

[54] APPARATUS FOR FORMING DISPLAY PACKAGES

3,552,092 1/1971 Jenkins ..... 53/183  
3,657,857 4/1972 De Woskin et al. .... 53/184 X

[75] Inventors: **Ronald C. Warner**, Ottawa Lake, Mich.; **Bobby R. Shepherd**, Toledo, Ohio; **Ray M. Hickok**, Toledo, Ohio; **Charles A. Alexander**, Toledo, Ohio

*Primary Examiner*—Travis S. McGehee  
*Assistant Examiner*—Horace M. Culver  
*Attorney, Agent, or Firm*—Roylance, Abrams, Berdo & Kaul

[73] Assignee: **Cameo, Inc.**, Toledo, Ohio

[22] Filed: **May 7, 1973**

[57] **ABSTRACT**

[21] Appl. No.: **357,771**

An apparatus for forming display packages of the type including a transparent blister containing a product to be displayed and a blister supporting card. The apparatus includes a plurality of support assemblies mounted on a conveyor, each of which assemblies receives and supports a card, a blister and a product while a display package is being formed; adhesive applying means for applying adhesive to the card while it and the blister and product are supported on an assembly; means for folding the card over to form the package, which is held together by the adhesive; and an ejecting mechanism for discharging the display package from the support assembly after the package is formed.

[52] U.S. Cl. .... **53/183, 53/329, 53/371**

[51] Int. Cl. .... **B65b 43/00, B65b 43/10**

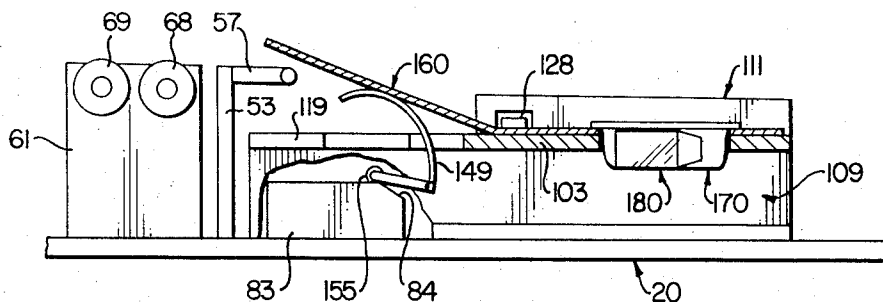
[58] Field of Search ..... 53/183, 184, 185, 194, 53/195, 191, 329, 371, 373, 369; 93/52

[56] **References Cited**

**UNITED STATES PATENTS**

3,075,329	1/1963	Swezey et al. ....	53/184
3,199,263	8/1965	Lee .....	53/183
3,247,643	4/1966	Bartelt .....	53/184 X
3,374,604	3/1968	Roesner et al. ....	93/52 X
3,418,785	12/1968	Duryee .....	53/184
3,447,284	6/1969	Sparks, et al. ....	53/373 X

**8 Claims, 14 Drawing Figures**



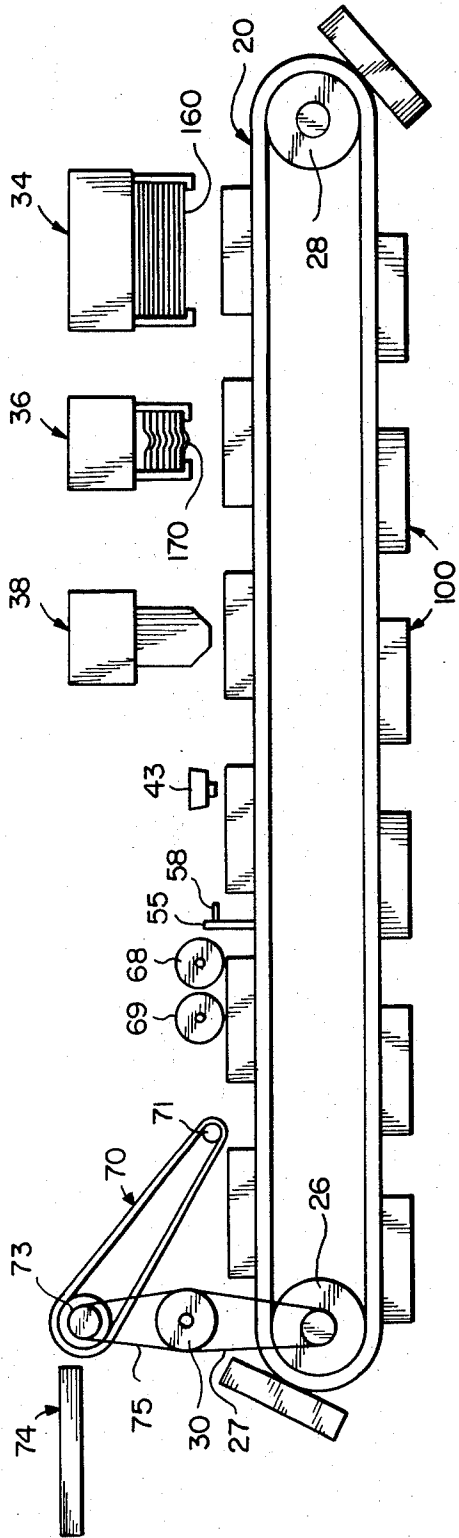


FIG. 1

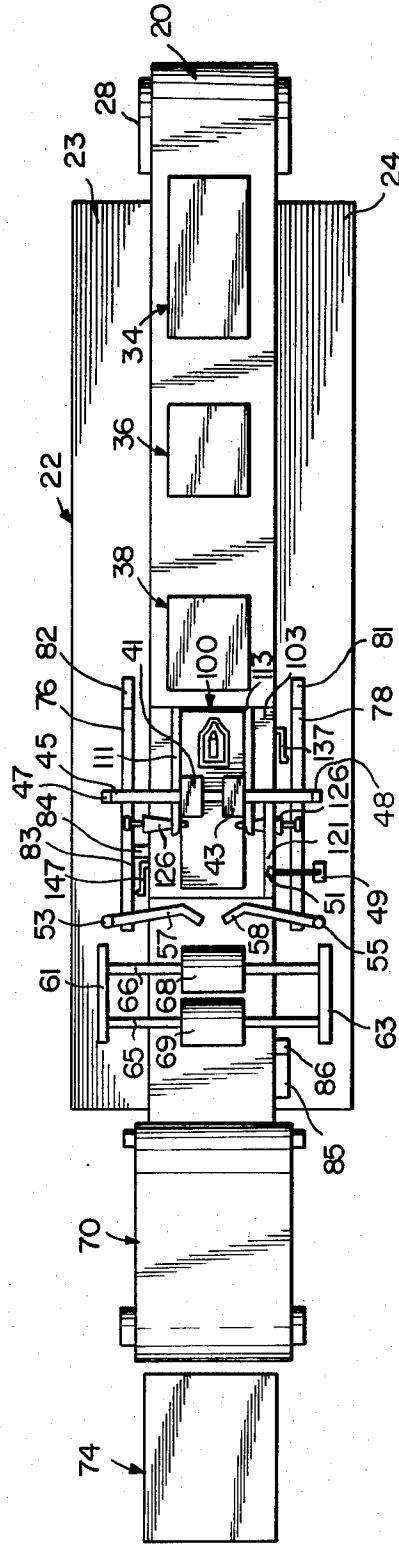
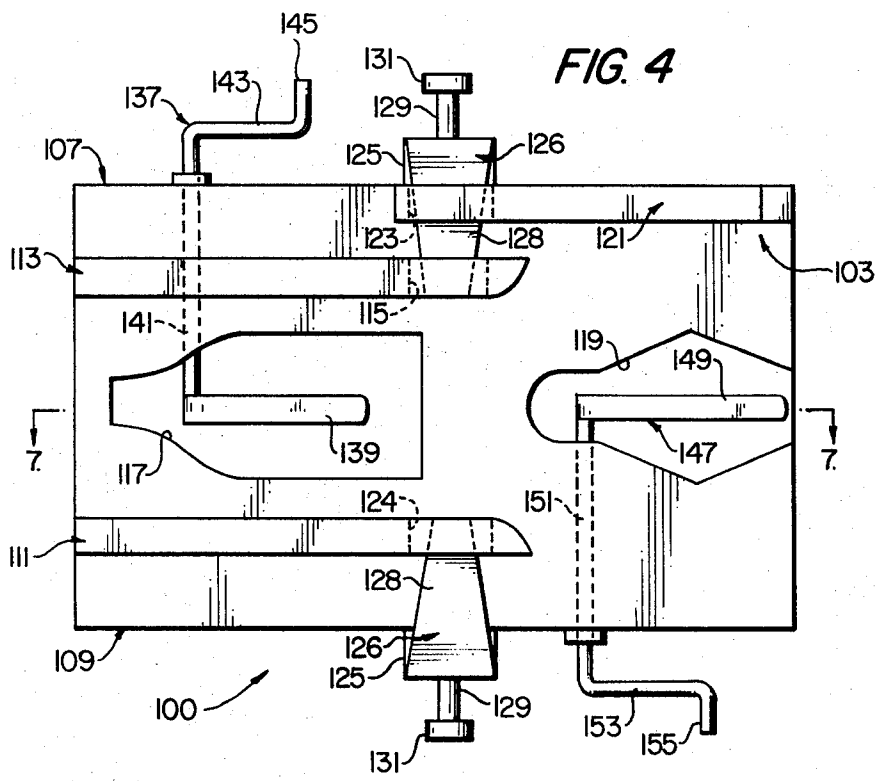
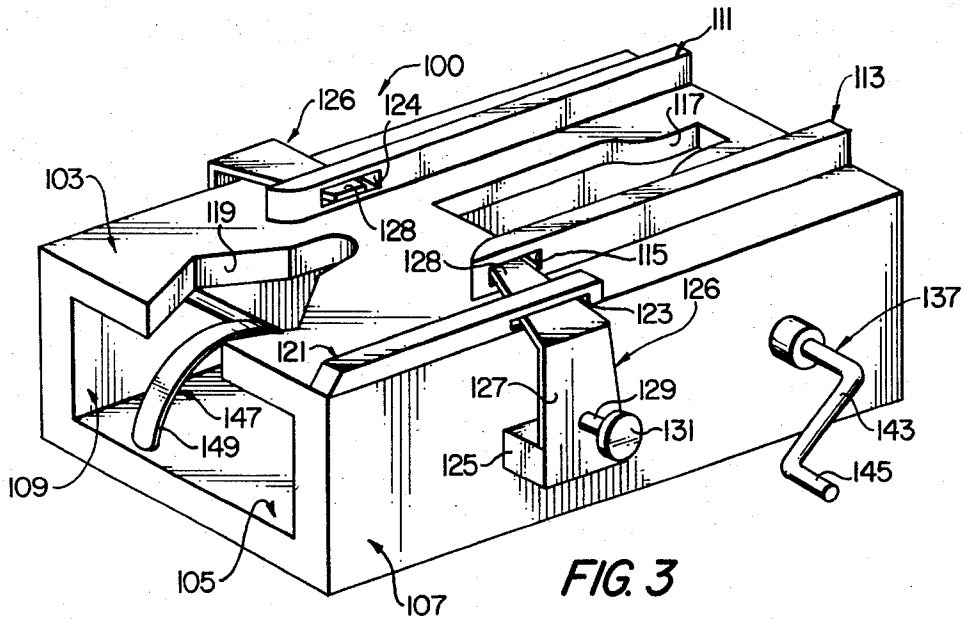


FIG. 2



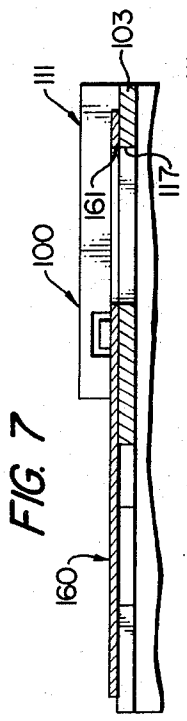


FIG. 7

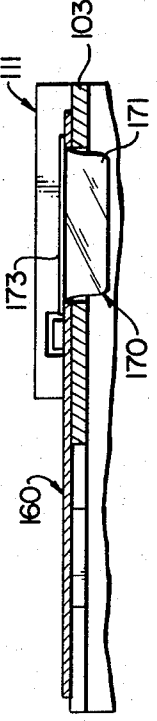


FIG. 8

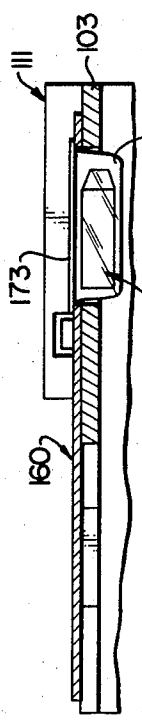


FIG. 9

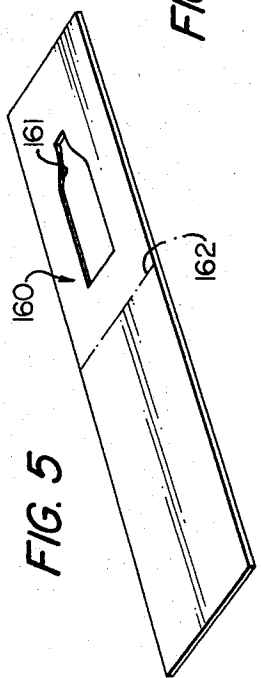


FIG. 5

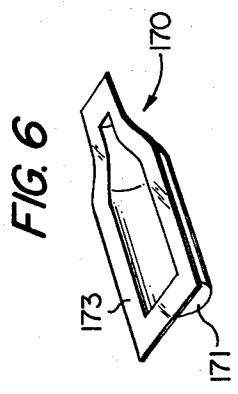


FIG. 6

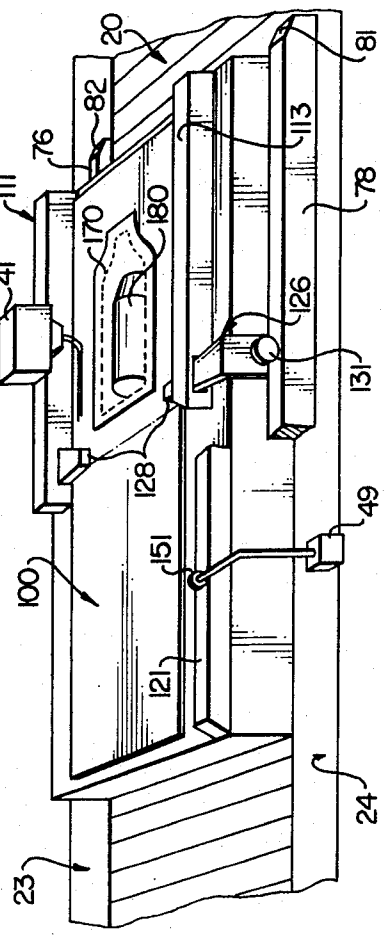


FIG. 10

FIG. 11

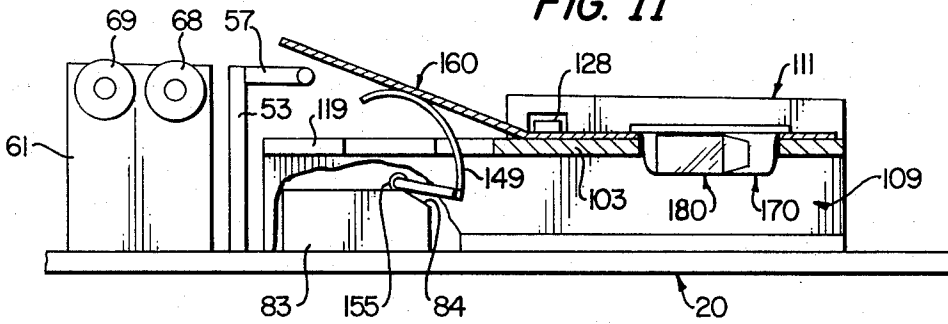


FIG. 12

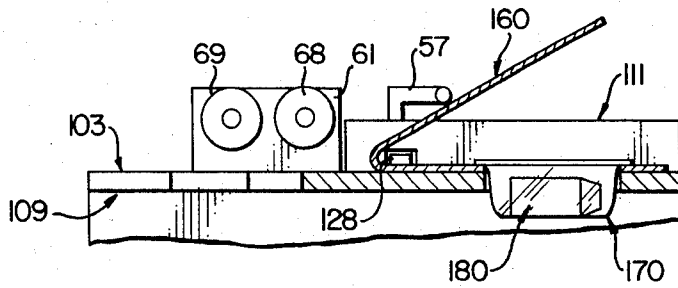


FIG. 13

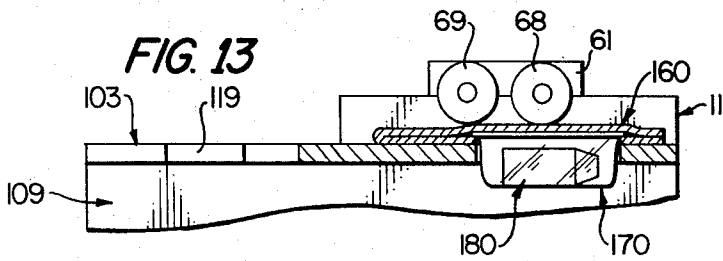
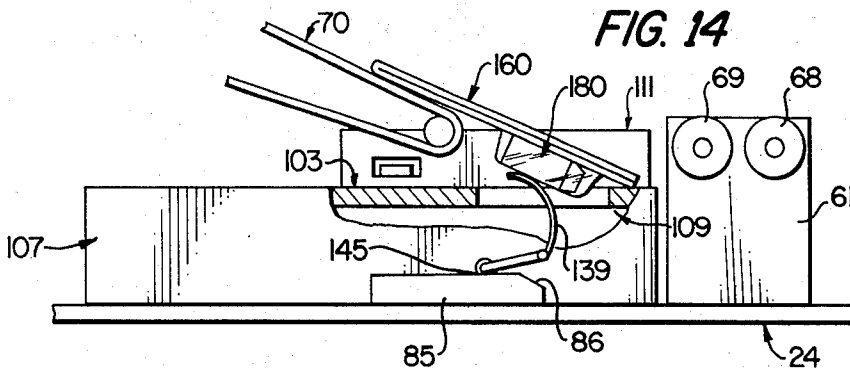


FIG. 14



## APPARATUS FOR FORMING DISPLAY PACKAGES

The present invention relates to an apparatus for forming display packages, and more particularly relates to an apparatus for forming a display package consisting of a card, a transparent blister and a product contained in the blister.

A common form of display packaging used in retail stores today is a so called "blister pack." This package includes a cardboard backing card; a transparent, plastic blister which is raised above the surface of the card; and a product positioned between the raised blister and the surface of the card. Typical items of commerce displayed in such blister packs are lipsticks, nail polish, pens and pencils, small tools and hardware, and any other small item of merchandise. The advantages of the blister pack are twofold. The first is that the item to be sold is clearly visible through the transparent blister, and the second is that the item can not easily be pilfered since it is enclosed by a blister and mounted to a card which is much larger than the item itself.

In the past there have been various attempts to provide devices for automatically forming blister packs. However, many of these prior art attempts have not been totally successful or economical since the process of formation includes a complicated series of steps, which necessarily required the use of complicated and expensive equipment.

It is therefore, an object of the present invention to overcome the limitations and drawbacks associated with the prior art devices and to provide a new and improved device for forming display packages.

Another object of the present invention is to provide an apparatus for forming display packages of the type including a transparent blister containing a product to be displayed and a blister supporting card.

A further object of the present invention is to provide a display package forming apparatus which can automatically form packages at a high rate of speed.

A further object of the present invention is to provide display package forming apparatus which is relatively simple and inexpensive to produce, yet which will operate satisfactorily for extended periods of time without undue maintenance or repair.

A further object of the present invention is to provide an apparatus which can combine a product, a transparent blister, and a blister supporting card into a display package in one continuous operation.

Other objects, advantages and salient features of the present invention will become apparent from the following detailed description, which, taken in conjunction with the indexed drawings, discloses a preferred embodiment of the present invention.

Referring now to the drawings which form a part of this original disclosure:

FIG. 1 is a side elevational view of an apparatus in accordance with the present invention;

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

FIG. 3 is a perspective view of one of the support assemblies;

FIG. 4 is a top plan view of a support assembly;

FIG. 5 is a perspective view of a typical blister supporting card used in accordance with the present invention;

FIG. 6 is a perspective view of a typical transparent blister used in display packages and in accordance with the present invention;

FIG. 7 is a sectional view of the support assembly taken along lines 7—7 in FIG. 4, and showing a blister supporting card resting on the top of the support assembly;

FIG. 8 is a sectional view similar to FIG. 7, but also showing a transparent blister located in an aperture in a blister supporting card;

FIG. 9 is a sectional view similar to FIG. 7 but additionally showing a product filling the transparent blister;

FIG. 10 is a perspective view of a support assembly while adhesive is being applied to the top of the blister supporting card;

FIG. 11 is a side elevational view of a support assembly partially in section showing one portion of the card being elevated and ready for folding;

FIG. 12 is a side elevational view similar to FIG. 11 but showing the card being folded;

FIG. 13 is a side elevational view similar to FIG. 11 but showing the card being rolled; and

FIG. 14 is a side elevational view similar to FIG. 11 but additionally showing the now formed display package being ejected from the support assembly onto a second conveyor.

The foregoing objects are attained by providing an endless conveyor with a series of support assemblies, each including a box-like housing having aligning rails on the top surface and movable spring fingers coupled thereto, capable of passing through slots in the aligning rails to secure a card to the support assembly. An odd cam rail is provided on the top surface for actuating glue heads to deliver an adhesive composition to the card. An elevating finger and ejecting finger, each rotatably mounted through the sides of the housing, are capable of being cammed upwards to respectively elevate a portion of a card and eject the finished display package. Located on support surfaces on both sides of the conveyor are a series of cam rails to actuate the spring fingers, the ejecting finger, and the elevating fingers. Two fixed rods are provided in overlying relationship to the conveyor and the housing for folding one portion of the card onto a second portion thereof after adhesive has been applied to the card. Rollers are provided for compressing the folded card to form the final package and the ejecting finger is then operated to discharge the package onto an ejecting conveyor. Conventional delivering devices can be used for feeding the blister supporting cards, the transparent blisters, and the products to the support assemblies, but the details of these delivering devices form no part of the present invention. In a typical operation, a card, a blister, and a product are sequentially delivered to each support assembly. Then, the card is secured to the assembly and adhesive is applied to the top of the card. Next, a forward portion of the card is elevated and folded back onto the rear portion of the card. Then, the folded portions are compressed together, with the adhesive between them, by means of rollers. Finally, the completed display package is ejected from the support assembly.

Referring to the drawings in further detail, as shown in FIGS. 1 and 2, the apparatus for forming the display package includes an endless conveyor 20 which has its upper run movable through a planar support surface 22 comprised of a right-hand surface 23 and a left-hand

surface 24. The top of the surfaces 23 and 24 are in the same plane as the top of the surface of the endless conveyor 20. As seen in FIG. 1, the endless conveyor 20 is supported by a power roller 26 at one end, and an idler roller 28 at the other end. The roller 26 is connected by a drive belt 27 with a drive roller 30 which, in turn, is rotated by a suitable drive motor (not shown). The conveyor 20 moves from the right to the left as seen in FIGS. 1 and 2.

Mounted above a first portion of the upper run of the endless conveyor 20 are three conventional feeding devices for feeding blister supporting cards, transparent blisters, and the product to be displayed to a support assembly 100 which is mounted on the conveyor 20, and which will be described in detail hereinafter. A card-feeding device 34 is positioned above the endless conveyor 20 adjacent the idler roller 28 and can be any conventional sheet or article feeding device for individually feeding a rectangular card onto the support assemblies 100. Adjacent the card-feeding device 34 is a blister feeding device 36 which is any conventional device capable of individually delivering a conventional transparent blister onto the card which has previously been deposited on a support assembly. A product-feeding device 38 is located above the endless conveyor 20 adjacent the blister feeding device 36 and is any conventional device for delivering an individual product into the transparent blister which is lying in a card which is located on the top of a support assembly. As will be described in more detail hereinafter, a card is delivered to one of the support assemblies 100 located on the conveyor 20, then a transparent blister is delivered to an aperture in the card and finally a product is delivered to, and fills, the blister. The details of the feeding devices 34, 36, and 38 do not form a part of the present invention.

As seen in FIGS. 1, 2, and 10, two conventional adhesive applying glue heads 41 and 43 are supported above the middle of the endless conveyor 20 in a position adjacent to the product-feeding device 38. These glue heads 41 and 43 are supported by a support rod 45 which is parallel to the surface of the endless conveyor 20 and is mounted to the support surfaces 23 and 24 by means of upright posts 47 and 48.

A microswitch 49 is mounted to the left-hand support surface 24 adjacent post 48 and has a cam rail follower 51 connected thereto. The microswitch 49 is connected to the glue heads 41 and 43 and when actuated causes the glue heads to deposit glue in two continuous streams on the edges of a card moving thereunder, as will be described hereinafter. Each glue head includes a supply reservoir in which adhesive is stored and a depositing nozzle to which adhesive can gravitationally flow, and a valve normally preventing such flow. Operation of the microswitch 49 opens such valve.

Spaced further along the support surface 22 are two upright rods 53 and 55 which support angle rods 57 and 58, respectively, lying parallel to the surface of the endless conveyor 20 and extending over the conveyor.

Adjacent the upright rods 53 and 55 are two upright supports 61 and 63 in the form of rectangular walls. Rotatably mounted on the supports 61 and 63 are two rods 65 and 66 which are spaced from, and parallel, to each other and parallel to the surface of the endless conveyor 20 and which further carry thereon in their center, two rollers 68 and 69. The width of each roller

is preferably equal to the width of the blister supporting cards.

Spaced from the roller 69 is an endless ejecting conveyor 70 which has its conveying surface oriented at an acute angle to the plane of the surface of the endless conveyor 20. The ejecting conveyor 70 is supported between a small idler roll 71 adjacent the top of the support assemblies 100 and a larger driven roll 73 elevated above the roll 71 so that the conveyor 70 slopes upwardly. The drive roll 73 is connected by a drive belt 75 to the drive roller 30. The conveyor 70 runs in the same direction and at substantially the same speed as the conveyor 20 and adjacent the upper end of the ejecting conveyor 70 is a platform or additional conveyor 74 for receiving articles ejected from the conveyor 70.

Referring to FIGS. 2 and 10, two cam rails 76 and 78 are slightly spaced from and parallel to the edges of the endless conveyor 20 on the support surfaces 23 and 24, respectively, extending from a position adjacent the product-feeding device 38 to slightly past the upright rods 53 and 55. Each cam rail is elongated, and rectangular in cross-section, and is provided with a downwardly sloping front end 81 and 82 as shown in FIG. 10.

As seen in FIGS. 2 and 11, located adjacent and parallel to the cam rail 76, between that rail and the edge of the endless conveyor 20, is a smaller cam rail 83 which extends from a position adjacent the upright post 47 to the upright rod 53 on the right-hand support surface 23. Cam rail 83 is rectangular in cross-section and has a downwardly sloping front end 84.

As seen in FIGS. 2 and 14, a fourth cam rail 85 is located on the left-hand support surface 24 next to and parallel to the edge of the endless conveyor 20 between the support 63 and the front of the ejecting conveyor 70. This cam rail 85 also has a downwardly sloping front edge 86 which is similar to the other cam rails 76, 78, and 83.

Referring now to the support assemblies 100, a plurality of such assemblies are connected at the middle of their bottom surfaces to the endless conveyor 20. Such assemblies are spaced from one another by a preselected distance.

As seen in FIG. 3, each support assembly 100 is formed as a box-like housing having rectangular planar walls, including a top wall 103, a bottom wall 105, a left side wall 107, and a right side wall 109, with each of the walls being perpendicular to those adjacent it. The top wall 103 has two spaced, parallel aligning rails, or members, 111 and 113 on its top surface which members are parallel to the edges of the top wall and extend approximately two-thirds of the length of the top wall from the rear edge. Adjacent the forward end of each of the aligning rails, are horizontally oriented slots 115 and 124 which pass completely through each aligning rail. An aperture or cutout 117 is formed through the top wall 103 between and spaced from the two aligning members 111 and 113. The shape of the cutout 117 can be as desired and is preferably in a configuration which matches the configuration of the transparent blister, as will be described hereinafter.

Along the forward portion of the top wall 103 is a slot 119 which extends from a position adjacent the ends of the aligning members to the front edge of the top wall. The shape of the slot 119 can be as desired as long as it allows a rod-like finger to pass through it. On the left side of the top wall 103 is an odd cam rail 121 which

is parallel to rail 113 and extends from the forward edge of the top wall adjacent the slot 119 rearwardly past the end of the slot 115 on the aligning member 113. The rail 121 is provided with a slot 123 which is aligned with the slot 115 in the aligning rail 113.

A lug 125 mounted on the exterior of the side wall 107 has rigidly connected thereto, a right-angled spring finger 126. The finger 126 includes a first portion 127 having its bottom end mounted to the top of the lug 125 and includes a second portion 128 passing through the slot 123 in the odd rail 121 and into the slot 115 in the rail 113. Attached perpendicularly to the spring finger 126 is a rod 129 having an enlarged roller head or cam follower 131 at its free end. A similar lug 125 is mounted on the exterior of the side wall 109 and it carries a similar spring finger having a free end or second portion 128 extending into the slot 124 in the rail 111. The free ends or second portions 128 of the spring fingers can move inwardly and outwardly through the slots 115 and 124.

As seen in FIGS. 3 and 4, an ejecting finger 137 is rotatable mounted through an aperture in the left side wall 107. As seen in FIGS. 4 and 14, the ejecting finger 137 has a first curved portion 139 which connects at right angles to a straight portion 141 which passes through an aperture in the left side wall 107 and then connects at right angles to an arm portion 143 which is parallel to the surface of wall 107 and has an outwardly facing enlarged head or cam follower 145 at right angles to its free end. In an unactuated position, due to gravity, or if desired, a biasing spring, the free end of the curved portion 139 rests on the bottom wall 105 of the support assembly 100. The curved portion 139 is in a position between the left and right side walls 107 and 109 such that it is aligned with the center of the cutout 117 in the top wall 103 and can pivot upward toward and through that cutout.

As best seen in FIGS. 3, 4, and 11, an elevating finger 147 is rotatably mounted on the right side wall 109 adjacent and forward the spring finger located thereon. This elevating finger 147 is of a similar construction to the ejecting finger 137 and is essentially a mirror image thereof. Specifically, the elevating finger 147 has a curved portion 149 connected perpendicularly to a straight portion 151 which passes through an aperture in the right side wall 109 and is perpendicularly connected to an arm portion 153 which has an enlarged head or cam follower 155 connected thereon and facing away from the right side wall 109. The free end of the curved portion 149, as seen in FIG. 3, rests on the top of the bottom wall 105 in the unactuated position due to gravity or, if desired, by spring pressure. The curved portion 149 is centered between the left and right side walls 107 and 109, and is aligned with the center of the slot 119 so it can rotate upward, toward, and through it.

As shown in FIGS. 5 and 7, the blister supporting card 160 is preferably rectangular in shape and has a cutout 161 in one portion corresponding in shape to the cutout 117 in the top wall 103 of the support assembly 100.

As shown in FIG. 6, a typical blister 170 is formed from transparent plastic and has a bulged support section 171 formed in the shape of the product to be carried therein and a flange portion 173 surrounding the edge of the support section 171.

In operation, the card-feeding device 34 is filled with the blister-supporting cards 160, the blister-feeding device 36 is filled with the transparent blisters 170, and the product-feeding device 38 is filled with products 180 to be packaged. The drive motor operates the endless conveyor 20 and the ejecting conveyor 70. The card-feeding device 34 is synchronized with the movement of the endless conveyor 20 so that as a support assembly 100 moves underneath the card-feeding device, a single card 160 is dropped from the feeding device 34 onto the top wall 103 of the support assembly so that the side edges of the card are between the aligning members 111 and 113, and the cutout 161 in the rear portion of the card is aligned with the cutout 117 in the top wall 103 of the support assembly. Preferably, the length of the card 160 will be about equal to the length of the top wall 103. This position is shown in FIG. 7. As the conveyor 20 moves from the right to the left as shown in FIG. 1, a blister 170 is dropped from the blister feeding device 36 into the cutout 161 on the card 160 with the support section 171 therein projecting through the card cutout and into the cutout 117 in the top wall 103. This is shown in FIG. 8 wherein the flange portion 173 rests on the surface of the card 160 and supports the depending support section 171 below the card and in the cutout 117 in the top wall 103. As the conveyor 20 moves further to the left, a product 180 is dropped from the product-feeding device 38 into and filling the blister support section 171. This is shown in FIG. 9. As used herein, the term "filling" does not require that the product 180 completely fill the blister 170, and instead, is merely used to distinguish a filled blister from an empty one.

As the support assembly 100 moves further along past the product-feeding device 38, the cam followers 131 connected to the spring fingers 126 engage the sloping ends 81 and 82 of the cam rails 76, and 78, and are elevated to run along the top surface of these cam rails. This elevation of the cam followers causes a concomitant inward rotation of the spring fingers 126 which causes their free end portions 128 to move through the slots 115, and 124, and into an overlying relationship with the card 160 lying on the top wall of the support assembly, as shown in FIGS. 2, and 10. This action secures the blister-supporting card 160 to the top surface of the support assembly to prevent it from shifting.

As each support assembly 100 moves further along the support surface 22, the odd rail 121 located thereon engages and moves the cam rail follower 51 connected to the microswitch 49. This closes the microswitch 49 and actuates the glue heads 41 and 43 causing them to deliver two stripes of adhesive composition along the edges of the top of the rear portion of the blister-supporting card 160 as shown in FIG. 10.

Also, as the support assembly 100 moves along the support surface, the follower 155 on the elevating finger 147 engages the top surface of the cam rail 83 which causes the curved portion 149 thereon to rotate upwardly through the slot 119 and into engagement with the bottom of the forward portion of the blister-supporting card 160. This rotation and engagement, as shown in FIG. 11, raises the forward portion of the card 160 to a height above the angle rods 57 and 58. Since the middle of the card 160 is held in place by the spring fingers 126 as discussed above, the forward movement of the conveyor 20 causes the bottom of the raised por-



tion of the card 160 to engage the angle rods 57 and 58 and pivot around the spring fingers 126 as the assembly 100 moves past the angle rods. This is shown in FIG. 12. If desired, the card 160 can be prescored or pre-folded centrally, as shown at 162 in FIG. 5, to facilitate folding.

Thus, the forward portion of the card 160 is folded over onto the rear portion and the card then proceeds to move under the rollers 68 and 69 which press the forward portion of the card onto the rear portion of the card which has adhesive thereon. This causes the forward portion of the card to become adhered to and fixed to the rear portion of the card which contains the blister and the product. The blister flange 173 is sandwiched between the folded card portions, thus locking the blister 170 in position. At this time, the followers 131 associated with the spring fingers 126 reach the ends of the rails 76 and 78, and disengage from them allowing the spring fingers to rotate out of engagement with the top of the card 160.

As seen in FIG. 14, as the support assembly 100 continues to move along with the endless conveyor 20 past the rollers 68 and 69, the follower 145 on the ejecting finger 137 rides up the sloping end 86 and moves along the fourth cam rail 85. This causes the curved portion 139 of the ejecting finger to rotate upwardly through the cutout 117 and into an engagement with the bottom of the blister 170. Since the spring fingers 126 have previously been released from their engagement with the card 160, nothing prevents the card 160 from being elevated upwardly by contact with the curved portion 139. As this happens, the bottom of the card 160 engages the forward end of the ejecting conveyor 70, is lifted from the top wall of the support assembly 100, and is carried along the length of the ejecting conveyor 70. After movement along the conveyor 70, the now completed display package is delivered to the platform or container 74. The conveyor 70 can be formed as two separated bands with a central space through which the blisters 170 can travel while the card edges are supported on such bands.

This operation is continued for successive support assemblies 100 and automatically forms any desired number of display packages.

While the invention has been described above with the blister being fed to an aperture in the card and then the product fed into the blister, it is possible for the product to be frictionally secured to the inside of the blister and the blister then fed to the portion of the card not having the aperture. In this case, the portion having the aperture is folded over the blister and the product resting on the other portion of the card. Thus, the need for the cutout 117 in the support assembly could be eliminated.

Additionally, the precise sequence of the operation can be altered by varying the length and position of the various components of the apparatus. Therefore, although the invention has been described with the adhesive being deposited essentially on only the rear portion of the card, the entire card can receive adhesive strips by varying the length of the odd rail and the position of the microswitch, or the position of the glue heads.

While one advantageous embodiment has been chosen to illustrate the invention, it will be understood by those skilled in the art that various changes and modifications can be made therein without departing

from the scope of the invention as defined in the appended claims.

We claim:

1. Apparatus for forming display packages of the type including a transparent blister containing a product to be displayed and a blister supporting card, said apparatus comprising:

support assembly means to support said card and blister while said display package is formed;

means for depositing the card, the blister and the product which fills the blister, onto said support assembly means,

said card having first and second portions, one of which has an aperture therein for receiving the filled blister and the other of which serves as a backing sheet for the filled blister;

adhesive applying means for applying an adhesive composition to said card;

folding means for folding said first portion of said card over and onto said second portion thereof where said adhesive composition adheres said portions together to form the display package;

ejecting means for discharging the display package from said support assembly means;

an endless conveyor;

a plurality of said support assembly means mounted in a spaced relationship on said endless conveyor; and

drive means for continuously driving said endless conveyor so that said plurality of support assembly means mounted thereon continuously move past said means for depositing, and said adhesive applying means,

said folding means includes engagement means carried by each support assembly means for securing said card against each support assembly means and further includes elevating means carried by each support assembly means for elevating said first portion of said card.

2. An apparatus according to claim 1, and further including roller means for pressing said first portion of said card against said second portion.

3. An apparatus according to claim 1, wherein each of said support assembly means includes:

a housing having two positioning members thereon, between which said card is positioned, and said engagement means includes finger means coupled to said housing and movable into a securing engagement with said card.

4. An apparatus according to claim 1, wherein said folding means further includes members located adjacent said conveyor for rotating said first portion about said engagement means.

5. An apparatus according to claim 1, wherein said ejecting means includes

a finger pivotally coupled to each of said support assembly means; and

cam means, mounted adjacent said conveyor, for pivoting said finger into contact with said card.

6. An apparatus according to claim 1, wherein said adhesive applying means includes

adhesive delivering means, mounted above said conveyor, for delivering an adhesive composition to said card;

switch means for actuating said adhesive delivering means; and

9

10

cam means, mounted on each of said support assembly means for actuating said switch means.

7. An apparatus according to claim 3 and further including

cam rail means, mounted adjacent said conveyor, for moving said finger means into the securing engage-

ment with said card.

8. An apparatus according to claim 3 wherein each of said two positioning members has a slot therein for receiving a portion of said finger means.

\* \* \* \* \*

10

15

20

25

30

35

40

45

50

55

60

65