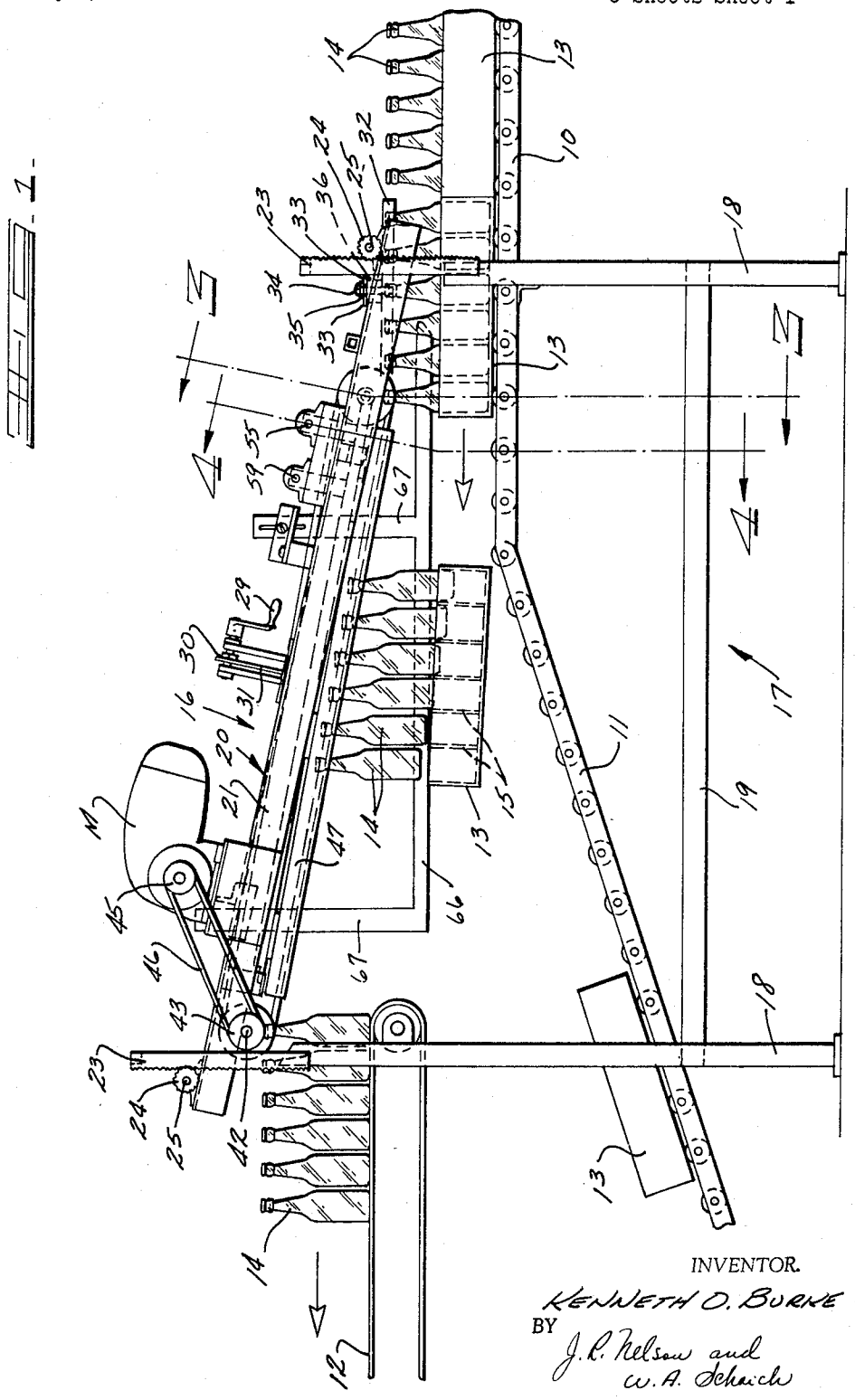
Dec. 6, 1966 K. O. BURKE 3,289,867

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FIG. 1



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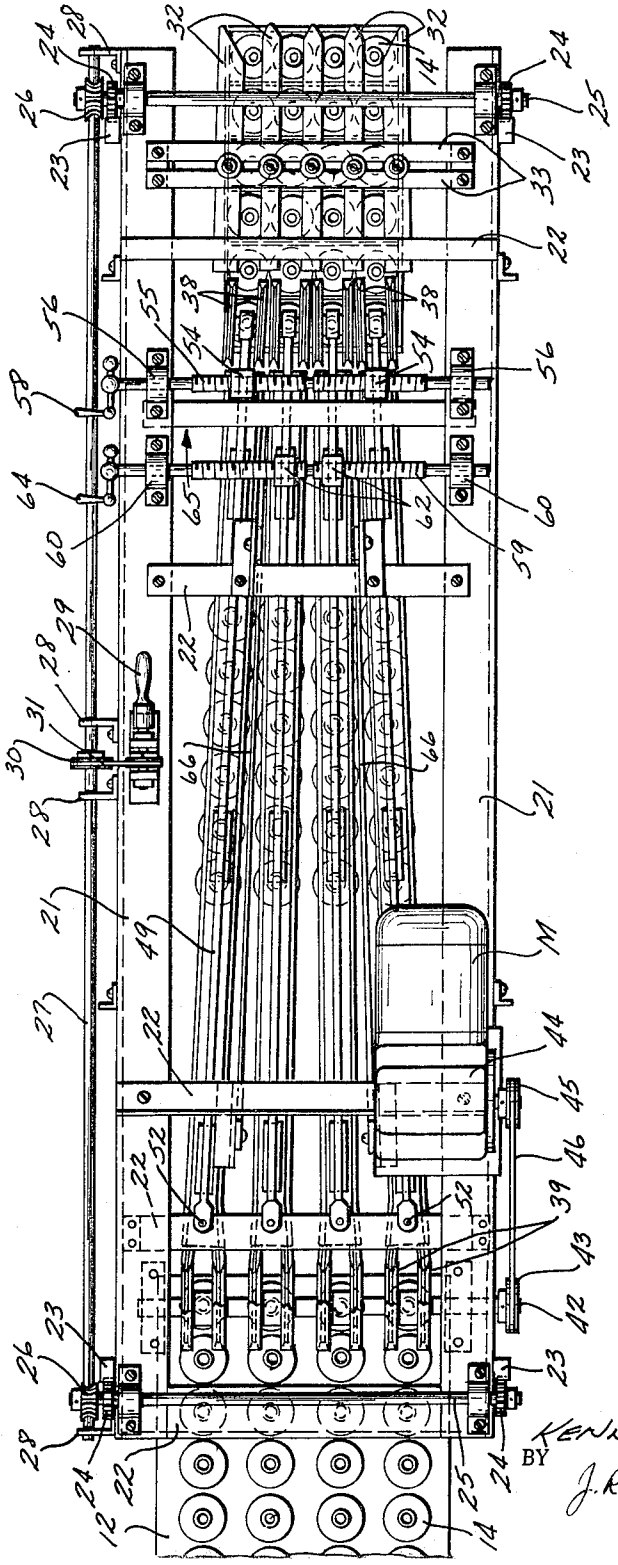


FIG. 2

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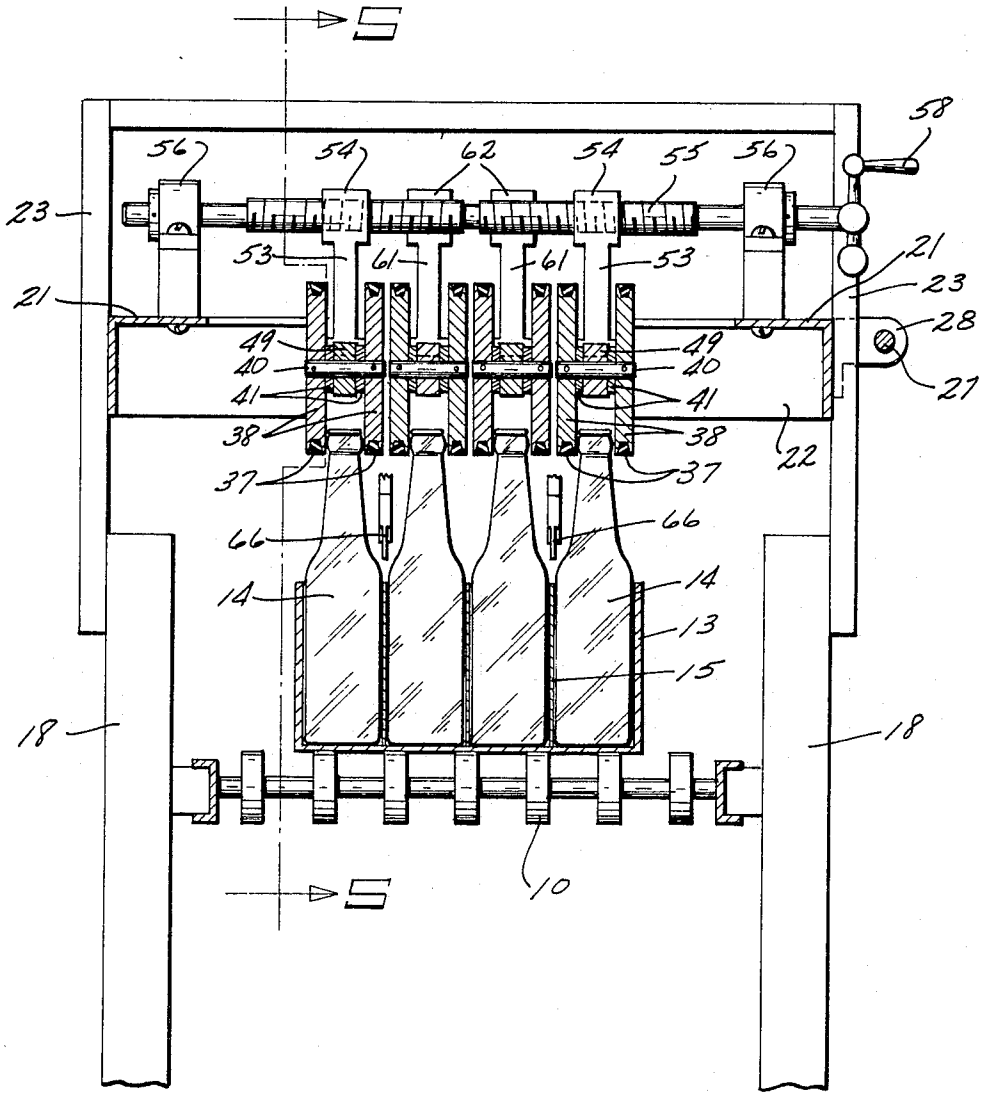


FIG. 3

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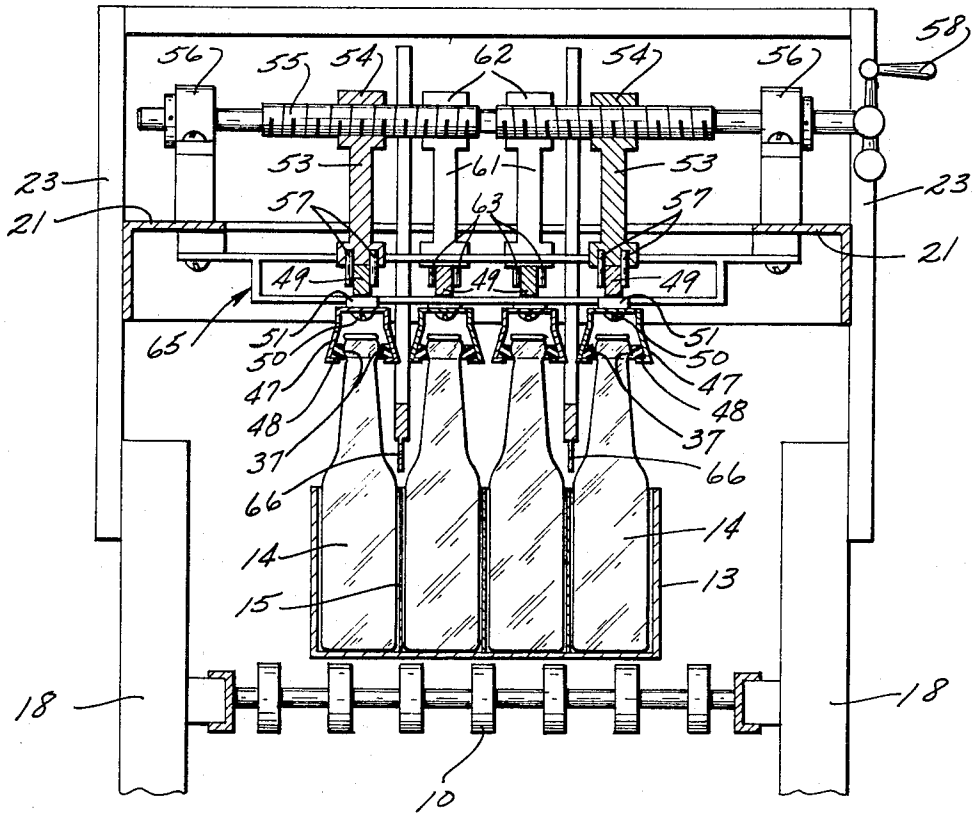


FIG. 4

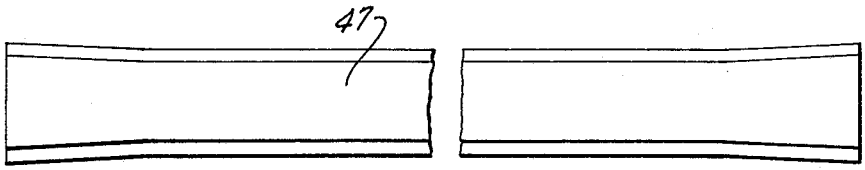


FIG. 4A

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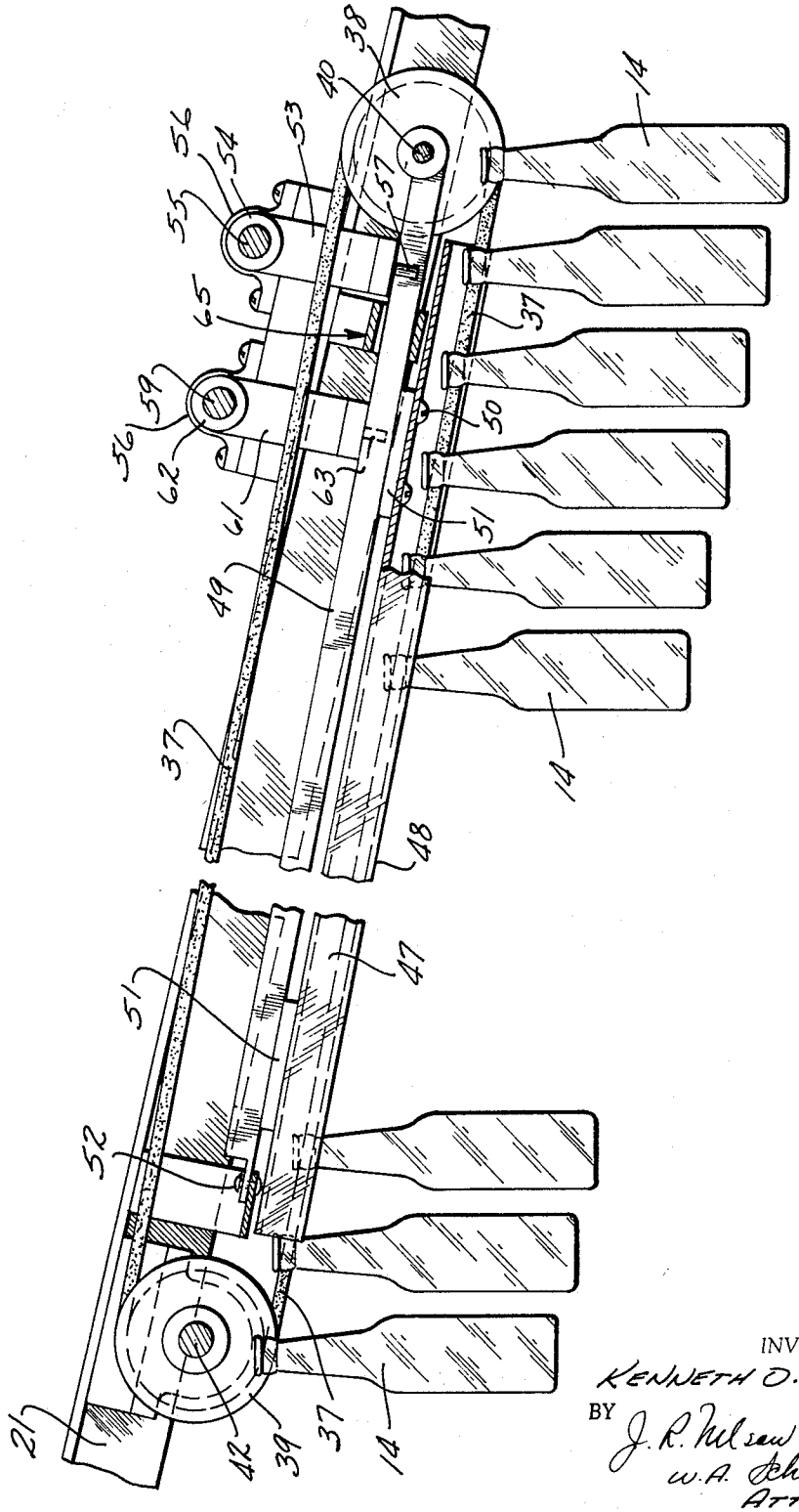


FIG. 5

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3,289,867

CASE UNLOADER

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Filed July 8, 1965, Ser. No. 470,529
7 Claims. (Cl. 214—309)

My invention relates to case unloaders and has for an important object the provision of novel mechanical means for removing bottles from cell-type or other cases, without interrupting the normal advancing travel of the cases along a conveyor and depositing the uncased bottles upright upon a conveyor which may transport the bottles to any preselected point, for washing, filling, etc.

A further important object of my invention is the provision of novel mechanism facilitating rapid easy adjustment of the uncaser, as may be required from time to time, because of differences in the diameter and/or height of the bottles being handled. It should be readily recognized that "job change" time is a most important factor and in the absence of some simple reliable means for adjusting an uncaser to accommodate bottles of various height and/or diameter, it would be imperative to provide one or more "standby" machines, each designed to handle a specific size of bottle. That, of course, would be a most uneconomical practice. My invention, however, completely avoids the need for any such "standby" machines and permits ready adjustment of the machine, as required, in a matter of minutes, and, if need be, without shutting down the operation.

It is also an object of my invention to provide a plurality of pairs of cooperating, endless, bottle neck gripping belts which grasp between them the necks of advancing bottles, while still cased, such belts being inclined in the direction of their length and functioning to elevate bottles from advancing cases, there being novel effective means for quickly adjusting the belts as variations in the bottle dimensions may dictate.

A still further object of my invention is the provision of novel means for adjusting the spacing between adjacent pairs of bottle grasping belts or bands, as may be required, by either or both the spacing apart of the longitudinal rows of bottles in the cases, or, perhaps, variations in the height of the bottles.

Finally, it is an important object of my invention to provide simple, effective means for insuring complete separation of the bottles from the cases and placement of the bottles upright in parallel longitudinal rows upon a continuously moving horizontal conveyor, while depositing the empty cases upon an inclined conveyor for delivery to a preselected station.

Other objects will be in part apparent and in part pointed out hereinafter.

In the accompanying drawings forming a part of my application:

FIG. 1 is a side elevational view of a bottle case unloader embodying my invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is a sectional elevational view taken substantially along the plane of line 3—3 of FIG. 1;

FIG. 4 is a sectional elevational view taken substantially along the plane of line 4—4 of FIG. 1;

FIG. 4–A is a plan view showing particularly the flared ends of one of the bottle grasping belt guides; and

FIG. 5 is an enlarged fragmentary side elevational view, partly in section, taken substantially along the plane of line 5—5 of FIG. 3.

In the illustrated embodiment of my case unloader, it is positioned between and in part above the discharge end of a horizontal roller-type conveyor 10, having an inclined empty case chute section 11, or extension, and a

horizontal endless belt conveyor 12 whose receiving end may well be directly above a portion of the inclined chute section 11. As shown, the belt conveyor 12 is at a somewhat higher elevation than the roller-type conveyor 10, for reasons which will be evident. Cases 13 of upright bottles 14, positioned in conventional cells created by dividers 15 or partitions, are advanced in succession along the roller-type conveyor 10 until they reach the uncaser 16. Here the bottles are, or may be, shifted laterally, if necessary, to pre-position them for entry into the uncaser proper. Thereupon, with continued advance of a case 13, the longitudinal rows of bottles 14 are lifted out of their case cells successively and advance along an inclined path while other means positively strips the cases from the bottles so that these cases fall by gravity onto the previously mentioned chute section 11. These bottles 14 then are deposited upright upon the belt conveyor 12. Because of "job changes," from time to time, necessitated for the reasons explained above, my uncaser 16 incorporates simple means for changing both the elevation of the uncaser and the lateral spacing apart of the bottle lifting means, all without interrupting operation of the machine, if that is important, or desirable, but in any event, in a matter of a few minutes time. Thus the "down time" of the uncaser for the purposes of adjustment is held to an absolute minimum.

The uncaser 16 is mounted upon an inclined supporting frame 17, comprising upright corner posts 18 and longitudinal connector rails 19. Well above these rails 19 are the major uncaser elements, such being mounted upon a vertically adjustable inclined carrier frame 20, which comprises (FIGS. 1 and 2) a pair of parallel spaced apart side bars 21, interconnected at intervals by transverse bars 22, or angle irons, certain of which perform other functions, as will be evident presently. Vertical adjustment of this frame is obtained by means of racks 23, one at each corner of the frame 20, these racks meshing with pinions 24. These pinions are arranged in pairs at each end of the frame 20, there being a transverse horizontal shaft 25 carrying each such pair of pinions. At one side of the frame 20 each horizontal shaft 25 is extended a short distance and carries a worm gear 26 meshing with and drivable by a worm (not shown), the latter mounted upon the ends of a longitudinal shaft 27 extending alongside the frame 20 and journaled in bearings 28. Rotation of this shaft 27 to raise or lower the frame through the rack and pinion devices, is obtained by means of a hand crank 29 and sprockets 30 over which a power-transmitting chain 31 is trained, one of the sprockets 30 being mounted upon the shaft 27. Thus, with rotation of the crank 29, the entire uncaser frame and elements carried thereby and to be described presently, may be raised or lowered, with ease, to accommodate bottles of different height.

Preparatory to actual physical engagement with the uncasing elements, it is imperative that the bottles 14 be positioned accurately, if they are not already so arranged, for entry between endless, flexible, neck-grasping belts or bands, as will be apparent presently. For this purpose (FIGS. 1 and 2) a transverse series of parallel spaced apart horizontal deflector guide fingers 32 extend lengthwise over the roller conveyor 10 at the entrance to the uncaser. Each of these fingers (FIGS. 1 and 2) is mounted for independent transverse adjustment by reason of its being suspended from a pair of horizontal, spaced-apart parallel cross-bars 33. To this end, each finger or guide 32 may well be suspended from the cross-bars 33 by a screw 34 extending downwardly between the bars 33 through a washer 35 and collar 36, with its lower end screw-threaded into the corresponding guide finger 32. Thus the guide fingers 32 may quite easily be

adjusted, so that if necessary, the longitudinal rows of bottles, while still in their cases, and moving to the uncaser, will be shifted laterally slightly, to insure entry of their necks into the spaces between the pairs of bottle grasping and elevating belts or bands **37**, these being the devices which remove the bottles from the cases and transfer them to upright positions upon the belt conveyor **12**.

The uncaser itself comprises the transverse series of spaced apart pairs of endless flexible belts **37**, or bands, with each pair of belts being trained over a pair of pulleys **38** at the entrance or righthand end of the uncaser (FIG. 2) and a pair of pulleys **39** at the discharge end. Each pair of pulleys **38** at the entrance end is mounted on a short stub shaft **40**, these pulleys being spaced apart on the shaft by collars **41**. At the opposite or discharge end, the pulleys **39** also are arranged in pairs on a common transverse horizontal shaft **42**, one end of which supports a driven sprocket **43**, or pulley. Power is transmitted to this sprocket **43** from a motor M through a speed reduction gear unit **44** and a pulley **45**, there being a belt **46**, or chain, trained over the sprocket **43**, or pulley and the pulley **45**. Thus, the several bottle grasping belts **37** are driven.

In order to bring each pair of belts **37** or bands into firm holding engagement with diametrically opposed sides of the bottle necks, their lower working reaches are confined in inverted generally U-shaped or channel guides **47**, extending lengthwise of the uncaser and having bottom flanges **48** to slidingly support the belts **37**. These guides **47** have their inlet and discharge ends flared (FIG. 4A) to facilitate grasping and release of the bottles, as is obvious.

Independent adjustment of each of the pairs of pulleys **38** at the entrance end of the uncaser, to align a pair of belts **37** with the center of a row of incoming bottles **14**, is obtained by mechanism substantially as will now be described. Four longitudinal, inclined belt guide supporting arms **49**, or bars, are connected at intervals by screws **50** and spacer pads **51**, to the upper side of the channel guides **47** for the belts **37**. These arms **49** at the end nearest the belt conveyor **12** (FIG. 2) are pivoted to vertical pins **52** carried by one of the cross-bars **22**. This pivot point is fixed so that uncased bottles **14** will be placed upright in longitudinal rows spaced apart transversely of the belt conveyor, irrespective of the bottle diameter. The other end of each arm **49**, however, is connected to one of the collars **41** or spacers between a pair of the pulleys **38** or sheaves. Each such pair of pulleys **38** is independently shiftable laterally or axially, so as to be properly positioned to permit ready entry of the bottle necks between the pairs of grasping belts **37**. The precise positioning of the pairs of pulleys is determined by the setting of the guide fingers **32** just above the cases **13** and they are shiftable in pairs.

To this end the two outermost pendent fingers **53** (FIGS. 3 and 4) have collars **54** screw-threaded upon a horizontal transverse adjusting rod **55**, which is journaled in bearings **56** on the frame **21**. The lower end of these fingers carry a pair of pins **57** which straddle the outermost arms **49**. By rotating the hand crank **58** on one end of the rod **55**, the pendent fingers **53** and therefore the corresponding arms **49**, may be shifted horizontally as desired and thereby determine the precise position of the inlet end of the bottle grasping belts. The center pair of arms are similarly, but separately or independently adjustable and to this end a second threaded adjusting rod **59** (FIG. 2) is mounted in bearings **60**. Pendent fingers **61** having collars **62** threaded on the rod **59** are provided with pins **63** straddling the arms **49**. Thus, with rotation of the second adjusting screw rod **59**, the innermost pair of arms and supported belt guides **47**, can be adjusted as desired. A hand-crank **64** is operable to rotate the rod **59**. It will be observed that the four arms **49** or bars extend through suitable guides **65** beneath one of the cross-bars **22**.

To insure complete separation, or stripping, of the cases **13** from the bottles above the inclined chute section, a pair of horizontal stripper rods **66** (FIGS. 1, 3, and 4) suspended from vertically adjustable arms **67** carried by the uncaser frame, extend longitudinally of the uncaser at an elevation to overlie the cases and to extend between rows of bottles **14** being removed from the cases. Thus, as the cases advance and the bottles are elevated, the stripper rods, as is evident, prevent the cases from rising with the bottles being elevated. Consequently, the cases fall onto the inclined chute section **11**.

Operation of the uncaser and the importance of and procedure involved in adjusting the positions of the bottle grasping belts are believed to be abundantly clear and fully explained in the above descriptive matter.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. In a case unloader for removing upright bottles arranged in parallel rows in a case with neck portions protruding above the case, the combination of a horizontal conveyor for bringing bottle containing cases to the unloader, an inclined chute extension of said conveyor beneath the unloader, a horizontal conveyor beyond the unloader upon which the latter places uncased bottles upright in longitudinal rows, driven endless pairs of bottle neck grasping belts having working reaches moving along inclined paths to elevate bottles from the case, striping means for positively separating the case from the bottles being elevated and causing the case to be deposited by gravity upon said inclined chute extension, an elongated inclined arm supporting each pair of said belts, each arm pivoted near its upper end for lateral movement about such pivot relative to the conveyor, and means at the lower end of the arms for supporting and moving them on their pivots thereby to vary the lateral spaced relationship of their lower ends.

2. In an unloader as defined in claim **1**, the endless belts being arranged as a plurality of pairs of cooperating belts lying in a common inclined plane.

3. In an unloader for removing upright bottles arranged in parallel rows in a case with neck portions protruding above the case, bottle elevating means comprising an elongated inclined frame, a plurality of side by side pairs of endless flexible neck grasping belts extending lengthwise of the frame in a common inclined plane, each pair of belts having lower working reaches for bottle neck engagement, an elongated inverted channel-like guide housing the working reaches of a pair of the belts, a supporting arm for each guide extending lengthwise of and secured to the latter, means pivoting an end of each arm to the upper end of the frame for movement laterally of said frame, a plurality of upper pairs of pulleys on a horizontal axis near the pivots and over each pair of which pulleys two of the bottle grasping belts are trained, a plurality of lower pairs of pulleys on a common horizontal axis at the lower end of the frame and over which said belts are trained, means for moving the arms on their pivots and thereby adjusting the relative positions of the lower pairs of pulleys across the frame to align pairs of the grasping belts with rows of bottles in the cases, and means for positively driving the upper pairs of pulleys.

4. In an unloader as defined in claim **3**, there being stripping means for holding the cases against elevation with the bottles being unloaded.

5. In an unloader as defined in claim **3**, the means for moving the arms comprising a pendent finger engaging each arm near the lower pulleys and manually operable means for shifting the fingers in a direction generally across the frame.

6. In an unloader as defined in claim **3**, the means for moving the arms comprising a pendent finger engaging

each arm near the lower pulleys, a threaded adjusting rod extending transversely of the frame above said fingers, collars threaded on the rod and connected to the pendent fingers, and means for rotating the rod.

7. In an unloader as defined in claim 3, the means for moving the arms comprising a pendent finger engaging each arm, there being one pair of such fingers spaced longitudinally of the frame from another like pair of fingers, a horizontal transverse threaded adjusting rod for each pair of fingers, collars threaded on the rods and connected to the fingers, and means for rotating the rods.

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