

May 13, 1969

S. H. BIRRELL
CASE PACKING APPARATUS

3,443,355

Filed Feb. 3, 1967

Sheet 1 of 2

FIG. 1

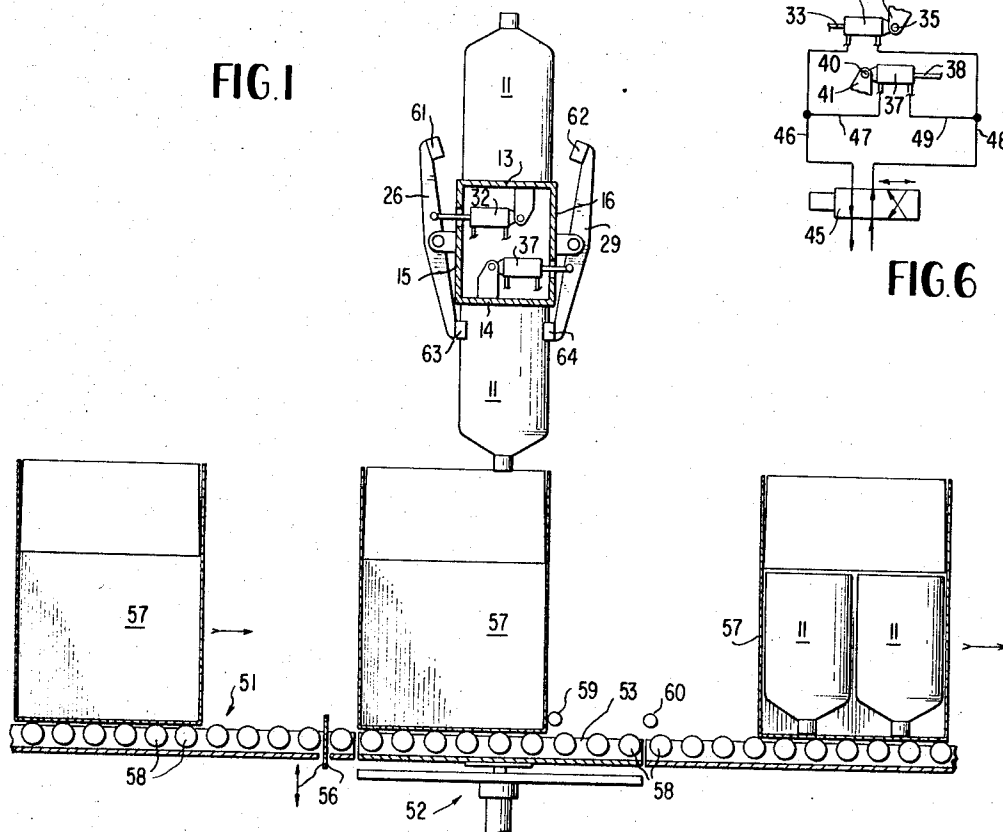


FIG. 6

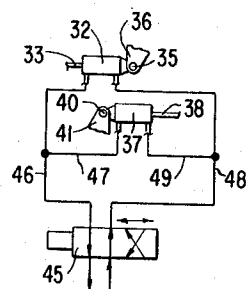
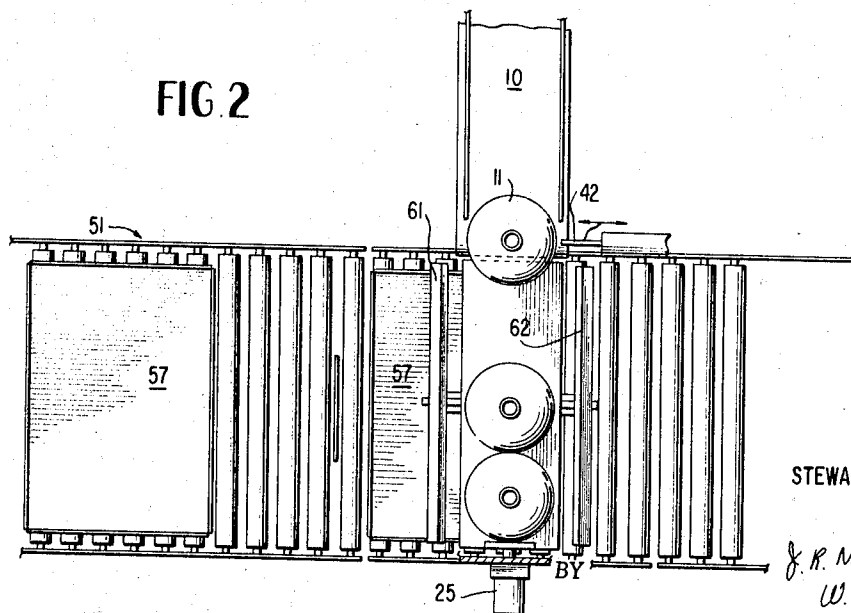


FIG. 2



INVENTOR
STEWART H. BIRRELL

J. R. Nelson &
W. A. Schach
ATTORNEYS

May 13, 1969

S. H. BIRRELL

3,443,355

CASE PACKING APPARATUS

Filed Feb. 3, 1967

Sheet 2 of 2

FIG 3

FIG 4

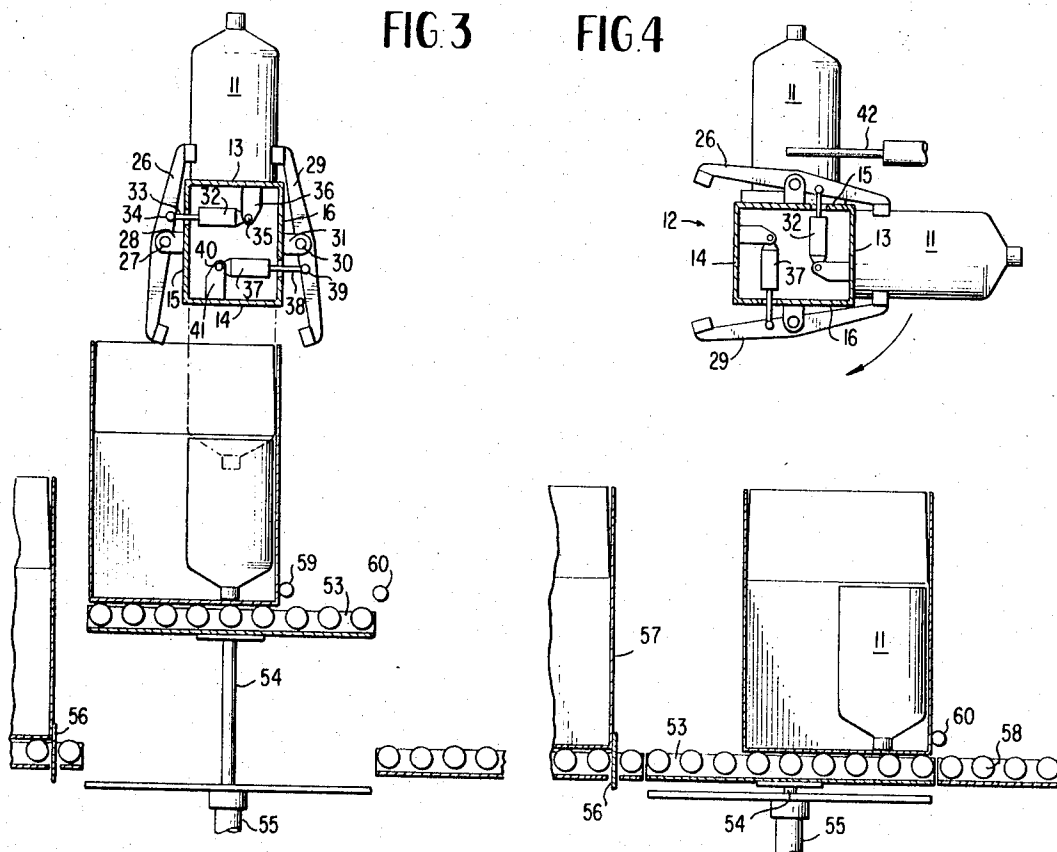
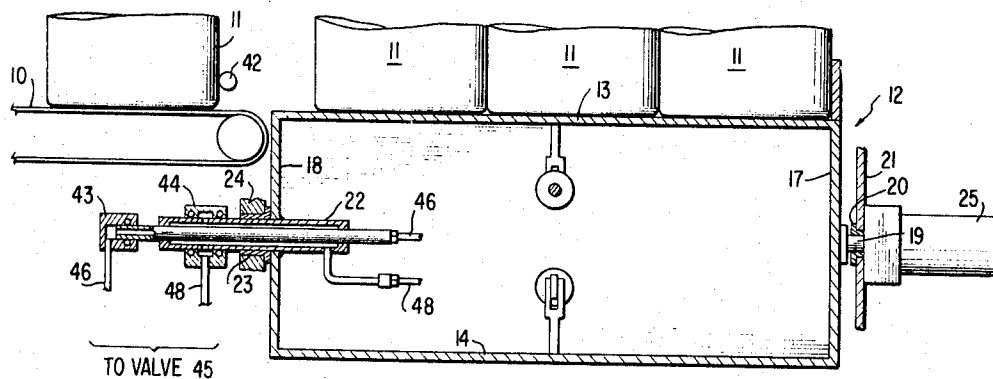


FIG 5

INVENTOR

STEWART H. BIRRELL

BY *J. R. Nelson & W. A. Schuch*

ATTORNEYS

1

3,443,355

CASE PACKING APPARATUS

Stewart H. Birrell, Toledo, Ohio, assignor to Owens-Illinois, Inc., a corporation of Ohio
Filed Feb. 3, 1967, Ser. No. 613,919

Int. Cl. B65b 21/12, 35/16

U.S. Cl. 53—161

10 Claims

ABSTRACT OF THE DISCLOSURE

A case loading apparatus in which articles to be packaged are collected and clamped in position on a platform supported for rotation about a horizontal axis. The platform is then rotated through 180° about the horizontal axis to invert the articles, which are then released and permitted to fall by gravity in the inverted condition into an open case.

This invention relates to a case loading apparatus, and particularly to an apparatus for loading articles such as empty bottles, or the like, in an inverted condition into an open case.

It is common practice to package containers such as cans, bottles, or the like, whether empty or filled (hereinafter referred to generally as bottles), in an inverted condition into cases for subsequent handling. This practice permits the ultimate user of empty bottles, for example, to simply invert and lift off the case, leaving the bottles which have been packaged therein in an upright condition ready to be filled and closed by automatic machinery. Numerous devices have been provided in the past for packaging bottles into cases in the inverted condition, but these devices have not been entirely satisfactory for various reasons. For example, these prior art devices have normally been relatively slow, have been very large and complex and therefore have occupied excessive floor space, and frequency have required excessive attention by an operator.

It is, therefore, the primary object of the present invention to provide an improved, fully automatic, high speed case loading apparatus.

Another object of the invention is to provide such an apparatus in which bottles are packaged in a case in the inverted condition.

Another object is to provide such an apparatus which occupies a minimum of floor space.

Another object is to provide such an apparatus in which the bottles to be packaged are collected and clamped upon a platform, which platform is then rotated about a horizontal axis to invert the clamped bottles, with the bottles then being released and permitted to fall by gravity into an open case.

In the attainment of the foregoing and other objects, an important feature of the invention resides in providing a bottle conveyor for transporting the bottles to be packaged in an upright condition onto a platform supported for rotation about a horizontal axis. A second conveyor conveys the open cases in succession to a position directly beneath the rotatable platform, where the cases are temporarily held in position to receive a load of bottles. A clamping mechanism mounted on the platform for rotation therewith is actuated to clamp and retain bottles positioned on the upper surface of the platform, and the platform is then rotated through 180° to invert the bottles. The clamping mechanism is then actuated to release the inverted bottles to permit them to fall by gravity into an open position directly therebelow.

Preferably the rotatable platform is provided with a bottle supporting surface on two opposed sides, with a clamping mechanism for each bottle supporting surface

2

so that, when the platform has been rotated to invert one group of bottles, a second group may be received on the platform, thereby greatly increasing the capacity of the apparatus. If desired, the two clamping mechanisms may be interconnected for simultaneous operation so that, as one group of bottles is released to fall into the container, the second group of bottles is clamped ready to be rotated with the platform.

Other objects and advantages of the invention will become apparent from the following detailed description, taken with the drawings, in which:

FIG. 1 is an elevation view, partially in section, of a case loading apparatus according to the present invention;

FIG. 2 is a top plan view of the case loading apparatus shown in FIG. 1;

FIG. 3 is a view similar to FIG. 1, with certain parts shown in an alternate position;

FIG. 4 is a view similar to FIG. 3 illustrating a group of bottles being inverted by the apparatus;

FIG. 5 is a partial sectional view taken on line 5—5 of FIG. 3; and

FIG. 6 is a schematic illustration of the fluid actuating system for the bottle clamping mechanism of the apparatus.

Referring now to the drawings in detail, a case loading apparatus according to the present invention is illustrated as including a horizontally disposed driven belt bottle conveyor 10 for conveying bottles 11 in an upright condition to a rotatably supported platform 12. The platform 12 is illustrated as being an elongated, rectangular structure including two opposed, parallel plates 13, 14 providing two load supporting surfaces for the platform, with the plates 13, 14 being joined by opposed sides 15, 16 and opposed end plates 17, 18. The platform is supported for rotation about a horizontal axis spaced below and extending generally parallel to the bottle conveyor 10 by a stub shaft 19 extending through a bushing 20 in a rigid frame member 21 and by an elongated tubular shaft 22 extending through a bushing 23 in a rigid frame member 24. A suitable rotary motor 25 is mounted on frame member 21 and is operatively connected to shaft 19 to rotate the platform 12 about its horizontal axis to move plates 13 and 14 alternately between an upper, or load receiving position and a lower, or load releasing position. As best seen in FIG. 5, bottles 11 are discharged from the conveyor 10 directly onto the upper load supporting surface of the plate 13 or 14 which is in the load receiving position. A fluid motor actuated retractable stop 42 is provided on the end of conveyor 10 adjacent platform 12 to control movement of bottles 11 from the conveyor onto the platform.

To clamp bottles 11 on the load supporting surfaces of platform 12, a first elongated lever arm 26 is pivotally supported, as by pin 27, on a bracket 28 rigidly mounted on side 15, and a second elongated lever arm 29 is pivotally supported, as by pin 30, on a bracket 31 rigidly mounted on side 16. A double-acting linear fluid motor 32 has its piston rod 33 pivotally connected, as by pin 34, to arm 26 at a point intermediate the bracket 28 and plate 13, and has its cylinder end pivotally connected, as by pin 35, to a bracket 36 mounted on the inner surface of plate 13. Similarly, a double acting linear fluid motor 37 has its piston rod 38 pivotally connected, as by pin 39 to the lever 29 at a point intermediate the bracket 31 and the plate 14, and has its cylinder end pivotally connected, as by pin 40, to a bracket 41 on the inner surface of plate 14. Fluid under pressure from a suitable source, not shown, is directed from a two-position, four-way valve 45 (see FIG. 6) through lines 46, 47 to the rod end of motor 32 and the cylinder end of motor 37, or through lines 48 and 49 to the cylinder end of motor

32 and the rod end of motor 37, depending upon the position of the valve 45.

As shown in FIG. 5, the fluid in line 46 is directed into the interior of the rotatable platform 12 through the hollow tubular shaft 22. To accomplish this, a suitable rotatable fluid coupling 43 is provided in conduit 46 outside of the platform 12. Similarly, fluid in conduit 48 flows into the interior of the platform 12 through the hollow shaft 22, and a suitable rotatable fluid coupling 44 is provided to permit rotation of the platform.

Referring now to FIGS. 1-4, a roller-type case conveyor, indicated generally by the reference numeral 51, is shown extending beneath the rotatable platform 12, at right angles to the bottle conveyor 10, to convey empty cases into a loading position beneath the platform 12 and to convey the loaded cases therefrom. An elevator assembly, indicated generally at 52, is provided to raise an empty case, in the loading position, to partially insert the downwardly directed necks of a group of inverted bottles into the case. The elevator 52 comprises a roller conveyor segment 53 mounted on the end of a vertical piston rod 54 of a fluid motor 55. A retractable stop 56 is mounted on conveyor 51 adjacent the upstream side of the elevator segment 53 to prevent empty cases 57 on conveyor 51 from engaging the elevator segment 53 until the retractable stop 56 is moved from the raised position illustrated in the drawings to a retracted position spaced below the upper surface of the roller elements 58. A pair of retractable stops 59, 60 are mounted on the elevator segment 53, with the stop 59 being positioned to locate a carton 57 to receive a first row of bottles released from the clamps 26, 29. The stop 59 is then retracted horizontally by suitable means such as a fluid motor, not shown, and the partially filled case is driven along the conveyor segment 53 to engage the second stop 60. This second stop 60 positions the case to receive a second row of bottles.

When the first row of bottles 11 is deposited in the case, the elevator mechanism is lowered to permit the second row of bottles to be swung into position above the empty case clear of the upstanding flaps of the case. The elevator is then again raised to partially insert the second row into the case and the clamping mechanism is actuated to release the second row and permit them to fall by gravity into the open case. The elevator is then lowered and the stop 60 is retracted by suitable means such as a fluid motor, not shown, and the filled case is moved from the elevator section. At the same time, the retractable stop 56 is lowered and a second empty case is moved onto the elevator section 53. As soon as the filled case moves clear of the stop 59, it is again projected to position the second case to receive its first row of bottles.

In operation of the case filling apparatus just described, the empty bottles 11 are moved in a single file along the bottle conveyor 10 into engagement with the retractable bottle stop 42. The stop 42 is then retracted, and a suitable counting mechanism (not shown) permits a sufficient number of bottles to be moved by the conveyor 10 onto the upper horizontal surface of plate 13 of the rotatable platform 12. Typically, the number of bottles positioned on the platform forms a single row in the case to be packed, and in the drawings this number is illustrated as being three relatively large bottles of the type commonly employed to package laundry bleach or the like. When the desired number of bottles are positioned on the platform, the stop 42 is projected to prevent further bottles from moving onto and interfering with rotation of the platform, and simultaneously the valve 45 is shifted to the position illustrated in FIG. 6 to direct fluid under pressure to the cylinder end of the fluid motor 32 and the piston end of fluid motor 37 to pivot lever arms 26 and 29 in a direction to move clamping bars 61 and 62 into engagement with the bottles positioned on the platform and thereby clamp the bottles in position for rotation with the platform.

While the bottles are being moved onto platform 12, an empty case 57 is moved into position in engagement with the retractable stop 59 on the elevator segment 53. The motor 25 is then actuated to rotate the platform about its horizontal axis through 180° to invert the clamped bottles. Stop 42 is then retracted to permit a second row of bottles 11 to move onto the upper surface of plate 14, and simultaneously fluid motor 55 is actuated to raise elevator section 53 to partially insert the previously inverted row of bottles into the open case.

As soon as the second complete row of bottles is in position on the upper surface of the platform, stop 42 is projected and the valve 45 is actuated to direct pressure fluid to the head end of motor 32 and the rod end of motor 37 to actuate the clamping mechanism to simultaneously clamp the second row of bottles between clamping bars 63, 64 and to release the first row of bottles and permit them to fall by gravity into the open case. Stop 59 is then retracted to permit the partially filled case to move into engagement with stop 60, and motor 55 is actuated to lower the elevator. Simultaneously, motor 25 is actuated to rotate to the platform through 180° to invert the second row of bottles.

While the case loading apparatus illustrated is employed to load cases one row at a time, it is believed apparent that the device could readily be adapted to clamp a plurality of rows of bottles so that a full case load of bottles could be inverted and released simultaneously. Similarly, the apparatus has been illustrated with the case conveyor disposed at right angles to the bottle conveyor, but it is believed apparent that the case conveyor could readily be positioned parallel to and beneath the bottle conveyor to conserve floor space. In such an arrangement, if the mechanism were employed to load the cases one row at a time, the platform would merely be rotated about an axis perpendicular to the bottle conveyor rather than parallel thereto as illustrated in the drawings. Accordingly, while I have described a preferred embodiment of my invention, I wish it understood that I do not intend to be limited solely thereto but that I do intend to include all embodiments thereof which would be apparent to one skilled in the art which come within the spirit and scope of my invention.

I claim:

1. An apparatus for packing articles in cases comprising, in combination, a conveyor for transporting articles to be packed in an upright condition to a packing station, a platform at said packing station having an article supporting surface thereon for receiving and supporting articles conveyed thereto by said conveyor, means supporting said platform for rotation about a horizontal axis to move said supporting surface between an upper load receiving position to receive articles from said conveyor and an inverted load releasing position, clamp means mounted on said platform and rotatable therewith, and means for actuating said clamp means to clamp and retain articles supported on said article supporting surface for rotation therewith from said load receiving position to said load releasing position to invert said articles and for releasing the inverted articles at said load releasing position to permit the articles to fall by gravity into an open case positioned thereunder.

2. An apparatus for packing articles in cases as defined in claim 1 wherein said platform comprises first and second substantially horizontal article supporting surfaces thereon on opposite sides thereof, said supporting surfaces being successively positioned at said upper load receiving position to receive articles from said conveyor and said inverted load releasing position by rotation of said platform, said clamp means being operable to clamp and retain articles supported on either of said supporting surfaces for rotation therewith.

3. The apparatus for packing articles in cases as defined in claim 2 wherein said clamp means is operable to simultaneously clamp articles supported on one of said

5

supporting surfaces and to release articles from the other of said supporting surfaces.

4. An apparatus for packing articles in cases as defined in claim 1 further comprising a conveyor for transporting empty cases into a load receiving position beneath said platform, and for conveying filled cases from beneath said platform.

5. An apparatus for packing articles in cases as defined in claim 4 wherein said case conveyor extends substantially perpendicular to said article conveyor.

6. An apparatus for packing articles in cases as defined in claim 4 wherein said case conveyor extends parallel to and beneath said article conveyor.

7. An apparatus for packing articles in cases as defined in claim 4 further including an elevator mechanism for elevating an empty case beneath said platform to partially insert articles inverted by said platform into the open top of an empty case.

8. An apparatus for packing articles in cases as defined in claim 7 wherein the axis of rotation of said platform extends substantially perpendicular to the direction of movement of said article conveyor.

9. An apparatus for packing articles in cases as defined in claim 7 wherein the axis of rotation of said plat-

6

form extends substantially parallel to the direction of movement of said article conveyor.

10. An apparatus for packing articles in cases as defined in claim 7 wherein said articles to be packaged are collected on said platform in a single file and deposited in said cases one row at a time, and means for advancing said cases a distance equal to one row of articles after each row of articles is deposited therein until the case is filled.

References Cited

UNITED STATES PATENTS

1,243,406	10/1917	Hawthorne	53—243 X
2,157,642	5/1939	Vosler	53—392 X
2,679,963	6/1954	Neal	53—243 X
3,103,773	9/1963	Barzano	53—392
3,313,394	4/1967	Mills	53—143 X
3,309,840	3/1967	Bilaisis	53—243

WAYNE A. MORSE, JR., *Primary Examiner*.

U.S. Cl. X.R.

53—143, 243; 269—9