June 2, 1964 R. K. DAUGHERTY ETAL 3,135,049

CUTTER GUARD AND PIERCING MEANS FOR TRAY PACK CUTTER

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FIG. 1

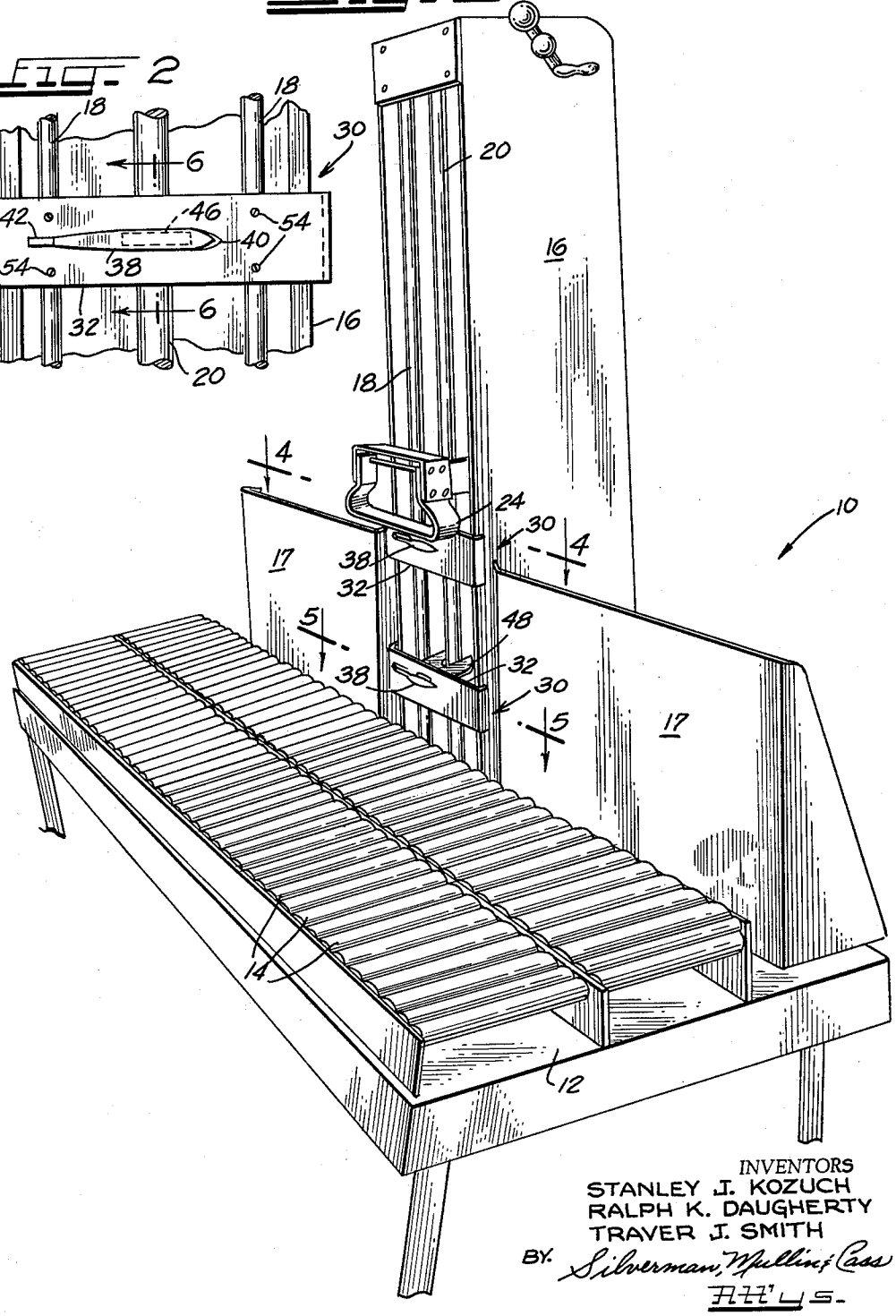


FIG. 2

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FIG. 3

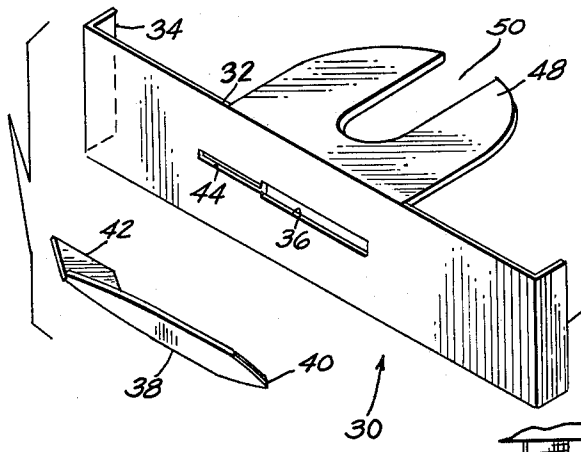


FIG. 4

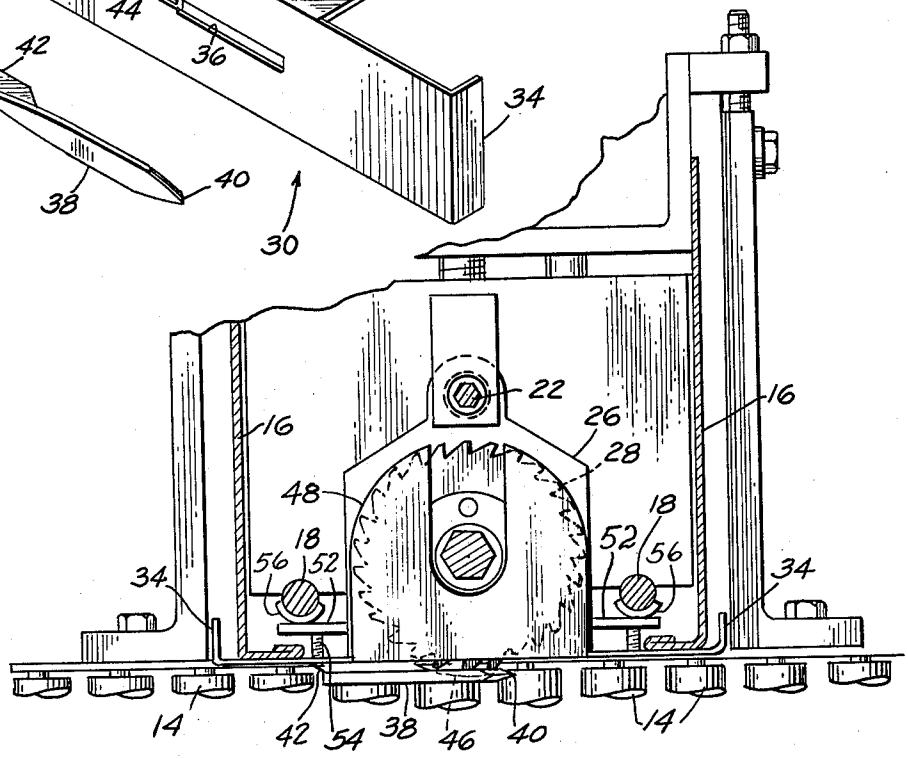


FIG. 5

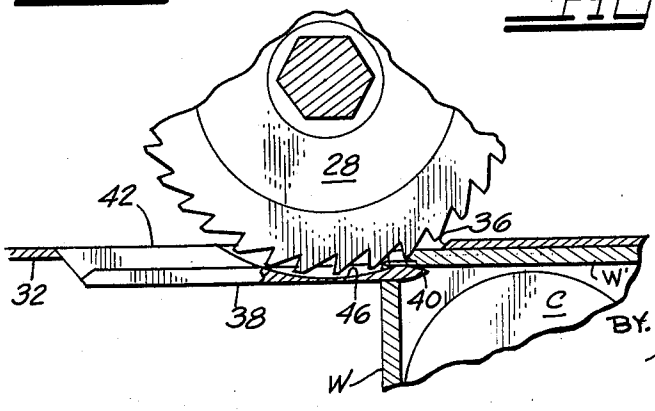
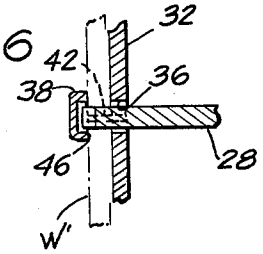


FIG. 6



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3,135,049

CUTTER GUARD AND PIERCING MEANS FOR TRAY PACK CUTTER

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6 Claims. (Cl. 30—2)

This invention relates generally to tray pack cutters of the type disclosed in the co-pending application of Ray E. Clark and William N. Garwick, entitled Tray Pack Processing Cutter, Serial No. 47,671, filed August 5, 1960; and Traver J. Smith and Ralph K. Daugherty, entitled Tray Pack Cutter, Serial No. 129,928, filed June 23, 1961, all assigned to an assignee in common with the subject application. More particularly, this invention relates to an improved combination cutter guard and piercing means for such tray pack cutters. The herein application comprises a continuation-in-part of the aforementioned co-pending applications.

As described in the said co-pending applications, the tray pack cutters with which the subject invention is concerned comprise a novel apparatus for readily cutting cartons or the like made of pulp products to form a pair of trays therefrom. The trays then may be immediately and conveniently employed for handling, marking, stacking or displaying the cans or other containers of goods which were originally packaged in the carton. The apparatus eliminated the wasteful and inefficient manual opening and cutting of cartons and also permitted the cans or other containers of goods to be efficiently handled in bulk rather than individually as heretofore. Quite obviously, the tray pack cutters have their greatest utility in supermarkets, grocery stores, department stores, and the like.

Briefly, the said tray pack cutters comprised a horizontal platform or table having an upstanding framework associated therewith. Mounted on the framework were a pair of driven rotary cutter blades which could be adjustably positioned in vertical relationship for cutting one or two trays of any desired depth from a carton as the same was moved on said table and against said cutter blades.

One of the problems inherent in the use of the tray pack cutters was the need for controlling the depth of the cut made by the cutter blades so that damage to the cans or other containers and their contents within the carton could be avoided. To this end, the second of said aforementioned co-pending applications included improvements comprising a novel cutter guard and piercing member which sheathed the cutting edge of the cutter blade. The member was provided with a sharp tapered point which was adapted to pierce and enter the carton wall and was intended to shield the contents thereof from the cutter blade. In addition, guide rails or the like were provided in conjunction with the table or framework in an attempt to insure that the piercing member always entered each carton at the same desired depth. The guide rails were designed to serve as means for accurately positioning the carton with relation to the piercing member and cutter blade.

Although the said improvements aided to some extent in solving the described problem, they were not entirely successful and certain disadvantageous features were nonetheless encountered in the use thereof. Thus, for example, it was discovered that the piercing member sometimes entered the carton wall at too shallow or too great a depth. As a result, in the former instance, the piercing member had to be withdrawn and re-inserted. In the latter event, the member sometimes damaged the packaged cans or tore the labels thereon. Additionally,

considerable portions of the cutter blades were dangerously exposed, due to the partial sheathing of only the actual cutting portion thereof.

These disadvantageous features may be attributed in part to the fact that the guide rails were inadequate to insure that the piercing member entered the carton wall at the exact proper depth and angle in each and every case. Similarly, the limited cooperation between the cutter guard and cutter blade was not of itself sufficient to accurately and invariably retain the affected carton wall in proper position therebetween.

It is, therefore, an important object of this invention to provide an improved tray pack cutter of the character described which overcomes all of the above described disadvantageous features.

Another important object of the invention is to afford an improved combination cutter guard and piercing member of the character described which overcomes all of the above described disadvantageous features.

A further object is to provide a combination cutter guard and piercing member of the character described having integral means for insuring the accurate retention of a carton wall being cut in proper cutting relationship between the cutter guide and cutter blade. In this respect, said means are operative on said carton wall above, below and on either side of the cutter blade cutting edge.

Yet another object is to provide a combination cutter guard and piercing member of the character described having integral means for shielding the entire cutter blade so that no portions thereof remain dangerously exposed.

Still a further object is to afford a combination cutter guard and piercing member of the character described which may be integrally and inexpensively fabricated and yet is most durable and efficient for the purposes intended.

For the purpose of facilitating an understanding of our invention, we have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, our invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

FIG. 1 is a perspective view of a tray pack cutter embodying the principles of the invention;

FIG. 2 is an enlarged fragmentary front elevational view illustrating the novel combination cutter guard and piercing member of the invention;

FIG. 3 is an enlarged and exploded perspective view of the combination cutter guard and piercing member;

FIG. 4 is a fragmentary sectional view taken on the plane of line 4—4 in FIG. 1 and viewed in the direction indicated;

FIG. 5 is a similar view taken on the plane of line 5—5 in FIG. 1, viewed in the direction indicated, and illustrating the operative relationship of parts while cutting a carton wall; and

FIG. 6 is a fragmentary sectional view taken on the plane of line 6—6 in FIG. 2 and viewed in the direction indicated.

Referring now to FIG. 1 of the drawings, the reference numeral **10** indicates generally a tray pack cutter in which is incorporated the principles of the subject invention. In general, the tray pack cutter **10** is similar to the apparatus disclosed and described in said co-pending application, Serial No. 129,928, and only so much thereof as is necessary for an understanding of the subject invention will be described in detail. It will thus be seen

that the tray pack cutter comprises a horizontal platform or table such as 12. A plurality of conveyor rollers such as 14 is mounted on the table 12 for facilitating the movement of the cartons thereover. Associated with the table 12 adjacent one side thereof is a vertical enclosed framework such as 16. A pair of vertical retaining walls such as 17, 17 may likewise be associated with the table 12.

Included in the framework 16 is a pair of support rods 18, 18, a hexagonal drive shaft 20 and a rearwardly-spaced second shaft 22 (see FIGS. 2 and 4). Adjustably mounted on the support rods 18, 18 is a suitable vertical guide member such as 24, the same being adjustably positionable to accommodate the height of any particular carton thereunder. A pair of yolk plates such as 26 (see FIG. 4) is mounted on the second shaft 22 in vertically spaced relationship and a pair of rotary cutting blades such as 28 is associated with said yolk plates. The cutter blades 28 are likewise mounted on the drive shaft 20 and a motor (not shown) is provided for rotatably driving the same. Suitable vertical adjustment means (not shown) which may be of the type disclosed in said last-mentioned co-pending application, are provided in association with the second shaft 22 for properly positioning the yolk plates 26 and cutter blades 28 to suit any particular carton and to cut trays of any desired depth.

Cooperating with each of the cutter blades 28 is a novel combination cutter guard and piercing member indicated generally by the reference numeral 30. Each of the members 30 comprises a vertical plate 32 having a short leg 34 extending substantially perpendicularly therefrom at each end thereof. The plate 32 is provided with a central longitudinal slot 36 (see FIG. 3) whose function will become apparent as the description proceeds.

A spear-like member 38 is integrally associated with the vertical plate 32, said member being provided with a tapered relatively sharp point 40 at one end thereof. A relatively thin connecting web 42 extends inwardly from the opposite end of the member 38 and is permanently secured to the plate 32. In the latter regard, the member 38 may be integrally formed with the plate 32, or alternatively, the web 42 may be soldered or welded thereto after positioning within a cooperating narrow slot such as 44 (see FIG. 3). It will thus be appreciated that the member 38 in effect closes the slot 36 but is nonetheless positioned in horizontally spaced relationship with the vertical plate 32, thereby providing a gap therebetween the function of which will become apparent as the description proceeds.

Turning to FIGS. 4, 5 and 6 of the drawings, it is important to note that the member 38 is formed with a central arcuate groove 46 and that said groove is positioned in registry with the slot 36. Cooperation of the member 30 with the cutter blade 28 may now be appreciated, for it will be seen that a portion of said blade projects outwardly through the slot 36 and into the arcuate groove 46 in the member 38. The outwardly projecting teeth portions of the blade 28 are thus sheathed within the groove 46 of the member 38. In actual practice, the clearance between the cutter blade teeth and the inner wall of the groove 46 is on the order of 1/32 inch or even less.

Completing the structure of the member 30 is a central cover plate 48 which may project inwardly from a central portion of an edge of the vertical plate 32. The cover-plate 48 is provided with a longitudinal groove 50 which is adapted to freely accommodate the drive shaft 20 therein when the member 30 is operationally positioned on the tray pack cutter (see FIGS. 1, 3 and 4). In the embodiment illustrated, the lower one of the members 30 has the cover plate 48 extending from the top edge of its vertical plate 32, whereas the upper member 30 has the cover plate 48 extending from the bottom edge of its vertical plate 32 (not shown). It will thus be appreciated that the cover plates 48 serve to effectively shield the cutter blades 28 so that the hands of an operator cannot become inadvertently cut thereby. If desired, however, each of the members 30 may be provided with a pair of cover plates 48, viz., one cover plate extending from each of the top and bottom edges of the vertical plate 32.

For purposes of operatively mounting the members 30, each of the yolk plates 26 may be provided with an arm 52 projecting from each lateral edge thereof. The vertical plates 32 are connected to the arms 52 as by means of the screws 54. Semi-circular guide members such as 56 may likewise be secured to the inner surface of the arms 52 for slidably cooperating with the support rods, 18.

Operation of the members 30 may now be described with particular reference being made to FIGS. 5 and 6 of the drawings. The yolk plates 26, to which the members 30 are operatively connected, are first adjusted to the desired position for the particular carton to be cut, and the vertical guide member 24 is similarly positioned. The cutter blades 28 are actuated and the particular carton, having walls W and W', is positioned on the rollers 14 so that the wall W' is in face-to-face engagement with the vertical plates 32 of the guard and piercing members 30. The carton is then moved to the left (as viewed in FIG. 1) until the points 40 of the spears 38 pierce the leading wall W and enter the carton. At this point, it will be noted that the wall W' is firmly positioned within the gap between the spear members 38 and the vertical walls 32. As the carton is now moved further to the left, the cutter blades 28 cut through the wall W' until the same has passed completely thereover.

After the wall W' has been completely cut, the carton is turned through an angle of 90° and the described operation repeated to cut a second wall thereof. The same operation is, of course, repeated until all four walls of the carton have been cut as described.

It is important to note that during the described cutting operation, the spear members 38 shield the cans C in the carton from injurious contact with the cutter blades 28. The inwardly tapered points 40 of the members 38 likewise exert a camming action on the cans C forcing them away from the spears as the same are passing through the carton, thereby preventing injury to the cans or the labels thereon. The thin webs 42 pass readily through the cuts already made by the blades 28 so that the progressive motion of the carton over the blades is in no way impeded. It is likewise important to note that the vertical plates 32 exert an affirmative holding and positioning force on the carton wall being cut so that the latter is always retained in proper cutting position between the vertical plates and the members 38. In this regard, it will be appreciated that the plates 32 exert the described holding force above, below and to both sides of the cutter blades 28.

From the foregoing description and drawings, it should be apparent without further description that we have provided a novel combination cutter guard and piercing member for tray pack cutters. The cooperation of the members with their associated cutter blades insures that the carton walls are always pierced and entered at the proper angle and depth. An efficient cut is likewise assured with no resulting damage to the contents of the carton. Moreover, the members include safety cover plate means for shielding the cutter blades.

It is believed that our invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of our invention as defined in the appended claims.

What we claim and desire to secure by Letters Patent of the United States is:

1. A combination cutter guard and piercing member for a tray pack cutter of the character described compris-

ing an elongated vertical plate, said plate being formed with a central longitudinal slot for accommodating a portion of an associated rotary cutter blade therethrough, and an elongated spear member integrally connected to the outer surface of said plate in aligned but spaced relationship with said slot, said spear member having an arcuate longitudinal groove in the inner surface thereof, said groove being channel-shaped in cross section whereby the marginal edges of said cutter blade are sheathed therein.

2. The cutter guard and piercing member of claim 1 in which said spear member is provided with a tapered carton piercing point at one end thereof, said spear member adapted to be positioned within a carton of goods and interposed between a carton wall and the goods therein to shield the goods from contact with said cutter blade.

3. The cutter guard and piercing member of claim 2 in which a spacing web is connected between the opposite end of said spear member and said vertical plate, said web being sufficiently thin to pass through a cut in said carton wall formed by said cutter blade.

4. In a tray pack cutter including a carton support, a vertical framework associated with said carton support and a horizontal rotary cutter blade mounted on said framework; a combination guard and piercing member associated with said cutter blade and comprising an elongated vertical plate, said plate being formed with a central longitudinal slot accommodating a portion of said

cutter blade therethrough, an elongated spear member connected to said plate in horizontally spaced relation therewith, said spear member having an arcuate longitudinal groove in the inner surface thereof and spaced medially between its top and bottom edges, said groove sheathing the protruding marginal edges of said cutter blade whereby said top and bottom spear member edges cooperate to support a carton wall above and beneath a cut formed therein by said cutter blade.

5. The tray pack cutter of claim 4 in which an elongated horizontal web is connected between the trailing portions of said spear member and said vertical plate, said web being sufficiently thin to pass freely through said cut and of sufficient length to guide and support said carton wall as the same is being cut.

6. The tray pack cutter of claim 4 in which a cover plate projects inwardly from a longitudinal edge of said vertical plate to afford a safety shield for said cutter blade.

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