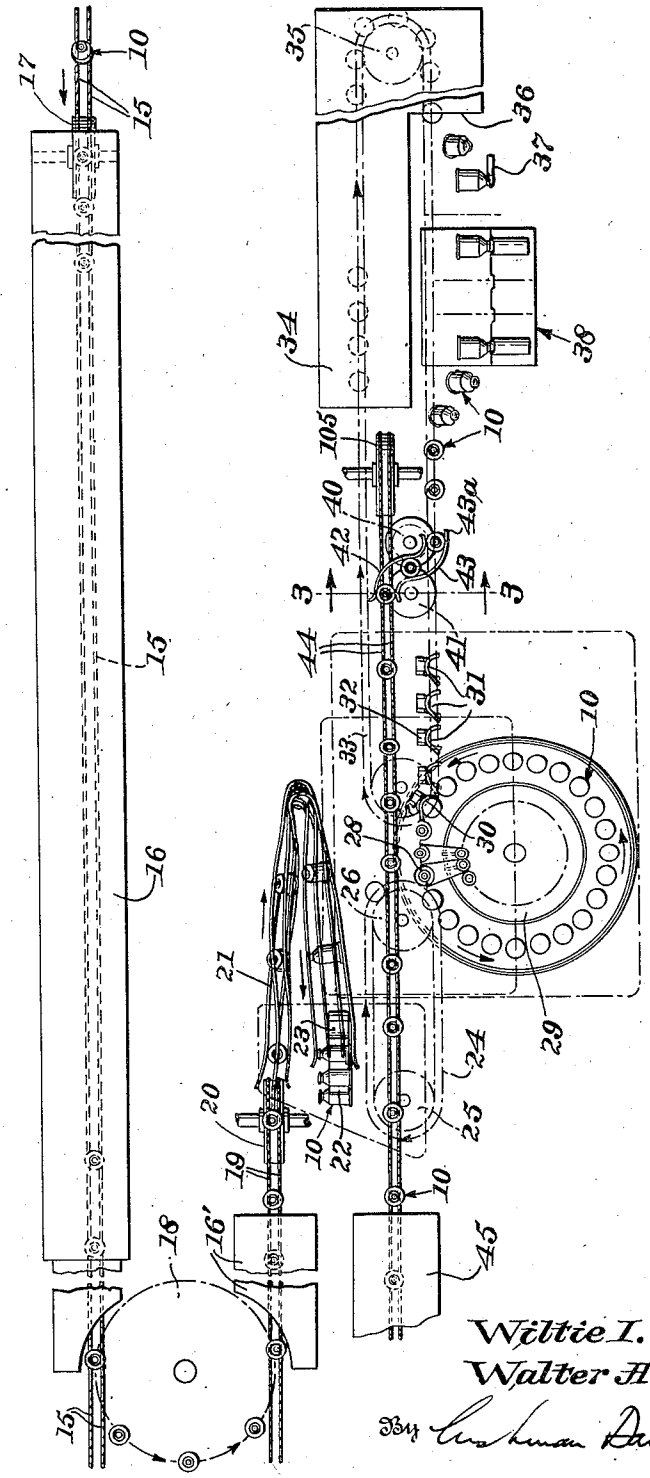
March 20, 1945. W. I. GLADFELTER ET AL 2,371,885

APPARATUS FOR HEATING AND HANDLING CONTAINERS

Filed Aug. 7, 1941 7 Sheets-Sheet 1

Fig. 1.



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APPARATUS FOR HEATING AND HANDLING CONTAINERS

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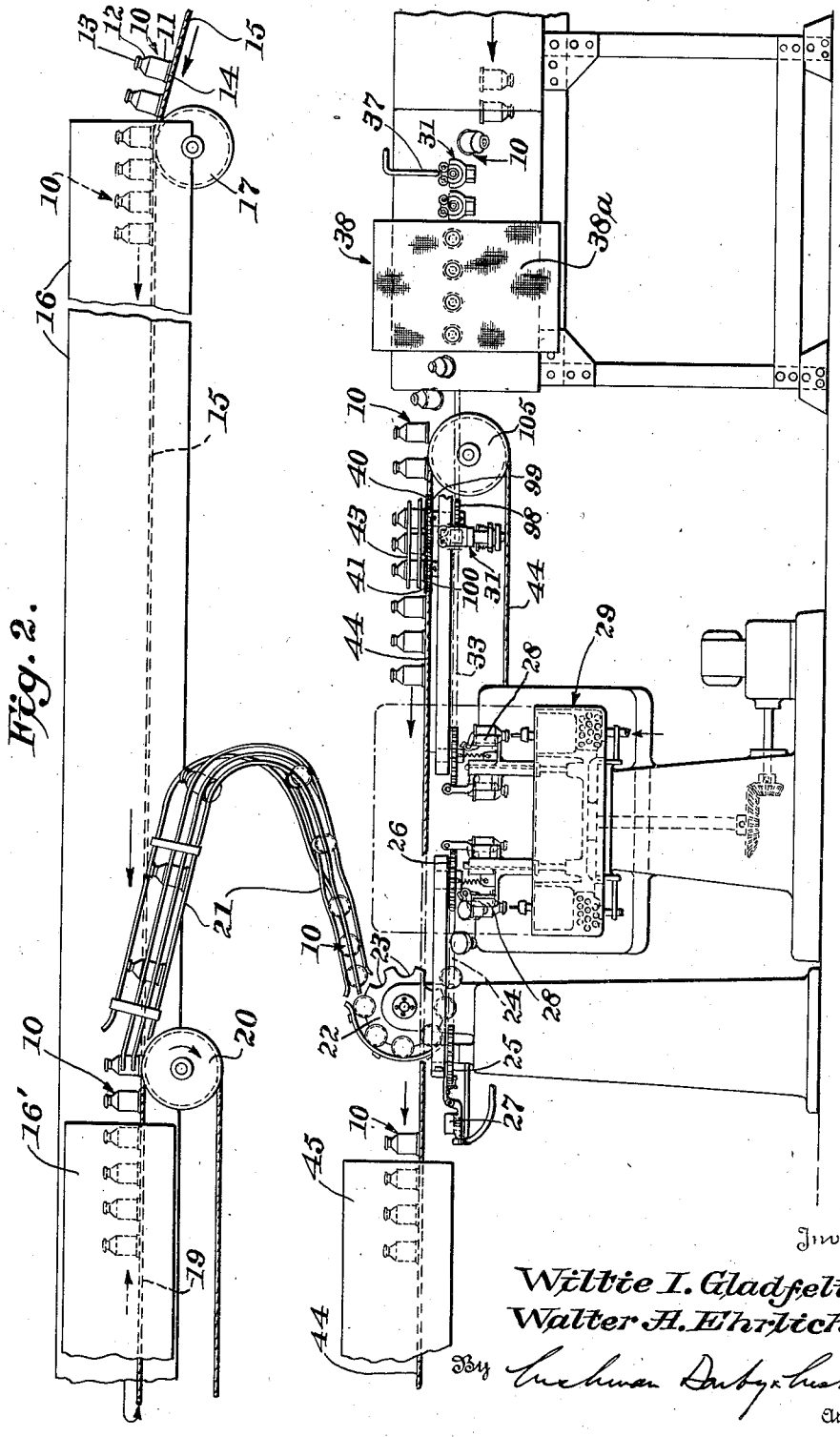


Fig. 2.

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APPARATUS FOR HEATING AND HANDLING CONTAINERS

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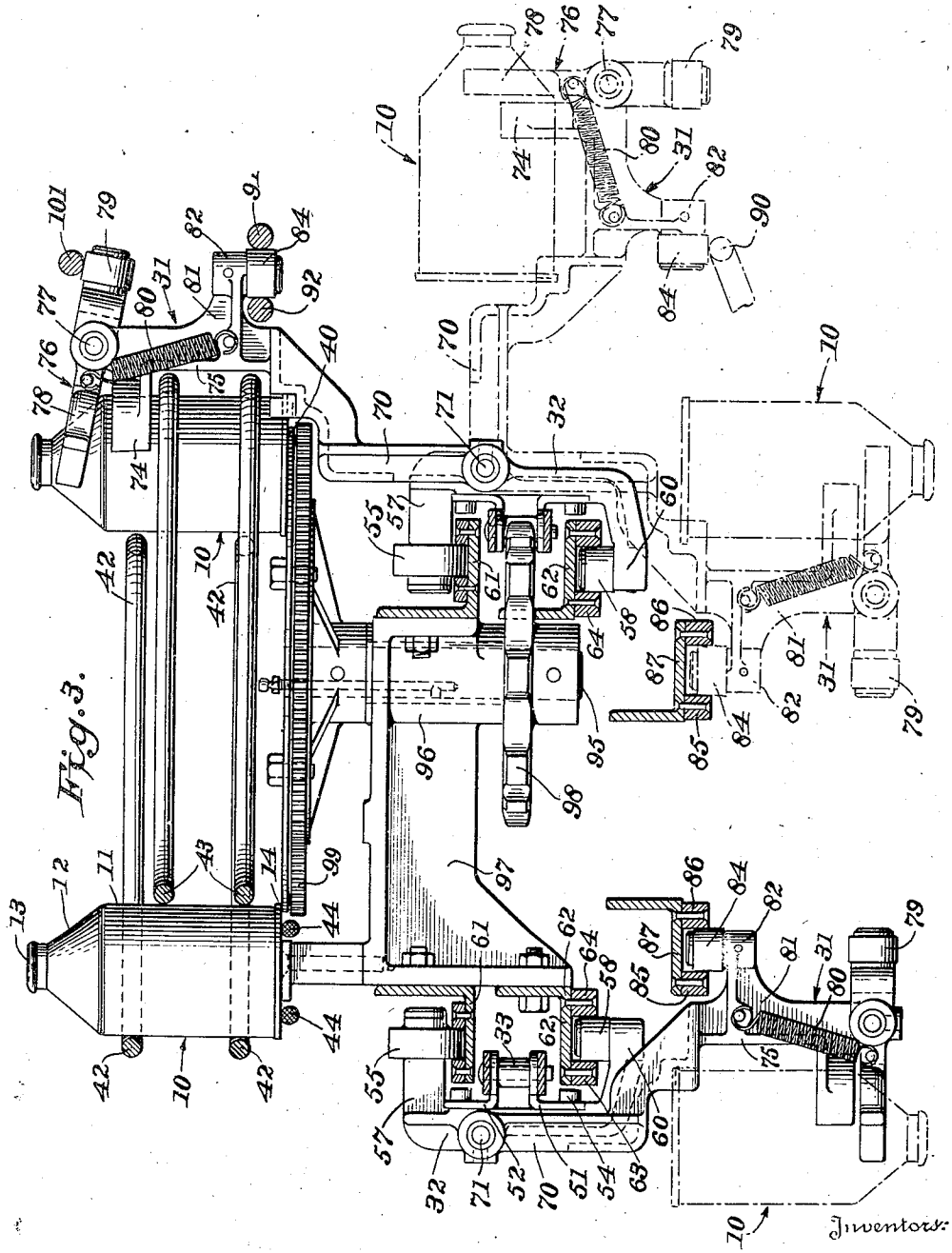


Fig. 3.

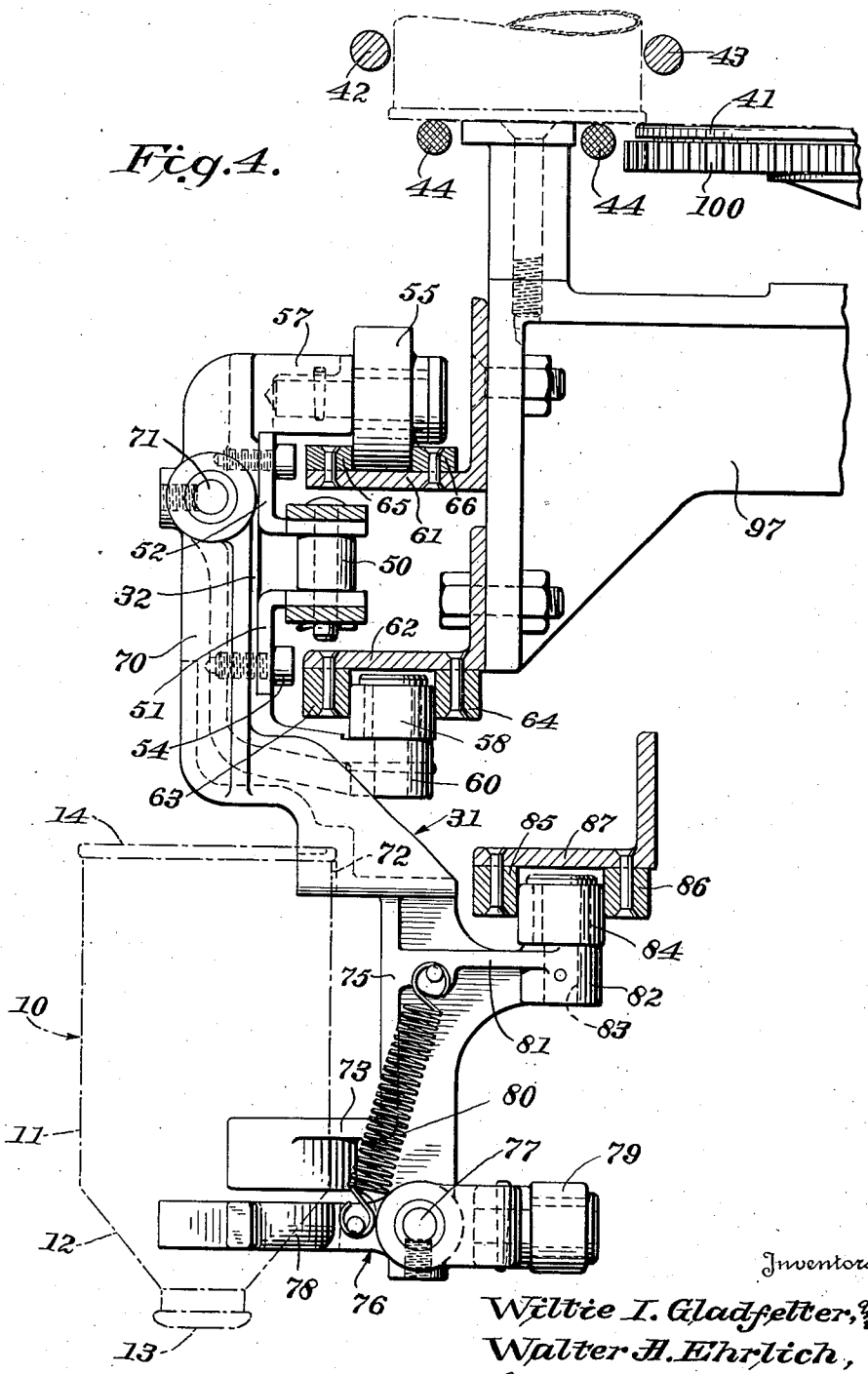
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APPARATUS FOR HEATING AND HANDLING CONTAINERS

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Fig. 4.



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APPARATUS FOR HEATING AND HANDLING CONTAINERS

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Fig. 5.

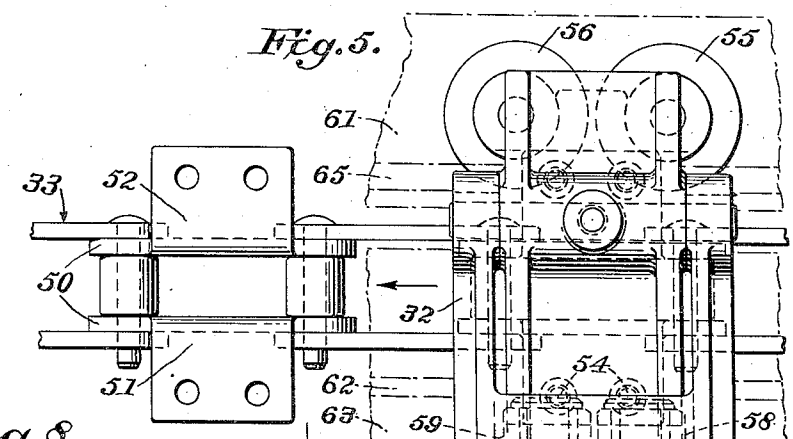
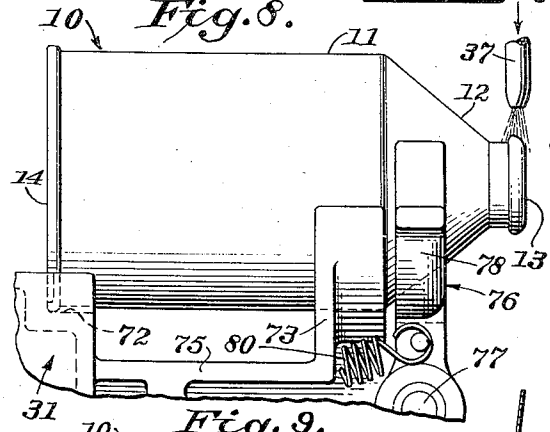


Fig. 8.



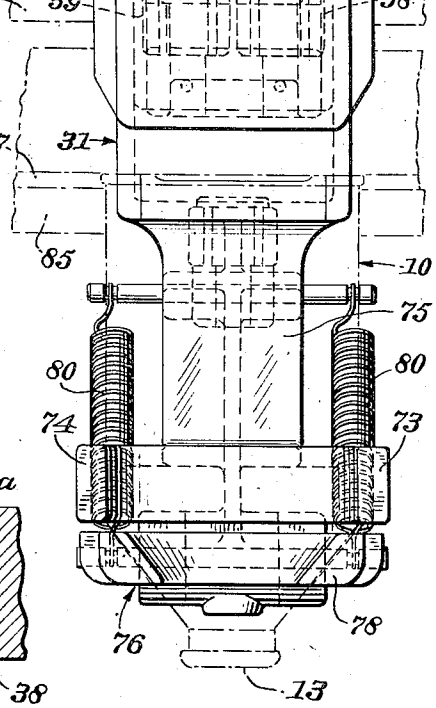
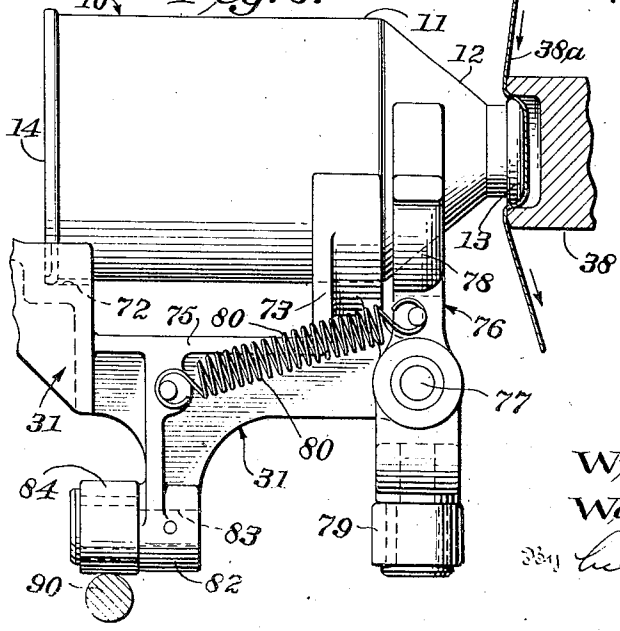


Fig. 9.



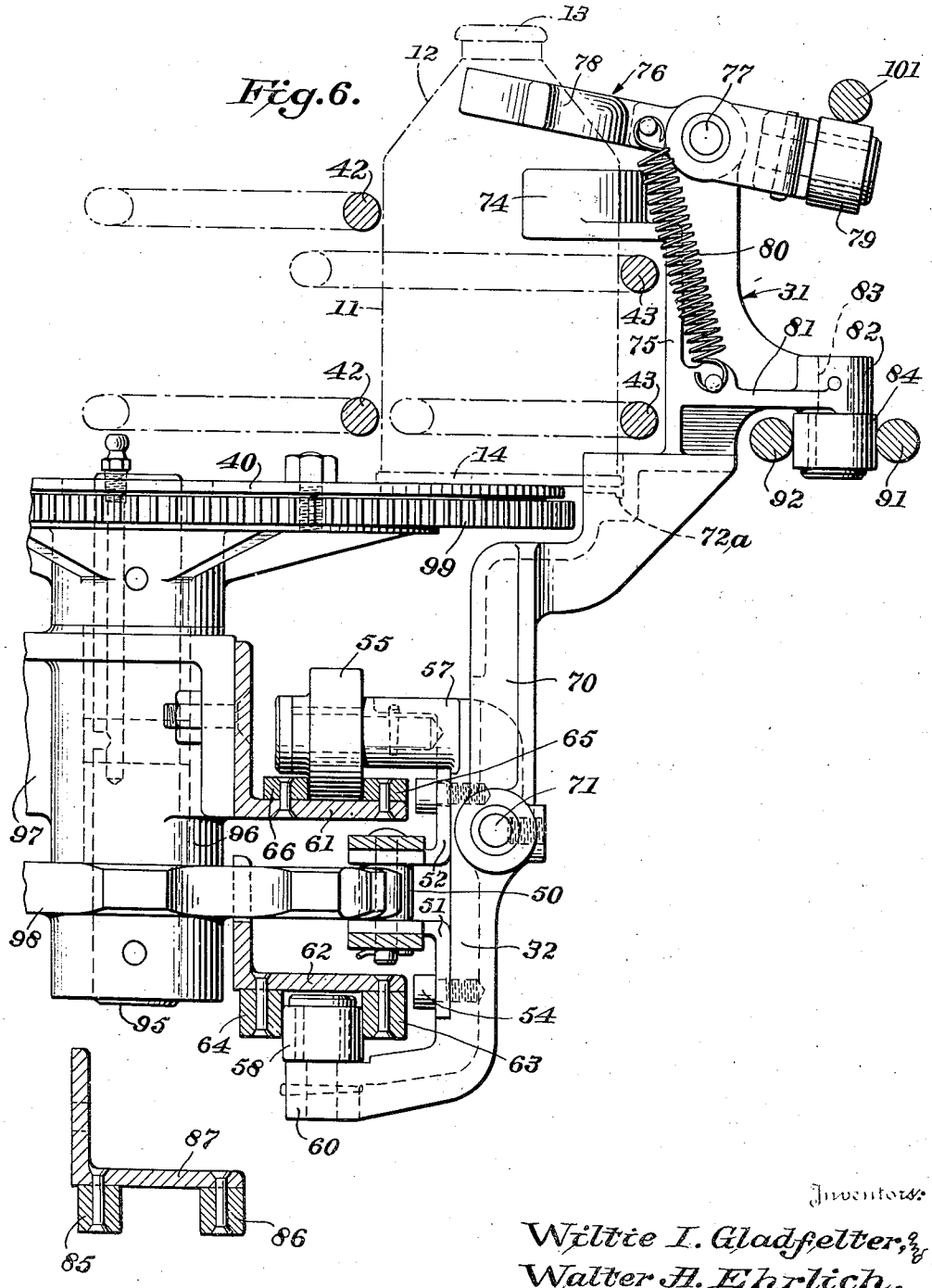
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APPARATUS FOR HEATING AND HANDLING CONTAINERS

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Fig. 6.



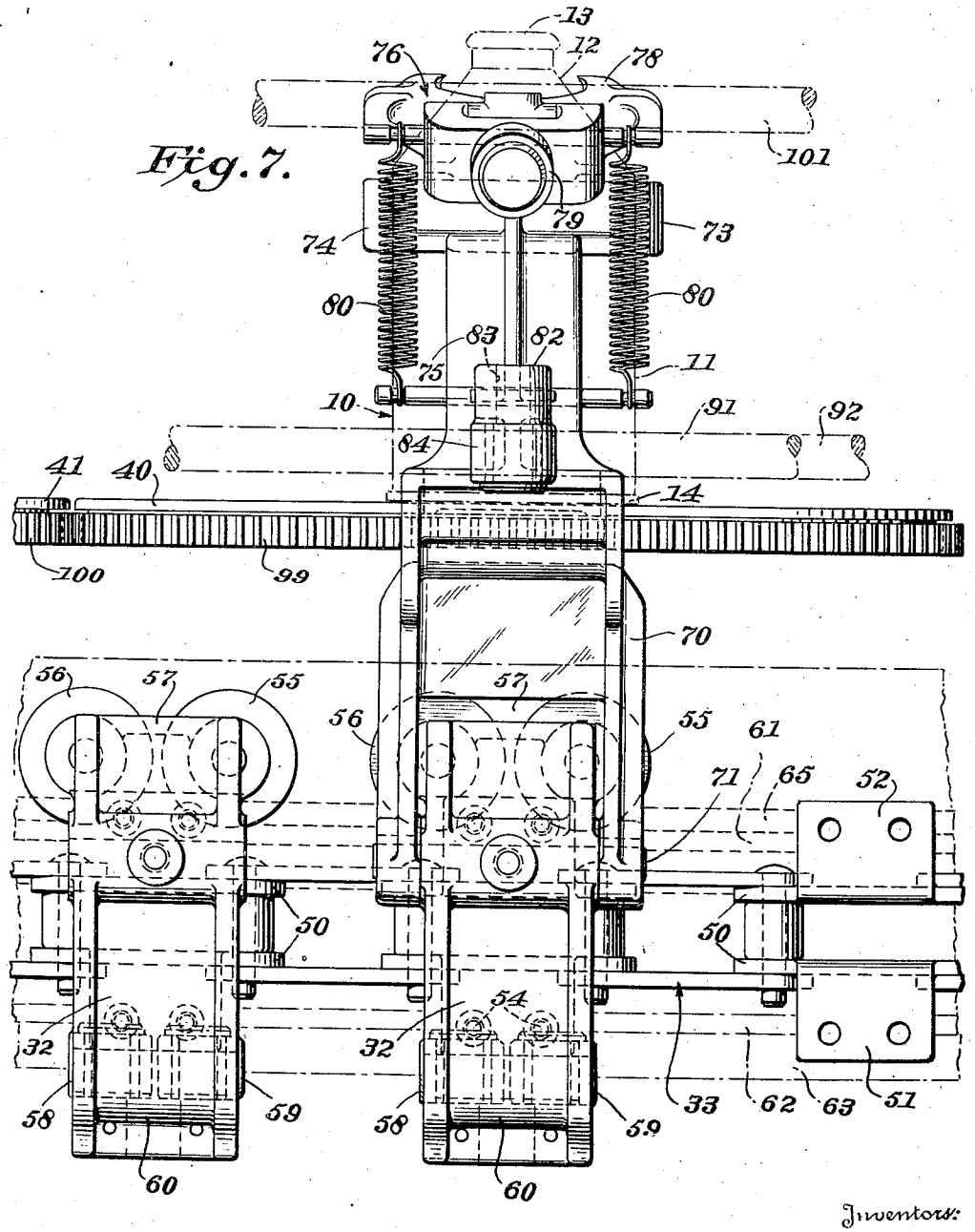
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APPARATUS FOR HEATING AND HANDLING CONTAINERS

Filed Aug. 7, 1941 7 Sheets-Sheet 7

Fig. 7.



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UNITED STATES PATENT OFFICE

2,371,885

APPARATUS FOR HEATING AND HANDLING CONTAINERS

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Application August 7, 1941, Serial No. 405,866

14 Claims. (Cl. 91—13)

The present invention relates to apparatus for handling, coating and treating articles of manufacture, such as containers, and is a modification of and an improvement upon the apparatus shown in the pending application of Gladfelter and Schmidt, Serial No. 350,976, filed August 3, 1940. As in the case of the apparatus of that application, the invention provides means for coating with wax or the like, the interiors of hollow metallic containers, such as beer cans.

It is an object of the invention to provide improved means for handling the containers, during the preheating, coating, draining and settling or distribution of the wax in the containers.

A further object of the invention is to provide improved means for transferring the articles from the preheating oven to the machine for coating the interiors of the containers with wax or the like.

A further object of the invention is to provide improved means for conveying the containers through the wax drain oven and for transferring the same to the conveyor associated with the wax settling oven.

A further object is to provide, in combination with the drain oven conveyor, means for cleaning the ends of the containers and to provide a novel form of drain oven conveyor adapted to cooperate with said container and cleaning means.

As pointed out in the above identified application, it is important that beer cans and the like be provided with relatively thin, continuous linings of wax-like coating materials to prevent contact of the contents of the containers with the metallic walls thereof. The present invention provides means for effecting the desired, relatively thin, evenly distributed coating of wax on such containers. All of the objects of the invention of the aforementioned application are accomplished by the present invention and many of them are accomplished in an improved manner.

A further object of the invention is to provide means making it possible to simplify the conveyors in the preheating oven and in the coating material settling oven, so that the expense thereof may be materially reduced, without lessening the efficiency thereof. To this end, the invention provides improved transfer devices, making it entirely feasible to employ simple cable conveyors in those ovens.

A further object of the invention is to arrange the various units of the apparatus in such relative position to each other that space in the plant is greatly conserved. By placing the several ovens at different elevations, the ovens may be disposed above each other, thereby decreasing the total floor space occupied.

Other and further objects and advantages of the invention will be apparent from a consideration of the following description of the specific embodiment of the invention shown in the accompanying drawings, in which:

Figure 1 is a diagrammatic plan view of the apparatus as a whole, certain parts being broken away for the conservation of space.

Figure 2 is a diagrammatic side elevation, similar to Figure 1.

Figure 3 is a partial vertical section and elevation, on an enlarged scale, taken substantially on line 3—3 of Figure 1.

Figure 4 is an enlarged transverse vertical section and elevation of the wax drain oven conveyor.

Figure 5 is a side elevation, looking from the left of Figure 4.

Figure 6 is a view similar to Figure 4, but showing the can holder in the discharge position.

Figure 7 is a side elevation looking from the right of Figure 6, and

Figures 8 and 9 are fragmentary elevational views of the can holders in an intermediate position.

Although not confined to such use, the apparatus of the present invention is adapted to coat with wax or wax-like compositions, the interiors of drawn seamless containers of the type shown in the pending application of Calleson et al., Serial No. 334,876, filed May 13, 1940. A line of such containers 10, each having a cylindrical side wall 11, a conical upper end 12 terminating in a neck having a crown finish 13 at its upper end and a bottom end member 14 double-seamed to its bottom end, is conducted by a cable conveyor 15 from any suitable point in the plan to and through a preheating oven 16. The cables 15 may extend upwardly on an inclined plane, as shown in Figure 2, from a transfer device associated with a baking oven, as disclosed in the application of Gladfelter et al., Serial No. 347,564, filed July 25, 1940. The cables 15 are trained over sheaves 17 at the entrance end of the preheating oven 16 and extend through the oven to and past a transfer table 18 at the far end thereof. This table transfers the containers to the return portion 16' of the preheating oven, through which the containers are carried by cables 19. The latter cables are trained about sheaves 20 and deliver the containers to a gravity chute 21 which comprises a plurality of guide rods twisted to cause the containers to roll and simultaneously tilt laterally to a horizontal

position at the lower end thereof. The chute delivers the horizontally disposed containers to a dial 22 journalled for rotation on a horizontal axis and having peripheral pockets 23 therein.

A conveyor chain 24 or the like, trained for movement on a horizontal path about sprockets 25, 26, has a plurality of tiltable article-receiving brackets 27 pivotally secured thereto. The brackets 27 and the chain 24 are interconnected, by appropriate gears and the like, for movement with the dial 22 in such manner that each article-receiving bracket 27, while in horizontal position, registers with a horizontally disposed dial pocket and receives a container therefrom. The brackets with the containers therein swing downwardly, under control of appropriate guide rails, to a vertical position and move in tangential relation to and in registration with the container-receiving members 28 associated with the wax coating machine 29.

The conveyor 24, sprockets 25, 26 and article-receiving brackets 27 constitute a transfer table adapted, as explained above, to receive the containers in horizontal position from the dial 22 and to deliver the same in vertical, inverted, neck-down position to the coating machine 29. The brackets 27 and associated parts may be similar to the holders associated with the wax drain oven conveyor, explained in detail below, or they may be made substantially in accordance with the article-receiving brackets associated with the infeed transfer table shown in the aforementioned Gladfelter et al. application, Serial No. 350,976, more particularly in Figures 1–5 thereof. As explained in that application, the article-receiving brackets are pivotally connected to a conveyor chain for downward swinging movement from a horizontal to a vertical, inverted position, and include magnetic means for holding the containers in the pockets of the brackets. Since any preferred type of article holder may be associated with the chain 24, the details of construction thereof need not be further described.

The details of construction of the inside waxing machine 29 are not shown and described herein, since a machine of the type shown in the application of Goebel and Rau, Serial No. 151,758, filed May 2, 1937, may be employed, preferably in the modified form shown in the application of Gladfelter and Duhan, Serial No. 348,306, filed July 29, 1940. Reference is made to those applications for a complete disclosure of a suitable inside coating machine which may be used with the devices shown in detail herein.

The internally coated containers are delivered at a transfer station 30 to holders 31 carried by travellers 32 connected to a chain 33 trained for movement through the wax drain oven 34. At the transfer position 30, the holders are in a downwardly projecting position, aligned with the article supporting devices associated with the wax coating machine. During their passage through the wax drain oven, the holders remain in this position to permit the coating material to drain from the inverted containers.

At the far end of the drain oven, the chain 33 and the devices carried thereby move around a sprocket 35 and travel toward the discharge end 36 of the oven. As the containers move out of the discharge end of the oven 34, the holders therefor are swung upwardly to horizontal position, by means hereinafter described. In that position, they pass an air nozzle 37 and a neck wiping machine represented generally at 38, whereby the neck finish ends of the containers are effectively cleaned, before the containers are swung to upright position, thereby avoiding the possibility of wax coating material running down upon the exterior side wall of the neck finish or upon the outside of the conical upper end 12 thereof. The neck blower and neck wiper are preferably constructed in accordance with the disclosure in the application of Gladfelter, Serial No. 387,757, filed April 7, 1941.

As soon as the containers leave the neck wiper, the holders are swung upwardly to an upwardly projecting vertically disposed position, by means hereinafter described. When in the latter position, they are elevated considerably above the position in which they were received by the holders and are in substantial alignment with transfer discs 40, 41, hereinafter described. In this position, the containers are released from the holders 31 and are deposited upon the first transfer disc. Guide rails 42, 43 control the movement of the containers under the influence of the discs and serve to deposit them upon cables 44 which constitute means for conveying the containers in upright position through the wax settling oven 45, the cables being trained for movement therethrough.

It should be noted that, in the arrangement just described, the preheating oven is at a relatively high elevation and that the containers are delivered therefrom to the coating machine primarily under the influence of gravity. The wax drain oven is at a relatively low elevation, while the wax settling oven is at an intermediate elevation. The containers are simultaneously uprighted and elevated to the level of the wax settling oven by swinging movement of the holders associated with the wax drain oven conveyor.

Prior to transfer to the wax drain oven conveyor, the containers are supported in the wax coating machine substantially in accordance with the disclosure of the aforesaid application of Gladfelter and Duhan, Serial No. 348,306, in inverted position with clamps engaging their upwardly facing bottom ends. At the transfer position 30, the containers are picked up by the holders 31 associated with the drain oven conveyor chain 33 and the clamps associated with the coating machine are simultaneously released, to permit the containers to move away with the conveyor chain holders. Referring to Figures 3–7, alternate links 50 of the conveyor chain 33 carry laterally bent wings 51, 52, upon which travellers 32 are secured by bolts 54 or the like. The travellers are of general C-shape and have rollers 55, 56 on their upper legs 57 and lower, vertically disposed guide rollers 58, 59 on their lower legs 60, the upper rollers being supported upon an upper horizontal track 61 and the lower rollers being disposed in downwardly facing guide channels formed by a lower track 62 having side guide rails 63, 64 carried thereby. Similar upwardly projecting guide rails 65, 66 are carried by the upper track 61, to engage the end faces of the rollers 55, 56. The tracks 61, 62 are preferably in the form of angle irons and are bolted or otherwise secured to appropriate supports in the wax drain oven and exteriorly thereof.

The holders 31 each comprises a downwardly projecting member 70 pivotally connected to the traveller by a horizontally disposed pin 71, for swinging movement in a vertical plane about the axis of the pin. Ajacent its lower end, each carrier is curved laterally to provide can-receiving pockets comprising an arcuate surface 72 and a

similar groove 72a adapted to receive the bottom, double-seamed ends of the containers and forwardly and rearwardly projecting arcuate wings 73, 74, positioned to engage the side wall 11 of the container adjacent the conical end 12 thereof, the connecting web 75 between the seat 72 and the wings 73 being spaced a substantial distance from the container side wall for purposes hereinafter described. At the end of each holder remote from the pivot 71, a clamping member 76 is pivotally supported by a pin 77, the clamp having a bifurcated, yoke portion 78 at one end adapted to embrace the conical end 12 of the container and a cam following roller 79 journalled on its other end. Tension springs 80 are connected to each clamp and to the web portion 75 of the associated holder, so as to normally maintain the clamp in operative relation to the container in the pocket.

A laterally projecting flange 81, integral with the intermediate web portion 75, terminates in a hollow boss 82 carrying a pin 83 upon which a guide following roller 84 is journalled. Guide rails 85, 86 carried by an angle iron track 87 engage opposite sides of the roller 84 and thereby maintain the pivoted holders in predetermined relation to the travellers 32.

Adjacent the transfer station 30, there is positioned a stationary cam, not shown, which serves first to swing the yoke end 78 of each clamp downwardly, so that the container may be inserted into the can holding pocket by registration of the pocket with the holders associated with the wax coating machine. The clamps carried by the wax coating machine are swung to release position and the bifurcated ends 78 of the clamps 76 are immediately moved to clamping position by the springs 80, whereby the containers in inverted position are transferred to the holders associated with the drain oven conveyor chain.

The containers in the position shown in the lower portion of Figure 4 travel through the wax drain oven and emerge therefrom in the same position, as shown in dotted lines at the right-hand bottom portion of Figure 3. As they leave the drain oven, the rollers 84 encounter a cam guide rail 90 which is shaped to cause the holders to swing outwardly and upwardly to a horizontal position, as shown in dotted lines at the extreme right-hand portion of the composite view in Figure 3 and as shown in Figures 8 and 9. While maintained in this horizontal position, the containers pass the air nozzle 37 and the apron 38a of the neck wiping machine 38, as is fully described in the aforesaid application of Gladfelter, Serial No. 387,757, filed April 9, 1941. Hence, the neck finish ends are wiped clean of all excess coating material that tends to collect thereon before they are brought to upright position, and no material is left, to run down onto the conical end portions 12.

As the containers leave the neck wiping machine, a continuation 91 of the cam guide rail 90 swings the holders upwardly from the horizontal position of Figures 8 and 9 to the vertically disposed, upper position shown in Figure 6 and at the upper right-hand portion of Figure 3, a second guide rail 92 being provided to accurately control the position of the holders when in upright relation.

The upward swinging movement of the containers brings them to a position above the periphery of the first transfer disc 40, the disc being mounted upon a vertical stub shaft 95 journalled in a bearing 96 carried by a bracket 97 which also serves as a support for the tracks 61, 62 at the discharge position. The stub shaft 95 for the disc 40 carries a sprocket 98, disposed in engagement with the conveyor chain 33, to receive rotation therefrom and to rotate the disc. The disc 40 carries a spur gear 99 in mesh with a similar gear 100 carried by the second transfer disc 41, whereby rotation is imparted thereto in the opposite direction.

A stationary cam rail 101 (Figs. 3 and 6) is positioned to depress the cam roller 79 and thereby raise the yoke end 78 of the can-engaging clamp, to release the clamp from engagement with the conical end of the container. As indicated in Figure 6, engagement of the bottom end 14 of the container with the disc 40 tends to lift the double-seam out of the arcuate groove 72a in the container receiving pocket, so that the can may be removed from the pocket for movement with the disc 40. The guide rails 43 have ends 43a positioned to enter the space between the side wall of the container and the web 75 of the associated holder, thereby positively withdrawing the container from the holder and depositing it upon the disc 40, for movement therewith under control of guides 43, 42. The containers shift over to the disc 41 and are moved through a path of substantially 90° thereon, until the guides shift the containers radially outwardly of the disc upon the cables 44, trained for movement adjacent the discs, as shown in Figures 3 and 4.

As shown in Figures 1 and 2, the cables 44, trained about sheaves 105, have an upper run extending through the wax settling oven 45 and disposed at an intermediate elevation, below the preheater oven conveyors 15, 19 and above the wax coating machine and the drain oven conveyor 33. As explained above, the holders associated with the latter conveyor are swung upwardly to raise the containers to the level of the settling oven cables 44.

During their passage through the wax settling oven, the containers are maintained at a sufficiently elevated temperature to enable the wax to distribute itself evenly over the interior surfaces of the containers and to collect adjacent the double-seams at the bottom thereof, to seal the same and prevent the contents of the containers gaining access to the folds of the metal in the seam.

As soon as the holders 31 deposit the containers upon the transfer disc 40, they immediately swing downwardly, under the influence of downwardly curved portions of the guide rails 91, 92, with the result that the holders assume the vertical, downwardly projecting position to receive additional freshly coated containers from the wax coating machine, as previously described.

When the containers emerge from the wax settling oven, they may be carried by suitable transfer and conveyor devices to a box-filling machine, to storage, or to any desired point in the plant.

The present invention is not limited to the details of construction or combinations of elements shown in the accompanying drawings and described above, but includes all modifications coming within the scope of the appended claims and their equivalents.

We claim:

1. Apparatus for handling containers which have had their interiors freshly coated with liquid coating material, said apparatus comprising a drain oven conveyor for conveying the

containers in inverted, neck down position, a settling oven conveyor at a higher level than the first mentioned conveyor, and means for swinging the containers upwardly from the inverted, neck down position as carried by the first conveyor to an upright position at the level of the settling oven conveyor and for transferring the uprighted containers to the latter conveyor.

2. Apparatus for conveying a line of containers which have had their interiors freshly coated with liquid coating material, said apparatus including a drain oven conveyor comprising invertible holders for the containers, means for transferring the containers in inverted position to said holders for movement therewith in inverted position, a settling oven conveyor adapted to support the containers in upright position, means for inverting the holders associated with the first conveyor to position the containers in upright relation, and means for transferring the containers in the latter position to the settling oven conveyor.

3. Apparatus for conveying a line of containers which have had their interiors freshly coated with a liquid coating material, said apparatus comprising a drain oven conveyor comprising a plurality of vertically swingable holders for the containers adapted when in their lowermost positions to receive the containers in neck-down position, whereby the containers in that position are carried through the drain oven to drain, a settling oven conveyor trained at a higher elevation than the first conveyor, means for swinging the holders upwardly to position the holders in upright relation adjacent the elevation of the settling oven conveyor, and means for transferring the uprighted containers from the holders to the settling oven conveyor.

4. Apparatus for conveying a line of containers which have had their interiors freshly coated with a liquid coating material, said apparatus comprising a drain oven conveyor comprising vertically swingable holders for the containers adapted when in their lowermost positions to receive the containers in inverted neck down position and to carry the containers in that position to drain, means for swinging the holders and the containers to a substantially horizontal position and for maintaining them in that relation for treatment of the containers by a neck cleaning apparatus or the like, means for thereafter swinging the holders and the containers to substantially vertical, upright position and means for removing the uprighted containers from the holders in the latter position.

5. Apparatus for conveying a line of containers which have had their interiors freshly coated with liquid coating material comprising a drain oven conveyor comprising vertically swingable holders for the containers adapted when in their lowermost positions to receive the containers in inverted neck down position and to hold the containers in that position during their passage through the oven to drain, means for swinging the holders and the containers upwardly to a substantially horizontal position and for maintaining them in that position as they move in operative relation to a neck cleaning apparatus, means for thereafter swinging the holders and the containers upwardly to a substantially vertical, upright position, a settling oven conveyor at a higher elevation than the first mentioned conveyor, and means for transferring the uprighted containers from the holders to the settling oven conveyor.

6. Apparatus for conveying a line of containers which have had their interiors freshly coated with a liquid coating material comprising a drain oven conveyor including a track, a plurality of brackets having rollers supported on the track, a chain connecting the brackets for movement along the track, a plurality of holders for the containers pivoted to the brackets for upward swinging movement and adapted to carry the containers in inverted position for drainage, means for swinging the holders upwardly to upright the containers, a settling oven conveyor and means for transferring the upright containers from the holders to the settling oven conveyor for movement therewith in upright position.

7. In combination, a drain oven conveyor, a settling oven conveyor at a higher elevation than the drain oven conveyor, means for delivering containers with freshly coated interiors to the drain oven conveyor, and means for transferring the containers from the first conveyor to the second, the drain oven conveyor comprising a flexible chain, a plurality of brackets carried thereby, holders for the containers pivoted to the brackets for upward swinging movement from a lower, container receiving and draining position to an upper transfer position, rollers carried by said holders and stationary cam means for swinging the holders upwardly to the elevation of the settling oven conveyor for transfer of containers in upright position thereto.

8. Apparatus for conveying a line of containers such as beer cans through a preheating oven and for delivering the same in inverted, neck down position to a machine for coating their interiors with a lining material such as wax, comprising a pre-heating oven conveyor adapted to support the cans in upright position, means for receiving the cans from said conveyor in substantially upright position and for delivering them in substantially horizontal position, and additional means for receiving the cans in horizontal position and for delivering them to the coating machine in inverted, substantially vertical, neck down position.

9. A conveyor for moving a line of cans or the like, comprising a track, a plurality of travellers mounted thereon, means connecting the travellers for movement in unison along the track, a can holder pivotally connected to each traveller for swinging movement about a horizontal axis, each of said holders comprising a normally depending member having a pocket at its lower end for receiving a can in inverted position, a clamp pivoted to the holder and adapted to engage an end of the can, and cam following means associated with said clamp, means for swinging the holders upwardly from the depending position to an upwardly extending position, and cam means positioned to engage said cam following means for releasing the clamps when the holders are in the latter position.

10. A conveyor for a line of cans or the like, comprising track means, a plurality of travellers having supporting and guiding rollers mounted on the track means, a chain interconnecting the travellers for movement in unison along the track, can holders pivotally connected to the traveller for vertical swinging movement, said holders having guide rollers journalled thereon and article-engaging clamps pivotally connected thereto, guide means for said guide rollers adjacent the path of movement of the holders and curved to swing the holders vertically, and means

for swinging said clamps about their pivotal connections to discharge the articles from the holders.

11. In combination, a conveyor chain, track means adjacent thereto, a plurality of travellers connected to the chain and mounted on the track means, a can holder pivotally connected to each traveller for swinging movement from a lower, depending position to an upper, upwardly projecting position, means associated with said holders for carrying containers inverted in the first-mentioned position, means for swinging the holders upwardly to the second-mentioned position with the containers upright therein, a transfer disc positioned to receive the uprighted containers from the holders in that position, and means driven by said chain for rotating the transfer disc.

12. In combination, a conveyor for cans comprising a plurality of vertically swingable can holders, means for swinging the holders from a lower, depending position to an upper, upwardly projecting position, a pair of transfer discs positioned to receive the containers from the holders in the latter position, means driven by said chain for rotating one of the discs, and intermeshing gears rotatable with the discs whereby said one disc rotates the other.

13. A conveyor for moving a line of cans having conical upper ends and bottom end members double-seamed to their lower ends, comprising a chain, and a plurality of can holders operatively connected to the chain, each holder comprising surfaces shaped to engage the double-seam and the adjacent side wall of the container, a pivoted clamp having a bifurcated end adapted to embrace a portion of the conical upper end of the can, spring means for urging the clamp into can-engaging position, and cam following means for moving the clamp against the force of said spring means to a can-releasing position.

14. Apparatus for conveying a line of cans and for delivering the cans to a coating machine, comprising a pre-heating oven conveyor for conveying the line of cans in upright position at a relatively high elevation, a gravity chute at the discharge end of said conveyor, having guide means twisted to swing the cans from the upright position as received from the conveyor to a horizontal position as they move down the chute, a dial journalled for rotation on a horizontal axis at the discharge end of the chute and having horizontally disposed peripheral pockets positioned to receive the cans from the chute, a conveyor below the dial having tiltable can holders associated therewith, means for swinging the holders to horizontal position below the dial to receive the cans therefrom in horizontal position, means for swinging the holders downwardly to vertical position to invert the cans, and means for transferring the cans in inverted, neck-down position to the coating machine.

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