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PACKAGING MACHINE AND METHOD

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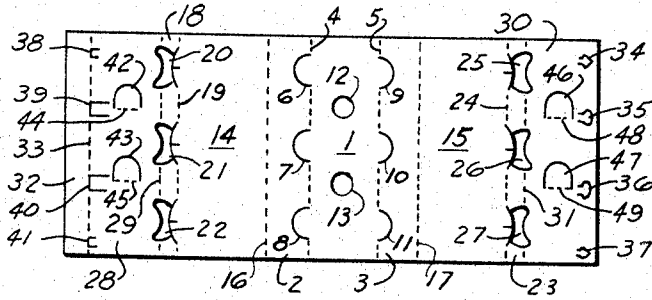


Fig. 1

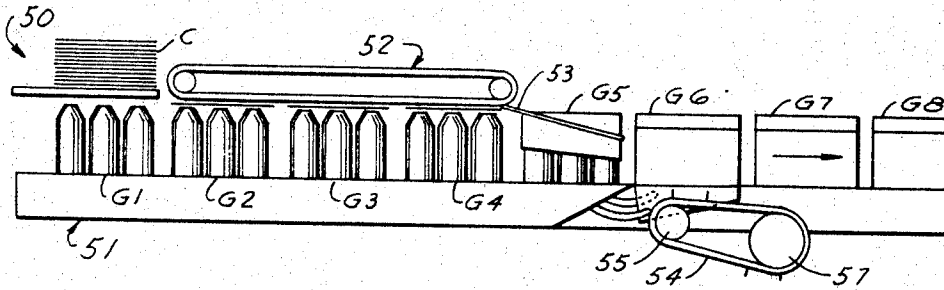


Fig. 2

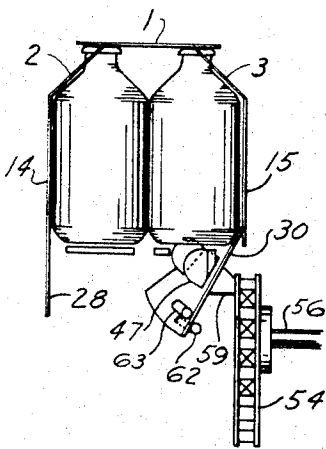


Fig. 4

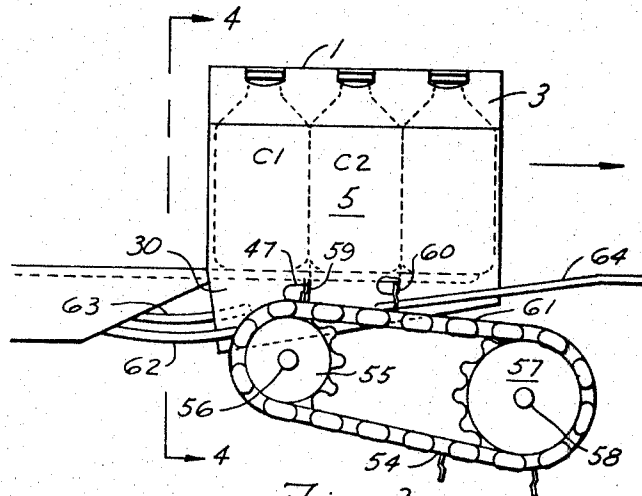


Fig. 3

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PACKAGING MACHINE AND METHOD

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This invention relates to a packaging machine and method and more particularly to the application of a wrap around type of carton blank to a group of articles to be packaged and wherein transverse article separating tabs are struck from the bottom of the wrapper for affording protection against breakage or other damage, this invention being devoted in part to simultaneously folding such transverse cushioning tabs out of the plane of the panel from which they are struck while the folding of such panel is being effected.

In order to afford protection against breakage or other damage due to collisions between adjacent articles to be packaged, it is the current practice either to separate the articles by a separate partition or to provide separating means in the form of tabs which may be struck from the bottom or the top of the wrapper and which protrude inwardly to occupy positions between adjacent articles. Such tabs may be either transversely disposed with respect to the wrapper or may take the form of a medial keel or a plurality of medial tabs which serve as article separating means.

Wrapper type packages are known wherein transverse article separating tabs are struck from the bottom panel and folded into positions between adjacent articles so as to afford protection therefor. Such known packages are formed by known machine which fold the transverse tabs out of the plane of the panel from which they are struck prior to positioning of the articles to be packaged on such panel. In carriers of the wrapper type such for example as are disclosed in U.S. Patent 2,786,572, transverse separating tabs may be employed but such tabs may not be folded into their service positions prior to placement of the articles to be packaged on the bottom of the carrier because the bottom panel is a composite structure comprising a pair of lap panels which are folded underneath the group of articles and then secured to each other.

A principal object of this invention as applied to a carrier having bottom lap panels is to provide an improved machine and method for folding transverse article separating tabs out of a bottom lap panel from which they are struck simultaneously with the bottom folding operation of the bottom lap panel itself.

Another object of the invention is the provision of an improved packaging machine wherein tucking means for folding transverse article separating tabs out of a wrapper lap panel also serves to guide the insertion of the separating tabs into positions between pairs of adjacent articles respectively.

The invention in one form as applied to a packaging machine and method is for the purpose of adapting such a machine for manipulating transverse separating tabs formed in at least one bottom lap panel of a wrapper and comprises an endless conveyor having a tucking reach disposed below and in alignment with the path of movement of the articles to be packaged, at least one tucking stud mounted on the conveyor and arranged to move in synchronism with a group of articles to be packaged, the tucking stud being engageable with a transverse article separating tab during folding of the lap panel so as to fold the tab out of the plane of the lap panel and into the space between a pair of adjacent articles to be packaged. According to a feature of the invention, the tucking

reach of the endless conveyor may move in a downwardly diverging direction relative to the path of movement of the articles to be packaged and if desired a pair of fixed positioning guides may be mounted on the machine and disposed so as to engage opposite surfaces of a lap panel of the wrapper thereby to control the lap panel during engagement between the tucking stud and the transverse separating tab. Of course a plurality of tucking studs may be mounted on the endless conveyor so as to accommodate a plurality of transverse tabs in each wrapper or so as to engage tabs in a succession of wrappers one behind the other.

For a better understanding of the invention reference may be had to the following detailed description taken in conjunction with the accompanying drawings in which FIG. 1 is a plan view of a blank of the wrapper type for packaging a group of articles or the like and in which transverse article separating tabs are formed in the bottom structure of the wrapper; FIG. 2 is a side view of a high speed packaging machine for securing a wrapper such as is shown in FIG. 1 about a group of articles to be packaged and which incorporates the transverse tab folding mechanism of this invention; FIG. 3 is an enlarged side view of a portion of the right hand end of the machine depicted in FIG. 2 and showing the essential elements of this invention; and in which FIG. 4 is a sectional view taken along the line designated 4—4 in FIG. 3.

The carton blank depicted in FIG. 1 comprises a top portion which preferably incorporates a center section 1 and a pair of sloping panels 2 and 3. Sloping panel 2 is foldably joined to top section 1 along fold line 4 while sloping panel 3 is foldably joined to top section 1 along fold line 5. As is well known, arcuate slits 6, 7 and 8 are formed in sloping panel 2 and similar arcuate slits 9, 10 and 11 are formed in sloping panel 3 for receiving the caps and the upper portion of the necks of the packaged articles. If desired finger gripping apertures 12 and 13 may be formed in top section 1. Side walls 14 and 15 are foldably joined to sloping panels 2 and 3 respectively along fold lines 16 and 17. Sloping panel 18 is foldably joined to the bottom edge of side wall 14 along a fold line 19 and a plurality of openings 20, 21 and 22 are formed in sloping panel 18. In similar fashion a sloping panel 23 is foldably joined along fold line 24 to the bottom edge of side wall 15 and a plurality of openings 25, 26 and 27 are formed in sloping panel 23 for receiving the lower portions of the packaged articles as is well known.

The bottom structure of the carrier is a composite panel comprising lap panel 28 which is foldably joined to sloping panel 18 along fold line 29 and another lap panel 30 which is foldably joined to sloping panel 23 along a fold line 31. A medial keel panel 32 is foldably joined along fold line 33 to a side edge of lap panel 28 and when the carton is assembled occupies a medial position between articles in one row and those in the other row.

For securing the lap panels 28 and 30 together in overlapping relationship, a plurality of locking tabs 34, 35, 36 and 37 are struck from lap panel 30 and are driven through the openings defined by retaining tabs 38, 39, 40 and 41 respectively.

In order to separate the middle article in each row from the end articles on opposite sides thereof, a pair of transverse cushioning tabs are struck from the lap panel 28 and are designated in the drawings by the numerals 42 and 43. Transverse tab 42 is foldably joined to lap panel 28 along a fold line 44 while transverse tab 43 is foldably joined to lap panel 28 along a fold line 45. In like fashion transverse cushioning tabs 46 and 47 are struck from bottom lap panel 30 and are foldably joined thereto along their respective fold lines 48 and 49.

The purpose of this invention is to provide means for folding the transverse cushioning tabs such as 42, 43, 46, and 47 out of their respective lap panels and into their positions between adjacent articles while the package is being formed so as to provide cushioning separating means therebetween.

The high speed machine depicted in FIG. 2 and shown schematically comprises a hopper structure generally designated by the numeral 50 on which a supply of blanks designated at C are mounted and which preferably are of the type shown in FIG. 1. Of course hopper structure 50 is secured in any desired manner to the frame 51 of the machine. An overhead boom such as is generally designated at 52 preferably overlies the groups of articles to be packaged and serves to maintain a particular wrapper C in position immediately above its associated group of articles to be packaged as the articles move from left to right through the machine and while the various packaging operations are being performed. The positions of the groups of articles passing through the machine are designated at G1-G8 although it will be understood that the various groups are moving continuously as the packaging operation is performed. The group of articles designated at G1 for example is disposed immediately below the hopper 50. Means not shown are provided for withdrawing a blank C from the hopper 50 and for depositing such blank atop the adjacent group of articles such as G1. Thereafter each blank is held in position above the associated group of articles such as G2, G3, and G4 by the boom mechanism 52 and by appropriate continuous positioning elements. The group of articles at G5 has reached a position wherein the side portions such as 14 and 15, sloping panels 18 and 23 and bottom lap panels 28 and 30 are being folded downwardly by suitable means such as plows 53 to occupy positions alongside the associated group of articles.

The group of articles designated G6 is disposed at the point of the machine wherein the transverse tab folding mechanism and method constructed according to this invention is effective to fold and secure the tabs such as 42, 43, 46 and 47 in their service positions. Groups G7 and G8 simply represent completed packages which are ready for egress from the machine.

The structure depicted generally at G6 is best shown in FIGS. 3 and 4 and comprises an endless conveyor 54 which may take the form of a chain and which is mounted on a sprocket 55 rotatable about a shaft 56 and a sprocket 57 which is rotatable about a shaft 58 mounted on the frame of the machine. Suitable driving means is coupled to shaft 56 or 57 but is not shown. Affixed to the endless conveyor 54 is a plurality of tucking studs 59 and 60. As is shown in FIG. 3 the tucking reach 61 of the tucking conveyor is arranged in a downwardly diverging relationship to the path of movement of the articles C.

For the purpose of positioning a lap panel such as 30 in the desired orientation while the folding of transverse tabs such as 46 and 47 is being effected by a tucking stud such as 59 and 60, a pair of positioning guides 62 and 63 are affixed to the frame 51 and disposed to receive therebetween the lap panel 30.

Folding of lap panels 28 and 30 underneath their associated group of articles C is accomplished by means of a guide or plow 64 which is secured to the frame of the machine and which performs in known manner to fold its associated lap panel such as 28 or 30 underneath the associated group of articles following which folding operation the machine secures the panels 28 and 30 together in overlapping relationship by driving the locks 34-37 through the openings defined by the retaining tabs 38-41 respectively.

From the description thus far it is apparent that a tucking stud such as 59 engages a transverse tab such as 47 and folds that tab out of the plane of its associated lap panel such as 30 while the lap panel is being folded under-

neath the group of articles. Tucking stud 59 on conveyor 54 moves in synchronism with the blank G6 and holds the tab 47 in angular relation to panel 30. This simultaneous operation of the folding mechanism is particularly advantageous in that the tucking stud such as 59 not only folds the transverse tab such as 47 out of plane of the lap panel such as 30, but the transverse tab such as 47 also is guided by the tucking stud such as 59 into position between a pair of articles such as C1 and C2 between which the transverse tab is interposed. The cushion tab 47 is moved into position between adjacent articles as the lap panel 30 is forced upwardly by the plow 64 into contact with the bottom of the articles. Lap panel 30, while being folded, moves upward carrying the tabs such as 46 and 47 away from the tucking studs 59 and 60. Following completion of the folding and guiding operation as described, tucking stud such as 59 moves gradually downwardly as the tucking reach of the conveyor 61 causes the tucking stud such as 59 to move downwardly relative to the path of movement of the articles C.

Mechanism similar to that described is employed to fold the tabs 42 and 43 and conventional means for folding keel panel 32 are used but are not shown.

Of course the positioning guide such as 62 and 63 cause the lap panel such as 30 to afford a sturdy means from which the transverse tab such as 47 may be positively and securely folded.

While a particular embodiment of the invention has 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 packaging a plurality of articles arranged in at least one row in rectilinear relation in a wrap-around type carrier having a top portion, spaced side walls, a pair of bottom lap panels, and at least one transverse cushioning tab struck from at least one of said lap panels for separating a pair of adjacent articles in one row, said machine comprising means for advancing a group of articles along a predetermined path, means for advancing a wrapper blank along said path and immediately above a group of articles to be packaged, means for folding said side walls downwardly alongside the group of articles, means for folding said lap panels underneath said group of articles, and a tucking stud movable in synchronism with the group of articles and with the blank and disposed generally below the path of movement thereof, said tucking stud being arranged to engage said transverse cushioning tab during folding of said one lap panel out of the plane of the associated side wall and toward a generally perpendicular relationship therewith and being effective simultaneously to fold said tab into a position generally perpendicular to said one lap panel and between the pair of adjacent articles.

2. A machine according to claim 1 wherein a pair of fixed positioning guides are disposed on opposite sides respectively of said one lap panel during engagement of said tab by said stud.

3. A machine according to claim 1 wherein said stud is mounted on an endless conveyor having a tucking reach disposed below and in alignment with the path of movement of the articles.

4. A machine according to claim 3 wherein said tucking reach is disposed in downwardly diverging relation to the path of movement of the articles.

5. A machine according to claim 1 wherein a plurality of studs are mounted in spaced relation to each other in a manner to engage a plurality of spaced tabs in said one lap panel.

6. A method of forming a package for a plurality of

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articles comprising arranging the articles in a group, moving the group along a predetermined path, placing a wrapper type blank in transverse relation to the path of movement thereof above the group of articles and moving it in synchronism therewith, folding the ends of the blank downwardly and underneath the group of articles, folding a transverse tab formed in the blank in a part thereof which is foldable underneath the group of articles to a position normal to said part of the blank and between a pair of adjacent articles, folding of said tab being simultaneous with the folding of said part of the blank toward a generally horizontal position underneath the group of articles.

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