

March 5, 1963

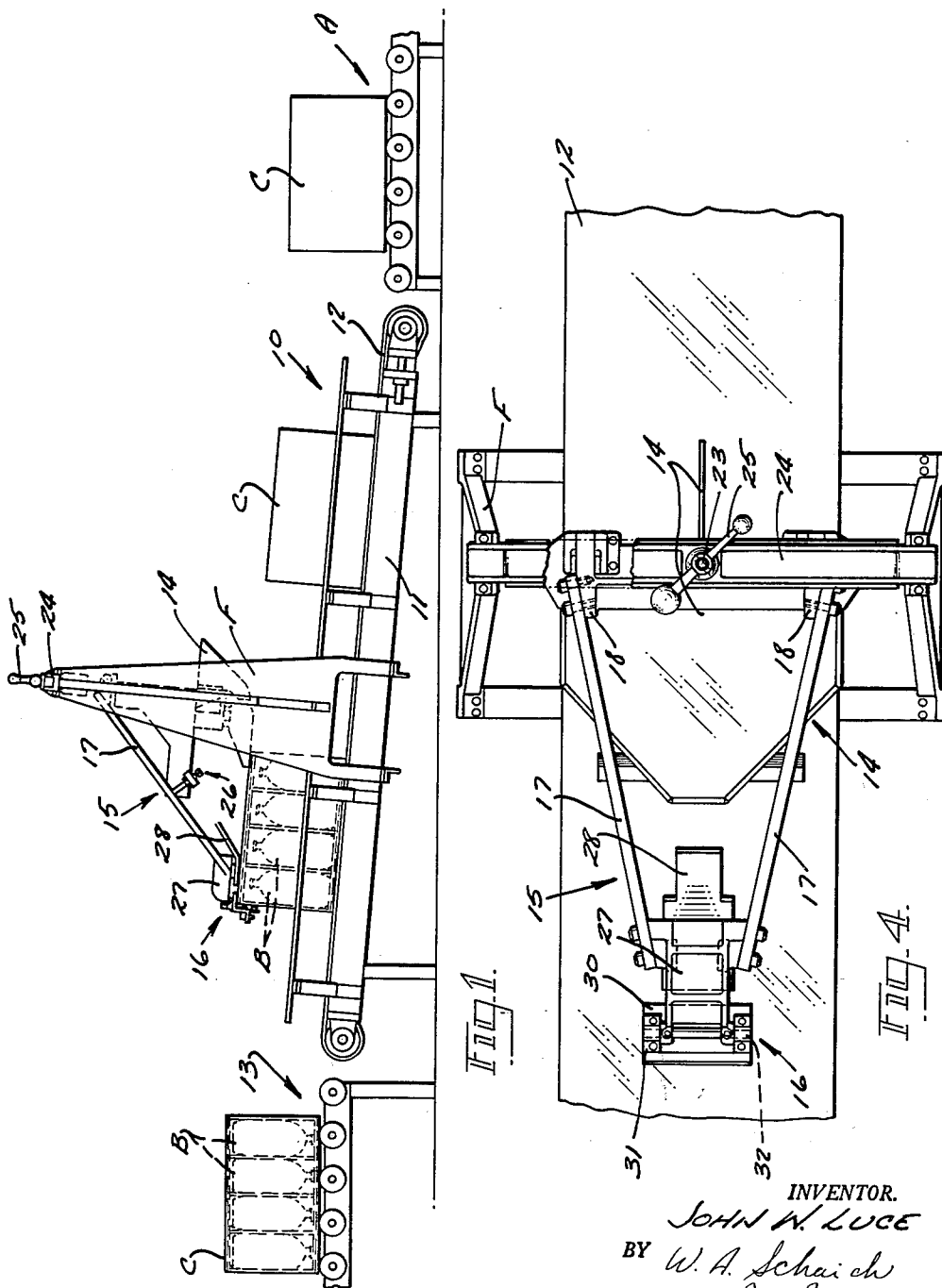
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3,080,041

SHIPPING CARTON INVERTING APPARATUS

Filed Feb. 27, 1961

3 Sheets-Sheet 1



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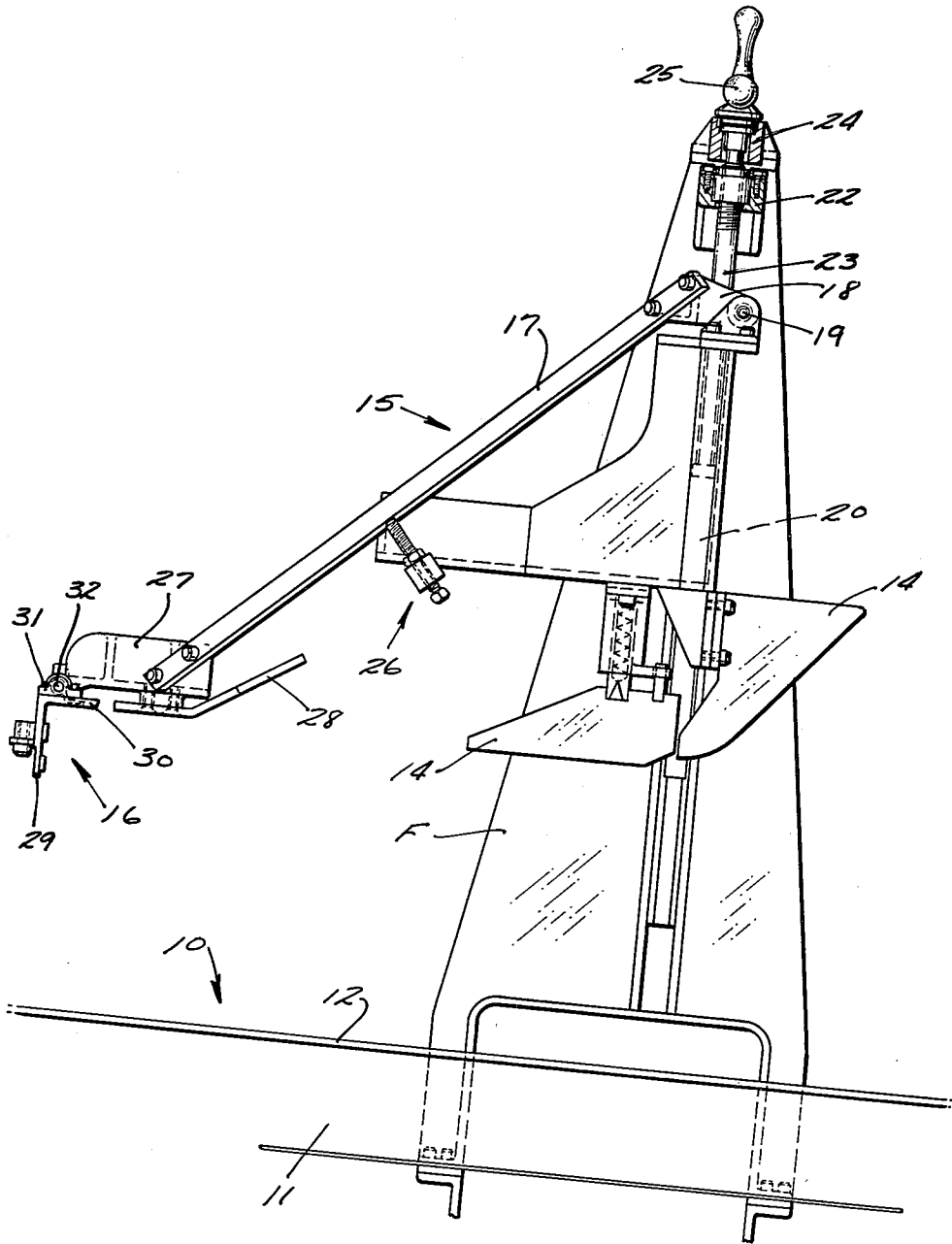


FIG. 2.

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3 Sheets-Sheet 3

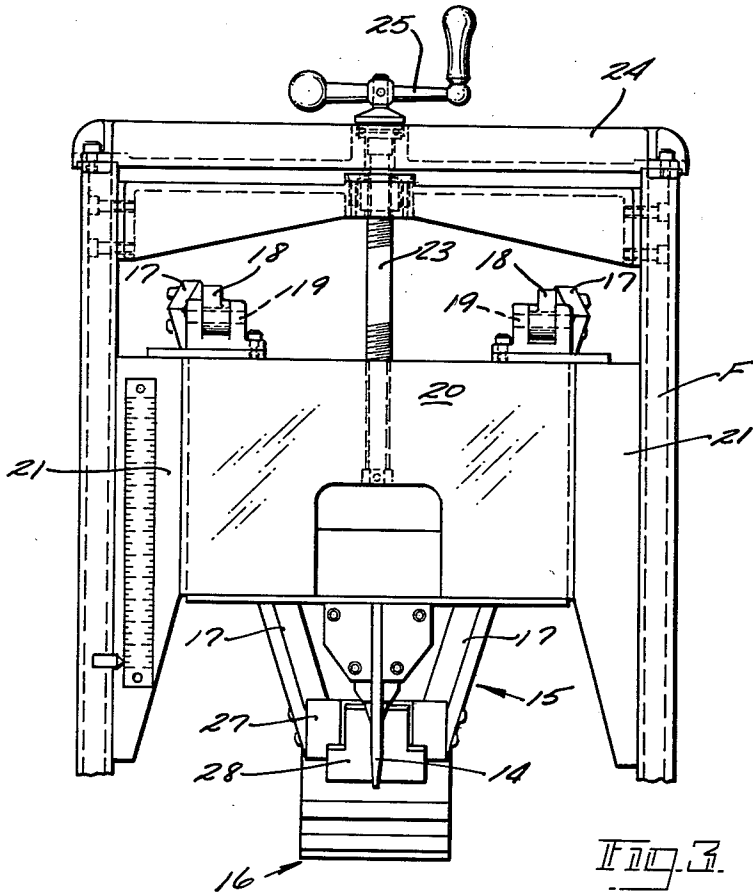


Fig. 3.

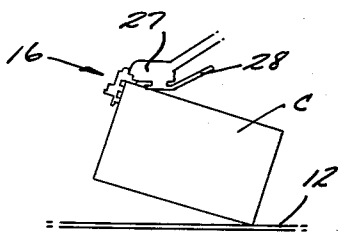


Fig. 5.

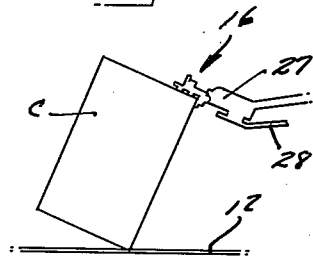


Fig. 6.

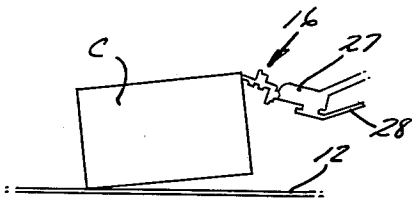


Fig. 7.

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SHIPPING CARTON INVERTING APPARATUS

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 9 Claims. (Cl. 198—33)

My invention relates to apparatus for inverting shipping cartons after they have been filled with empty newly formed bottles, or jars.

In the conventional handling of bottles and jars in the plant where they are manufactured, they are deposited bottom end lowermost in shipping cartons. The usual cover flaps are closed and thereafter the filled closed cartons are inverted. As a consequence, the containers occupy inverted positions with the open mouth-end facing downwardly and closed against insect and/or carton dust entry, by reason of their contact with either the carton flaps, or perhaps an inner liner sheet. Thus the likelihood of foreign matter entering the containers is minimized.

An important object of my invention is the provision of novel, efficient and exceedingly simple, inexpensive mechanism for inverting these cartons mechanically, as they advance along the conventional conveyor line from the filling and cover flap closing zones or stations, to a palletizing platform.

A further object of my invention is the provision of a shipping carton inverter, or "turn-over" apparatus, comprising a vertically swingable hold-back or lift arm positioned directly over a carton conveyor and operating to momentarily halt advance of the carton while the conveyor urges the carton forwardly and in the process applies a lifting pressure to the hold-back arm, such resulting in upward movement of the forward end of the cartons while the rearmost end advances with the conveyor so that ultimately the carton moves through an angle of 180° and brings the top of the carton into contact with the conveyor.

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

In the drawings forming a part of my application:

FIG. 1 is a fragmentary side elevational view of a carton conveyor line with my inverter apparatus incorporated therein.

FIG. 2 is an enlarged side elevational view of my invention.

FIG. 3 is a fragmentary rear elevational view of my carton inverting apparatus.

FIG. 4 is a top plan view of my invention overlying a section of a conveyor.

FIGS. 5, 6 and 7 are views more or less diagrammatically showing successive positions assumed by a carton and the hold-back and lift arm, during a typical inverting cycle.

My invention is illustrated in association with a typical conveyor line including an inclined endless conveyor 10 carried by an elongated frame 11 and comprising an upper carton supporting reach 12, which receives shipping cartons C from an accumulator platform A, and following inversion, delivers the cartons to a conveyor 13. These cartons, which are already filled with bottles B, or similar containers, then are removed from the conveyor 13 and stacked upon pallets (not shown) or the like for shipment, or possibly warehousing. The foregoing is conventional practice. Cover flap closing members 14 overlie the incline conveyor 10.

My carton inverting or "turn-over" apparatus comprises an inclined combined carton hold-back and lift arm 15, which is pivoted at its upper end for free vertical swinging movement and at its lower end carries a pivoted turn-over foot 16. The lift arm comprises a pair of opposed upwardly divergent side bars 17, which, at their upper

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ends, are secured to brackets 18, these later in turn being pivoted to coaxial horizontal hinge pins 19. These hinge pins are positioned at the upper end of a vertical carrier slide 20 which is mounted in a pair of opposed slideways 21, or guides, these forming a part of a main supporting frame F for the lift arm. A cross-head 22 interconnects the upper ends of the slideways 21. A threaded adjusting rod 23 is journaled in the cross-head, extends above the latter and through a cross-bar 24, where it is attached to a lever 25, or handle, by which said rod may be manually rotated. The lower end of this rod 23 is rotatively connected to the slide 20. Thus, with rotation of this rod 23, the slide 20 may be either raised, or lowered, as required by the carton height. Stops 26 in the form of adjustable screws function to regularly determine the normal lowermost position of the foot carrying lower end of the lift arm 15. This, of course, is important in adapting the apparatus to handle cartons of different height.

The lower end of the lift arm 15 is secured to a turn-over foot holder 27, which, in addition to supporting the previously mentioned foot 16, carries a cover flap deflector 28, the function of which, of course, is to insure proper final positioning of the carton cover flaps immediately prior to initiation of the carton inverting cycle. At the forward end of the holder 27 there is pivoted the turn-over foot 16. This is a generally inverted L-shaped member, including a normally pendant toe 29 and a base 30, this latter portion being secured to bearings 31. These bearings 31 (FIG. 4) have journaled therein the ends of a horizontal hinge pin 32 which is mounted upon the aforementioned holder 27. This turn-over foot 16 is free for limited movement in a vertical plane about the hinge pin 32 so that with completion of each carton inverting cycle, it will, under the influence of gravity, return to a position for engagement with the next approaching carton.

In operation, the cartons, filled with newly formed bottles B, or jars, in upright positions therein, and with the cover flaps at least partially closed, are placed upon the lower or receiving end of the inclined conveyor 10. These cartons enter the zone in which my inverting unit is positioned and pass beneath the flap closing members 14 and deflector 28, in order to insure final complete closing of the cover flaps preparatory to carton inversion. As the carton continues to advance, its forward end contacts the turn-over foot 16 and momentarily comes to a halt. Because the lift arm is free to move upwardly about its pivots 19 and the conveyor 10 continues to apply pressure to the rearmost end of the carton, the forward end moves upwardly away from the conveyor (FIG. 5). As this carton movement progresses, the conveyor 10 resumes its function of advancing the carton, such occurring as the forward end rises and moves rearwardly (FIG. 6). As the carton moves rearwardly beyond its center of gravity it falls onto the conveyor with the top side now lowermost and the bottles, or jars, inverted as shown in the carton at the left-hand side of FIG. 1. This carton now is ready for stacking on pallets, or the like, for shipment, or warehousing.

As pointed out above, this carton inverter, in addition to performing its function entirely automatically and without slowing down the normal carton handling procedure, is capable of being adjusted quite easily to handle cartons of different height.

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

I Claim:

1. In combination, means for supporting a carton having a top and bottom with the bottom initially lowermost and advancing the carton through a carton inverting zone, inverting apparatus in said zone comprising a lift arm mounted for free limited swinging movement in a vertical plane extending along and above the path of travel of

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the carton, a turn-over foot pivoted to an end of the lift arm, said foot having a pendant toe positioned to engage the foremost end of the advancing carton and terminate momentarily the advance of said foremost end.

2. In combination, a continuously moving conveyor for advancing cartons through an inverting zone, means for placing a carton having a top and bottom upon one end of the conveyor bottom lowermost, apparatus for inverting a carton while on said conveyor, said apparatus comprising a carton lift arm pivoted for free swinging movement in a vertical plane extending lengthwise of the conveyor, said arm declined in the direction of advance of the carton and pivoted at its uppermost end, a carton turn-over foot pivoted to the lowermost end of said arm for vertical swinging movement, said foot being generally inverted L-shape and having a pendant toe engageable with the foremost end of an advancing carton.

3. Carton inverting apparatus, as defined in claim 2, a vertical carrier slide to which the lift arm is pivoted, and means for moving the carrier slide vertically thereby to accommodate the turn-over foot to cartons of different height.

4. Carton inverting apparatus, as defined in claim 2, a vertical carrier slide to which the lift arm is pivoted, and stop means for restricting downward movement of the arm about its pivot.

5. Carton inverting apparatus, as defined in claim 3, the carrier moving means being a cross-head above the carrier, and a manually operable threaded rod connecting the cross-head and carrier and rotatable to elevate or lower the carrier.

6. Carton inverting apparatus for positioning over a generally horizontal carton conveyor, comprising, a sup-

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porting frame straddling the conveyor, a carrier mounted upon the frame, a lift arm declined forwardly from the carrier, means pivoting the arm to said carrier for free vertical movement about said pivot, and a turn-over foot pivoted to the lowermost end of the lift arm for vertical swinging movement, said foot having a pendant toe positioned normally for momentary holding engagement with an end of a carton.

7. Apparatus as defined in claim 6, the carrier being a vertically movable slide and a manually operable screw for adjusting the elevation of the carrier.

8. Apparatus as defined in claim 6 and stop means for limiting possible downward movement of the arm about its pivot.

9. Carton inverting apparatus positionable over a generally horizontal conveyor, comprising, a substantially inverted L-shaped turn-over foot for engagement with the foremost end of a carton being advanced by the conveyor, and a lift arm overlying the path of travel of the carton and declined in the direction of travel of said carton, means pivotally connecting the foot to the lower end of said arm for limited vertical swinging movement, and means pivotally supporting the arm at its upper end whereby both said arm and foot, when the latter is engaged by an advancing carton, are moved upwardly with the foremost end of the carton and hold the latter end against advancing travel while the rearmost end moves forwardly on the conveyor.

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