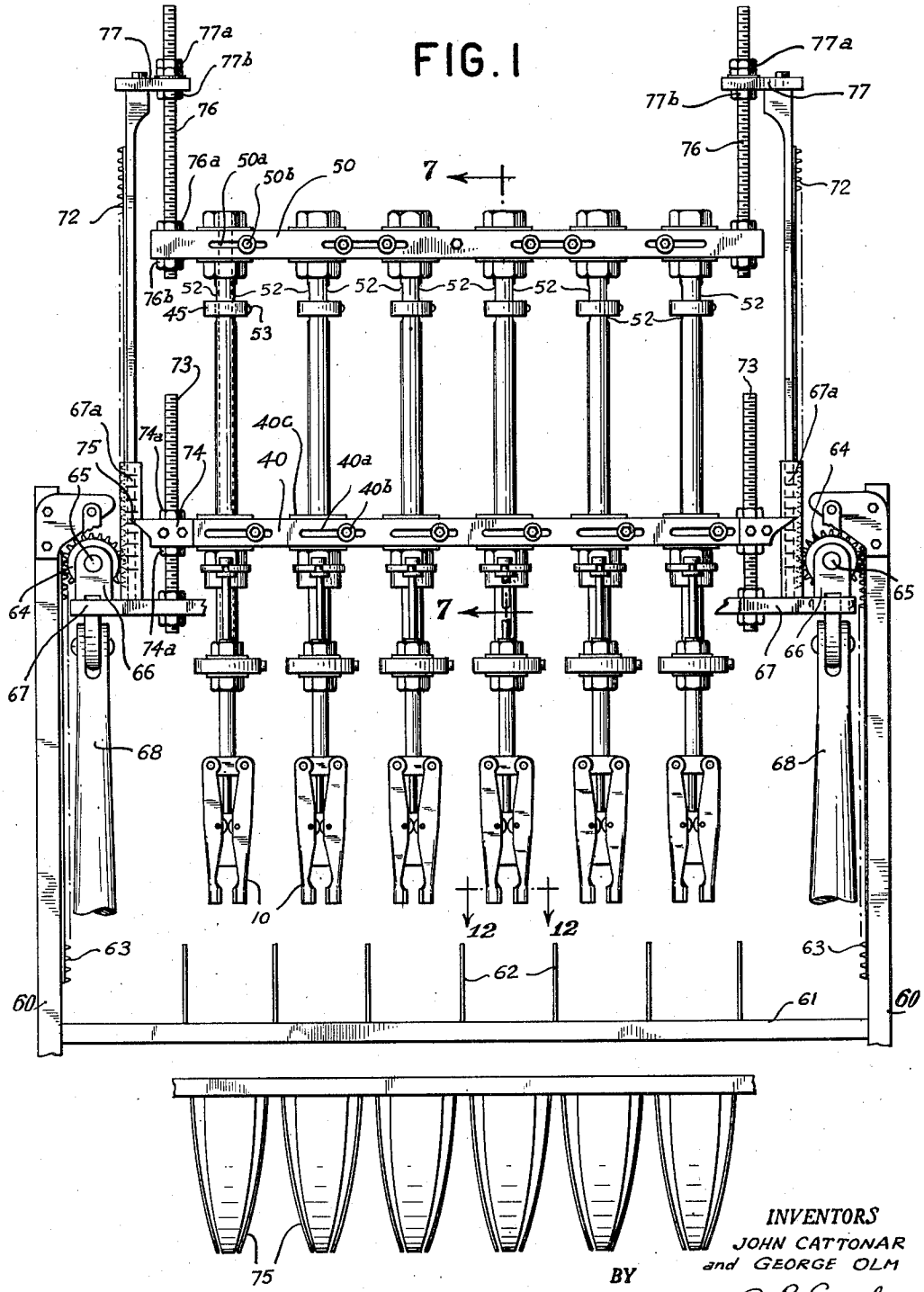
Oct. 10, 1950 J. CATTONAR ET AL 2,524,880

BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 1

FIG. 1



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Oct. 10, 1950 J. CATTONAR ET AL 2,524,880

BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 2

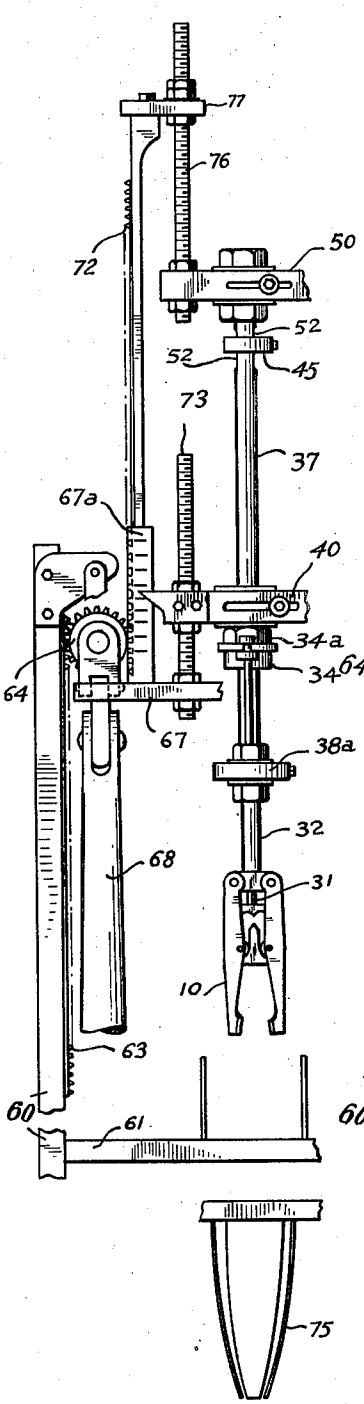


FIG. 2

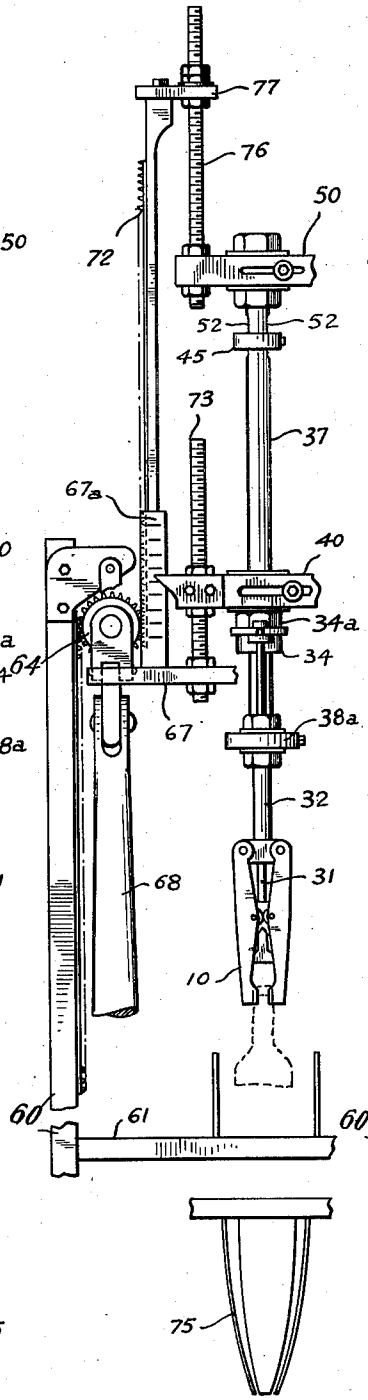


FIG. 3

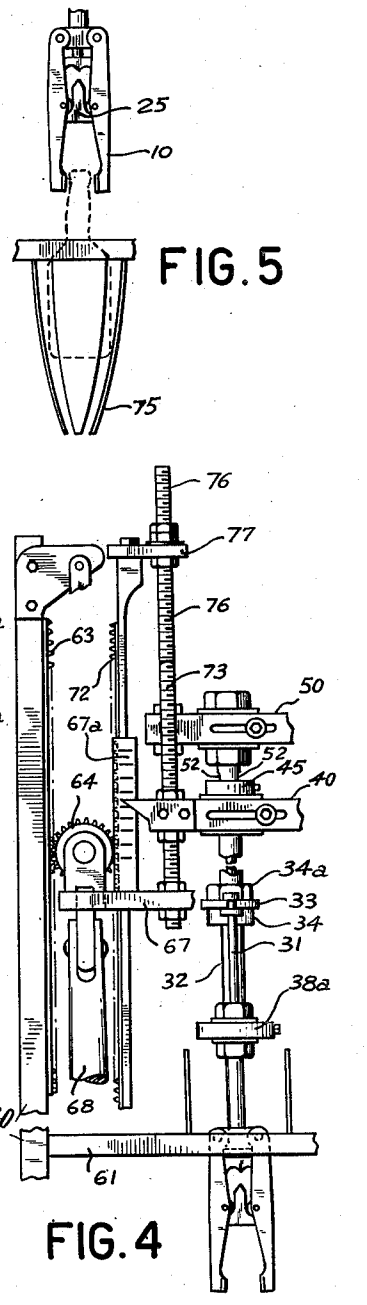


FIG. 5

FIG. 4

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Oct. 10, 1950 J. CATTONAR ET AL 2,524,880

BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 3

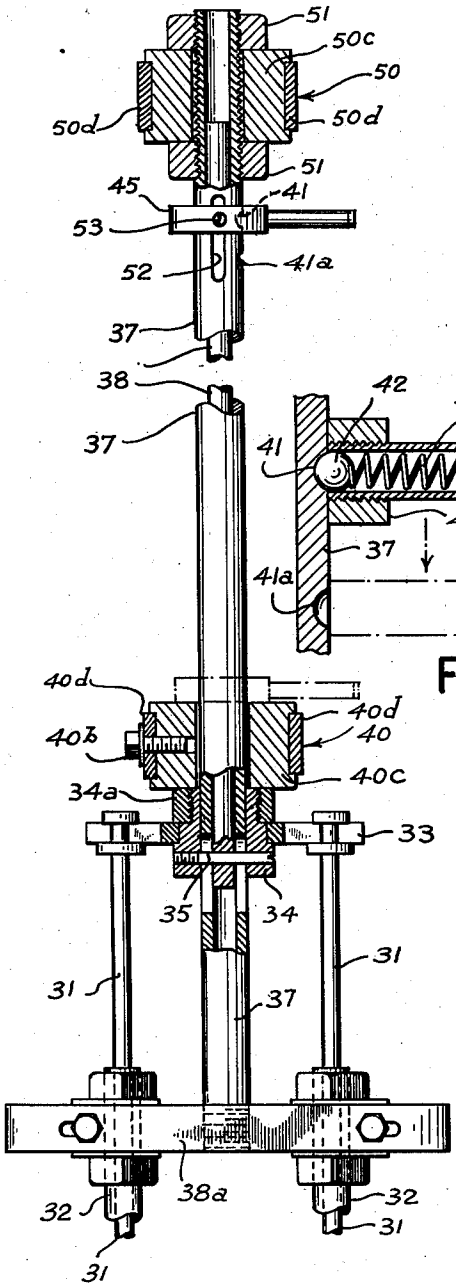


FIG. 6

FIG. 7

FIG. 8

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Oct. 10, 1950 J. CATTONAR ET AL 2,524,880

BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 4

FIG. 9

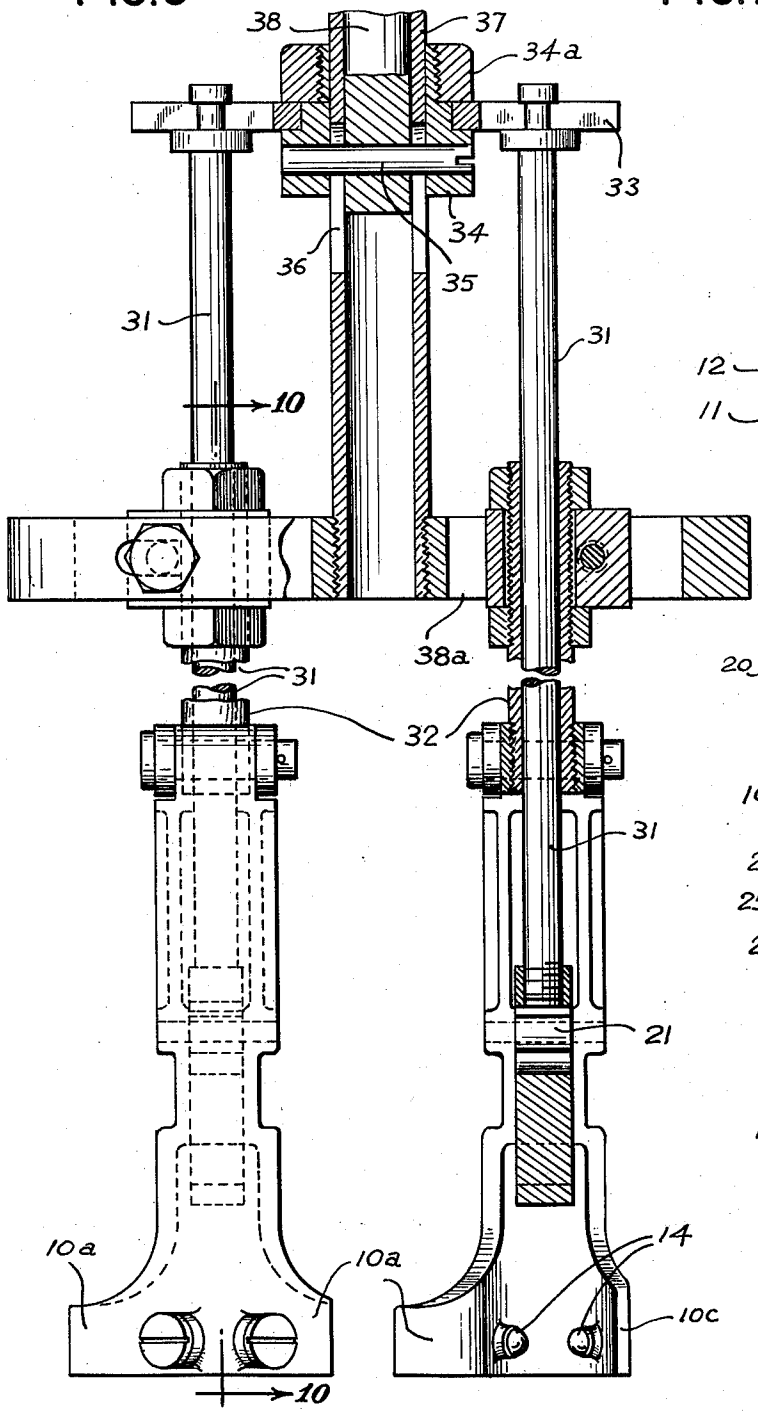
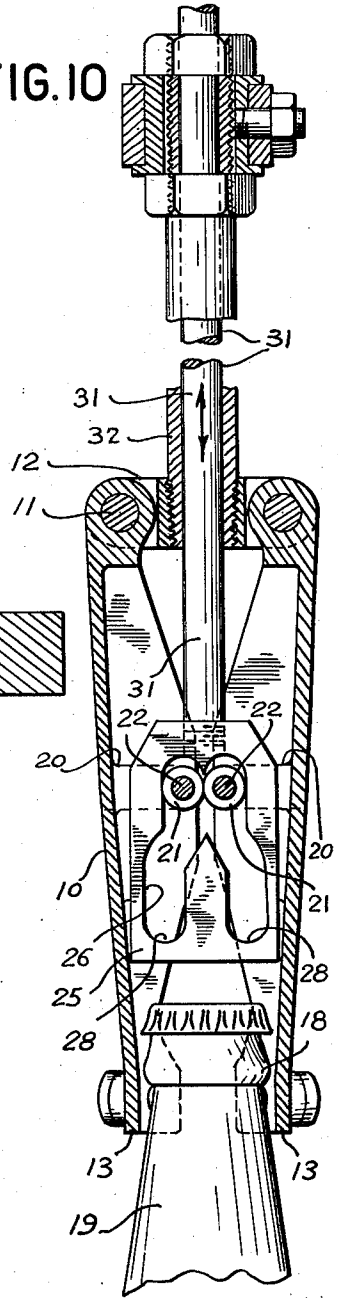


FIG. 10



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Oct. 10, 1950 J. CATTONAR ET AL 2,524,880

BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 5

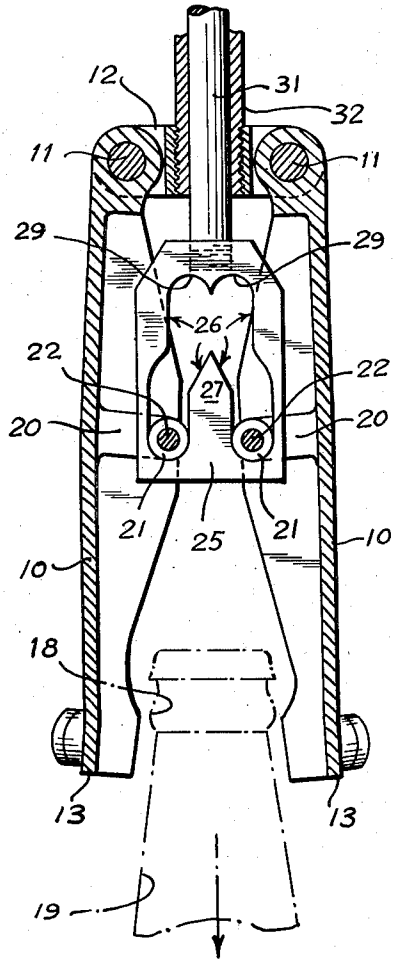


FIG. 11

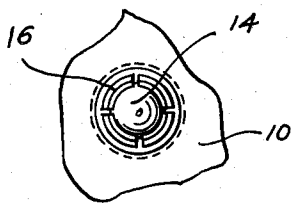


FIG. 13

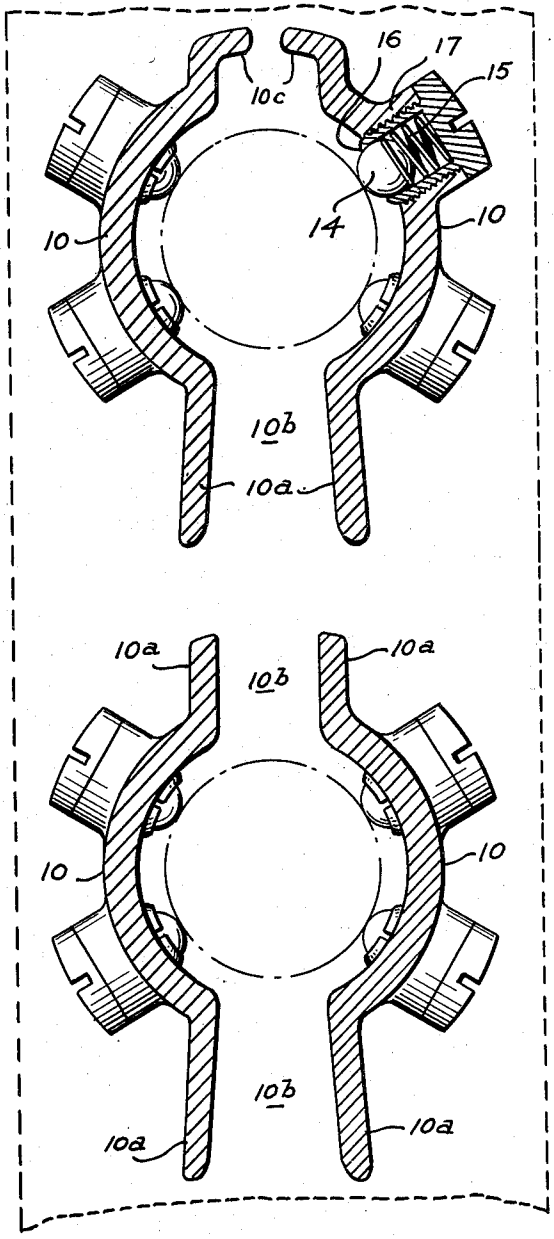


FIG. 12

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BOTTLE PACKAGING MACHINE

Filed Aug. 7, 1946 6 Sheets-Sheet 6

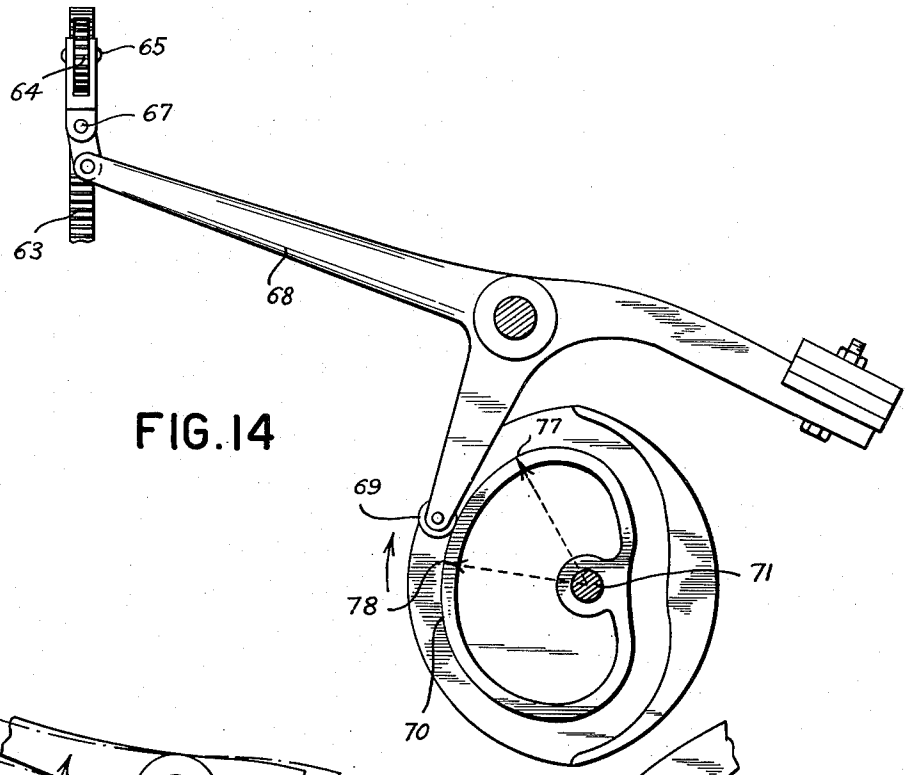


FIG. 14

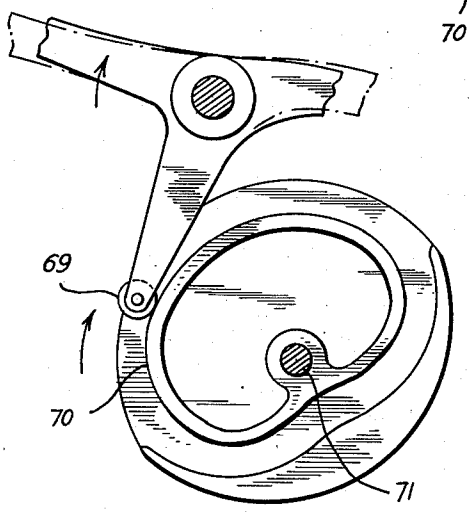


FIG. 15

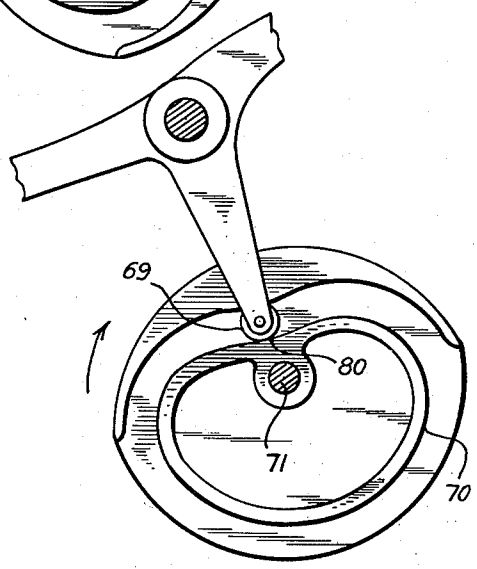


FIG. 16

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Patented Oct. 10, 1950 2,524,880

UNITED STATES PATENT OFFICE

2,524,880

BOTTLE PACKAGING MACHINE

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Application August 7, 1946, Serial No. 689,070

6 Claims. (Cl. 214—1)

1

This invention relates to packaging machines, in which bottles are received from suitable conveyors and then inserted into empty cases or crates, which cases or crates when filled are removed automatically from the packaging machines.

In such machines, the bottles, after having been positioned to be gripped by gripping mechanisms, were gripped by the same, and inserted into the cells of the cases or crates. The grippers were spring operated and the springs, either because of varying composition of the steel or with the run of time, weakened and did not perform up to expectation, thereby impairing the efficiency of the machine.

The object of the invention is to provide positively operating and actuated pairs of jaws, set in open or closed position alternately, and changed from open to closed position, and from closed to open position, at definite predetermined periods, in a manner that all jaws are actuated at the same time. At the same time, during such a positive gripping action, the jaws must have some resiliency at their gripping portions, to adapt the ends of the jaws to the neck of the bottle, and contact it at four or more points.

For this purpose, the invention consists of a pair of jaws, a support for the same, a pivot for one end of each jaw on said support, a cam plate within the jaws, and positive means on the jaws acting in predetermined relation with said cam plate, whereby in one relative position of the jaws and cam plate, the jaws are open to receive a bottle neck, and in another relative position of the jaws and cam plate the jaws are closed to grip the bottle neck. In the embodiment herewith shown and described, the lower ends of the jaws are provided with spring pressed balls which engage the outer contour of the bottle neck to provide a yieldability to the gripping action.

The invention consists further in providing means for changing the relative positions of the jaws and cam plate. These means consist essentially of a sleeve connected with the support for the jaws, and a rod connected with the cam plate, said sleeve being connected with one horizontal frame member and the rod being intermittently connected with another horizontal frame member, the two horizontal frame members being vertically raised or lowered, each at a different rate of speed in timed sequency with the feeding into and between a pair of jaws of a bottle, and with the jaws operating in a cycle, first with a gripping action of the jaws, then a descent with the gripped bottle, then a subsequent release of

2

the bottle from the jaws, and then the return ascent of the open jaws to a position to again enter into the cycle of operation just described. For this purpose, the sleeve and rod are provided respectively with collars which at certain times abut against that horizontal frame member which travels at the low rate of speed. Finally actuating means for the frame supports are provided which are cam controlled, to carry out the aforesaid cycle of operations.

In the embodiment shown and described, two aligned pairs of jaws are disposed, each pair to grip one bottle, and thereby load two bottles at the same time into the case or crate, and a certain number of such groups of two pairs of jaws each are laterally disposed from each other, to correspond with the number of cells or pockets, in one row of the case to be loaded, whereby two rows of bottles may be loaded into the case in one cycle of the machine, namely two rows of six bottles each, or half a case containing four rows of cells or twenty-four cells. If desired, the group may be arranged to contain three or four pairs of jaws, and the number of groups, laterally disposed, may also be different from six, so as to fill or load an entire case in one cycle of the machine.

The invention will be more fully described hereinafter, reference being made to the accompanying drawings, and the invention will be specifically pointed out in the appended claims.

In the accompanying drawings,

Fig. 1 is a front view of the improved machine;

Fig. 2 is a partial front view showing the initial position, with the jaws open;

Fig. 3 is the same view as Fig. 2, showing the first advanced position of all parts therein in the cycle of operation, with the jaws closed;

Fig. 4 is the same view as Fig. 2, showing the position of all parts therein just after the jaws have been reopened;

Fig. 5 is a front view of the jaws, opened to release the bottle;

Fig. 6 is a side view of the parts corresponding to the position shown in Fig. 2;

Fig. 7 is a side view of the parts taken on line 7—7 of Fig. 1, corresponding to the position of Fig. 3;

Fig. 8 is a section of the spring held ball engaging the sleeve;

Fig. 9 is an enlarged view of Fig. 7, partly in section showing also the gripper jaws;

Fig. 10 is a front view of the parts shown in Fig. 9, corresponding to the position of the parts shown in Fig. 3;

Fig. 11 is a front view of the jaws showing the open position of the same, corresponding to the position of the parts shown in Fig. 5;

Fig. 12 is a horizontal section taken on line 12—12 of Fig. 1;

Fig. 13 is a front view of the spring held ball in the gripper jaws;

Figs. 14, 15 and 16 are views showing the different positions of the cam, corresponding to the positions of Figs. 3, 4 and 5.

Similar characters of reference indicate corresponding parts throughout the various views.

Referring to the drawings, the jaws 10 are pivoted at 11 at their upper ends to a holder 12. The jaws extend downwardly to ends 13 which ends are provided with bottle gripping balls 14 seated in springs 15 held in sleeves 16 in screw threaded sockets 17 of the ends 13 of the jaws 10 (Fig. 12). The diameter of the ball 14 is slightly larger than the diameter of the open end of the sleeve 16, requiring a slight pressure on the ball to pass the walls forming the opening. The balls grip the bottle neck below the neck rim 18 of the bottles 19. Within each of the jaws 10, a bracket 20 is provided, each of which brackets 20 extends inwardly and at its inner end supports a roller 21 rotatably mounted on a pin 22.

Within the jaws 10, a plate 25 having a cam slot 26 is arranged. This cam slot 26 is bifurcated, forming a wedge 27 to separate the rollers 21, the continued passage of the rollers 21 in the cam slot 26 causing the rollers 21 to seat in the lower curved ends 28 of the cam slot. This position of the rollers in the cam slot corresponds to the open position of the jaws, as shown in Fig. 11. When the plate 25 is in its other extreme position, the rollers 21 are near the upper curved ends 29 of the cam slot, that is, the rollers 21 are closely together, as shown in Fig. 12, and the jaws are closed. The relative movement of cam plate and jaws takes place, and the holding of the jaws in open or in closed position takes place, under positive or controlled action and without springs.

The jaws convey the bottles from an upper level to which they are fed and there supported by a trap floor as described in U. S. Letters Patent No. 2,277,688 of March 31, 1942, to a lower level where they are released by the jaws, and dropped into the cases or crates, guided into their assigned places in the case by the spring leaves 75 (Figs. 1, 2, 3 and 5).

For that purpose, the jaws must be brought over the neck of the bottle in open position, then closed to grip the neck of the bottle, and convey the bottle downwardly to the lower level, when the jaws are opened for the release of the bottles. Immediately thereafter the jaws will return to the upper level while still in their open position and will remain so until they reach the last portion of their upward travel, at which time they will again close and grip the neck of the bottles for the next bottle-lowering operation.

To provide relative movement of the rollers 21, and plate 25, the cam plate 25 is secured to a vertical rod 31 which slides in a sleeve 32 fastened to the holder 12. The rod 31 extends upwardly and has its upper end secured to a horizontal bracket 33 (Fig. 9) loosely mounted between collar 34 and nut 34a. A pin 35 through the lower portion of collar 34 connects the collar 34 with a rod 38 which is slidably inserted in the sleeve 37. Slots 36 cut in the sleeve 37 will allow a certain amount of vertical motion to the pin 35, while the rod 38 slides in sleeve 37. This

sleeve 37 has its lower end secured to a horizontal plate or frame member 38a, which supports the sleeve 32 into which the cam plate rod 31 slides.

As the embodiment shown, provides for two bottles to be lowered at the same time, the bracket 33 extends diametrically opposite beyond the collar 34, and supports a pair of cam plate rods 31, and the plate 38a supports a pair of spaced sleeves 32 with each of which a pair of the jaws 10 are connected through the support 12. The lower part of Fig. 9 shows the exterior of one of the pairs of jaws and the interior of one of the other pairs of jaws. To permit the passage of a bottle through the front pair of jaws, shown on the left of Fig. 9, to a position in the jaws on the right of Fig. 9, the jaws 10 in Fig. 12, are provided with extensions 10a, and disposed to form spaces 10b. The furthest inward pair of jaws 10 have at their inward portions inwardly extending parts 10c, to prevent the bottle from moving beyond the same (Fig. 12).

Immediately above the collar 34, the upper end of the sleeve 37 passes through the frame member 40 (Figs. 6 and 7).

The sleeve 37 is provided with vertically spaced grooves 41 each intermittently engaged by a ball 42 pressed by a spring 43 arranged in a tubular member 44 extending from a collar 45 surrounding the sleeve 37. A screw adjustment 46 to regulate the pressure of the spring is provided.

The sleeve 37 has two vertically disposed slots 52 diametrically opposite with each other. A pin 53 passes through the slots 52 and is secured to the collar 45 and to the rod 38.

The sleeve 37 is secured at its upper end to a frame 50, by nuts 51, one above and one below the frame 50.

The jaws 10 are intended, as known, to carry the bottles from one horizontal level to a lower horizontal level, namely to the cases being filled. Thus, when the bottles, on the higher level, are placed in position for the gripping operation, the jaws are on the last portion of their upward motion and still open. During this last portion of their upward travel the jaws are closed thereby gripping the neck of the bottle and the upward motion of the gripping mechanism will cease. The trap floor operates to remove the support from under the bottles, and the jaws will start their downward movement with the bottles gripped between them until the bottles almost seat themselves on the bottom of the cases. The jaws are opened, and the jaws then reverse their vertical directional movement and return upwards while in open position. When they approach their upward position, a new supply of bottles have been positioned below the open jaws, when the jaws again will close, and repeat their operations as described.

To perform these operations, the machine, a front view of which is shown in Fig. 1, has its vertical standards 60, one on each side, supporting a table portion 61 to which the bottles are fed and aligned between guards 62. This table portion 61 is provided with a trap floor (not shown, but shown and described in U. S. Letters Patent No. 2,332,058, as an example). The inner sides of the standards 60 are provided with racks 63, each engaged by a pinion 64 on a shaft 65, supported by a bracket 66 on a movable support 67, the lower part of which is connected with a lever 68, suitably connected with a follower 69 actuated by a cam 70 on a shaft 71 (Figs. 14, 15 and 16).

Upon the support 67 and in a guide 67a is slidably mounted a rack 72 substantially parallel to rack 63 and also meshing with pinion 64. The support 67 has also arranged thereon a vertical spindle 73, which passes through the frame 40 and engages corresponding threaded nuts 74a in an extension 74 of the horizontal frame member 40. The rack 72 has a gauge applied thereto, and the extension 74 has a pointer 75. The nuts 74a enable the adjustment of the spacing of the frame member 40 to be made and the gauge enables the amount of spacing to be read. The frame member 40 has a plurality of slots 40a, through which bolts 40b pass to engage the collars 40c (Figs. 1, 6 and 7). The bolt 40b and slot 40a permit a lateral adjustment of the collar 40c between the parallel long sides 40d of the frame member 40 to be made.

The upper horizontal frame 50 spaced above and parallel with the horizontal frame 40, has slots 50a, bolts 50b to engage collars 50c, and these serve also for lateral spacing adjustment between the parallel long sides 50d of the frame 50, substantially as the lateral adjustment in the frame 40 therebelow (Figs. 1, 6 and 7).

The frame 50 is supported at its ends by spindles 76 which pass through the ends of the frame, and the spindles 76 are secured to the frame 50 by upper and lower nuts 76a and 76b. The spindles 76 are supported by brackets 77 above and below which nuts 77a and 77b are provided and which engage the spindles 76. The bracket 77 is secured to the upper end of the rack 72. The spacing of the frame 50 in its proper relationship with frame 40 may thereby be made, so as to suit the height of the bottle being handled.

Finally, the leaf springs are attached to a frame which travels up and down in timed synchronism with the bottle load. (See U. S. Patent No. 2,332,058.)

The operation of the machine is as follows:

The position of the parts in their initial position is shown in Fig. 2. The jaws 10 are open, the infeeding of a pair of bottles from the front of the machine to the rear thereof, having placed a bottle neck between each pair of jaws 10 (see Fig. 3). This infeeding takes place while the follower 69 passes over the circular portion 77—78 of the cam 70, which is concentric to the shaft 71 (Fig. 14). The cam 70 then raises the follower 69 (Fig. 15) and the support 67 is thereby raised from the position shown in Fig. 2 to the position shown in Fig. 3. The frame 50 ascending, vertically moves the sleeve 37, secured thereto, which sleeve 37 moves freely through the frame 40. But the collar 34 which abuts against the lower surface of the collar 40c is retarded, consequently the pin 35, rod 38, bracket 33, rods 31 and cams 25 are also retarded by their temporary contact with the frame 40 which travels at a lower rate of speed than the frame member 50. At the same time, the frame member 50, sleeve 37, plate 38a, the sleeves 32, brackets 12 and the jaws 10 continue at the higher rate of speed because of their direct connection with the sliding rack 72. The rollers 21 thereby enter the upper parts of the cam slots of the cam plate 25 held by the lower end of the rod 31. The jaws 10 are thereby closed as shown in Fig. 3 and grasp the bottle neck.

The cam follower 69 then descends on the cam, and in consequence the lever 68 descends, moving the pinion 64 downwards thereby causing the rack 72 to descend until the follower reaches its

lowest position on the cam, as at 80 (Fig. 16), the corresponding position of the parts being shown in Fig. 4.

However, the frames 40 and 50 are so adjusted in respect to each other, that just when this lowest position is reached, the collar 45 abuts against the upper surface of the collar 40c. The pin 53 of this collar 45 locked to the rod 38 retards the rod 38, but does not impede the downward movement of the sleeve 37 by reason of the slot 52, whereby the advancing sleeve 37 moves the jaws 10 downwardly and thereby the rollers 21 downwardly in the cam slot, and against the cam 26, into the bifurcations, whereby the jaws 10 are opened as shown in Fig. 11. The bottle drops. The time element of this cam slot action, corresponds to the spacing between the two grooves 41 on the sleeve 37, and the ball 42 is thereby moved into the upper groove 41 as shown in Fig. 8. The action of the spring 43 is sufficiently strong to hold the ball 42 in the upper groove 41 of the sleeve 38, so that the collar 45 locked to the rod 38 by means of pin 53 holds the rod 38 and sleeve 37 together so that they move together in their upward or return movement, whereby the jaws 10 are maintained in their open position during the returning ascent.

With the abutting of the collar 34 against the lower surface of the collar 40c as in Fig. 3, the collar 45 by means of its direct connection with the collar 34, through the pin 53, rod 38, and pin 35, is forced out of the upper groove 41 to the lower groove 41a.

The ascent and descent of the jaws with relation to the ascent and descent of the cams 25 is governed by the relative motion of the frames 40 and 50 as positively set by the proper spacing, by means of the spindles 73 and 76. The jaws being open, until the follower reaches point 77 on the cam 70, when for a time the frames do not ascend, during which time (the travel of the follower on the cam from 77 to 78), a new set of bottles are positioned between the open jaws.

The cam position of Fig. 14 corresponds to the position of the parts in Fig. 3; the cam position of Fig. 15 corresponds to the position of the parts in Fig. 4, and cam position of Fig. 6 corresponds to the position of the parts where the bottles are being released into the case.

Fig. 6 corresponds to the position of the parts in Fig. 2, and Fig. 7 corresponds to the position of the parts in Fig. 3.

We have described several forms of our invention, but obviously various changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claims.

We claim:

1. In a packaging machine, the combination of a pair of jaws, a support for the same, a pivot shaft for one end of each jaw on said support, a cam plate having cam grooves disposed within the jaws, positive means on each jaw acting on said plate in the groove thereof, and spring pressed balls at the tip of the jaws for providing a four point contact with the bottle, whereby in one relative position of the jaws and cam plate, the jaws are open to receive a bottle neck, and in another relative position of the jaws and cam plate the jaws are closed to grip the bottle neck.

2. In a packaging machine, the combination of a pair of superposed horizontal bars, a sleeve connected with the upper of said bars and passing through the lower horizontal bar, a rod movable within the sleeve, a cam plate connected with the

rod, a jaw support connected with the sleeve, jaws on said jaw support, rollers on the jaws engaging the cam plate, a collar on said rod below the lower horizontal bar, a collar on said rod above the lower horizontal bar, and means for vertically moving the horizontal bars including means for moving the upper horizontal bar faster than the lower horizontal bar, for moving the sleeve and rod in respect to each other for closing the jaws, when the lower collar abuts the lower side of the lower bar, and moving the closed jaws downwardly, then opening the jaws when the upper collar abuts the upper side of the lower bar, and moving the open jaws upwardly, said sleeve having vertically spaced grooves, and said upper collar having a ball intermittently engaging either groove, and a spring for the ball, the spring being sufficiently strong to prevent the sleeve and rod moving in respect to each other by the action of gravity.

3. In a packaging machine, the combination of at least two pairs of jaws, one of said pairs having curved opposed portions for receiving the neck of a bottle and parallel flanges on opposite sides of said curved portions, and the other pair of jaws having curved opposed portions for receiving the neck of a bottle, parallel inlet flanges on one side of said curved portions adjacent to and substantially in alignment with the parallel flanges on one side of one of said pairs of jaws, and inwardly extending portions at the other end preventing the passage of a bottle neck.

4. In a packaging machine, the combination of a support, a pair of gripping jaws connected to said support for relative opening and closing movement, cam means for positively closing said jaws, and spring urged balls in opposing faces of said jaws for resilient engagement with the neck of a bottle when said jaws are closed.

5. In a packaging machine, the combination of a vertically movable sleeve, a shaft shiftable axially of said sleeve, a gripping member including a pair of jaws mounted on said sleeve for

movement therewith, camming means connected with said shaft and movable therewith for opening and closing said jaws upon sliding movement of said shaft relative to said sleeve, means for moving said sleeve up and down in a path of predetermined length, means for shifting said shaft axially relative to said sleeve near the ends of said path, and resilient means on said shaft engaging said sleeve for retaining said shaft in the position into which it has been shifted near one end of the path until said sleeve approaches the other end of said path.

6. In a packaging machine, the combination of a vertically movable sleeve, a shaft shiftable axially of said sleeve, a gripping member including a pair of jaws mounted on said sleeve for movement therewith, camming means connected with said shaft and movable therewith for opening and closing said jaws upon sliding movement of said shaft relative to said sleeve, means for moving said sleeve up and down in a path of predetermined length, means for shifting said shaft axially relative to said sleeve near the ends of said path, a pair of axially spaced recesses in said sleeve, resiliently urged means carried by said shaft and alternately engageable in said recesses for retaining said shaft in the position into which it has been shifted near one end of the path until said sleeve approaches the other end of said path.

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GEORGE OLM.

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