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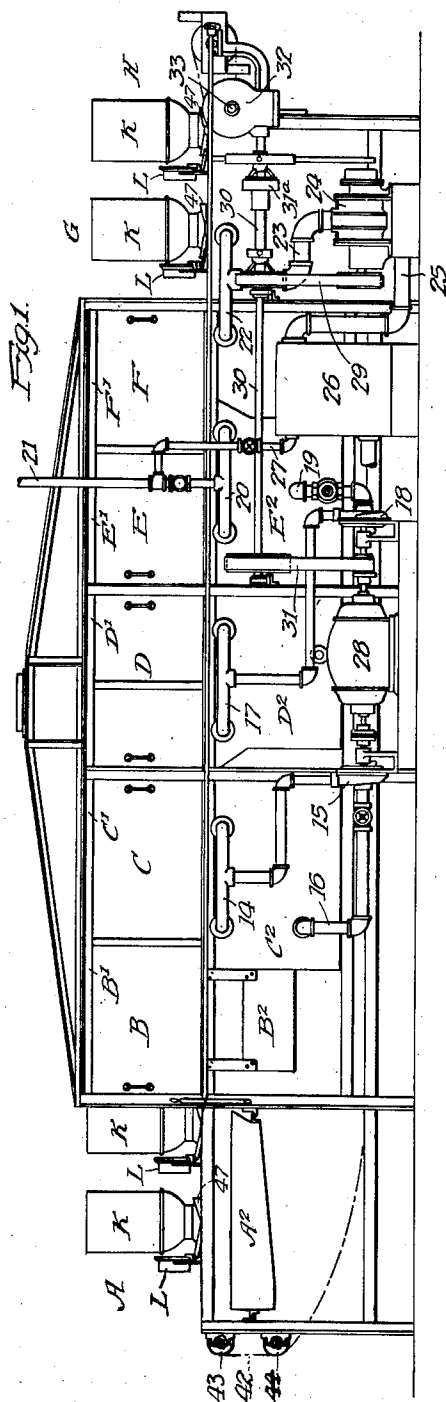
J. R. ROBERTS

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CAN WASHING MACHINE

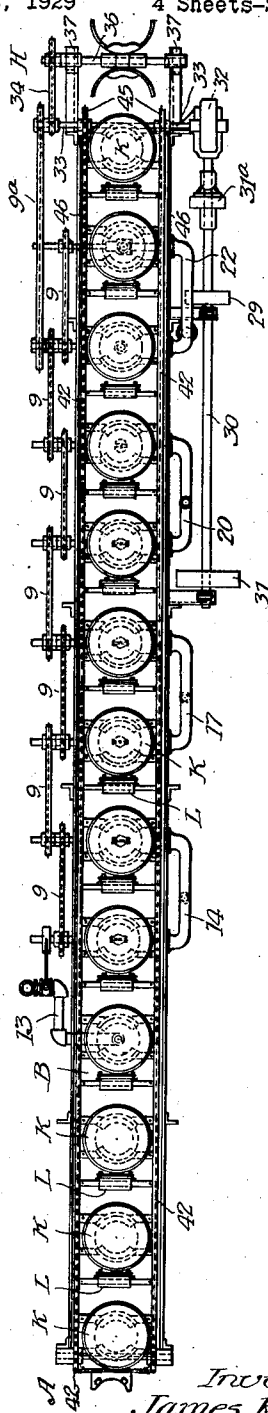
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Witness
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Fig. 2.



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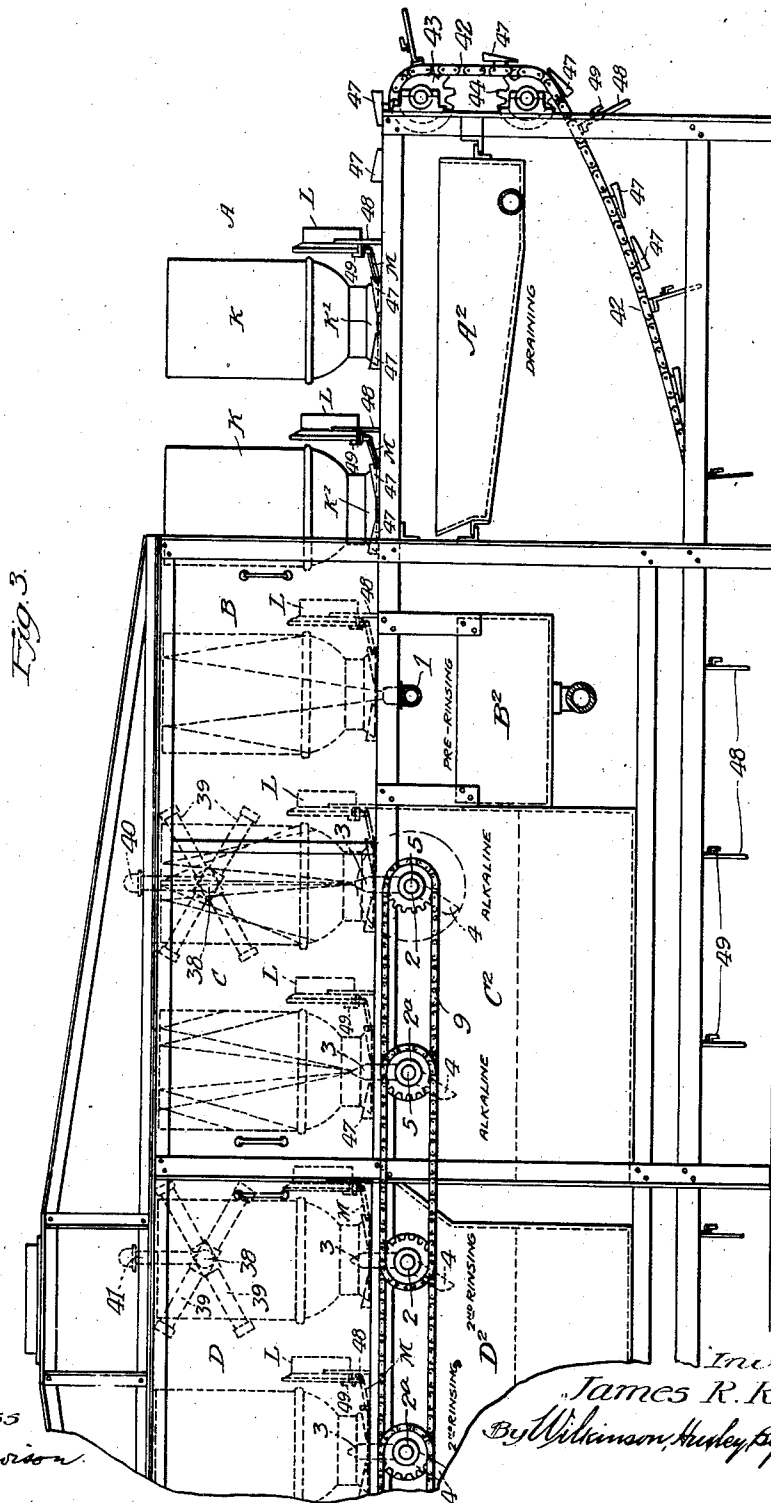
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CAN WASHING MACHINE

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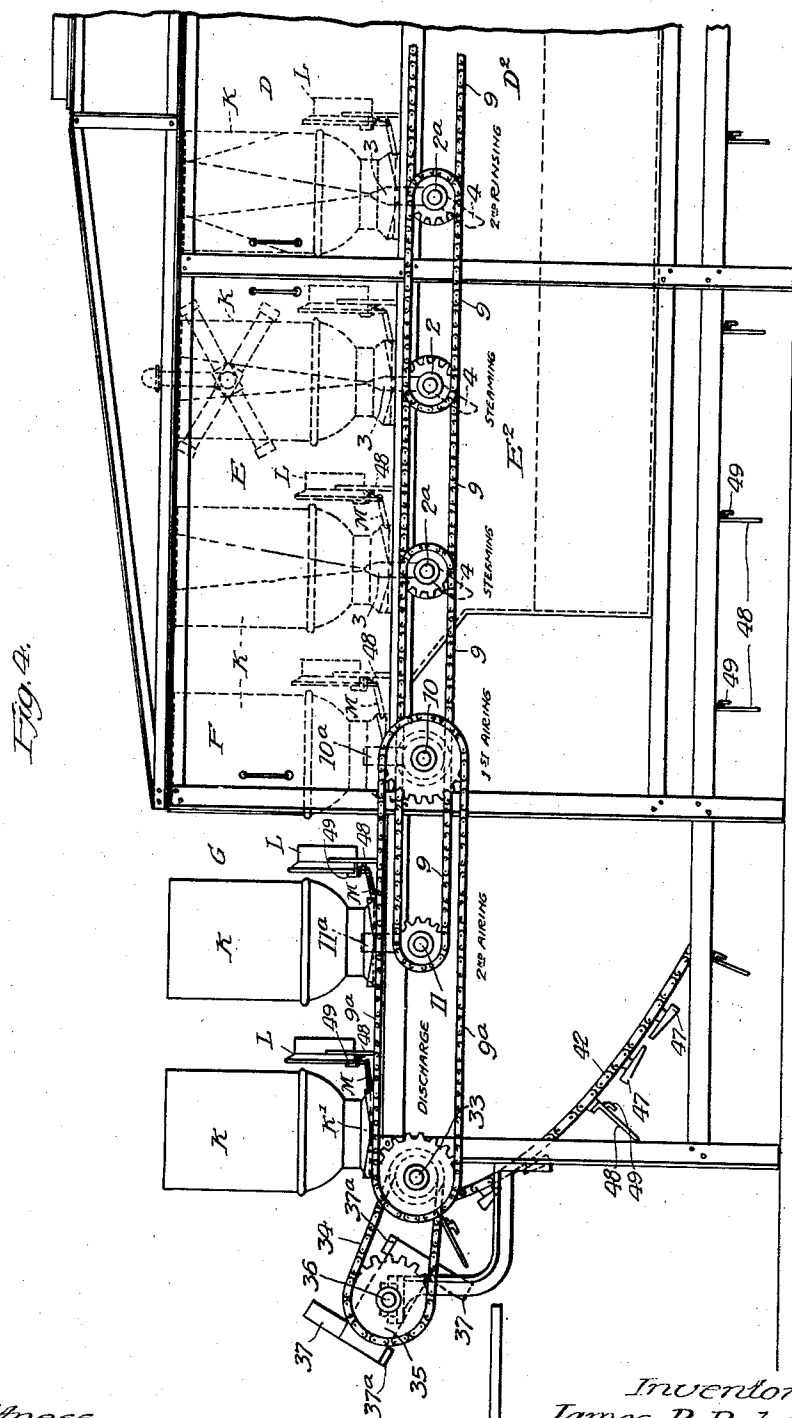
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CAN WASHING MACHINE

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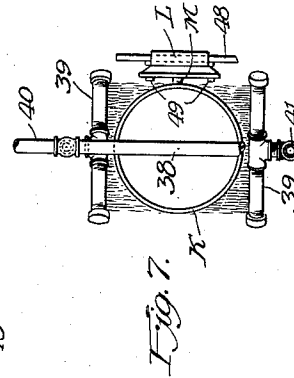
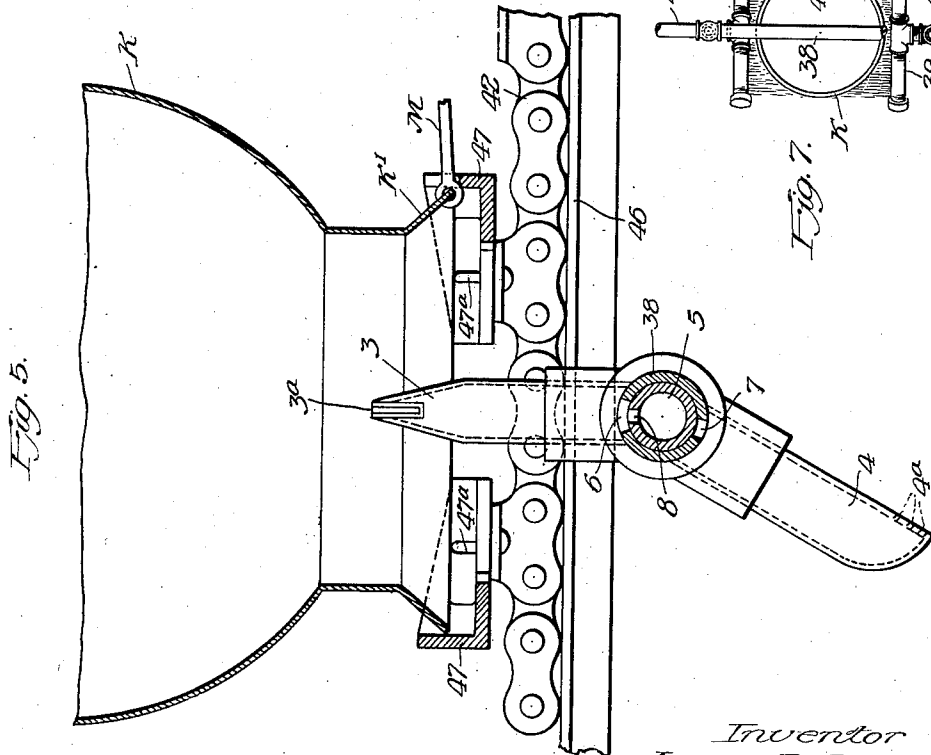
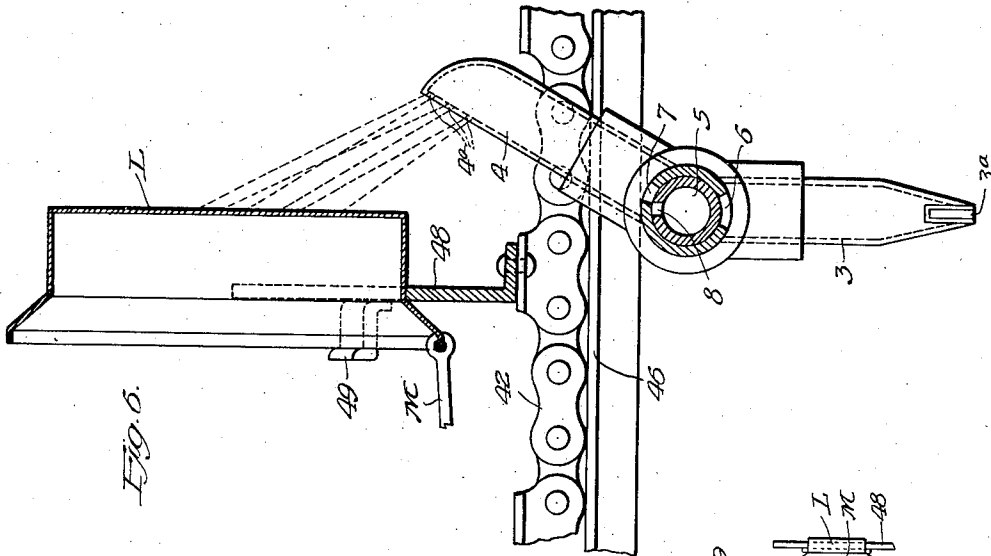
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CAN WASHING MACHINE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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CAN WASHING MACHINE

Application filed October 18, 1928. Serial No. 400,473.

This invention relates to an apparatus for use in washing receptacles, such as milk cans, and has for its primary object to provide an improved apparatus which, when the cans are presented to it in proper position, will take complete possession of the cans and pass them automatically through a series of successive zones of treatment without the requirement of attention on the part of the attendant, and including delivery of the cans, right end up, in position convenient for inspection and removal from the machine.

A further object of the invention is to provide an apparatus which will receive not only the cans to be cleansed but will receive, as well, and subject to cleansing treatment, the covers employed for closing the cans when in use; and particularly covers which are permanently linked to the cans.

In carrying out the invention according to its preferred embodiment, the cans are presented in inverted positions to an endless carrier which conveys them, preferably by continuous movement, through the successive zones of treatment, including a draining zone where any fluid commodity remaining in the cans is permitted to escape by gravity into a suitable receiver, in which it can be preserved if desired; a pre-rinsing zone in which the interiors of the cans are successively subjected to a copious spray of water which likewise drains out by gravity; an alkaline bath zone in which the cans are sprayed with an alkaline solution accompanied by draining; a second rinsing zone in which any remaining alkaline solution is washed out; a steaming zone in which the cans are thoroughly sterilized by hot steam; a first airing zone in which the cans are subjected to a blast of air that displaces aqueous vapor therefrom; a second airing zone in which the cans are subjected to a second blast of air which thoroughly dries the interior of the cans; and a discharging zone by which the cans are laid over upon an inverting device which delivers the cans, right end up, upon a table, conveyor, or other receiving surface. While passing through the machine, the covers of the cans are supported as if standing on edge, by means of racks located rearwardly from and

in alignment with the cans in the direction of travel, so that they receive treatment by the various functioning elements of the several zones and are in position to swing by gravity over the mouths of the cans as they are inverted in the step of final delivery.

An important feature of the present invention resides in the fact that in each of the more important zones of treatment, such as those in which the cans receive the alkaline bath, the second rinsing, steaming, and airing, the functions are duplicated, not only with the effect of making the treatment more thorough but insuring better distribution of impingement of the treating medium over interior and exterior surfaces of the cans and their covers, such, for instance, as may result from having a second nozzle of a single treating zone direct its discharge against the exterior of a can as the open end of the can approaches the first nozzle in the zone.

Another important feature of the invention consists in providing treating nozzles of two different types, alternately brought into action so that the rear side of the can as well as the cover will be treated, as will also the front side.

In the accompanying drawings, in which the preferred embodiment of the invention is shown by way of illustration—

Figures 1 and 2 are, respectively, a right side elevation and a top plan view (minus the cover of the spraying zones) showing the complete machine.

Figures 3 and 4 are elevational views on an enlarged scale of forward and rear halves of the left elevation of the machine; Figure 4 overlapping somewhat the disclosure of Figure 3.

Figures 5 and 6 are detail views on an enlarged scale showing, respectively, the action of the interior and exterior spraying nozzles; and

Figure 7 is a detail view in plan upon a smaller scale, of the means for spraying the sides of the cans.

A represents the draining zone, B the pre-rinsing zone, C the alkaline washing zone, D the second rising zone, E the steaming zone, F the first airing zone, G the second airing

zone or drier zone, H the delivery zone, K the cans to be washed, and L the covers of the cans which are supported in position to receive the same treatment as the cans as they pass through the several zones. Of these zones, those indicated at B, C, D, E, and F involve the use of suitable enclosures or housings B', C', D', E', and F', in order to confine the treating medium used therein. Of these several zones also, those represented at A, B, C, D, and E are provided with receiving receptacles A2, B2, C2, D2, and E2, into which the several media by which the can is treated in said zones are collected as they escape from the cans.

Pre-rinsing zone B is provided with a stationary water nozzle 1. The alkaline washing zone C is provided with rotary sprayers 2, 2a, each equipped with two nozzles 3 and 4 which, by the rotation of the sprayers, are successively brought into position to discharge fluid supplied by the central pipe 5 of the sprayer. This discharge is controlled by the ports 6 and 7 of the sprayers coming into and out of registry with the port 8 of the central pipe 5. Nozzle 3 has a delivery opening 3a, which is generally in the direction of the axis of the nozzle and restricted in the direction which lies in the plane of rotation, but spread to any desired degree in a direction perpendicular thereto. Nozzle 4 has its delivery opening 4a presented in the direction of rotation. The rotary sprayer thus constructed is constantly rotated, for instance through means of drive chains 9, and the result of the arrangement is that as a can approaches the sprayer, the nozzle 3 will be directed rearwardly at an angle toward the approaching can that first impinges the delivered stream against the exterior surface of the side of approach, then against the interior surface of the rear side of the can, and then after swinging across the entire interior surface of the can, including the interior surface of the forward and now receding wall of the can, the nozzle will reach an angle of declination that closes its port 6. But this is followed by the arrival of port 7 of the nozzle 4 into registry with the port 8 of the pipe 5, and the spraying of the now receding rear side of the can, followed by the spraying of the can cover.

The second rinsing nozzle D is likewise provided with rotary sprayers 2, 2a and nozzles 3 and 4 in all respects similar in construction and organization to the sprayers 2, 2a described in connection with zone C; and similar rotary sprayers 2, 2a are to be found in the steaming zone E. In the first and second airing zones F and G, rotary air nozzles 10a and 11a are employed.

The equipment for supplying the various treating media to the several zones will be best understood upon reference to Figures 1 and 2. 14 represents a branched alkaline

solution pipe leading to the respective alkaline sprayers 2, 2a from a pump 15 which is supplied by pipe 16 from the tank C2, so that alkaline solution maintained in said tank can be repeatedly pumped up to and sprayed into cans passing through the zone. 17 represents a branched water pipe leading to the respective second rinsing nozzles 2, 2a in zone D, from a pump 18 which may take its supply through pipe 19 leading from the tank E2 beneath the steaming zone E, where a supply of hot water will be maintained. 20 represents a branched steam pipe for supplying the two rotary steam sprayers 2, 2a in the zone E with steam supplied from some suitable source through the pipe 21; and 22 represents a branched hot air pipe delivering to the rotary air sprays 10 and 11, which carry to air nozzles 10a, 11a in the zones F and G, hot dry air supplied through pipe 23 from the rotary blower 24 which receives its air through pipe 25 leading from the drier and heater 26, in which temperature is kept up by steam entering through branch pipe 27.

Pumps 15 and 18 are shown driven by electric motor 28, and rotary blower 24 is indicated as being driven through a belt 29 leading from shaft 30 which is in turn driven through belt 31 from the shaft of motor 28. Shaft 30 serves the further function of driving, through manually shifted clutch 31a, reduction gearing 32 on the shaft 33 which drives, indirectly through chain 9a, the various chains 9 which rotate the rotary sprayers 2, 2a, 10 and 11; suitable sprockets, of course, being employed for timing the rotation of said sprayers to bring their controlling ports into registry with the ports of their supply pipes as the cans reach positions in which they are to receive the spraying media which the sprayers control. Shaft 33 serves the further function of driving, through means of the chain 34, the rotary inverting cradle 35 which is constantly rotating upon shaft 36, and includes in its organization, besides the rotary body 35, curved embracing arms 37 and neck-engaging members 37a, successively brought into position to receive cans arriving at the delivery end of the machine.

Each pair of opposed shoes 47 on the endless chain conveyor 42 vertically supports a can in inverted position by its open end and engages said open end in a manner to prevent displacement of the can relatively to its said conveyor, but in so doing the neck of the can is left unobstructed and not only ready to receive the neck-engaging members 37a of the inverting cradle 35, but positively presented by engagement of the said shoes in position which registers with said neck-engaging members as a consequence of the positively inter-connected drives of the conveyor and the inverter, adjacent portions of which are moving in opposite directions at the time of the transfer and are free from interfering

parts. An important characteristic of the inverting cradle is its continuous rotation through a complete circle, as distinguished from an oscillatory movement. A complete rotation, especially in an organization in which there is interengagement with the can of a nature that develops interlock against relative longitudinal displacement of the can during the crucial period of inversion together with an axial drive of the can during the period of deposit, is superior to a mere oscillatory movement where the can is received at one inversion of the cradle and permitted to slide out of the cradle when it attains another inversion. The complete rotational cradle is much simpler in construction and more effective in cooperation with the conveyor that brings the cans to it, and its superiority in functioning is still greater when the conveyor brings the cans to it through means which engage the open end of the can without obstructing its neck and under conditions which positively hold the can against displacement on the conveyor, including a hold against forward sliding movement at the end of tipping, while leaving it free to tip on the forward shoe of the pair.

38 represents side washing sprayers, one in the alkaline washing zone C and the other in the second rinsing zone D. As shown in Figure 7, each of these washers consists of a pair of perforated cross pipes 39 fed with washing fluid, either alkaline solution or pure water through pipe 40 or 41, as the case may be. Cross pipes 39 are in planes substantially parallel to the line of travel of the can and spaced apart to permit the upper portion of the can to travel between them. They are also inclined in their said planes in opposite directions from a horizontal plane.

In order to cause the cans to traverse the machine, an endless chain conveyor 42 is suitably mounted, for instance, through means of sprockets 43, 44, at the intake end of the machine; and suitable sprockets, such, for instance, as indicated at 45 (Figure 2) at the discharge end of the machine. The intermediate portions of this chain slide along tracks 46. These chains are provided at suitable intervals with confining shoes 47 which are designed to conform to the lip of the can so that the can stands upon its inverted end in said shoes and, when the chain is traversing a horizontal portion of its path, jointly provide a confining seat for the mouth K' of a can. These shoes, being upon separate and spaced flexibly united links, are capable of rounding the guide sheaves which define the path of the chain. When rounding that sheave which is adjacent the reversing cradle 35, the receptacle which these shoes form by reason of one shoe entering upon the descent around the sheave in advance of the other, produces a more gradual tipping effect upon the can since the trailing shoe will con-

tinue in its steady movement while the leading shoe is changing its course. These shoes are also provided with elevating ledges 47a upon which the edge of the mouth of a can rests in order to impose minimum resistance to the escape of cleansing fluid from the can.

Mounted on links adjacent to those links of the chain which carry the confining shoes 47 and spaced from the shoes 47 a distance approximating the length of the connector M which units the can cover to the can, are cover racks 48 recessed to receive a cover L edgewise in the rack, and provided with confining fingers 49 that engage the face of the cover and prevent the cover from tipping. Fingers 49 are so located that the cover L will be readily released from the rack 48 and said fingers when pulled upwardly through the connector M by the forward tipping of the can at the discharge end of the machine. As thus equipped, the endless chain 42 is adapted to receive and convey a can and its cover successively through the several zones of the machine.

I claim:

1. In a can washing machine, an endless carrier, means through which to mount a can upon said endless carrier comprising a pair of shoes formed to receive the mouth and occupying independent flexibly united links spaced apart in the direction of travel of the carrier and providing a seat adapted to engage the mouth of the can vertically and horizontally, and prevent the can from displacement while traveling with the chain.

2. In a machine as described in claim 1, lifting ledges carried by the shoes which form the seat for the can in position to receive the edge of the mouth of the can and leave the mouth of the can otherwise free from obstruction for outflow of fluid from the can.

3. In a machine as described in claim 1, a cover support also mounted on the carrier in alignment with the can in the direction of travel.

4. In a machine as described in claim 1, a cover support also mounted on the carrier in alignment with the can-receiving seat; said cover support comprising an upstanding rack recessed to receive the cover edgewise and having confining fingers in position to engage a face of the cover and prevent it from tipping.

5. In a machine as described in claim 1, an endless chain having a seat to receive and hold a can open end downward, and a rack constructed to receive and hold a can cover in upstanding edgewise position immediately in rear of the can; said cover rack being adapted to release the cover by an upward movement of the cover incident to the forward tipping of the can in leaving the machine.

6. In a can washing machine, in combination, a conveyor chain, a seat constructed to receive and support a can with its open end

downward, a can resting in said seat, a cover linked to said can, and a cover rack located in rear of the can seat on the chain a distance within the length of the link which joins the can and cover together, and constructed to
6 release said cover by an upward movement imparted by tipping motion of the can through the link to the cover.

7. In a can washing machine including a
10 carrier for causing cans to move through the machine, an inverting cradle comprising a member rotating in complete circles and upon which cans are laid sidewise by the carrier; said cradle having embracing arms which
15 receive and confine the can against lateral displacement thereon, and means which engage the neck of the can to keep the can from slipping endwise thereon.

8. In a can washing machine including a
20 carrier for causing cans to move through the machine, and an inverting cradle which receives cans sidewise from said carrier, pairs of shoes aligned on the carrier in the direction of travel constructed to vertically support
25 cans by their open ends while the cans are in upright position and to engage each can by its said open end against displacement on the carrier; said shoes leaving the necks of the cans unobstructed; and means on the in-
30 verting cradle embracing the can laterally and interengaging with it longitudinally at its neck; said cradle having means for positively rotating it in complete circles in timed relation to the carrier and with its neck-engaging
35 means presented to the necks of the cans while the shoes on the carrier are restraining the ends of the cans adjacent to said necks.

Signed at Lincoln, Nebraska, this 14th day of October, 1929.

J. R. ROBERTS.