March 11, 1969 H. G. GENTRY 3,431,826

MACHINE AND METHOD FOR FOLDING AN INSERT

Filed March 27, 1967 Sheet 1 of 3

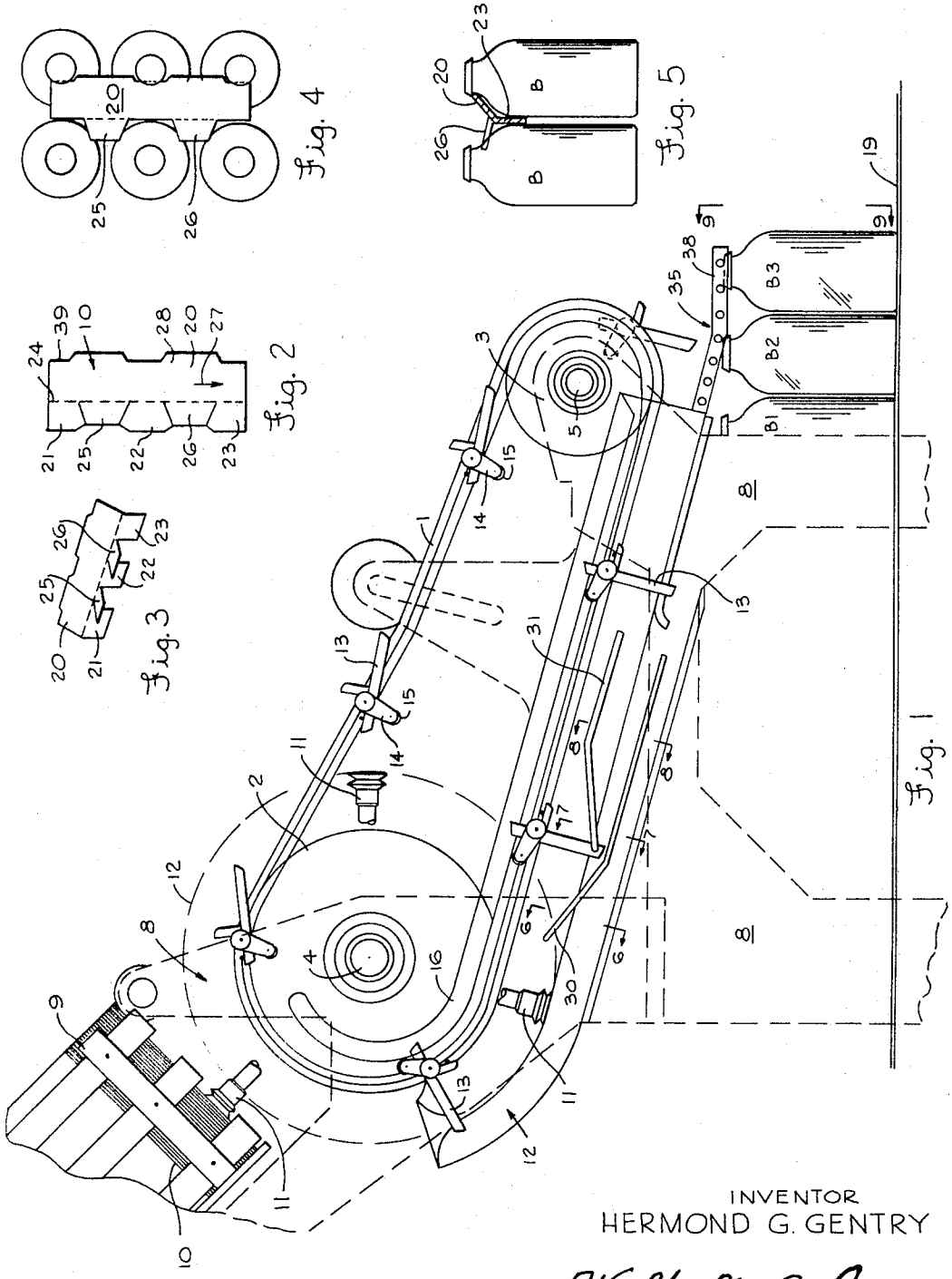


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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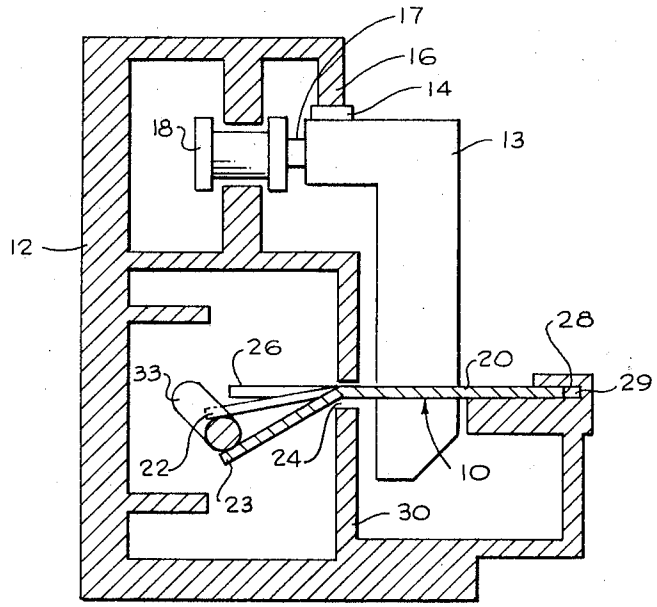


Fig. 6

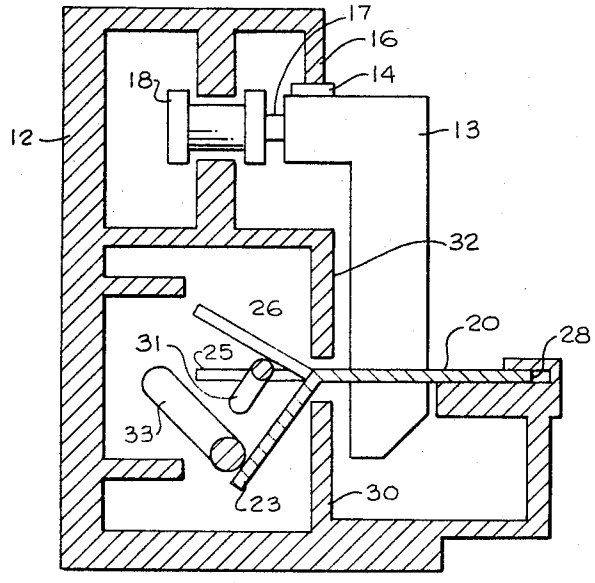


Fig. 7

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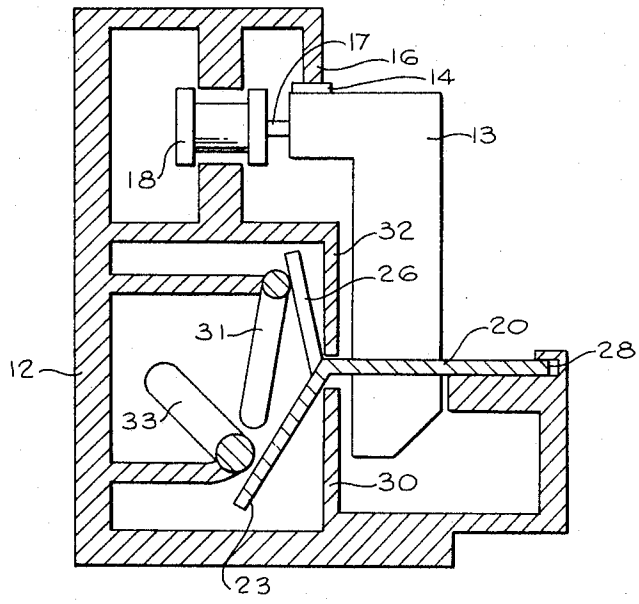


Fig. 8

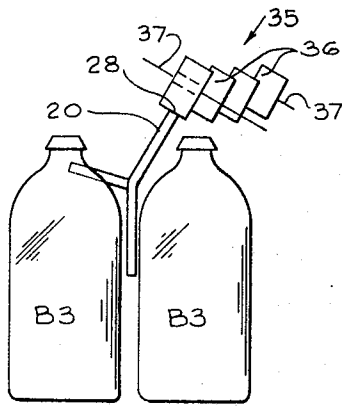


Fig. 9

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MACHINE AND METHOD FOR FOLDING AN INSERT

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Filed Mar. 27, 1967, Ser. No. 626,044
U.S. Cl. 93—1 6 Claims
Int. Cl. B31d 5/04; B31b 1/36

ABSTRACT OF THE DISCLOSURE

The machine and method as disclosed herein comprises an endless conveyor disposed adjacent a hopper containing a plurality of inserts together with a feeder mechanism arranged to withdraw the inserts from a hopper and to place them under control of the conveyor. As the inserts are moved along the working reach of the conveyor, they encounter a guide groove and main positioning means along which they are slidably moved. A fixed main tab folding guide is disposed alongside said positioning means and is configured so as to engage an elongated tab forming a part of the insert and to fold the tab out of the plane of the insert. Auxiliary positioning means is also disposed adjacent the main positioning means but on the opposite surface of the insert and an auxiliary tab folding guide is disposed on the same side of the insert as is the auxiliary positioning means and is arranged to engage and fold one or more auxiliary tabs out of the plane of the insert.

While the machine and method of this invention is not limited to use with any specific insert, the insert disclosed and claimed in United States Patent 3,258,190 issued June 28, 1966, is particularly well suited for use in conjunction with this invention.

The insert as disclosed and claimed in U.S. Patent 3,258,190 is particularly well suited for use in conjunction with bottle carriers of the wrap-around open-ended sleeve type. Since packages of this type are ordinarily formed on automatic machines which may operate at high speeds in a manner to form packages as the articles to be packaged are moved continuously, it is necessary that a machine and method for placing an insert in a package of this type be well adapted for high speed automatic operation. Furthermore, such a machine should be relatively simple in construction and should lend itself for adjustable operation at the speed at which the associated packaging machine is operated.

A machine and method according to this invention in one form may comprise a fixed guide groove arranged to receive an edge of the main panel of an insert to the opposite edge of which one or more elongated tabs are foldably joined together with one or more shorter auxiliary tabs. Main positioning means is disposed along the fold line by which the elongated tab or tabs are foldably joined to the main panel of the insert and a fixed main tab folding guide is arranged to engage the outer extremity of the elongated tab and is configured to impart folding movement thereto about the fold line between said tab and the main panel of the insert. In addition, an auxiliary tab folding guide and auxiliary positioning means may be disposed so as to engage and fold the auxiliary ribs as the insert moves along the ribs and along the guide groove. Means for placing the folded insert into a group of articles to be packaged is effective following folding thereof and before placement of the wrapper about the group to be packaged.

For a better understanding of the invention reference may be had to the following detailed description taken in conjunction with the accompanying drawing in which

FIG. 1 is a side view of a machine constructed according to this invention; FIG. 2 is a plan view of an insert blank which is placed atop a group of articles by the machine shown in FIG. 1; FIG. 3 is a perspective view of an insert constructed according to FIG. 2 and shows the insert after its various tabs have been manipulated into their service positions; FIG. 4 is a top view of a group of articles showing the insert of FIG. 3 in its service position atop and between the articles to be packaged; FIG. 5 is an end view of the structure depicted in FIG. 4; FIG. 6 is a cross-sectional view of a portion of the machine depicted in FIG. 1 and taken along the line designated 6—6; FIG. 7 is a cross-sectional view taken along the line designated 7—7 in FIG. 1; FIG. 8 is a cross-sectional view of a portion of the machine depicted in FIG. 1 and taken along the line designated 8—8 and in which FIG. 9 is an end view of a portion of the machine of FIG. 1 taken approximately along the line designated 9—9 in FIG. 1.

With reference to the drawings, the machine as depicted in FIG. 1 comprises an endless conveyor designated by the numeral 1 which is movably supported on sprockets 2 and 3 rotatably mounted on shafts 4 and 5. Shafts 4 and 5 are suitably supported on frame structure generally designated by the numeral 8. A fixed hopper 9 is disposed adjacent the sprocket 2 and is provided with a supply of insert blanks 10 such blanks being depicted in FIG. 2. Blanks 10 are fed individually from hopper 9 by a schematically depicted feeder mechanism generally designated by the numeral 11. The feeder mechanism 11 preferably comprises a plurality of suction cups which are rotatably mounted and movable in a path schematically designated by the dotted line 12. Thus the lowermost insert 10 in the hopper 9 is engaged by a particular suction cup and is drawn outwardly therefrom and downwardly into the fixed guide structure generally designated by the numeral 12 and is there released. Following release of a particular insert 10, a particular feeder finger 13 mounted on conveyor 1 moves in behind the trailing edge of the insert and pushes the insert downwardly and toward the right as viewed in FIG. 1.

In FIG. 1 of the drawings, the endless conveyor 1 is shown schematically. It will be understood that this conveyor preferably is in the form of a chain on the pins of which feeder fingers 13 are pivotally mounted. Preferably each feeder finger 13 is provided with a rigid transversely disposed arm 14 on which a roller 15 is rotatably mounted. Rollers 15 are arranged sequentially to engage a fixed positioning cam designated in the drawing by the numeral 16. Thus when a particular roller 15 engages fixed cam 16, its associated feeder finger 13 is projected outwardly and downwardly so as to provide a firm feeder structure by which a particular insert is fed downwardly and toward the right.

As may be observed in FIG. 6 the feeder finger 13 is disposed immediately behind the insert 10. The particular feeder finger 13 depicted in FIG. 6 is pivotally mounted on chain pin 17 which also constitutes a mounting for one end of link 18 forming an integral part of conveyor 1. Projecting arm 14 is visible in FIG. 6 and is seen to be riding along the lower surface of fixed cam 16.

From the description thus far it is apparent that inserts 10 are fed from hopper 9 and deposited atop and between the bottles B as they move along a supporting plate 19 and before a particular group of bottles is supplied to a packaging machine which effects a packaging operation by simply forming a wrapper about the bottle group.

The inserts 10 as shown in FIGS. 2, 3, 4 and 5 comprise a main panel 20 to which a plurality of elongated tabs 21, 22 and 23 are foldably joined along the fold line 24. Auxiliary tabs 25 and 26 are interspersed between

elongated tabs **1**, **2** and **3** and are foldably joined to the main panel **10** along a common fold line **24**.

As is apparent from FIG. 3, the main panel **20** is disposed at an angle relative to the elongated tabs **21**, **22**, **23** and the auxiliary tabs **25**, **26** are disposed at an angle to both the main panel **20** and the elongated tabs **21**, **22** and **23**.

From FIGS. 4 and 5 it is apparent that the main panel **20** of the insert is disposed alongside the necks of the bottles in the right hand row of bottles and the elongated tabs **21**, **22** and **23** are disposed between pairs of bottles in different rows, the auxiliary tabs **25** and **26** being disposed atop and resting on the shoulders of the middle bottle in the left row and the end bottles in that row.

The machine and method of this invention must manipulate the elongated tabs **21**, **22** and **23** out of the plane of main panel **20** and must also fold auxiliary tabs **25** and **26** at an angle relative to the main panel **20** and the tabs **21**, **22** and **23** and must then place the insert in its service position as depicted in FIGS. 4 and 5.

Folding of a particular insert **10** at the position designated **6—6** has progressed to the stage indicated in FIG. 6. As is best shown in FIG. 2 the insert is moving in the direction indicated by the arrow **27** with the right hand edge **28** of main panel **20** captured within the fixed guide groove **29**. Positioning means **30** may constitute a fixed rib and is disposed in general coincidence with the fold line **24**. Since the outer extremity of elongated tab **23** extends to the left a distance somewhat farther than the adjacent auxiliary tab **26**, the outer extremity of elongated tab **23** is engaged by a part of fixed main tab folding guide **33** and the tab **23** folded downwardly as depicted in FIG. 6. At this stage, the elongated tab **23** is disposed behind and underneath the fixed main tab folding guide **33** and its outer extremity is depicted in dotted lines. The auxiliary tab **26** and auxiliary tab **25** are disposed in the plane of main panel **20**.

As the operation progresses to the position depicted in FIG. 7, the auxiliary panel **26** has been folded by the fixed auxiliary tab folding guide **31** upwardly and out of the plane of main panel **20**. This folding operation is facilitated by auxiliary positioning means **32**. Of course, the elongated tabs **23**, **22** and **21** are by now disposed in alignment as depicted by the position of tab **23** in FIG. 7. At this stage of the operation, auxiliary tab **25** is disposed within the plane of the main panel **20**.

As the operation progresses, the parts appear as depicted in FIG. 8 with the main panel **20** disposed in a horizontal plane and with the elongated tabs **23**, **22** and **21** disposed as indicated at **23** and with the auxiliary tabs **25** and **26** disposed as indicated at **26**. At this stage the insert **10** is completely folded and ready for insertion atop the bottle group designated at B1, B2 and B3.

For the purpose of pressing the insert into the bottle group, yieldable biasing means generally designated by the numeral **35** is employed. Such means comprises a plurality of rotatably mounted rollers **36** mounted on pins **37** and supported by bracket **38**. Thus the rollers **36** ride atop the main panel **20** and generally along the edge **28** of each insert **10**.

Since the edge **28** is provided with notches **39**, the rollers are well adapted to urge the insert **10** to a position wherein the notches **39** lie immediately underneath the caps of the associated bottles in one row.

From the description above, it is apparent that the machine of this invention may readily be driven from the same motive means as that which is used to drive the packaging machine into which the bottle groups such as that generally depicted in FIG. 9 are fed so that synchronization of the two machines is insured. Furthermore the speed of the two machines is thus automatically correlated so that smooth and easy coordinated operation is achieved according to one facet of the invention.

While a particular machine and method have been shown and described, it will be understood that the invention is not limited thereto and it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A machine for engaging the outwardly protruding ends of an elongated tab and of a shorter auxiliary tab foldably joined to a main panel of a bottle carrier insert and for folding said tabs relative to said panel, said machine comprising a fixed guide groove arranged to receive an edge of said main panel remote from said tabs, main positioning means engageable with said insert along the fold line therein between said tabs and said main panel, means for engaging a part of said insert and for imparting movement to said insert along said guide groove and positioning means, a fixed main tab folding guide disposed alongside said positioning means on a side thereof remote from said guide groove for engaging the outer extremity of said elongated tab, said tab folding guide being configured so as to fold said tab to a position of angular relation to said main panel, auxiliary positioning means disposed on the opposite side of said insert from said main positioning means and engageable with said insert along the fold line therein between said main panel and said auxiliary tab, and a fixed auxiliary tab folding guide disposed alongside said auxiliary positioning means on a side thereof remote from said guide groove for engaging and folding said auxiliary tab out of the plane of said main panel, said folding guide being arranged with respect to the insert and with respect to their associated positioning means so as to cause said tabs to fold in opposite directions.

2. A machine for engaging an outwardly protruding end of an elongated tab foldably joined to a main panel of a bottle carrier insert and for folding said tab relative to said panel, said machine comprising a fixed guide groove arranged to receive an edge of said main panel remote from said tab, main positioning means spaced from said guide groove and engageable with said insert along the fold line therein between said tab and said main panel, means disposed above said guide groove and positioning means and having a part movable therebetween for engaging the trailing edge of said main panel of said insert and for imparting movement to said insert along said guide groove and positioning means, and a fixed main tab folding guide disposed alongside said positioning means on a side thereof remote from said guide groove for engaging the outer extremity of said tab, said tab folding guide being configured so as to fold said tab to a position of angular relation to said main panel.

3. A machine according to claim **2** wherein an auxiliary tab is foldably joined to said main panel along a fold line which is coincidental with the fold line between said main panel and said elongated tab and disposed alongside said elongated tab and of shorter length than said elongated tab and wherein auxiliary positioning means is engageable with said insert along the fold line therein between said main panel and said tabs, said auxiliary positioning means being disposed on the side of said insert opposite from said main positioning means and wherein a fixed auxiliary tab folding guide is disposed alongside said auxiliary positioning means on a side thereof remote from said guide groove for engaging and folding said auxiliary tab out of the plane of said main panel.

4. A machine according to claim **3** wherein said main and said auxiliary folding guides are arranged with respect to the insert and with respect to their associated main and auxiliary positioning means so as to cause said elongated tab and said auxiliary tab to fold in opposite directions.

5. A machine according to claim **3** wherein the insert comprises a main panel and at least a pair of elongated main tabs foldably joined in spaced relation to the main panel with at least one auxiliary tab interspersed between said main tabs and wherein said main and auxiliary fold-

ing guides are configured and disposed alternately to engage their respective tabs in sequence.

6. A method of folding a long and a short folding tab relative to the plane of a main panel to which said tabs are adjoined along a common fold line, the method comprising moving the main panel and tabs along a predetermined path in the general direction of alignment of the tabs, engaging the outer extremity of the long tab at a point thereon beyond the outer extremity of the short tab and folding it bodily out of the plane of the main panel and subsequently engaging the short tab and folding it out of the plane of the main panel in a direction opposite to the direction of folding of the long tab.

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BERNARD STICKNEY, *Primary Examiner.*

U.S. Cl. X.R.

93—52; 53—48