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(54) **System and method of opening a bag with partially offset lip**

System und Verfahren zum Oeffnen eines, mit einer teilweise versetzten Lippe versehenen, Beutels

Système et procédé pour ouvrir des sacs munis d'une lèvre partiellement décalée

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GB-A- 2 176 165 **US-A- 3 972 157**

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a method of opening a bag and a bag opening system for opening bags having an offset or cutout lip

[0002] Bags of various materials and structures are frequently used in the packaging of food and other items. Numerous patents exist which deal with the problem of opening the bag prior to inserting the product to be packaged. The need still exists, however, for a simple, reliable and effective method and system for opening the bags.

PRIOR ART

[0003] GB-A-2176165 discloses the use of adhesive tape to carry a plurality of bags towards a bag opening and loading station, each of the bags comprising superposed layers of film which define a generally flat bag mouth. This mouth is opened by a bag opening member penetrating the upper layer, and optionally a lower layer. When the bag opening member is raised it grips the resilient film of the upper layer to lift the upper layer away from the lower layer while the lower layer is held down by adhesion to tape. In one embodiment the upper layer may project longitudinally beyond the lower layer at the bag mouth so that the bag opening member engages only the upper layer.

[0004] It is a principal object of the present invention to provide a reliable method of opening a bag.

[0005] It is a further object of the invention to provide a method of opening a bag which avoids the use of air pressure or vacuum to open the bag.

[0006] It is a still further object of the invention to provide a method of opening a bag which is useful with side seal end seal bags.

[0007] It is another object of the invention to provide a method of opening a bag which reduces or minimizes the effect of stuck together bag openings.

[0008] It is still another object of the invention to provide a system for performing the method of opening bags according to the invention.

[0009] Other objects and advantages will appear hereinbelow.

SUMMARY OF THE INVENTION

[0010] In accordance with the invention, the foregoing objects and advantages are readily attained.

[0011] According to one aspect of the invention, there is provided a method of opening a bag, comprising the steps of: providing a plurality of bags, each bag comprising a first layer having a first lip and a second layer having a second lip, said first lip and second lip defining a substantially flat bag opening, and said first lip having a cutout defining an extending portion of said second lip

which extends beyond said first lip; positioning said plurality of bags in a row on an adhesive strip for advancing said bags along a path by adhering said first lip of each bag to said adhesive strip so that said bag opening is positioned transverse to said path and at a leading edge of said bag with respect to a direction of advance of said bag along said path; advancing said plurality of bags along said path toward a bag opening means; and displacing said bag opening means into contact with said extending portion of the first bag of the row so as to displace said second lip away from said first lip along the entire width of said first and second lips, thereby opening said bag opening, said method being characterised as claimed in claim 1.

[0012] In accordance with a second aspect of the invention, there is provided a bag opening system, comprising: a plurality of bags, each bag having a first lip and a second lip defining a substantially flat bag opening, said second lip having an extending portion extending beyond a portion of said first lip but not beyond the first lip along the entire width of said first lip, wherein said first lip has a cutout defining said extending portion of said second lip; means for positioning said plurality of bags in a row, said bags being positioned with said first lip attached to said positioning means and with said bag opening positioned transverse to said row; opening means for contacting said extending portion of said second lip of the first bag of the row so as to displace said second lip away from said first lip along the entire width of said first and second lips and to open said bag opening, and wherein said opening means passes through said cutout to contact said extending portion; and means for advancing said positioning means so as to advance said plurality of bags to said opening means.

[0013] Claims 1 and 2 are delimited over GB-A-2,176,165.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] A detailed description of preferred embodiments of the invention follows with reference to the attached drawings wherein:

Fig. 1 is a perspective view of a first embodiment of a bag positioned on adhesive strips of tape according to the invention;

Fig. 2 is a partially sectional view similar to Fig. 1;

Fig. 3 is a perspective view of a first bag opening system according to the invention;

Fig. 4 is a perspective view of the bag opening system of Fig. 3 with a bag in an open position;

Figs. 5-8 are side sectional views of a system according to the invention in various stages of opening a bag according to the method of the present invention;

Fig. 9 is an alternate embodiment of a bag positioned on adhesive strips according to the invention;

Fig. 10 is a perspective view of a second embodi-

ment of a bag positioned on adhesive strips of tape according to the invention; and
Figure 11 is a perspective view of a second bag opening system according to the invention.

DETAILED DESCRIPTION

[0015] The invention relates to a method and system of opening a bag for the packaging of food and other products in the bag.

[0016] Referring to Fig. 1, bags 10 to be opened in accordance with the method and system of the present invention are substantially flat and have an upper layer or side wall 12 and a lower layer or side wall 14. Layers 12, 14 are joined to each other at a bottom edge 16 and side edges 18 thereof. Layers 12, 14 have upper and lower lip portions 22, 24 respectively which serve to define an open top edge or bag opening 20 of bag 10. According to the invention, bags 10 are initially provided in a substantially flat condition as shown. Bag opening 20 of bag 10 is opened according to the invention so that bag 10 may be loaded with a product or for any other desired procedure in which it is desired to open bag opening 20.

[0017] Still referring to Fig. 1, bags 10 according to the invention are positioned on adhesive tape or strips 26, preferably on two substantially parallel spaced strips 26 as shown. Strips 26 are advanced so as to transport bags 10 along a substantially horizontal or vertical path for individual opening according to the invention, and subsequent loading and/or sealing steps and the like.

[0018] According to the invention, bags 10 are positioned with bag opening 20 arranged at a leading edge of bag 10 with respect to the direction of advance (indicated by arrow A in Fig. 1) of bags 10 and strips 26. Bags 10 are positioned in an end seal arrangement with bag opening 20 of each bag 10 arranged substantially transverse to the direction of advance as shown. Bags 10 are removably adhered to strips 26 so that bags 10 may be either removed from the strips and loaded or alternately after opening and insertion of product, readily removed from strips 26 as desired for further processing according to conventional techniques.

[0019] Any suitable motive means 27 may be provided, as shown schematically in Figs. 5-8, for advancing strips 26 and bags 10 positioned thereon in accordance with the invention.

[0020] Adhesive strips 26 may be made from any suitable flexible material, and provided with any adhesive sufficient to hold lower layer 14 in place during lifting of upper layer 12 and opening of bag 10. The adhesive is also preferably sufficiently releasable so as to permit removal of bags 10 from strips 26 after opening and loading.

[0021] According to the invention, a plurality of bags are provided on strips 26, arranged in a row and partially overlapping as shown in Fig. 4. Bags 10 may thereby be advanced toward an opening station generally re-

ferred to by reference numeral 36 so as to position bags 10 one at a time for opening at station 36. For simplicity, only a single bag 10 is illustrated in the other drawings.

[0022] In accordance with the invention, lower layer 14 is removably adhered to strips 26 and has a cutout 28 arranged in lower lip portion 24 thereof so as to provide an extending portion 30 of upper lip portion 22 at bag opening 20 where upper lip portion 22 is exposed or offset relative to lower lip portion 24.

[0023] Fig. 2 has a portion of upper layer 12 sectioned away so as to better illustrate cutout 28 in lower layer 14 according to the invention. Cutout 28 according to the invention preferably has a width W which is less than the spacing S of strips 26 so that upper layer 12 is not also adhered to strips 26. Of course, cutout 28 could alternatively be wider than the spacing S of strips 26. Cutout 28 may be formed in lower layer 14 according to any known procedure.

[0024] A force is applied by a lifting mechanism 36 to extending portion 30 of upper lip portion 22 in a direction substantially away from lower lip portion 24 whereby lower lip portion 24 is held in place by strips 26 and upper lip portion 22 is displaced away from lower lip portion 24, thereby opening bag opening 20 of bag 10 in accordance with the invention.

[0025] Referring now to Figs. 3 and 4, arm members 32 on lifting mechanism 36 are provided for applying the desired force F (See also Fig. 8) to portion 30 of bag 10 so as to open bag 10 in accordance with the invention. According to the invention, arms 32 are preferably moveable in a substantially vertical or perpendicular direction relative to a bag 10 positioned on strips 26 according to the invention, as indicated by arrows V. Further, arms 32 may preferably be movably mounted to a carriage 34 or other member which is moveable in a direction substantially parallel to the direction or path of advance of strips 26 as indicated by arrows P. Any means 35 known in the art may suitably be utilized according to the invention for providing the desired movement of arm members 32 and carriage 34 as illustrated schematically in Figs. 5-8. Further, vertical and parallel movement of arm members 32 may both be provided through carriage 34, or through any other suitable structure so as to provide the desired degrees of movement of arm members 32.

[0026] As shown in the drawings, two substantially parallel and spaced arm members 32 may be provided. Arm members 32 are preferably spaced at a spacing less than spacing S of strips 26 and less than width W of cutout 28 so that arm members 32 may readily pass between strips 26 and through cutout 28 during the opening or force applying step of the bag opening method of the present invention.

[0027] Referring now to Figs. 5-8, the steps of the method of the present invention are further described.

[0028] Initially, bags 10 are positioned on strips 26 as described above with each bag opening 20 in a leading position. Bags 10 and strips 26 are advanced toward

lifting mechanism 36 so as to position bag opening 20 of a bag 10 for opening. According to the invention, arm members 32 are positioned from a starting position indicated in Fig. 5 to a position below strips 26 and bag 10 or, in other words, to the lower layer 14 side of bag 10 as shown in Fig. 6. Arm members 32 are then advanced relative to bag 10 so as to position arm members 32 below portion 30 and cutout 28 as shown in Fig. 7. Arm members 32 are then lifted according to the invention so that arm members 32 pass through cutout 28 and contact portion 30 of upper lip portion 22. Further lifting of arm members 32 to the position illustrated in Fig. 8 above strips 26 results in application of force F to upper lip portion 22, lifting of upper lip portion 22 away from lower lip portion 24 which remains adhered to strips 26, and the opening of bag opening 20. Advantageously, the bag opening method of the present invention is carried out without the use of air pressure, vacuum and the like, and while minimizing the previously experienced problem of sticking between lips 22, 24 of bag opening 20. At this point, a product (not shown) can be inserted into bag 10. Arm members 32 can preferably be withdrawn from bag 10, to the starting position of Fig. 5, and loaded bag 10 removed to the next station for further processing according to conventional techniques which form no part of the present invention. The next bag 10 to be opened is then advanced and the method repeated as desired.

[0029] Rollers 38 or any other suitable structure can be provided if desired for rolling up advanced strips 26 or for guiding strips 26 to a discarding or recycling station.

[0030] It should be noted that the present method and system of opening bags is readily applicable to bags made from a wide variety of materials and bags of various shapes. Bags 10 may be made from any desired material. Further, while Figs. 1 and 2 illustrate straight seal bags, that is bags having a substantially straight bottom edge 16 and bag opening 20, bags 10 could be provided with curved bottom edges 16 and bag openings 20 as illustrated in Fig. 9. In this configuration, cutout 28 may be curved to match the contour of bag opening 20 if desired, or cutout 28 may be straight as in Figs. 1 and 2, all within the scope of the present invention.

[0031] An alternate bag system is illustrated in Figures 10 and 11 a bag 40 consisting of a top lip 42 and bottom lip 46 with the top lip 42 having one or more partial offsets or cutout portions 44 exposing the bottom lip 46 and the bottom lip 46 having a one or more partial offsets as cutout portions 48 exposing the top lip 42 may be opened with the device 50 shown in Figure 11. The device 50 consists of two circular rails 52 and 54 held equidistant by a stationary top block 56 and a stationary bottom block 58, the bottom block 58 having two clamps 60, 62 which are moved vertically relative to block 58. In addition the device has an intermediate block 64 which may move along rails 52, 54 and has two clamps 66, 68 which is moved vertically relative to intermediate

block 64. By moving the intermediate block 64 towards the bottom block 58 and indexing the bag 40 towards the device 50 the partial offsets 44, 48 in the bag lip may be aligned with the bag clamps 60, 62, 66, 68. After closing the clamps which secures the top and bottom lips the intermediate block 64 is moved toward the top block 56 along rails 52, 54 moving the top lip 42 away from the bottom lip 46 for opening the bag 40.

[0032] Thus disclosed is a method and system of opening a bag wherein bags are reliably opened without the use of air pressure or vacuum, and the sticking of lips of the bag opening is minimized or eliminated altogether.

[0033] It is to be understood that the invention is not limited to the illustrations described and shown herein, which are deemed to be merely illustrative of the best modes of carrying out the invention, and which are susceptible of modification of form, size, arrangement of parts and details of operation. The invention rather is intended to encompass all such modifications which are within its spirit and scope as defined by the claims.

Claims

1. A method of opening a bag (10), comprising the steps of:

providing a plurality of bags, each bag comprising a first layer (14) having a first lip (24) and a second layer (12) having a second lip (22), said first lip and second lip defining a substantially flat bag opening (20), and said second lip having an extending portion (30) which extends beyond said first lip;

positioning said plurality of bags in a row on an adhesive strip (26) for advancing said bags along a path by adhering said first lip of each bag to said adhesive strip so that said bag opening is positioned transverse to said path and at a leading edge of said bag with respect to a direction of advance of said bag along said path;

advancing said plurality of bags along said path toward a bag opening means (32); and displacing said bag opening means (32) into contact with said extending portion of the first bag of the row and displacing said second lip away from said first lip along the entire width of said first and second lips, thereby opening said bag opening;

characterised in that said first lip (14) includes a cutout (28) defining said extending portion (30) of said second lip (22); and **in that** said displacement of the bag opening means (32) comprises advancing said bag opening means (32) through said cutout (28) in said first lip (24) and into contact

with said extending portion (30) of said second lip (22).

2. A bag opening system, comprising:

a plurality of bags (10), each bag having a first lip (24) and a second lip (22) defining a substantially flat bag opening (20), said second lip having an extending portion (30) extending beyond a portion of said first lip; means (26) for positioning said plurality of bags in a row, said bags being positioned with said first lip (24) attached to said positioning means (26) and with said bag opening positioned transverse to said row; opening means (32) for contacting said extending portion of said second lip of the first bag of the row so as to displace said second lip (22) away from said first lip (24) and to open said bag opening (20); and means (38) for advancing said positioning means (26) so as to advance said plurality of bags to said opening means (32);

characterised in that said first lip has a cutout (28) defining said extending portion (30) of said second lip; **in that** said cut out (28) does not extend along the entire width of said first lip; and **in that** said opening means passes through said cutout to contact said extending portion to separate said second lip (24) from said first lip (22) along the entire width of said first and second lips.

3. A bag opening system according to claim 2, wherein said means for positioning said bags comprises at least one adhesive strip, said first lip of each bag being adhered to said strip.

4. A bag opening system according to claim 3, wherein said means for positioning said bags comprises two substantially parallel spaced adhesive strips.

5. A bag opening system according to claim 4, wherein said two spaced adhesive strips are spaced at a tape spacing and wherein said cutout is narrower than said tape spacing.

6. A bag opening system according to any one of claims 2 to 5, wherein said opening means comprises at least one arm member movably positioned relative to said positioning means between a ready position wherein said arm member is on one side of said positioning means and an opening position wherein said arm member is on the other side of said positioning means.

7. A bag opening system according to any one of claims 2 to 5, wherein said opening means comprises

a carriage adapted for movement in a first direction substantially parallel to said positioning means and at least one arm member mounted to said carriage for movement in a second direction substantially perpendicular to said positioning means.

Patentansprüche

1. Verfahren zum Öffnen eines Beutels (10), mit den Schritten:

Bereitstellen einer Vielzahl von Beuteln, wobei jeder Beutel eine erste Lage (14) mit einer ersten Lippe (24) und eine zweite Lage (12) mit einer zweiten Lippe (22) hat, wobei die erste Lippe und die zweite Lippe eine im wesentlichen flache Beutelöffnung (20) bilden, und wobei die zweite Lippe einen vorstehenden Bereich (30) hat, der sich bis über die erste Lippe hinaus erstreckt;

Positionieren der Vielzahl von Beuteln in einer Reihe auf einem Klebestreifen (26), um die Beutel entlang eines Weges vorzubewegen, indem die erste Lippe von jedem Beutel an dem Klebestreifen festgeklebt ist, so daß die Beutelöffnung schräg zu dem Weg und an einer führenden Kante des Beutels bezüglich einer Vorbewegungsrichtung des Beutels entlang des Weges positioniert ist;

Vorbewegen der Vielzahl von Beuteln entlang des Weges in Richtung auf eine Beutelöffnungseinrichtung (32); und

Verlagern der Beutelöffnungseinrichtung (32) in Kontakt mit dem vorstehenden Bereich des ersten Beutels der Reihe und Verlagern der zweiten Lippe weg von der ersten Lippe entlang der gesamten Breite der ersten und zweiten Lippe, wodurch die Beutelöffnung geöffnet wird;

dadurch gekennzeichnet, daß die erste Lippe (14) einen Ausschnitt (28) hat, durch den der vorstehende Bereich (30) der zweiten Lippe (22) definiert ist; und daß die Verlagerung der Beutelöffnungseinrichtung (32) das Verschieben der Beutelöffnungseinrichtung (32) durch den Ausschnitt (28) in der ersten Lippe (24) und in Kontakt mit dem vorstehenden Bereich (30) der zweiten Lippe (22) umfaßt.

2. Beutelöffnungssystem, mit:

einer Vielzahl von Beuteln (10), wobei jeder Beutel eine erste Lippe (24) und eine zweite Lippe (22) aufweist, die eine im wesentlichen flache Beutelöffnung (20) bilden, wobei die zweite Lippe einen vorstehenden Bereich (30)

hat, der über einen Bereich der ersten Lippe hinaus vorsteht;

einer Einrichtung (26) zum Positionieren der Vielzahl von Beuteln in einer Reihe, wobei die Beutel positioniert sind, daß die erste Lippe (24) an der Positionierungseinrichtung (26) befestigt ist und die Beutelöffnung schräg zu der Reihe positioniert ist;

einer Öffnungseinrichtung (32), um mit dem vorstehenden Bereich der zweiten Lippe des ersten Beutels der Reihe in Kontakt zu kommen, um so die zweite Lippe (22) weg von der ersten Lippe (24) zu verlagern und um die Beutelöffnung (20) zu öffnen; und

einer Einrichtung (38), um die Positionierungseinrichtung (26) vorzubewegen, um so die Vielzahl von Beuteln zu der Öffnungseinrichtung (32) vorzubewegen;

dadurch gekennzeichnet, daß die erste Lippe einen Ausschnitt (28) hat, durch den der vorstehende Bereich (30) der zweiten Lippe definiert ist; daß sich der Ausschnitt (28) nicht entlang der gesamten Breite der ersten Lippe erstreckt; und daß die Öffnungseinrichtung durch den Ausschnitt führt, um mit dem vorstehenden Bereich in Kontakt zu kommen, um die zweite Lippe (24) von der ersten Lippe (22) entlang der gesamten Breite der ersten und zweiten Lippe zu trennen.

3. Beutelöffnungssystem nach Anspruch 2, bei dem die Einrichtung zum Positionieren der Beutel zumindest einen Klebestreifen aufweist, wobei die erste Lippe von jedem Beutel an dem Streifen festgeklebt ist.

4. Beutelöffnungssystem nach Anspruch 3, bei dem die Einrichtung zum Positionieren der Beutel zwei im wesentlichen parallel beabstandete Klebestreifen aufweist.

5. Beutelöffnungssystem nach Anspruch 4, bei dem die beiden beabstandeten Klebestreifen mit einem Bandabstand beabstandet sind und bei dem der Ausschnitt schmaler als der Bandabstand ist.

6. Beutelöffnungssystem nach einem der Ansprüche 2 bis 5, bei dem die Öffnungseinrichtung zumindest ein Armbauteil aufweist, das relativ zu der Positionierungseinrichtung zwischen einer Fertig-Position, in der sich das Armbauteil an einer Seite der Positionierungseinrichtung befindet, und einer Öffnen-Position bewegbar positioniert ist, in der sich das Armbauteil an der anderen Seite der Positionierungseinrichtung befindet.

7. Beutelöffnungssystem nach einem der Ansprüche 2 bis 5, bei dem die Öffnungseinrichtung einen

Schlitten, der für eine Bewegung in eine erste Richtung im wesentlichen parallel zu der Öffnungseinrichtung ausgestaltet ist, und zumindest ein Armbauteil aufweist, das an dem Schlitten für eine Bewegung in eine zweite Richtung im wesentlichen senkrecht zu der Positionierungseinrichtung montiert ist.

10 Revendications

1. Procédé pour ouvrir un sac (10), comprenant les étapes consistant à :

fournir une pluralité de sacs, chaque sac comprenant une première couche (14) ayant une première lèvre (24) et une seconde couche (12) ayant une seconde lèvre (22), ladite première lèvre et ladite seconde lèvre définissant une ouverture de sac (20) sensiblement plate, et ladite seconde lèvre ayant une portion d'extension (30) qui s'étend au-delà de ladite première lèvre ;

positionner ladite pluralité de sacs en une rangée sur une bande adhésive (26) pour faire avancer lesdits sacs le long d'un chemin en faisant adhérer ladite première lèvre de chaque sac à ladite bande adhésive de telle sorte que ladite ouverture de sac est positionnée transversalement audit chemin et à un bord avant dudit sac par rapport à une direction d'avance dudit sac le long dudit chemin ;

faire avancer ladite pluralité de sacs le long dudit chemin vers un moyen d'ouverture de sac (32) ; et

déplacer ledit moyen d'ouverture de sac (32) en contact avec ladite portion d'extension du premier sac de la rangée et écarter ladite seconde lèvre au loin de ladite première lèvre sur toute la largeur desdites première et seconde lèvres, en ouvrant ainsi ladite ouverture de sac ;

caractérisé en ce que ladite première lèvre (14) comprend une découpe (28) définissant ladite portion d'extension (30) de ladite seconde lèvre (22) ; et **en ce que** ledit déplacement du moyen d'ouverture de sac (32) comprend l'avancement dudit moyen d'ouverture de sac (32) à travers ladite découpe (28) dans ladite première lèvre (24) et en contact avec ladite portion d'extension (30) de ladite seconde lèvre (22).

2. Système d'ouverture de sacs, comprenant :

une pluralité de sacs (10), chaque sac ayant une première lèvre (24) et une seconde lèvre (22) définissant une ouverture de sac sensible-

ment plate (20), ladite seconde lèvre ayant une portion d'extension (30) s'étendant au-delà d'une portion de ladite première lèvre ;

un moyen (26) pour positionner ladite pluralité de sacs en une rangée, lesdits sacs étant positionnés avec ladite première lèvre (24) fixée audit moyen de positionnement (26) et avec ladite ouverture de sac positionnée transversalement à ladite rangée ;
un moyen d'ouverture (32) pour venir en contact avec ladite portion d'extension de ladite seconde lèvre du premier sac de la rangée de manière à écarter ladite seconde lèvre (22) de ladite première lèvre (24) et à ouvrir ladite ouverture de sac (20) ; et
un moyen (38) pour faire avancer ledit moyen de positionnement (26) de façon à avancer ladite pluralité de sacs audit moyen d'ouverture (32) ;

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caractérisé en ce que ladite première lèvre présente une découpeure (28) définissant ladite portion d'extension (30) de ladite seconde lèvre ; **en ce que** ladite découpeure (28) ne s'étend pas sur toute la largeur de ladite première lèvre ; et **en ce que** ledit moyen d'ouverture passe à travers ladite découpeure pour venir en contact avec ladite portion d'extension pour séparer ladite seconde lèvre (24) de ladite première lèvre (22) sur toute la largeur desdites première et seconde lèvres.

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3. Système d'ouverture de sacs selon la revendication 2, où ledit moyen pour positionner lesdits sacs comprend au moins une bande adhésive, ladite première lèvre de chaque sac adhérent à ladite bande.

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4. Système d'ouverture de sacs selon la revendication 3, où ledit moyen pour positionner lesdits sacs comprend deux bandes adhésives espacées sensiblement parallèlement.

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5. Système d'ouverture de sacs selon la revendication 4, où lesdites deux bandes adhésives espacées sont espacées selon un espacement de bande et où ladite découpeure est plus étroite que ledit espacement de bande.

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6. Système d'ouverture de sacs selon l'une quelconque des revendications 2 à 5, où ledit moyen d'ouverture comprend au moins un élément formant bras positionné d'une manière mobile relativement audit moyen de positionnement entre une position prête où ledit élément formant bras se trouve sur un côté dudit moyen de positionnement et une position d'ouverture où ledit élément formant bras se trouve de l'autre côté dudit moyen de positionnement.

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7. Système d'ouverture de sacs selon l'une quelcon-

que des revendications 2 à 5, où ledit moyen d'ouverture comprend un chariot apte à se déplacer dans une première direction sensiblement parallèle audit moyen de positionnement et au moins un élément formant bras monté sur le chariot en vue d'un déplacement dans une seconde direction sensiblement perpendiculaire audit moyen de positionnement.

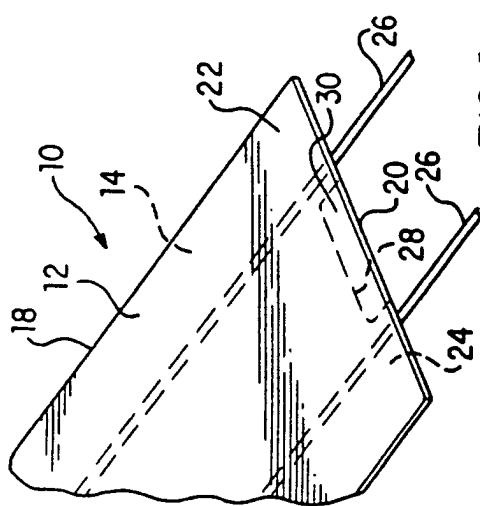


FIG. 1

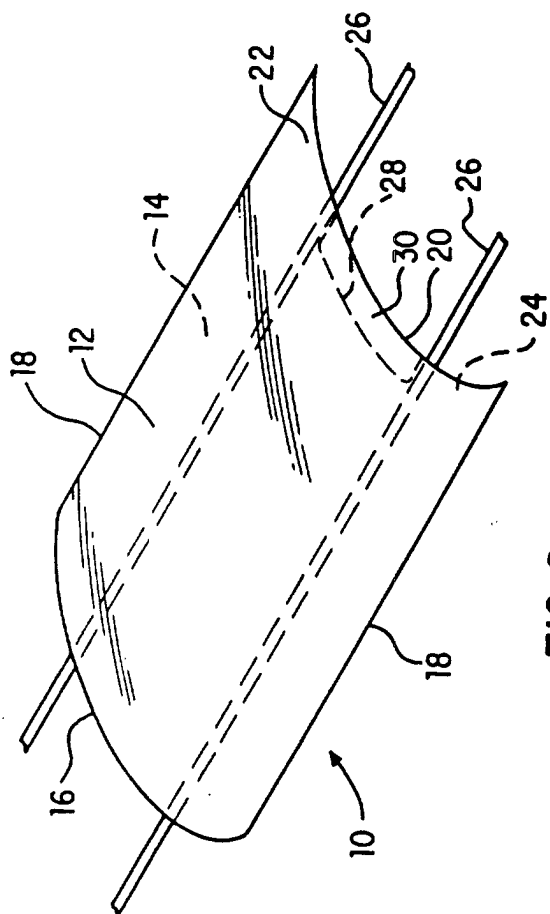


FIG. 9

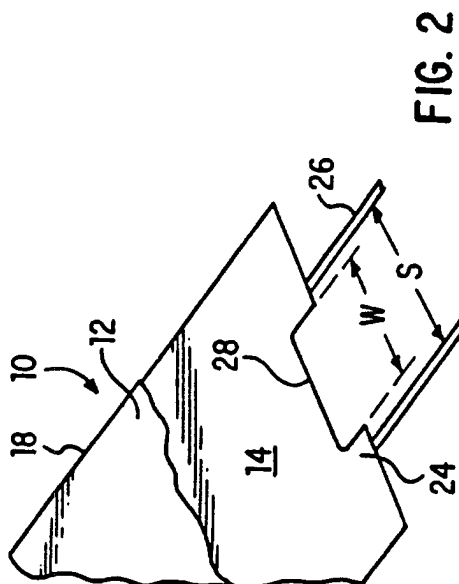
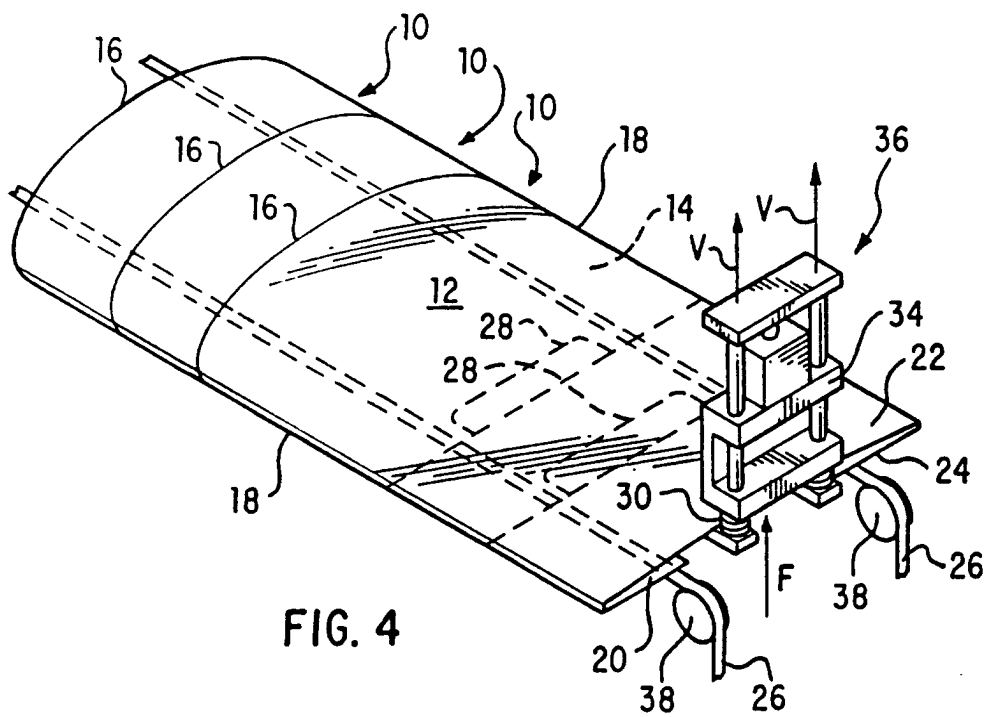
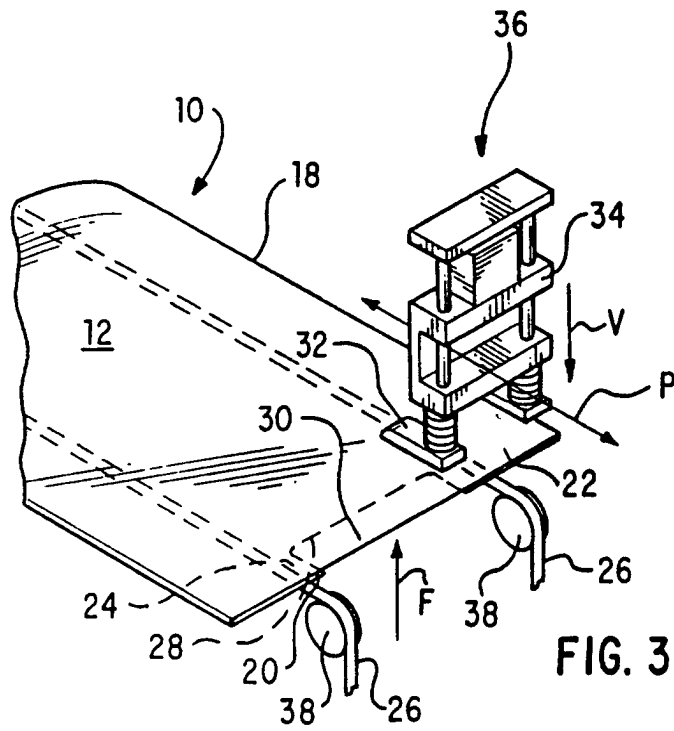


FIG. 2



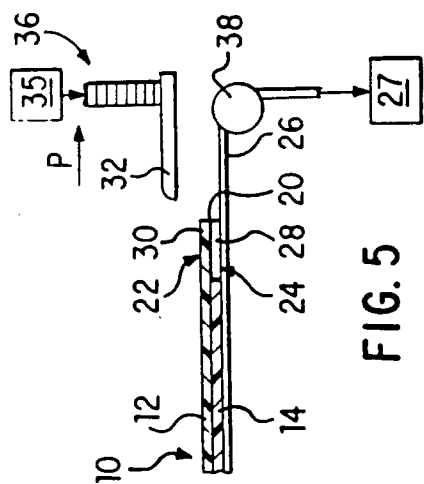


FIG. 5

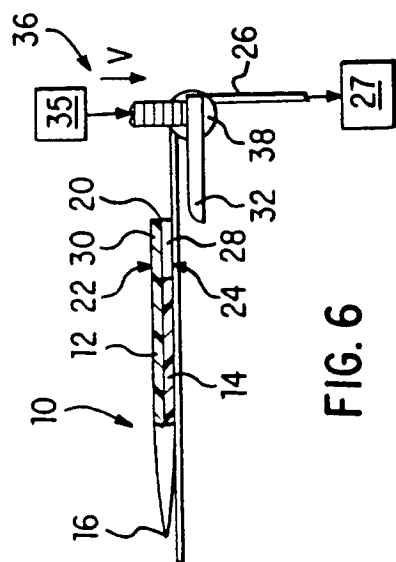


FIG. 6

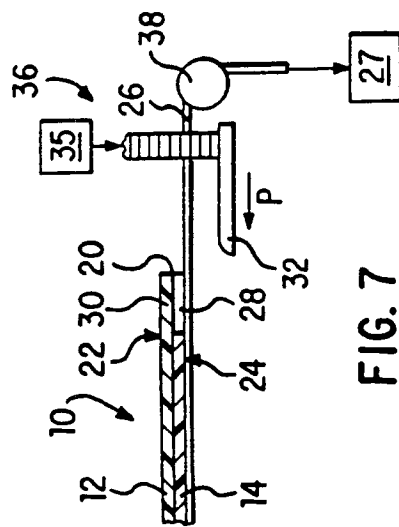


FIG. 7

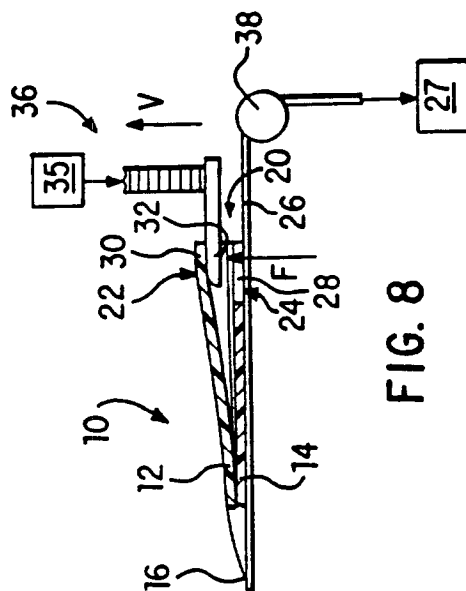


FIG. 8

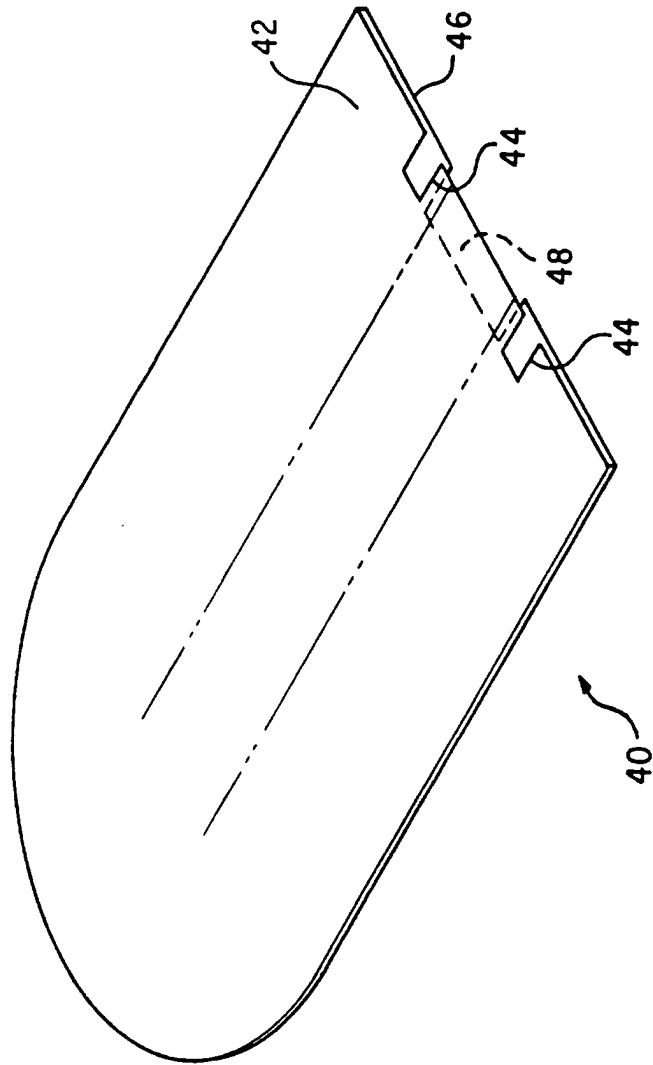


FIG. 10

