted in the housing 11. The side of the housing 11 adjacent the conveyors is preferably formed of sheet metal plates substantially as shown (Fig. 3) or a plate 148 arranged above the shelf and extending from a point located slightly thereabove so that a slot is provided through which the can ends may be projected into the machine. A plate 149 connected to the shelf and formed substantially as shown provides a slot through which can lids may be discharged from the machine, the slot being formed by the spacing of an edge 151 of the plate 149 and a shelf plate 152 that is formed to provide an inclined chute for guiding the can ends discharged from the machine onto the conveyor 18. Fresh air also enters at the can end feed and discharge slots to compensate for such moisture-laden air as may be deflected up the flue 49. The conveyor 18 may be any suitable conveying device including one or more pulleys 153 a belt 154 arranged over the pulleys and brackets 155 for supporting the pulleys and belt. It will be noted that the can ends are not clamped between the members 57 and 58, but are merely loosely positioned therebetween. While this is optional, it is a preferred construction and to prevent the can ends from falling out of the pockets or slots 59 and 61, a guide plate 156 is provided that surrounds the lower portion of the conveying device 14 or the portion thereof from which the can lids may have a tendency to fall out. This guide plate is preferably supported by supporting brackets 157 arranged to extend across the machine and suitably secured to the guide plate. The termination of the guide plate 156 before the tendency of the can end to fall out has been eliminated, or before the can ends become horizontal permits the can ends to fall out by gravity when they reach the point in the machine where the guide plate 156 terminates. The plate 152 is arranged to contact with the guide plate at this point.

The various parts of the machine are driven in timed relation by the motor 111 and the fan 16 may be driven at any desired rate to accomplish the desired or variable result by the motor 44, which is separate from and independent of the motor 111. Can ends are delivered to the machine by the conveyor 17 and as the conveying device 14 is rotated and the can ends are received on the shelf 144 the feeding mechanism through the eccentrics 125, rocking levers 134 and pawls 137 engage the rear edges of the can ends and project them into the pockets that are presented to receive can ends and into each pocket as they are successively presented. If there is no can end supplied for any pocket, this pocket will travel about the drying apparatus empty without delaying the operation of the conveyor or interfering with the can ends that are delivered by other conveyors. As the can lids are filled into the pockets they travel about in the heating chamber 13 and about the drum 27 until they reach the end of the guide plate 156 where they are permitted to discharge by gravity along the guide plate 152 onto the conveyor 18 where they are conveyed from the machine and may be stacked or otherwise prepared for use or storage.

While the can ends are travelling about the conveyor at a predetermined rate of travel, the desiccating or drying means operates upon the can ends and as before mentioned circulation is set up by the fan 16, the

air being discharged into the interior of the drum 27 passing through the perforations in the drum 27 that are distributed about the periphery of the drum and preferably in bands located substantially at the center of each row of end receiving pockets so that the air will be discharged directly at the can ends. The fan 16 receives its air from the interior of the drying chamber 15 into which it is delivered from the drum 27 through the channel 24 and the perforated plates 25 that collect the air from distributed points and circulation is continuous, or the air is continuously re-circulating.

The gases and fumes are drawn off by the stack 49 by a natural draught and the rate of discharge may be controlled by the butterfly valve 51 or damper. Fresh air is taken into the machine to compensate for the gases drawn off through the discharge and entrance slots. The machine is set to dry can ends of various sizes by means of the handle 96 and crank 19. The handle 96 is depressed to withdraw the pin 92 from the notch 91 in which it is located and the handle rotated to the desired point and reset in a notch corresponding with the size of the can end to be handled by the machine. Rotation of the handle 96 in either direction causes opposite movement of the spiders 71 and 72 since the spiral threads on the shaft 78 are oppositely inclined and the members 65 connected to the spiders 71 and 72 are consequently moved in opposite directions to move the ring members 57 and 58 correspondingly, either farther apart or closer together in accordance with the direction of rotation of the handle 19. When the point 92 is locked in any of the notches 91 movement of the members 58 and 57 is prevented and the size of the can receiving pockets remains fixed throughout operation of the machine, or until it is changed by movement of the handle 96.

It will be seen from the foregoing that a very large number of can ends can be handled and dried at any time. The diameter of the drum and the speed of the same cooperating to efficiently dry each can end in a little less than a complete revolution of the drum. In order to accomplish this, and also to provide for the operation of the machine upon different sizes of can ends, the can end seats or holders 57, 58 are arranged in pairs, the two elements of each pair serving to hold one can end, and a plurality of pairs are arranged in circular series on the axis of revolution, and a plurality of such series are arranged on the drum, and the number of such series will be such as will give the desired capacity of the machine. Also one or both members of each pair of can end seats or holders can be very readily adjusted to change the machine and adapt it to a different size can end which it may be required to dry.

The drying of can ends is accomplished by a constant circulating and re-circulating of air. This air is suitably heated at one point in its travel and portions of the same air continue to circulate, there being a constant supply of fresh air added to the circulating heated air currents. At the same time the small amount of foul or saturated air is discharged during this circulation of the air currents.

The amount of fresh air drawn in during this circulation will depend upon the amount of foul air which is permitted to escape from the device. This is all under the control of the operator, the volume or amount of fresh air automatically being determined by the amount of foul air which is discharged. The entire drying chamber 13 is filled with air when the drying apparatus begins to operate. Operation of the fan 16 circulates the air in the drying chamber, and throughout the various pipes and connections with the chamber and the fan. Air therefore from one side of the fan passes through the portion 34 of the member 28, and into the interior of the distributing drum 27. This air is being forcibly driven by the fan 16 and finds passage through the perforations in the drum 27. See Figure 2. The air passing from the drum 27 and into the drying chamber 13 moves across the can ends 62 carried about the drum center 27. This air, after passing across the ends, enters the perforations in the plates 25 and passes into the channel 24. The air at this point is still being forcibly driven by the current of air being operated on by the fan 16, and its movement is also assisted by a drawing action or suction impulse which tends to draw it into the drying chamber 15. There enters into the channel 24 not only the air that has passed from the fan 16, but also some fresh air entering through the slots formed in the casing at the can end entrance and exit. This combination of fresh air and air which has passed through the drum 27 circulates through the drying chamber 15 and is heated by the gas flame. This air continues in its circulation from the drying chamber 15 through the pipe 48 and into the opposite side of the fan 16, this circulation at this point being drawn toward the fan. This air continues to circulate, the air entering the fan 16 being the heated air which is projected outward from the tangent end of the fan and on through the same course of travel. As this air passes the pipe 49 the foul air portion is eliminated from the apparatus, this being controlled by the butterfly valve or damper 51. It is the purpose of this discharge pipe 49 to draw off the foul gases which have passed from the material or the can ends into the circulating drying air. This constant circulation and re-circulation of a portion of the same drying air conserves the heat in the air, and provides a rapid drying process for the can end.

It is thought that the invention and many

of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbetore described being merely a preferred embodiment thereof.

I claim:

1. An apparatus for drying can ends, comprising, means providing a drying chamber, means for positioning can ends in the chamber for a predetermined period of time, a carrier conveying the can ends in circular paths about a horizontal axis in said drying chamber, and means for circulating heated air through the chamber to dry the can ends and means for heating the air as an incident to the circulation thereof.

2. An apparatus for drying can ends, comprising, means providing a drying chamber, means for positioning can ends in the chamber for a predetermined period of time, a carrier for conveying the can ends in circular paths about a horizontal axis in said drying chamber, air heating means, and means for continuously circulating air through the drying chamber and through the air heating means.

3. An apparatus for drying can ends, comprising, means providing a drying chamber, means for positioning can ends in the chamber for a predetermined period of time, a carrier for conveying the can ends in circular paths about a horizontal axis in said drying chamber, and means for causing circulation of air through the drying chamber, and means adapted to heat the air as an incident to the circulation thereof.

4. An apparatus for drying can ends, comprising, means providing a drying chamber, means for positioning can ends in the chamber for a predetermined period of time, a carrier for conveying the can ends in circular paths about a horizontal axis in said drying chamber, a circulation system for circulating air through the chamber for drying the can ends, and means for ventilating the air circulation system to remove fumes therefrom.

5. A drying machine for can ends, and the like, comprising a housing providing a drying chamber, means for conveying can ends into and out of said drying chamber and retaining the can ends in the chamber for a predetermined period of time, means for circulating the can ends in circular paths about a horizontal axis, means for moving heated air across the can ends while circulating in said chamber to dry the can ends, and means associated with said chamber for removing used air therefrom and returning the air thereto reconditioned.

6. A drying machine for can ends, and the like, comprising, a housing providing a drying chamber, means for conveying can ends into and out of said drying chamber and retaining the can ends in the chamber for a predetermined period of time, means for circulating the can ends in circular paths about a horizontal axis in the drying chamber, means for moving heated air across the can ends while in said chamber to dry the can ends, and means associated with said chamber for removing air therefrom and returning air thereto, and means for heating the air before the air is returned to the drying chamber.

7. A drying machine for can ends, and the like, comprising, a housing providing a drying chamber, means for directing can ends into and out of said chamber and retaining the can ends within the chamber for a predetermined period of time, means for circulating the can ends in circular paths about a horizontal axis in the drying chamber, an air duct substantially surrounding said chamber and communicating therewith at a plurality of distributed points, and means communicating with said duct and adapted to remove air therefrom for removing air from the chamber at a plurality of distributed points.

8. A drying machine for can ends, and the like, comprising, a housing providing a drying chamber, means for directing can ends into and out of said chamber and retaining the can ends within the chamber for a predetermined period of time, means for circulating the can ends in circular paths about a horizontal axis in the drying chamber, an air duct surrounding said chamber and communicating therewith at a plurality of distributed points, and means communicating with the duct and the chamber for setting up a circulation of air between remote points in the chamber.

9. A drying machine for can ends, and the like, comprising, a housing providing a drying chamber, means for directing can ends into and out of said chamber and retaining the can ends within the chamber for a predetermined period of time, means for circulating the can ends in circular paths in the drying chamber, an air duct surrounding said chamber and communicating therewith at a plurality of distributed points, and means communicating with the duct and the chamber for setting up a circulation of air between remote points in the chamber, and means adapted to heat the air after its removal from the duct and before its return to the chamber.

10. A drying machine for can ends, and the like, comprising, a housing providing a drying chamber, means for directing can ends into and out of said chamber and retaining the can ends within the chamber for a predetermined period of time, means for circulating the can ends in circular paths in the drying chamber, an air duct surrounding said chamber and communicating therewith at a plurality of distributed points, and means

communicating with the duct and the chamber for setting up a circulation of air between remote points in the chamber, means adapted to heat the air after its removal from the duct and before its return to the chamber, and means for discharging a percentage of the air in circulation to remove fumes from the drying chamber.

11. A drying machine for drying can ends, and the like, comprising, a housing adapted to provide a chamber, desiccating means associated therewith, and means for directing can ends into said chamber and retaining the can ends within said chamber for a predetermined period of time and discharging the can ends from the chamber, said means including a ring having a plurality of radially extending slots adapted to receive edges only of the can ends.

12. A drying machine for drying can ends, and the like, comprising, a housing adapted to provide a chamber, desiccating means associated therewith, and means for directing can ends into said chamber and retaining the can ends within said chamber for a predetermined period of time and discharging the can ends from the chamber, said means including a plurality of oppositely disposed rings, each having a plurality of radially extending slots adapted to co-operate to support the can ends.

13. A drying machine for drying can ends, and the like, comprising, a housing adapted to provide a chamber, desiccating means associated therewith, and means for directing can ends into said chamber and retaining the can ends within said chamber for a predetermined period of time and discharging the can ends from the chamber, said means including a plurality of rings having radially extending slots therein for supporting can ends, and means for varying the space between said rings in accordance with the size of the can ends to be dried.

14. A drying machine for drying can ends, and the like, comprising, a housing adapted to provide a chamber, desiccating means associated therewith, and means for directing can ends into said chamber and retaining the can ends within said chamber for a predetermined period of time and discharging the can ends from the chamber, said means including a plurality of rings having radially extending slots therein for supporting can ends, and means for adjusting the space between said rings to a plurality of predetermined dimensions for adjusting the machine to receive different sizes of can ends.

15. A drying machine for drying can ends, and the like, comprising a housing formed to provide a chamber, desiccating means associated with said chamber, means for delivering can ends to the chamber and receiving can ends therefrom, and means for conveying can ends about the interior of the chamber, said means including a plurality of annular members each having a plurality of slots therein adapted to co-operate to support a can end.

16. A drying machine for drying can ends, and the like, comprising, a housing formed to provide a chamber, desiccating means associated with said chamber, a drum rotatably mounted in said chamber, and having a plurality of radially extending can end receiving narrow pockets communicating with and extending about the periphery thereof, and means for sliding can ends radially inward into said pockets.

17. A drying machine for drying can ends, and the like, comprising, a housing formed to provide a chamber, desiccating means associated with said chamber, a drum rotatably mounted in said chamber, and having a plurality of radially extending can end receiving pockets communicating with and extending about the periphery thereof, said pockets being formed of two oppositely disposed and spaced slotted members.

18. A drying machine for drying can ends, and the like, comprising, a housing formed to provide a chamber, desiccating means associated with said chamber, a drum rotatably mounted in said chamber, and having a plurality of radially extending can end receiving pockets communicating with and extending about the periphery thereof, each of said pockets being formed of two oppositely disposed slots formed in spaced members and said members being adjustable to vary the space between slots for adjusting the machine to can ends of different sizes.

19. An apparatus for drying can ends, and the like, comprising, a housing providing a chamber, desiccating means associated therewith, a fluid distributing drum rotatably mounted in said chamber, and means extending about said drum for conveying can ends about the chamber.

20. An apparatus for drying can ends, and the like, comprising, a housing providing a chamber, desiccating means associated therewith, means for distributing air in said chamber, and means rotatably mounted in said chamber adjacent said distributing means and adapted to convey can ends about the chamber and through air discharged by said distributing means.

21. In an apparatus for drying can ends, and the like, can supporting devices, comprising, a plurality of oppositely disposed slotted ring members providing can receiving pockets therebetween, and means for varying the space between said members in accordance with the size of the can ends to be dried.

22. In an apparatus for drying can ends, and the like, can supporting devices, comprising, a plurality of oppositely disposed slotted ring members providing can receiving pockets therebetween, means for varying the space between said members in accordance

with the size of the can ends to be dried, said means including a longitudinally movable bar attached to a ring member, and means for moving the bar.

23. In an apparatus for drying can ends, and the like, can supporting devices, comprising, a plurality of oppositely disposed slotted ring members providing can receiving pockets therebetween, means for varying the space between said members in accordance with the size of the can ends to be dried, said means including a longitudinally movable bar attached to a ring member, and means for shifting the bar to any one of a plurality of positions and locking the bar in any position.

24. An apparatus for drying can ends, and the like, comprising, a housing providing a drying chamber, drying means associated with said chamber, and means having an individual seat for each can end for conveying can ends about the interior of said chamber and adapted to expose each can end to the drying means for drying, said means being adapted to receive can ends of circular and non-circular shape.

25. An apparatus for drying can ends, and the like, comprising, a housing providing a drying chamber, drying means associated with said chamber, and means for conveying can ends about the interior of said chamber and adapted to expose each can end to the drying means for drying, said means being adapted to receive can ends of circular and non-circular shape and being adjustable to receive can ends of different sizes.

26. An apparatus for drying can ends, and the like, comprising, a housing providing a drying chamber, drying means associated with said chamber, and means for conveying can ends about the interior of said chamber and adapted to expose each can end to the drying means for drying, said means being adapted to receive can ends of circular and non-circular shape and being adjustable by means of a single crank to receive can ends of different sizes.

27. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices to receive can ends of different sizes, said means including an axially movable member secured to at least one of said cooperating devices, a member having an arm extending therefrom connected to said axially movable member, and means including a spirally threaded member for moving said last mentioned member to adjust the position of the cooperating device attached to said axially movable member.

28. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices to receive can ends of different sizes, said means including a movable member secured to at least one of said cooperating devices, and a handle arranged to control said movable member to adjust the position of the cooperating member secured thereto.

29. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices to receive can ends of different sizes, said means including a movable member secured to at least one of said cooperating devices, a handle arranged to control said movable member to adjust the position of the cooperating member secured thereto, and an indicator associated with said handle for indicating the position of the cooperating members.

30. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices, a handle arranged to control said movable member to adjust the position of the cooperating member secured thereto, an indicator associated with said handle for indicating the position of the cooperating members, and a locking device associated with said handle and said indicator for locking the movable member in any one of a plurality of positions.

31. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices to receive can ends of different sizes, said means including a plurality of movable members one of the cooperating members being secured to one of said movable members and another of said cooperating members being attached to another of said movable members, spiders individual to each of the cooperating members and connected thereto through the movable members, and means for adjusting said spiders to vary the position of said cooperating members.

32. In combination with a can end drying machine cooperating devices for supporting can ends in the machine for a predetermined period of time, means for circulating said devices in circular paths, and means for adjusting said cooperating devices to receive can ends of different sizes, said means including a shaft having a spiral thread thereon adapted to control the cooperating devices, and a handle for controlling said shaft.

33. In combination with a can end drying machine cooperating devices arranged in longitudinal rows around an axis of rotation for supporting can ends in the machine for a predetermined period of time, and means for adjusting said cooperating devices of each support in each row to receive can ends of different sizes, said means including a shaft

having two oppositely disposed spiral threads associated therewith and controlling said devices, and a handle for controlling said shaft.

34. In a can end drying machine the combination of can supporting devices, and means for adjusting said devices, said means including a shaft controlling said devices and extending through a bearing of the machine, an indicator associated with said bearing, and a handle connected to said shaft and adapted for interlocking engagement with the indicator.

35. A drying machine, comprising, a housing adapted to provide a drying chamber, a can end conveying drum having individual seats for can ends and extending through said chamber, means providing bearings for the ends of said drum, and means for discharging drying fluid into the chamber through the drum.

36. A drying machine, comprising, a housing adapted to provide a drying chamber, a can end conveying drum having individual seats for can ends and extending through said chamber, means providing bearings for the ends of said drum, and means for discharging drying fluid into the chamber through the drum and through one of the bearings thereof.

37. A drying machine, comprising, a housing adapted to provide a drying chamber, a can end conveying drum having individual seats for can ends and extending through said chamber, means providing bearings for the ends of said drum, means for supplying drying fluid to the drying chamber through said drum, and a bearing for said drum adapted to support an end of the drum through said last mentioned means.

38. An apparatus for drying can ends, and the like, comprising, a stationary housing, a drum rotatably mounted in said housing and adapted to convey can ends therein for drying, means for admitting air to the drying chamber through said drum, and externally disposed means for rotatably supporting said drum.

39. A drying apparatus for can ends, and the like, comprising, a housing providing a drying chamber, a conveying device in said chamber having can end receiving pockets therein, one for each can end and consisting of parts which are rigid with each other so as to travel together and are adapted to be successively presented to receive can ends, a shelf associated with said conveying device, means for successively delivering can ends to the shelf, and means operating in timed relation with said conveying device for projecting the can ends from said shelf into pockets in the conveying device as they are successively presented to receive can ends.

40. A drying apparatus for can ends, and the like, comprising, a housing providing a drying chamber, a conveying device in said chamber having can end receiving pockets therein consisting of parts which are rigid with each other so as to travel together and are adapted to be successively presented to receive can ends, a shelf associated with said conveying device, means for successively delivering can ends to the shelf, and means operating in timed relation with said conveying device for projecting the can ends from said shelf into pockets in the conevying device as they are successively presented to receive can ends, said means including a pawl, and means including an eccentrics for reciprocating said pawl.

41. In a machine for drying can ends having can end receiving pockets, means for feeding can ends in the pockets, said means including a pawl shaft, a plurality of can end engaging pawls secured thereto, means for imparting a swinging movement to said pawl shaft, and means for controlling the pawls to engage can ends in one direction of movement and to pass freely thereover in another direction of movement.

42. An apparatus for drying can ends, and the like, comprising, a housing adapted to provide a drying chamber, a conveying device within said housing having pockets for the can ends whereby they are circulated flat side foremost in said drying chamber, an entrance slot in said housing, an exit slot in said housing, and means for periodically projecting can ends through said entrance slot into the conveying device.

43. An apparatus for drying can ends, and the like, comprising, a housing adapted to provide a drying chamber, a conveying device within said housing having pockets for the can ends whereby they are circulated flat side foremost in said drying chamber, an entrance slot in said housing, an exit slot in said housing, and means for periodically projecting can ends through said entrance slot into the conveying device, said conveying device and said housing being arranged to permit the discharge of can ends through the exit slot by the action of gravity.

44. The combination of a plurality of pairs of can end-holding seats, an element of each pair being adjustable relative to the other element to receive can ends of different sizes, and means for simultaneously adjusting all of said adjustable elements.

45. The combination of a plurality of pairs of can end-holding seats arranged in a plurality of circular series around an axis of rotation, and means for feeding can ends to each of said circular series to supply can ends to each of said pairs of seats successively, and drying means for acting on the rotated can ends.

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