

Aug. 23, 1938.

I. H. RISSE

2,128,192

CONTAINER LOADING APPARATUS

Filed May 3, 1937

2 Sheets-Sheet 1

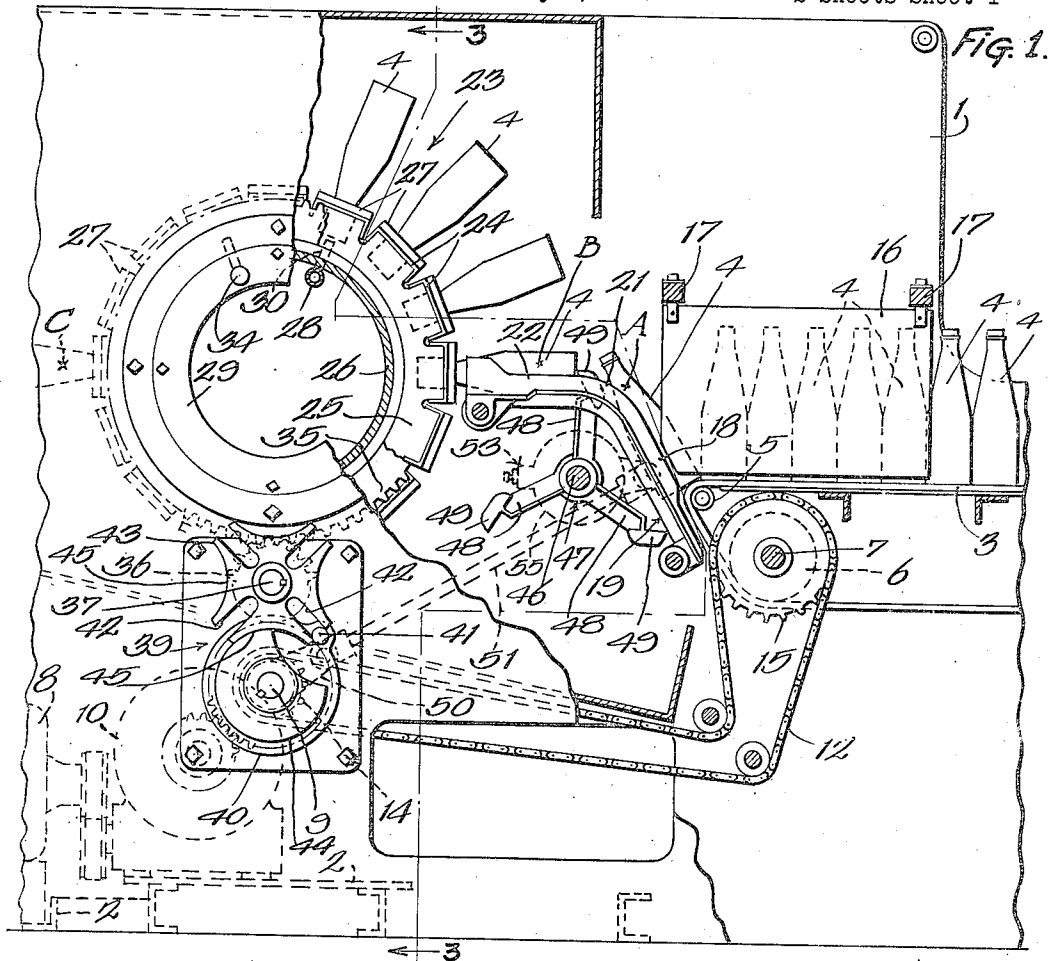


Fig. 1.

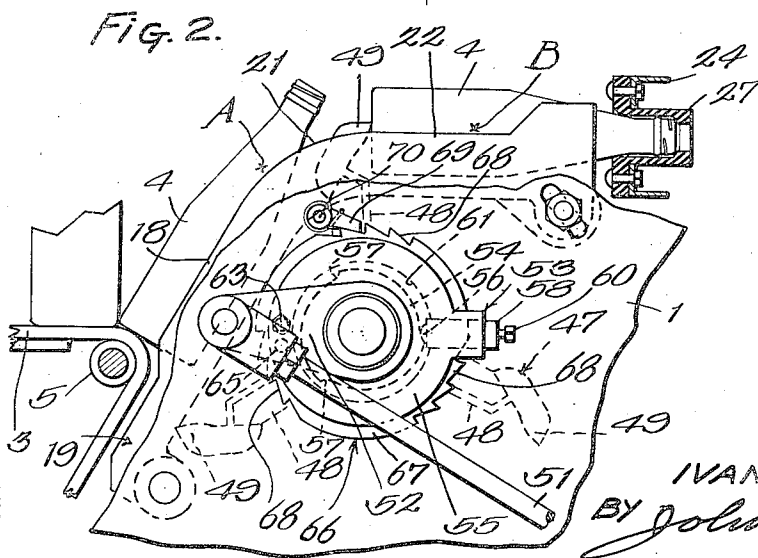


Fig. 2.

INVENTOR:

IVAN H. RISSE

BY John H. Nelson

ATTY.

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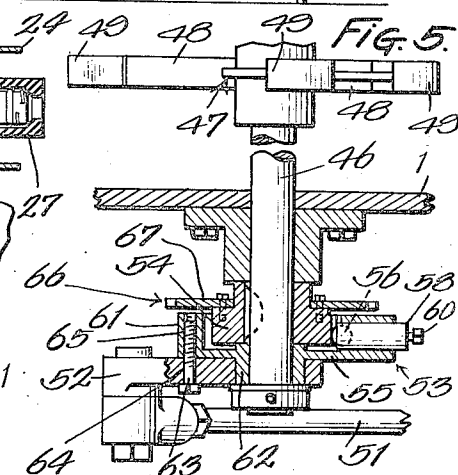
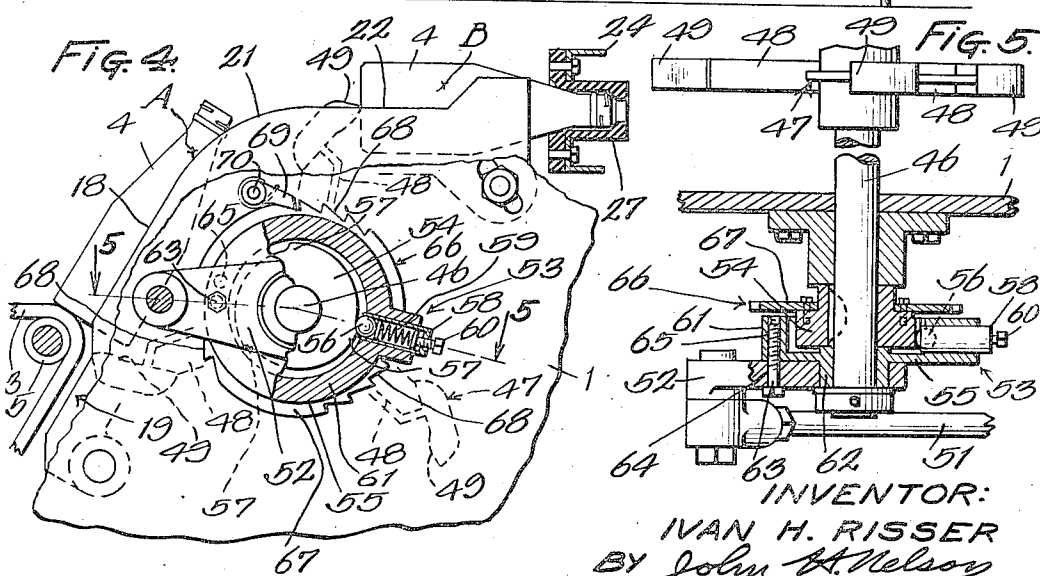
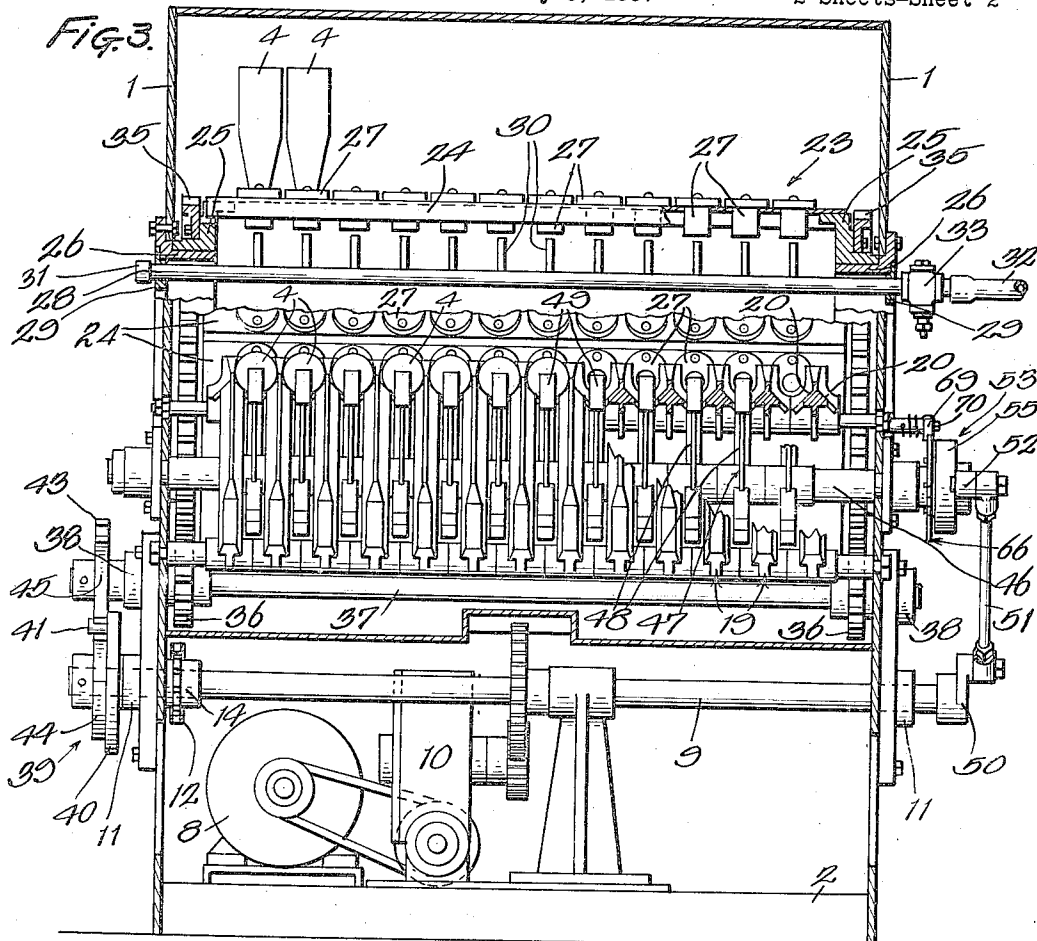
I. H. RISSER

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2 Sheets-Sheet 2



INVENTOR:
IVAN H. RISSE
BY *John H. Nelson*
ATTY

UNITED STATES PATENT OFFICE

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CONTAINER LOADING APPARATUS

Ivan H. Risser, Chicago, Ill., assignor to U. S. Bottlers Machinery Company, Chicago, Ill., a corporation of Illinois

Application May 3, 1937, Serial No. 140,281

4 Claims. (Cl. 198—25)

This invention relates to apparatus for loading or feeding containers onto a conveyor to be given a predetermined treatment, and more particularly pertains to such apparatus in connection with container cleaning machines.

One object of the invention is to provide such apparatus of the simplest construction that will positively transfer containers, such as bottles, from a conveyor, upon which they are conveyed in upright position into the machine, to bottle receiving pockets of an endless intermittently advanced conveyor for conveying the bottles from a loading station in reclining position to the cleaning means of the machine in inverted position, so that the bottles will be positively positioned in the pockets.

Another object is to provide such apparatus, as outlined, that will also serve to prevent endwise movement of the bottles in the pockets until they have been moved therewith from the loading station into an inverted position, to prevent dislodgment of the bottles from the pockets.

Another object is to provide such apparatus capable of being definitely adjusted to handle bottles of various predetermined or standard sizes, so that the adjustment of the apparatus can be quickly made to expedite the output of the machine.

Other objects and advantages will become apparent by reference to the specification and the accompanying drawings, in which:

Fig. 1 is a side elevation of a portion of a container cleaning machine incorporating feeding means embodying the invention, with parts broken away and other parts shown in section.

Fig. 2 is an enlarged detail view of the feeding means as viewed from the side of the machine opposite that seen in Fig. 1, with parts broken away and other parts shown in section.

Fig. 3 is a vertical section of the machine, as taken substantially on the section line 3—3 of Fig. 1, with parts broken away and other parts being omitted.

Fig. 4 is a view similar to Fig. 2, with parts of the feeding means adjusted to handle bottles of smaller size than those shown in Fig. 2.

Fig. 5 is a detail plan section of Fig. 4, with parts broken away and other parts omitted.

The machine illustrated includes a frame comprising interconnected side-frame members 1, such as upright plates, suitably mounted on a base framework 2.

Disposed therefrom, is an endless bottle-supplying conveyor 3, in the form of a horizontal belt,

upon whose upper stretch the bottles 4 are placed by hand, or other means, in an upright position, and then conveyed into the machine from right to left, as seen in Fig. 1. The belt 3 is supported at its inner discharge end upon a small idler pulley 5, suitably mounted in bearings in the side frames, from which pulley the belt continues downward into its lower stretch over a large drive pulley 6 secured on a shaft 7 which is suitably mounted in bearings in the side frames. The drive pulley 6 is driven by an electric motor 8 mounted on the base frame and being in driving connection with the pulley through intermediate of a power shaft 9 which is driven by the motor through a speed reducer 10. The power shaft 9 is mounted in bearings 11 in the side frames, and is connected with the drive pulley to drive same through an endless sprocket chain 12 which is trained over sprockets 14 and 15 secured on the power shaft and pulley shaft 7 respectively. Although the outer end of the belt 3 is not shown, it will be evident that said end is suitably supported on idler means.

As the bottles are conveyed on the belt 3 to its discharge end, they are caused to pass between equally spaced guides 16, in the form of upright plates, which direct the bottles in laterally spaced rows to a transfer station A at the discharge end of the belt. The guide plates 16 are mounted on, so as to depend from, a number of transverse support bars 17 mounted on the side frames.

At the transfer station A, the bottles are caused to tilt against upwardly inclined guide portions 18 of laterally spaced guides 19, with the bottoms of the bottles partly extending beyond the discharge end of the belt so as to be engageable thereunder.

The guides 19 have tapered sides 20 to form open-bottom troughs therebetween within which the bottles are guided. The guides 19 continue upward from their portions 18 into curved portions 21 which in turn continue into horizontal portions 22 for cooperating to support the bottles in reclining position at the loading station B of bottle-inverting conveyor 23, to which loading station the bottles are transferred from the transfer station by the feeding means of the invention later described.

The bottle-inverting conveyor is in the form of a drum and comprises a series of circularly arranged transverse cleats 24 mounted at their ends upon rings 25 which are rotatably mounted upon centrally open bearings 26 of ring formation which are secured in the side frames 1, with the said bearings being located so that the axis of

the conveyor will be in the horizontal plane of the axes of the bottles at the loading station B.

Each cleat **24** is provided with a row of bottle holders or bottle-neck-receiving pockets **27** in the form of tubular sections of resilient material, such as semi-resilient rubber, for supporting the bottles in inverted position about the upper portion of the conveyor **23**, with the pockets being spaced so as to be capable of receiving the bottles at the loading station.

The conveyor **23** is intermittently driven in counter-clockwise direction, as seen in Fig. 1, so that the transverse rows of pockets **27** are intermittently advanced to register with the bottles at the loading station to receive same, with the feeding means of the invention being so arranged and timed to positively position the bottles in the pockets.

Upon being fed to the conveyor **23**, the bottles are advanced thereon into an inverted position over a cleaning head **28** which directs jets of a fluid cleaning medium under pressure, such as water, into the bottles while the conveyor is at rest. The cleaning head **28** is in the form of a pipe extending through the central openings of the bearings **26** upon which are secured, respectively, rings **29** for supporting the pipe, with the pipe having upwardly extending nozzles **30** for directing the jets of water into the bottles. One end of the pipe **28** is closed by a suitable cap **31**, with the other end being connected to a suitable water-supplying conduit **32**. A valve may be included in the receiving end of the pipe **28**, such as that indicated at **33** in Fig. 3, which may be automatically operated in any suitable manner to intermittently shut off the supply of water to the pipe in accordance with the intermittent movement of the conveyor **23**.

Upon being advanced a step beyond the cleaner head **28**, the bottles are caused to drain, then on the next movement of the conveyor **23** the bottles are brought over an air cleaner head **34**, similar to the head **28**, which directs jets of air under pressure into the bottles to dry same before they are removed from the conveyor. The bottles are then advanced on the conveyor **23** until they assume a reclining position at a discharging station C, from which station they may be removed from the conveyor by hand or any suitable automatic means.

For driving the conveyor **23**, each cleat-supporting ring **25** thereof is provided with a ring-shaped gear **35** which meshes with a considerably smaller gear **36** secured on a shaft **37** located directly below the conveyor **23** and being rotatably mounted in bearings **38** in the side frames **1**. The shaft **37** is intermittently driven, to advance the conveyor **23** step by step, by the power shaft **9** located therebelow and being operably connected therewith through intermediation of a suitable common Geneva motion connection **39**. The said connection includes a crank disc **40** secured on one end of the power shaft and having a crank pin **41** which, during a quarter of each revolution of the power shaft, is caused to enter and have sliding engagement with one of four radial slots **42** in the arms respectively of a star-shaped wheel **43** secured on the shaft **37**, which, during said engagement, is advanced a quarter of a turn. The wheel **43** is positively held after each advance thereof by the crank disc **40** having a segmental cam-dwell formation **44** for cooperative engagement successively within peripheral recesses or concavities **45** in the wheel **43**. The gears **35** and **36** are so proportioned that upon each quarter

turn of the shaft **37**, the conveyor **23** will be rotated an amount in accordance with the spacing of its transverse rows of pockets **27**.

The feeding or transfer means of the invention will now be described. Said means includes an intermittently driven shaft **46** disposed transversely under the guides **19**, and having secured thereon a series of bottle-transporting star wheels **47** which are spaced in accordance with the spacing of the said guides and being arranged so as to be capable of passing therebetween respectively. Each star wheel **47** has a number of equally spaced radially extending arms **48** with bottle-engaging end portions **49**, and the shaft **46** being so situated that upon each movement thereof, an end portion **49** will engage under a bottle at the station A and elevate same along the guides at either side thereof to the loading station B and into a pocket of the conveyor **23**. The end portions of the arms **48** are so arranged that, upon transfer of the bottles from the station A into the pockets of the conveyor **23**, they provide temporary stops for confining the bottles in the pockets until they have been elevated on the conveyor **23** and inverted thereon sufficiently to enable their being retained in the pockets by force of gravity.

Although the star wheels may be provided with any number of arms, depending upon the arrangement of the parts with which they cooperate, in the particular construction shown the wheels are provided with three arms, which arms are so arranged on the shaft that one will be providing a temporary stop for a bottle at the station B with the end portion of the succeeding arm being in position to engage the bottom of a bottle at the station A.

The star wheels **47** are operated so that their arms are intermittently advanced from the station A to the station B in a counter-clockwise direction as seen in Fig. 1, by the shaft **46**, upon which the wheels are secured, being in driven connection with the power shaft **9**. To this end, the power shaft has a crank **50** at one end which is connected by means of a connecting link **51** to one end of a lever **52** loosely fulcrumed on the shaft **46**, with the crank and lever being so proportioned that upon each revolution of the power shaft the lever is oscillated slightly more than one hundred and twenty degrees. Connected between the lever **52** and the star wheel shaft **46** is an adjustable ratchet device **53** which is arranged to cause proper advancement of the arms of the star wheels upon movement of the lever in one direction, as seen in Figs. 2, 4 and 5.

The said ratchet device includes a ratchet or ratchet wheel **54** which is keyed on the shaft **46**, and loosely mounted on the shaft **46** and adjustably connected with the lever **52** is a detent carrier **55** having a spring-pressed detent **56** for engaging one of three teeth **57** of the ratchet wheel to rotate the shaft with the lever as same is moved in the same direction as that required of the star wheels to feed the bottles to the conveyor **23**. The detent comprises a ball received within one end of a spring-retaining tube **58** mounted on the carrier, and within the tube is a spring **59** interposed between the ball and a stop **60** at the other end of the tube for urging the ball into engagement with the ratchet. The detent carrier is in the form of a wheel with a peripheral flange **61** surrounding the ratchet wheel **54**, with the detent supporting tube **58** being supported in a radial bore in the flange. The carrier wheel also has a hub **62** upon which the

lever 52 is loosely mounted, with the lever being connected to said wheel by means of an adjustable connection comprising a bolt 63 passing through an aperture 64 in the lever and adapted to be received within one of a plurality of threaded apertures 65 in the flange 61 of the carrier wheel 55, for regulating the position of the detent with respect to the lever in accordance with the size of the bottles to be handled. To this end, the apertures 65 in the carrier wheel are so spaced as to permit the proper angular adjustment of the wheel with respect to the lever to advance or retract the stopping position of the star-wheel arms, particularly at the station B, in accordance with the various standard bottles to be handled.

Means is also provided for preventing movement of the star wheels 47 with the detent 56 upon the return stroke of the lever 52. To this end, a holding-ratchet device 66 is provided and is operably connected between the first mentioned ratchet device and the frame of the machine. The holding-ratchet device includes a holding ratch 67, in the form of a ratchet wheel, secured on one side of the ratchet wheel 54 and having a group of ratchet teeth 68 for every tooth of the latter wheel. The teeth of the ratchet wheel 67 are formed to engage a spring-pressed holding detent 69, in the form of a pawl pivoted on a side frame, as at 70, with the teeth being spaced in accordance with the spacing of the apertures 65 in the carrier 55 to prevent retraction of the star wheels upon the return stroke of the lever 52 at various positions of adjustment of the detent carrier with respect to the lever.

After proper adjustment of the lever 52 with respect to the detent carrier 55 has been made, as herein described, in determining the stopping position of the arms of the star wheels 47 at the station B of the conveyor 23, in accordance with the length of the bottles to be handled, the general operation of the machine will be as follows.

The bottles to be cleaned are placed in an upright position upon the continuously moving conveyor 3, and are conveyed thereon to the discharge end of the conveyor where they are separated into laterally spaced rows by the guides 16, with the leading bottles of the rows coming to rest temporarily in a tilted position against the inclined guide portions 18 of the guides 19, as at the station A. Upon reaching said station, the leading bottles of the rows are engaged at their bottoms by the intermittently driven star wheels 47 and are elevated thereby along the guides 19 into a horizontal position, as at the station B, with the necks of the bottles positively positioned in a transverse row of pockets 27 of the intermittently driven conveyor 23. After being positioned in the pockets, the bottles are elevated on the conveyor 23 step by step in an inverted position over the cleaner heads 28 and 34, successively, to be washed and dried, and then continue on to the discharge station C of the conveyor to be removed therefrom.

As the bottles are being initially elevated on the conveyor 23 from the station B, the star wheels 47 are caused to dwell with arms thereof providing temporary stops at the bottoms of the

bottles, whereby the bottles are positively retained in the pockets by said wheels until they have been inverted sufficiently on the conveyor to enable their being retained in the pockets by force of gravity.

The pocket construction for the conveyor 23, herein disclosed, forms substantially the subject matter of my co-pending application for patent on Container conveying apparatus, Ser. No. 121,928, filed January 23, 1937.

Having thus described my invention, I claim:

1. The combination with a conveyor including a series of interconnected container-neck-receiving pockets arranged for movement to successively receive the containers in reclining position at a loading station and then convey same into inverted position with means to intermittently advance the pockets to said station, of means for feeding the containers into the pockets when at said station including a movable container-transporting member with a plurality of serially arranged container-bottom-engaging portions with the member being arranged for movement so that its portions are capable of being intermittently advanced into a position at the loading station to force a container into a pocket and confine the container from endwise movement in the pocket until it has been advanced from the station to invert the container, and means for operating the member to intermittently advance the engaging portions.

2. The combination with a conveyor including a series of interconnected container-neck-receiving pockets arranged for movement to successively receive the containers in reclining position at a loading station and then convey same into inverted position with means to intermittently advance the pockets to said station, of means for feeding the containers into the pockets when at said station including a container-transporting wheel with a number of peripheral container-bottom-engaging portions, the wheel being arranged for rotation so that its portions are capable of being intermittently advanced into a position at the loading station to force a container into a pocket and then confine the container in the pocket until it has been advanced into an inverted position on the conveyor, and means operably connecting the wheel with the conveyor to intermittently advance said engaging portions in time relation with movement of the conveyor.

3. The structure as defined in claim 2, wherein the last means includes an adjustable operable connection for determining the position to which the engaging portions are advanced in accordance with the length of the containers handled.

4. The structure as defined in claim 2, wherein the last means includes a shaft upon which the wheel is mounted, a lever loosely mounted on the shaft for oscillation, a ratchet device operably connected between the lever and the shaft to intermittently advance the wheel upon oscillation of the lever, and an adjustable operable connection between the lever and the ratchet device to determine the position to which the engaging portions are advanced in accordance with the length of the containers handled.

IVAN H. RISSER.