April 29, 1924. 1,491,971

E. W. RICKARD

CAN DRAINING MACHINE

Filed June 7, 1923 2 Sheets-Sheet 1

Fig. 1.

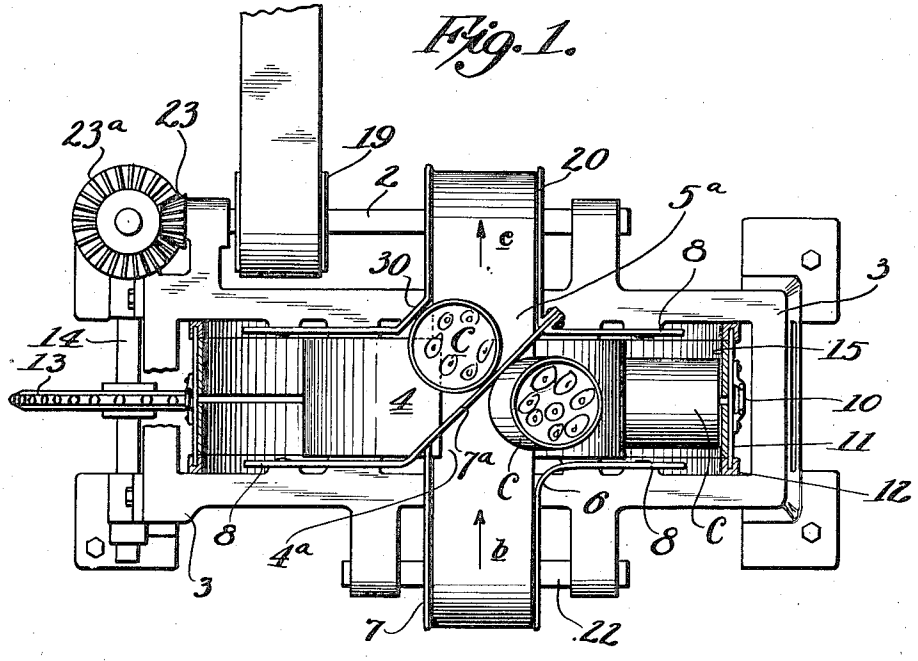
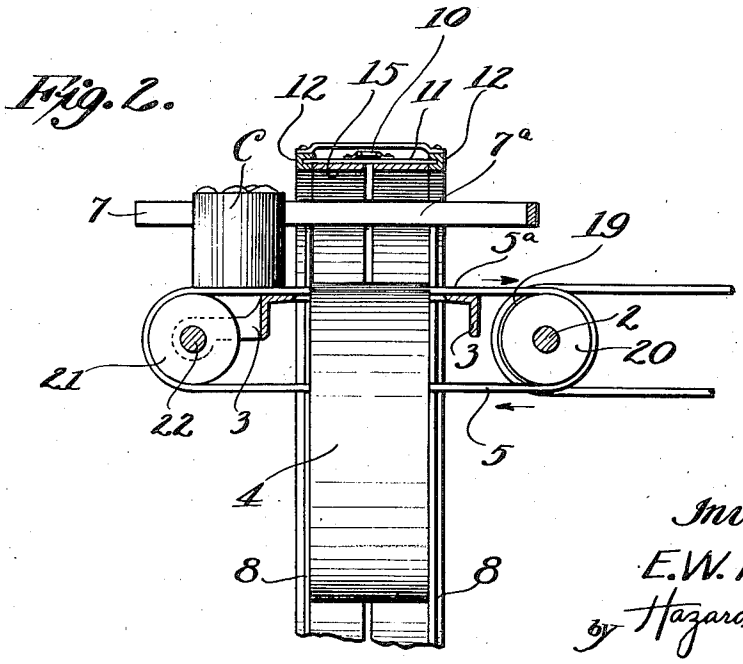



Fig. 2.




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Fig. 5.

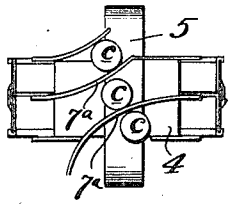
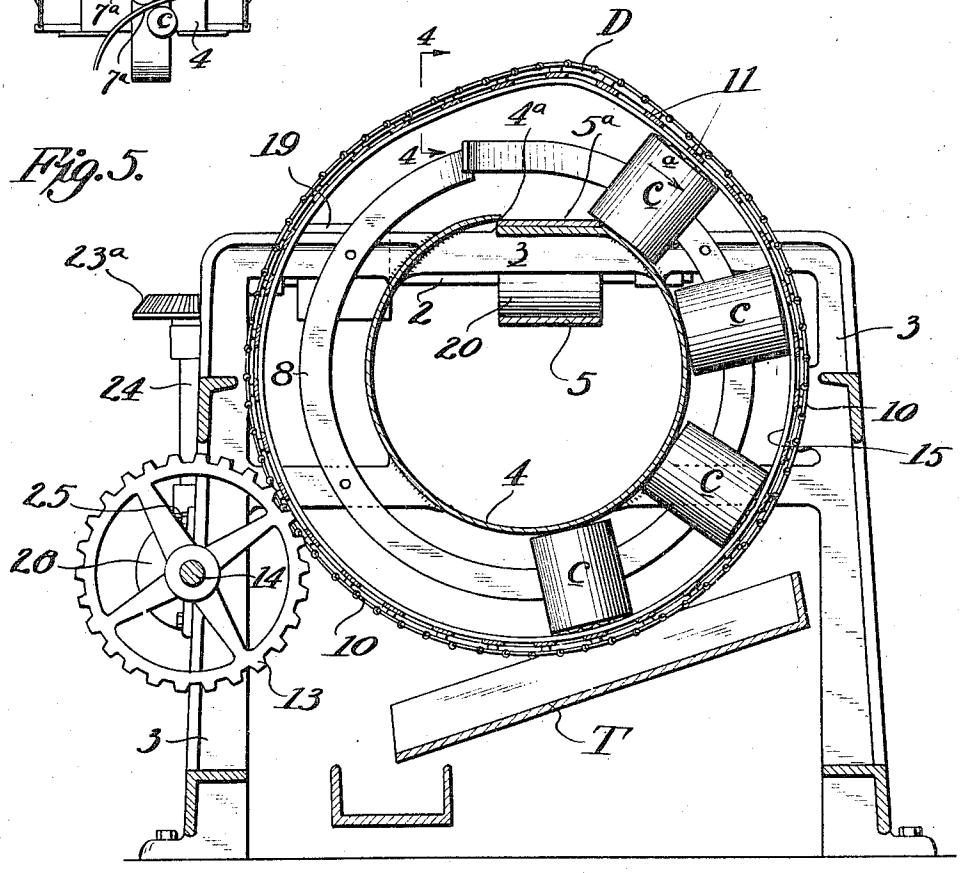



Fig. 3.



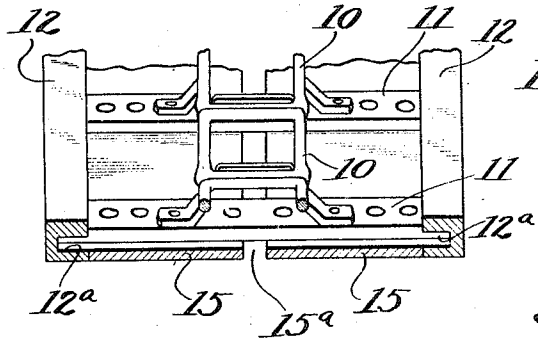




Fig. 4.

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Patented Apr. 29, 1924. 1,491,971

# UNITED STATES PATENT OFFICE.

ERNEST W. RICKARD, OF HEMET, CALIFORNIA.

## CAN-DRAINING MACHINE.

Application filed June 7, 1923. Serial No. 643,936.

*To all whom it may concern:*

Be it known that I, ERNEST W. RICKARD, a citizen of the United States, residing at Hemet, in the county of Riverside and State of California, have invented new and useful Improvements in Can-Draining Machines, of which the following is a specification.

This invention relates to canning machines.

In current systems of packing fruits and vegetables of certain kinds, the stock is, in many cases, subjected to a washing step and is picked from the bath of water more or less rapidly and deposited in open top cans. Incident to the washing and the transfer of the washed stock to the cans, naturally a small percentage of water is carried over, and this drains to the bottom of the can and, in the best practice, is removed from a can before the syrup is added. It has been the custom to place a number of the filled cans, immediately following the washing, in a box or tray, and to put a screen over the box or tray and then invert the loaded tray for a sufficient period of time to enable the undesirable water to be drained from the cans and material. While this may be a simple method, it is expensive and requires the labor of two or three operatives, and is slow, besides requiring the provision of a number of trays to be used in rotation, and requiring other equipment such as a draining bench or table, etc.

It has been proposed to obtain this desired de-watering by more or less automatic machines introduced at the proper position in the apparatus system of a cannery, but a serious objection to the machines having this object in view is that they employ some kind of a timing device which not only interrupts the rate of travel of the cans through the plant system from step to step, but also frequently results in the jamming of the apparatus. Can feeding means employing timing devices also usually require a momentary stopping of the travel of the cans because of the co-action necessary in the co-operating, carrying and timing mechanisms.

An important object of the present invention is to provide a can draining machine which is wholly free of any timing mechanism whatsoever, so that cans can be progressively fed into the machine irrespective of their spaced position and time of presentation to the draining machine, an object of the invention being to provide a machine which is capable of receiving, carrying around, inverting and thus draining the cans, and restoring them to an upright position to be continued to the next station in the system.

Another important object of the present invention is to provide a machine of extreme simplicity and having parts all of which are of rugged construction and therefore of great durability with practically no elements that are liable to be rendered inoperative, or to quickly get out of order. An object is to provide a machine having no can spacer, no can chucks, and no springs to stick or to get out of order, or to jam the cans, and no conveying lugs or chain lugs. An important object is to provide a machine which is not only without timing and spacing means, but which is designed to at any moment receive a single can, or to receive a number of cans either in close successive order, or in indeterminately spaced order in line of feed, and to provide a machine which will operate to carry one can or the maximum for which it may be designed.

In machines utilizing timing mechanisms determining the actual entry of the cans into the draining machine, the cans, of necessity, pause in their passage into and from the timing mechanism, with the result that the cans may tip or be turned over with the result that the contents are spilled. An object in my invention is to entirely eliminate any possibility of the open cans being tipped or turned over while out of control, and therefore, an object is to provide means for constantly having the cans under such control that they cannot be turned over from the time that they are received by the simple feeding means (not employing a timing means) to the time that they are ultimately passed onto a discharge means (not including a timing means).

A further object is to provide a machine whose capacity may be readily increased, and it is an object to provide a machine which is not only of extremely simple form and of very low cost in manufacture and up-keep and operation, but also to provide a machine

which is wholly free of any adjustments and which will run continuously until actually wearing to inoperative condition.

Another object is to provide a machine capable of readily running cans of different capacities, if they are of uniform height, without adjustment.

Also, an object is to provide a machine which is designed to receive cans which may be loaded to such an extent that the stock will extend above the can mouth and which machine will enable the loaded can with the projecting stock to pass into the machine into operative position without slicing or throwing out of the can projecting material.

Other objects and advantages will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, wherein—

Figure 1 is a top plan and horizontal section of the machine.

Fig. 2 is a central, vertical section and partial elevation of the upper portion of the machine.

Fig. 3 is a vertical, longitudinal, central section of the machine.

Fig. 4 is a section on line 4—4 of Figure 3, showing in detail the can transporting belt.

Fig. 5 is a diagrammatic plan showing the machine as adapted for a plurality of rows of cans in one cycle.

The present machine involves any suitable and substantial frame, parts of which are designated at 3, and rigidly secured to or formed as an integral part of the frame or one of the frame elements is a stationary, substantially circular track part 4, having, preferably, a smooth peripheral face, and which forms an inner, circular, immovable base upon which may be positioned, and around which there will readily slide, the bottoms of containers such, for instance, as cans C, which, by the present machine, are to be advanced around an orbit as in an unobstructed passageway around the track 4, so that the liquid contents of the cans C may drain readily therefrom from the hard fruit or other pieces which the cans may contain.

A broad object of my present invention is to provide a machine of utmost simplicity and of as few moving parts as may be practicable in an efficient machine. I have constructed and used a machine having stationary track or base of circular form, and have run the machine so that the cans bearing against the periphery of the base are successfully slid around and, in the interim, inverted so that the liquid is drained from the firm or solid pieces in the container.

At a suitable position, with respect to the central, substantially circular, fixed track 4 there is provided, in the present case, at the upper portion, a transversely arranged, endless feed and unloading device 5, consisting of a flexible belt chain, or the equivalent, presenting a substantially horizontal and transversely arranged, upper, effective, transferring stretch $5^a$, which preferably is disposed in a gap $4^a$ forming an interruption in the otherwise continuous, circular stationary track 4. As clearly shown in Figure 2, one end of the track 4 slightly overhangs or is spaced above the transferring belt part $5^a$, and the opposite edge of this belt part is disposed above the contiguous end of the fixed track 4, so that loaded cans C, coming from any source to the transferring member 5, can be readily guided off of the top of the transfer member onto the uppermost portion of the track 4, as shown in Figure 3, and thus bringing the cans into position between fixed guide rails 6 and 7, the latter of which has an oblique portion $7^a$ directed inwardly and diagonally across and above the top of the transferring belt 5.

The oncoming cans are, in any order of position, singly or in groups, or in rows in which the cans are positioned haphazardly, advanced by the transfer device 5, without any timing mechanism, onto the upper portion, in the present case, of the track 4. The diagonal portion $7^a$ of the rail obviously prevents the inwardly feeding cans from shifting straight across the top of the machine, and the cans coming onto the face of the track are directed so as to shift from the transfer device 5 with a diagonal movement onto the track 4.

The cans are loosely confined between circular guides in the form of flat rings 8, which are so positioned as to lie at about the central portions of the cans between the tops and bottoms thereof. The cans passing onto the circular face of the fixed track are adapted to be transported around on the track in a substantially radial position, and an important object of this invention is to provide a machine in which there is an entirely clear or unobstructed, circumferential space about the track 4 excepting merely for the diagonal guide $7^a$, which leads the oncoming cans onto the track and also has the function of diverting the cans from the track as soon as the circuit around the track has been finished.

To that end, I provide means to engage the open ends of the cans and substantially hold the cans in their orbit and to carry the cans around their orbit about the circular track, and while their bases are held against the face of the track. Such means consists of an extremely novel, flexible, endless device which may be regarded as a gear. This gear device is, in its preferred form, constructed as an endless sprocket chain 10, and has transverse bars 11, of any desired width, and the ends of which are supported in suitable guides 12, which are shown as having inwardly opposed, recessed or channel por-

tions 12ª, receiving the ends of the bars 11 and not only forming the supports for the bars, but which channels form a stationary means in which the flexible sprocket gear 10 is caused to rotate in a circle which is substantially concentric to the fixed track 4, which latter is preferably formed as a part of the frame of the machine, as above stated.

The endless, flexible sprocket gear 10 is shown as engaging a simple sprocket driver or pinion 13, fastened on a countershaft 14, journaled on the frame 3, and which is clearly shown in Figure 3 as meshing with the link teeth of the flexible sprocket gear 10, and therefore forming the means by which this flexible sprocket wheel is driven in an orbit which is spaced from the face of the fixed track a distance about equal to the height of a given size can.

An important feature of the invention is that there are provided no lugs, chairs, or other spacing carriers, and the transferring belt 5, which feeds the cans into and carries them from the machine, and the endless, traveling, flexible gear device 10, may, and preferably do, travel at materially different rates of speed, this being possible because of the entire absence of spacing and timing means.

To the sprocket chain gear 10, there is secured means designed to engage the open tops of the cans C as they successively or at random, singly enter the can space around the track 4, and serves as means for holding the can bottoms or bases against the track 4. This holding means is preferably of a flexible character, as is the endless sprocket gear 10, for the reason that it is desirable to provide at a portion of the gear orbit, a deflected part so that when the can comes into position between the track and the endless gear, the upwardly protruding can contents or stock S may pass in under the encompassing, flexible gear device without being cut off or scraped out of the can, due to its lateral, entering movement into the can space about the track 4.

The can holding means is shown as including a flexible lining, which may be of spaced belts, 15, of any suitable material, attached to the inner faces of the gear bars 11, as clearly shown in Figure 4. These flexible belts, therefore, are rigidly attached to the endless gear device 10 and travel with the same in the orbit which is defined by the channel guides which are fixedly secured to the frame 3. It will thus be seen that when the cans enter the can space at the feeding station, the bases of the cans will rest on the fixed track 4 and the top ends of the cans will be engaged by the retaining belts 15, which are rotatively driven in unison at the desired rate of speed by their gear part 10.

As shown in Figure 2, that portion of each of the guides 12 which is at the entering station for the cans, is outwardly deflected at D so as to provide for the ready entry of a can from which the contents may project, as shown, without the contents being scraped off. As soon as the can is fully presented at the loading station, between the track 4 and the belt device 15, the can then starts its downward movement, as indicated in Figure 3 by the arrow *a*, and is held from slipping between the track 4 and the transporting belt or belts 15.

In operation of the machine, the water which has collected in the bottom of the cans will naturally gravitate to the lowermost side of each can as it runs through its vertical orbit, and as soon as the lowermost side portion of each radially disposed can passes below the axis of the orbit, the liquid will drain down and out of the can and will readily flow out between the belts 15, which, to facilitate the discharge of the liquid, are shown as spaced at 15ª at their adjacent edges. Therefore, the liquid will run readily through the peripheral discharge aperture 15ª and be collected in and conveyed away by suitable discharge trough T.

A form of drive includes a main shaft 2, shown as arranged along one side of the machine, and having a pulley wheel 19 driven from any suitable source of power. The shaft 2 is provided with a pulley 20, around which runs the transfer belt 5, which, passing across the machine, runs around a pulley 21 at the entrance side of the frame, and being mounted on a shaft 22, the shafts 2 and 22 being suitably journaled in bearings provided on the frame 3.

Secured to one end of the main shaft 2 is a bevel gear 23, engaging a companion gear 23ª, secured on the upper end of a vertical shaft 24, the lower end of which is provided with a bevel gear 25, engaging a companion gear 26, which is secured on a countershaft 14, journaled transversely across one end of the frame and carrying a sprocket wheel 13 which meshes with the endless chain gear 10 and which is thereby driven through its orbit.

It will be seen that the cross belt 5 forms the sole means for introducing the cans into the can space around the fixed circular track, and also serves the sole means for receiving the cans as they are brought around and to the top of the machine and carrying them out from the can chamber.

It is obvious that the cans can be advanced to the transfer belt 5 in any suitable manner, manually or mechanically, and they will be carried into and out of the machine by the continuous rotation of the belt 5, which has its upper stretch 5ª exposed in the gap or space at the upper portion of the track 4. Cans are carried into the machine from one side of the frame, as shown by the

arrow *b*, Figure 1, and are later received by the belt part 5ª and carried outwardly, as indicated by the arrow *c*.

The guide rails 6 and 7 are positioned so as to engage the cans at about their central portion, and thus do not have any tipping tendency; and the discharge rail 30 is similarly located so as to engage the cans without a tipping tendency.

The flexible, transporting belt device or flexible gear (as it may be termed) and the transverse transporting belt, may be, and preferably are, run at different speeds, the latter traveling the faster, and it is understood that the endless can covering and carrying device 10 may be built up in various ways, and that the present construction is but illustrative of but one practical form.

I have demonstrated, by actual construction and operation of this machine, its practical use in canning operations. The machine can be installed at any desired point in a train of machines or apparatus in a canning plant, and an important feature is that the machine can be installed at any desired point and will operate on cans coming in untimed and indifferent relation but upright positions to the machine, which is capable of receiving the cans in any order and will carry the cans in indeterminately spaced positions without being in direct engagement with each other, and without requiring any spacing, timing or positioning mechanisms or parts at any portion of the machine.

The machine can be run at any given rate of speed, and will receive, invert and discharge the cans without in any wise mutilating them and jamming up the train, and effectively draining the liquid from the contents of the cans.

It will be seen that there is no direct connection between the transporting belt means and the concentric track 4, between which there is formed the unobstructed, circular, can orbital chamber.

It is obvious that cans of different diameters may be successfully run into the machine practically without adjustment of the same, so long as the cans are of uniform height; it being well known that cans of different capacities and having a uniform height are generally in use.

The capacity (number of cans per minute) of the machine may be increased to any desired extent without shortening the duration of the draining period, by utilizing a circular can track 4 and endless belt means of a width sufficient to receive any number of cans in side-by-side position across the face of the pulley, and in such case, the guide rail 8 will be formed substantially as a helix, as indicated in Figure 5, so that there can be two rows or more of cans across the face of the track.

In the illustrated machine, it has a capacity of about twelve cans in a single row at one time, and this can obviously be doubled, without changing the speed of the machine, by utilizing a track of a width to receive two rows of cans, thus making its capacity twenty-four per revolution.

Further embodiments, modifications and variations may be resorted to within the principle of the invention.

What is claimed is:

1. A machine for draining containers by moving the containers through an orbit in which the containers will be inverted, said machine comprising means for moving the containers through an orbit in which the containers are inverted, and means for feeding the containers to, and leading the containers from, the inverting means, said inverting means being deflected at the point of exit and entry of the containers from the orbital path of the containers whereby the operation of the inverting means is dependent only on the presentation of a container by the container feeder and not on the time of feeding the containers or the spacing of the containers, the feeding and discharging means operating transversely to the line of movement to the inverting means at the deflected portion of the latter.

2. A machine for draining containers by moving the containers through an orbit, said machine comprising rotatable means for moving the containers through an orbit in which the containers are inverted, and means for feeding the containers to and leading the containers from the inverting means, said inverting means being deflected at the point of exit and entry of the containers from the orbital path of the containers whereby the operation of the inverting means is dependent only on the presentation of a container by the container feeder and not on the time of feeding the containers or the spacing of the containers, the feeding and discharging means operating transversely to the line of movement to the inverting means at the deflected portion of the latter.

3. In a machine for draining containers, a central, fixed track onto the periphery of which the containers are adapted to be positioned, means for guiding the containers to and from the face of the track, and a rotary, substantially circular device concentrically spaced about the face of said track and adapted to engage the outer ends of the containers positioned on the track and carry the same around.

4. In a machine for draining containers, a central, fixed track onto the periphery of which the containers are adapted to be positioned, means for guiding the containers to and from the face of the track, and a rotary, substantially circular device concen-

trically spaced about the face of said track and adapted to engage the outer ends of the containers positioned on the track and carry the same around, said device being without direct connection with the track.

5. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt.

6. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container encompassing belt which is adapted to be driven in an orbit about its own center.

7. In a machine for draining containers, a stationary, substantially circular track to engage the inner end of the radially disposed container, a substantially circular device spaced about said track and operative to engage the outer end of the radially disposed container on said track, and an endless means for introducing cans into and removing the same from the space between the track and said device.

8. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and which is mounted independently of the inner supporting means.

9. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and which is driven independently of the inner supporting means.

10. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular, device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and which is adapted to engage and cooperate with a driving means.

11. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and means for defining orbital movement for the said belt.

12. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and means for defining orbital movement for the said belt, said means forming the support for the said belt.

13. In a machine for draining containers, a means to engage the inner end of a radially disposed container, and a substantially circular device adapted to close the outer, open end of the radially disposed container positioned on the inner means, said device consisting of a substantially circular, container-encompassing belt, and means for defining orbital movement for the said belt, said means forming the support for the said belt, and which has a portion deflected to provide a deflection in the orbit of the belt at the loading station of the machine to permit the entry of loaded containers without dislodging or separating upwardly projecting portions of solids in the container.

14. In a machine for draining containers, a substantially circular device adapted to close the outer, open end of a container disposed in a substantially radial position as to the center of a path in which it moves, said device consisting of an endless conveyor including spaced, substantially parallel, belt-like members, whereby the liquid draining from the container in its inverted position may pass therefrom through the space between the belt-like members.

In testimony whereof I have signed my name to this specification.

ERNEST W. RICKARD.