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(54) **CLOSURE DEVICE FOR A RECLOSABLE POUCH**

(52) **U.S. Cl. 24/400**

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(57) **ABSTRACT**

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A reclosable pouch includes first and second pouch walls having male and female closure elements disposed on and separate from the first and second pouch walls, respectively. The female profile element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile. Each of the first and second flanges includes a first portion of substantially uniform thickness and a second portion having a thickness less than the first portion and where the second portion is disposed between and contiguous with the first portion and the female profile member.

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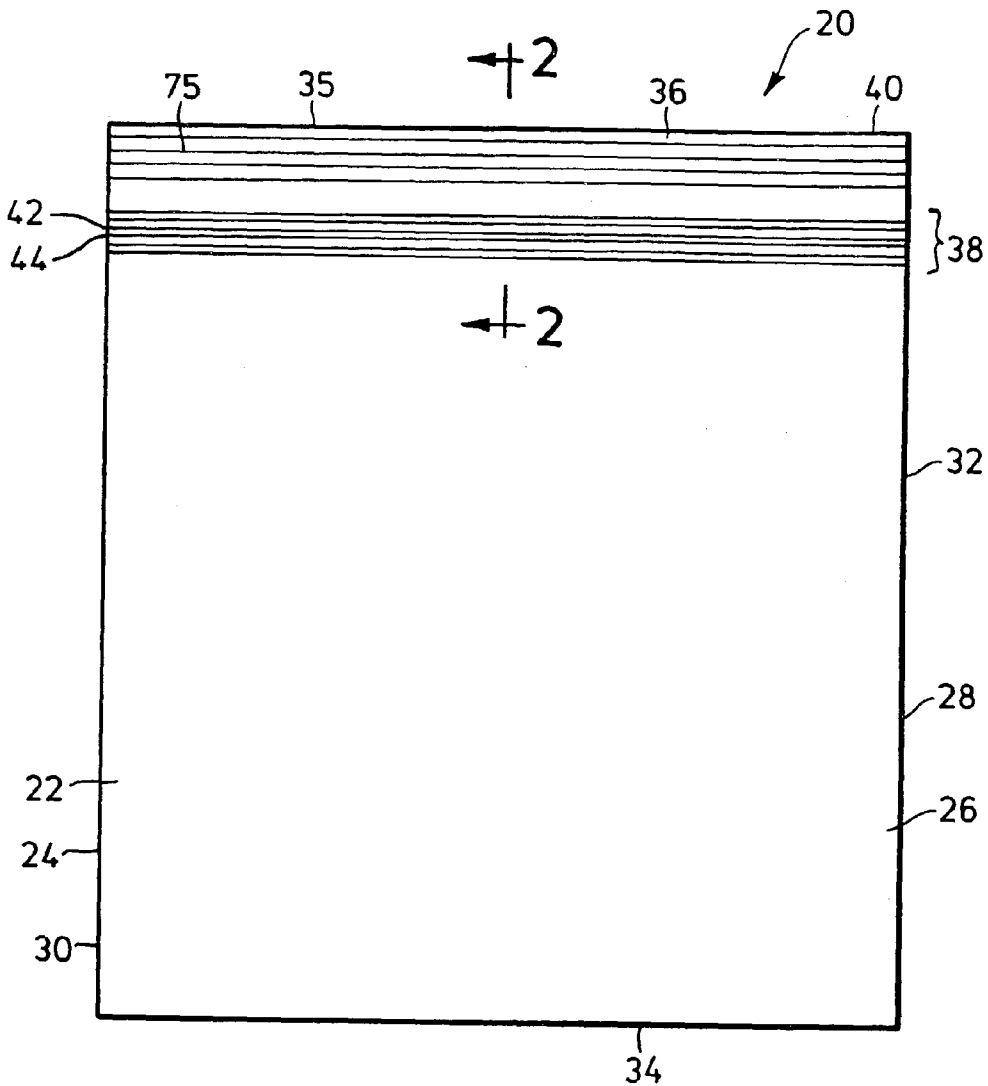


FIG. 1

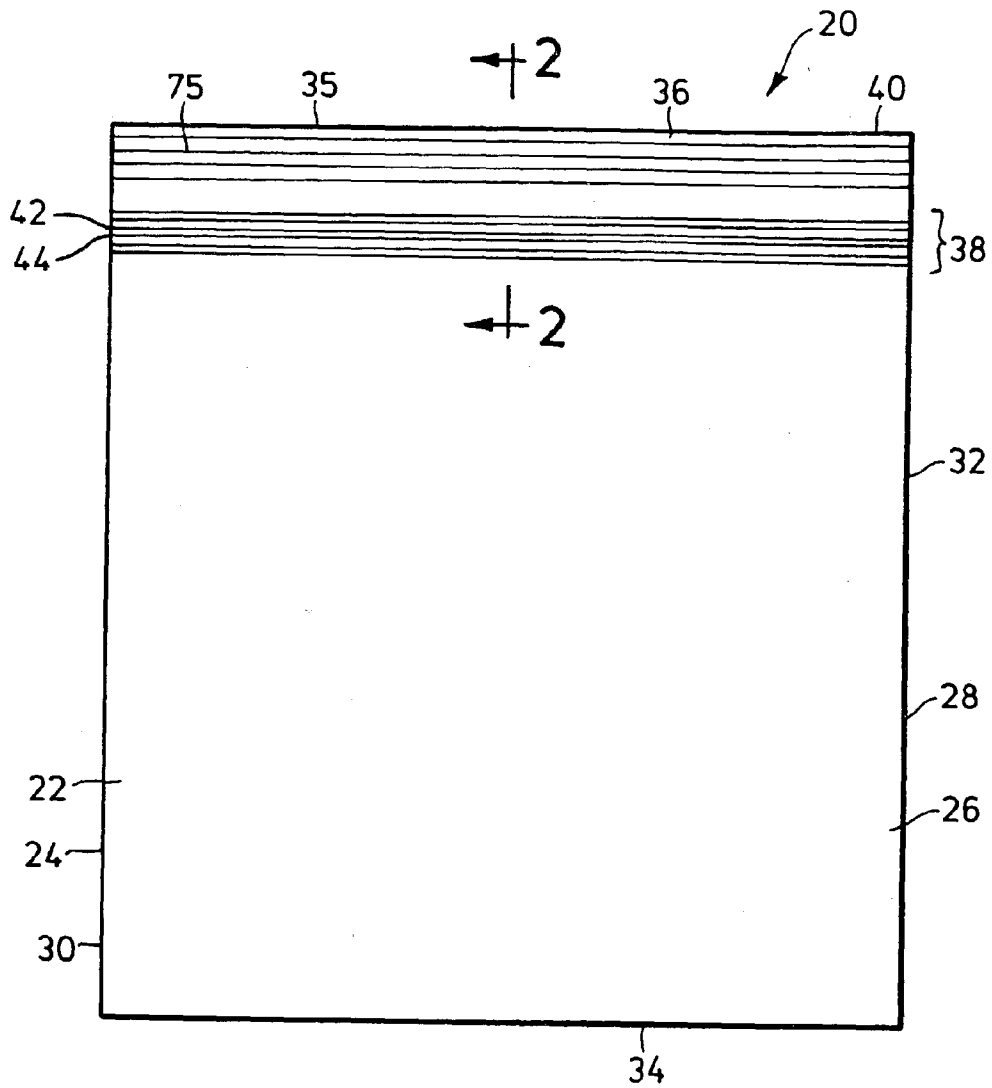


FIG. 2

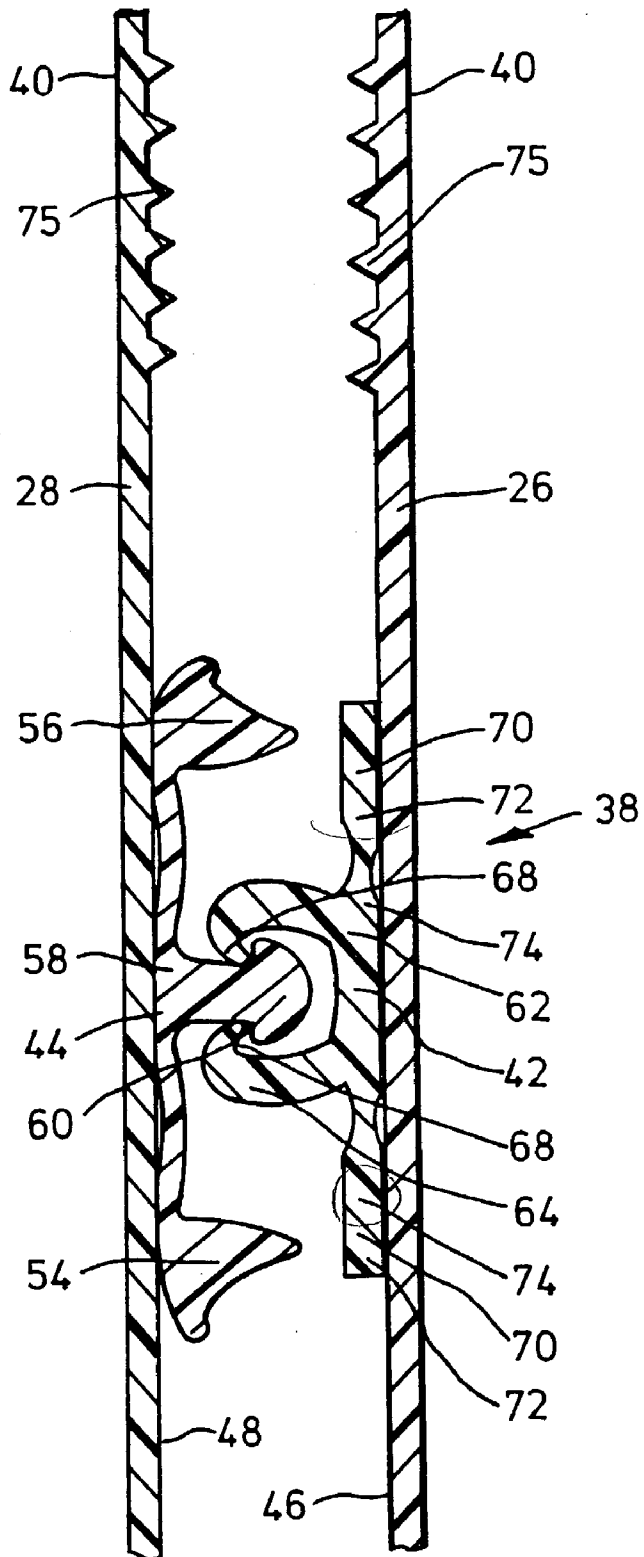


FIG. 3

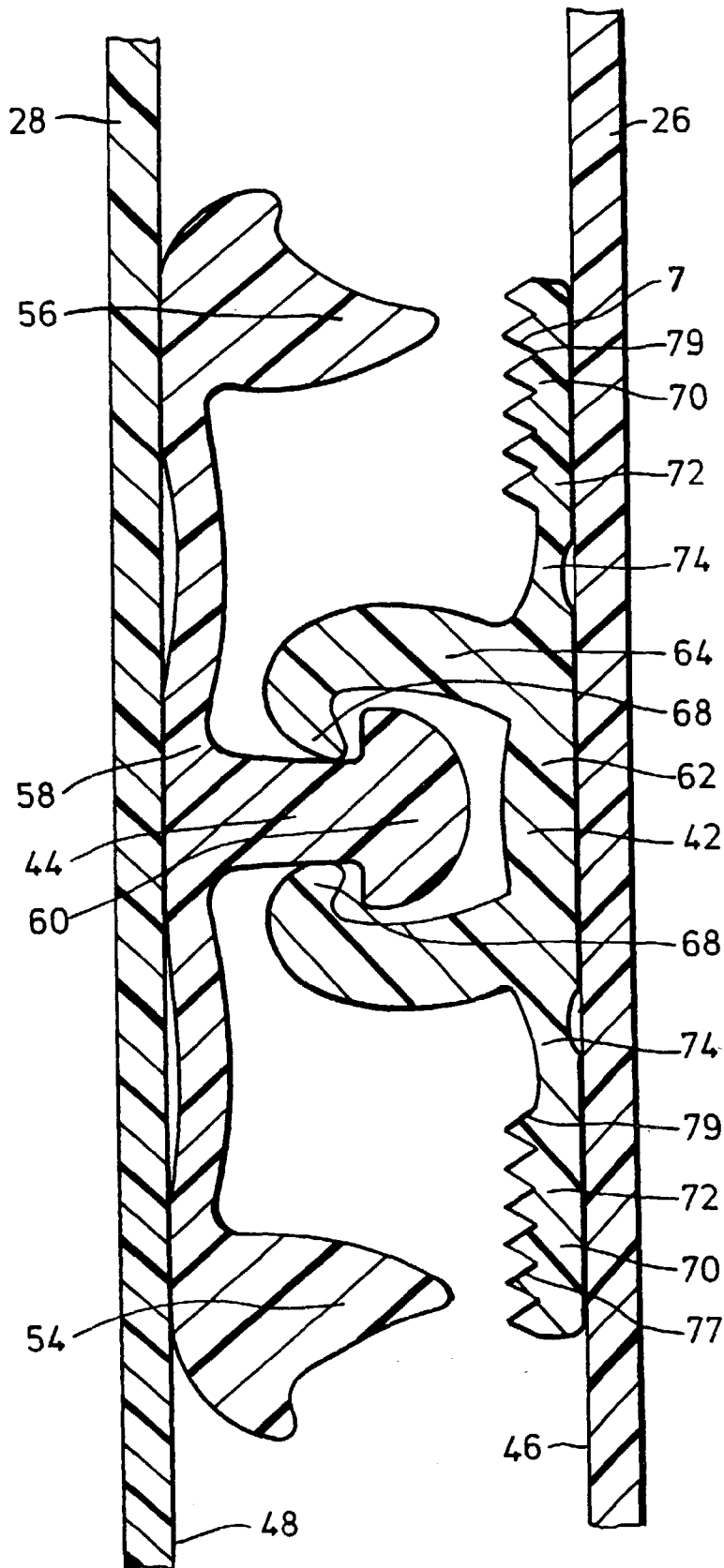


FIG. 4

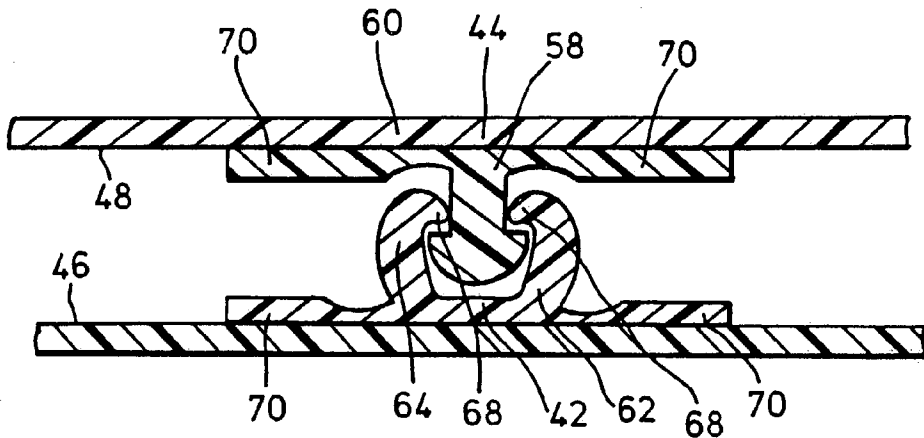


FIG. 5

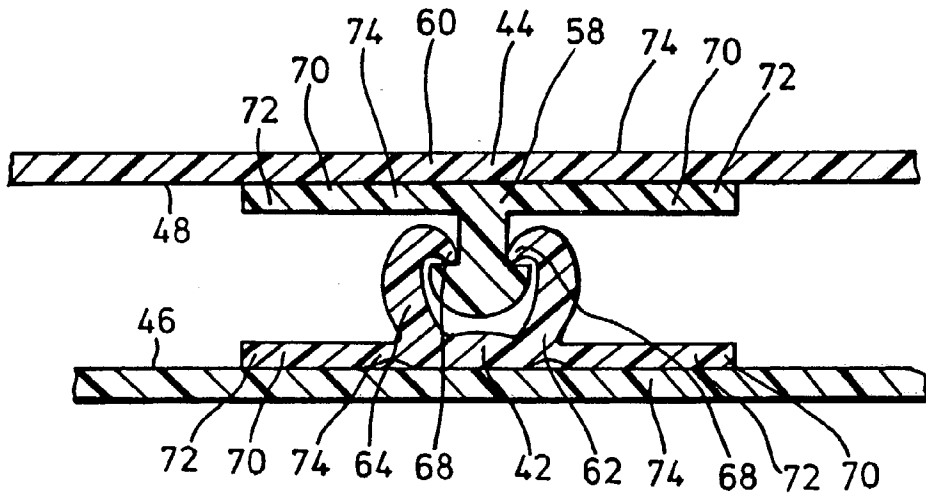


FIG. 6

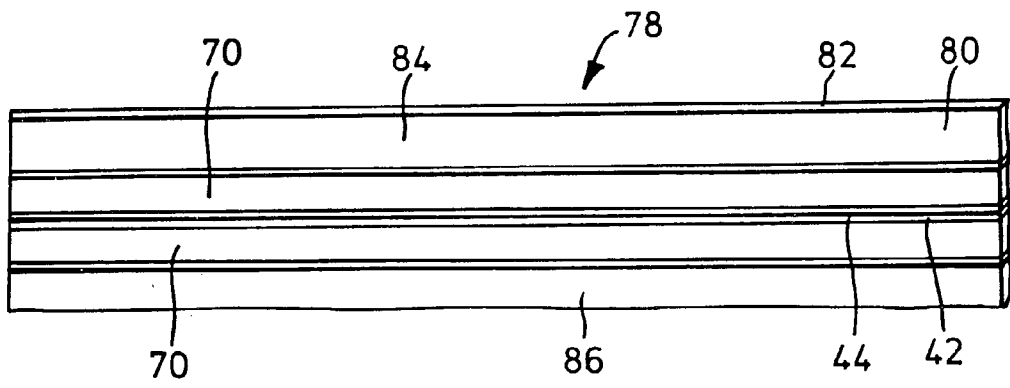


FIG. 7

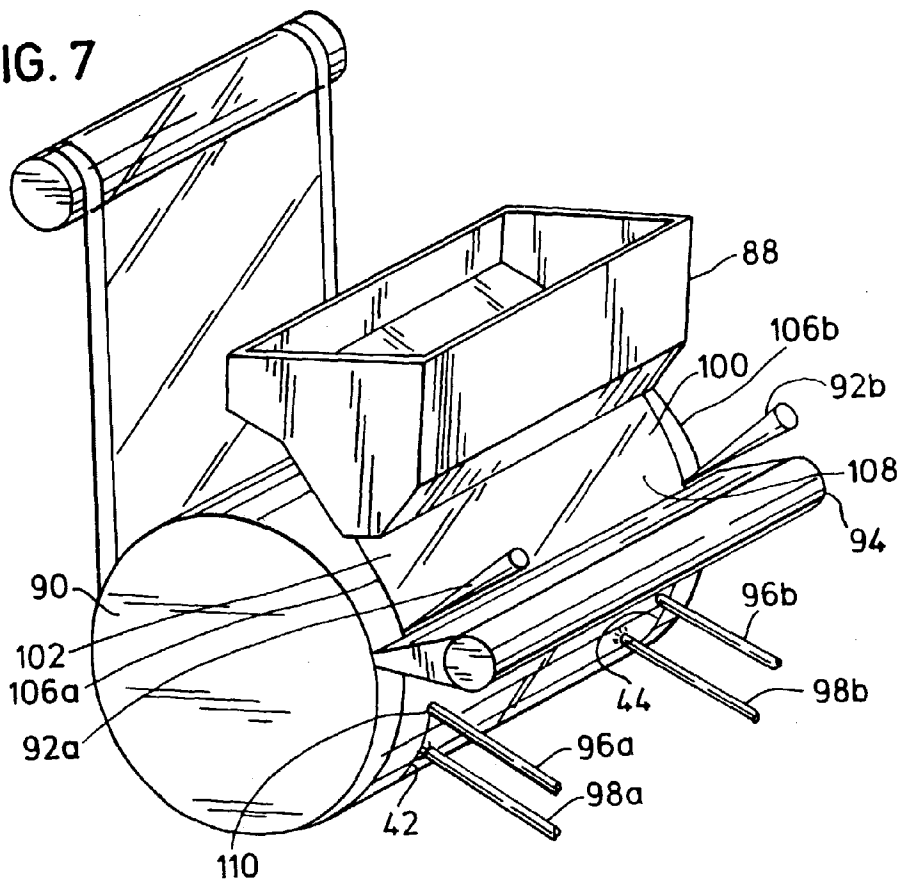


FIG. 8

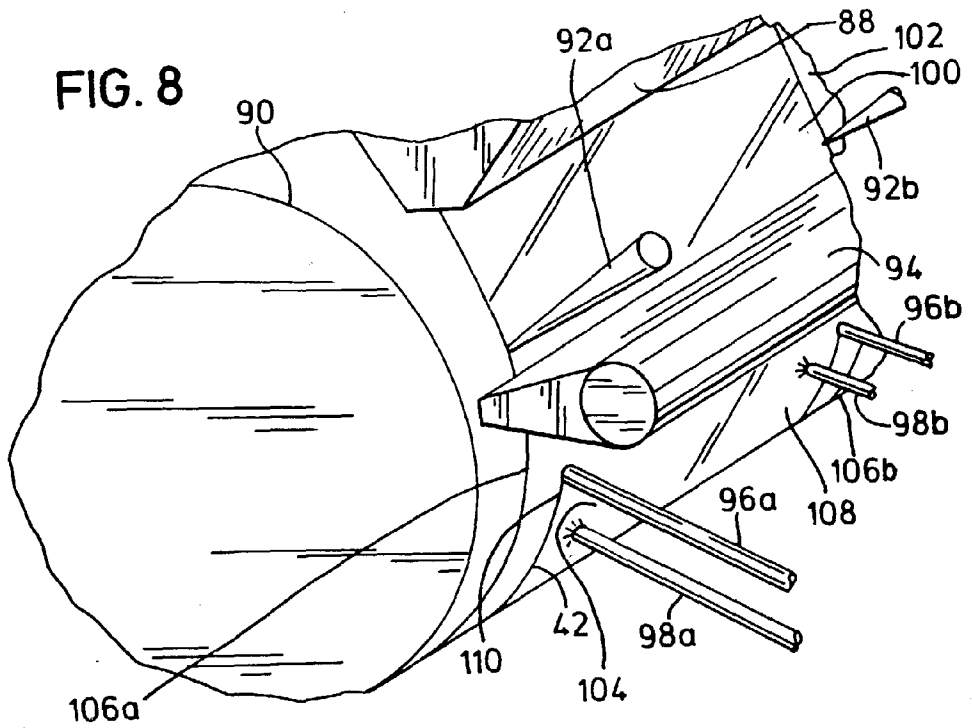


FIG. 9

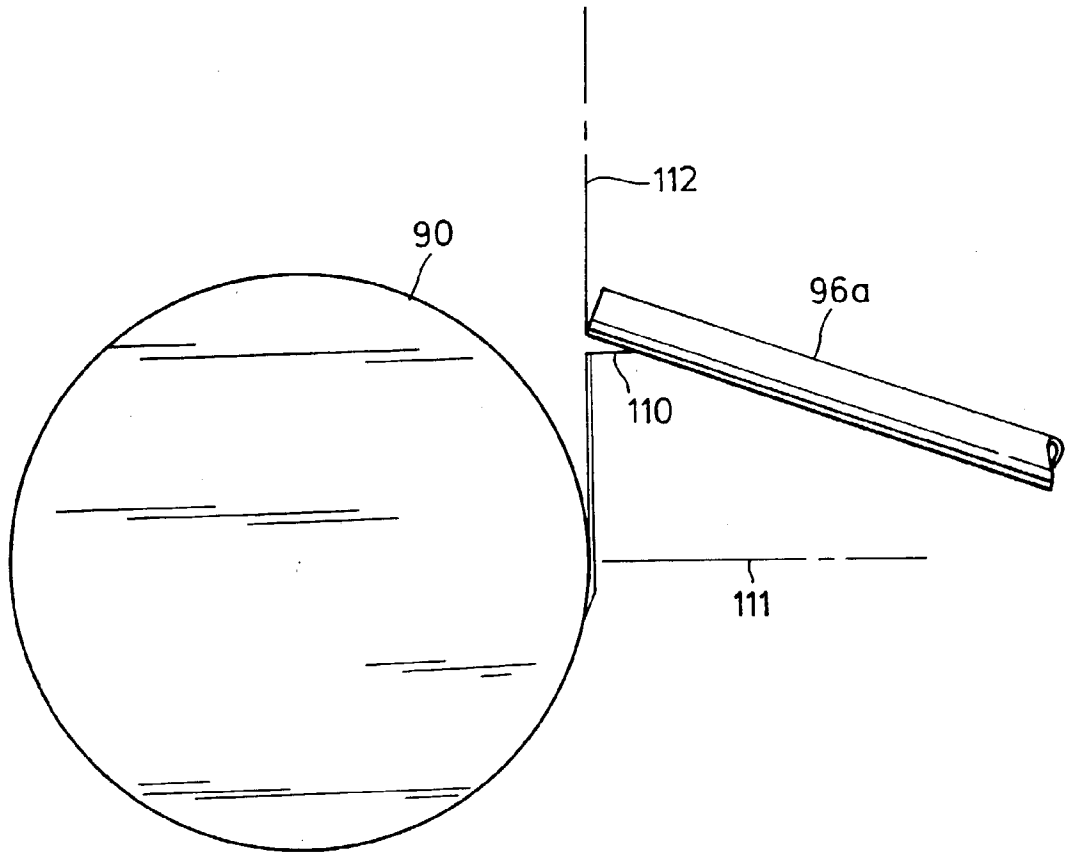


FIG. 10

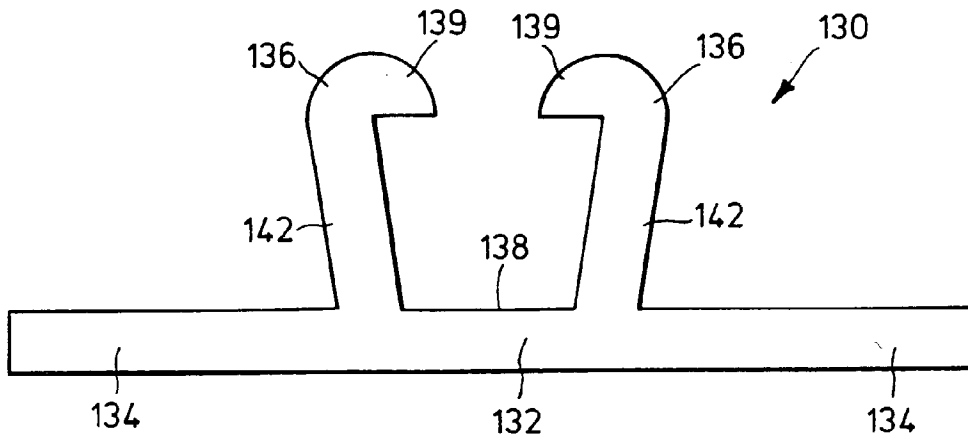


FIG. 11

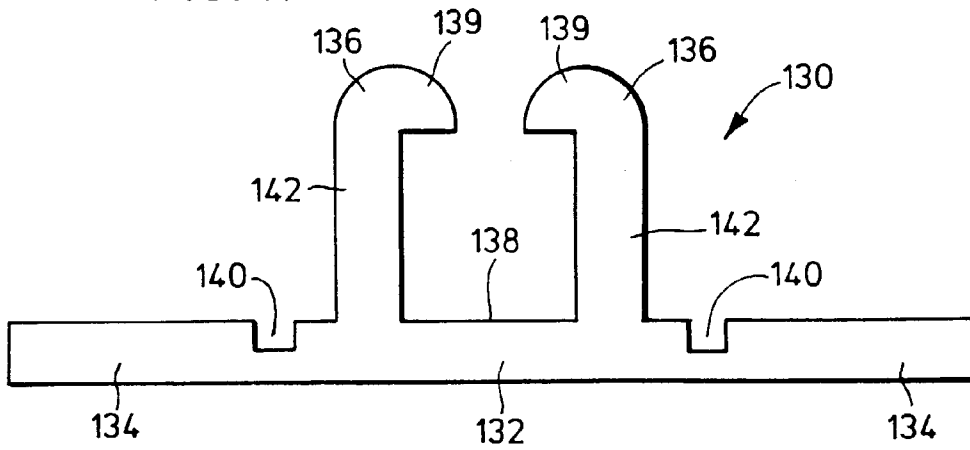


FIG. 12

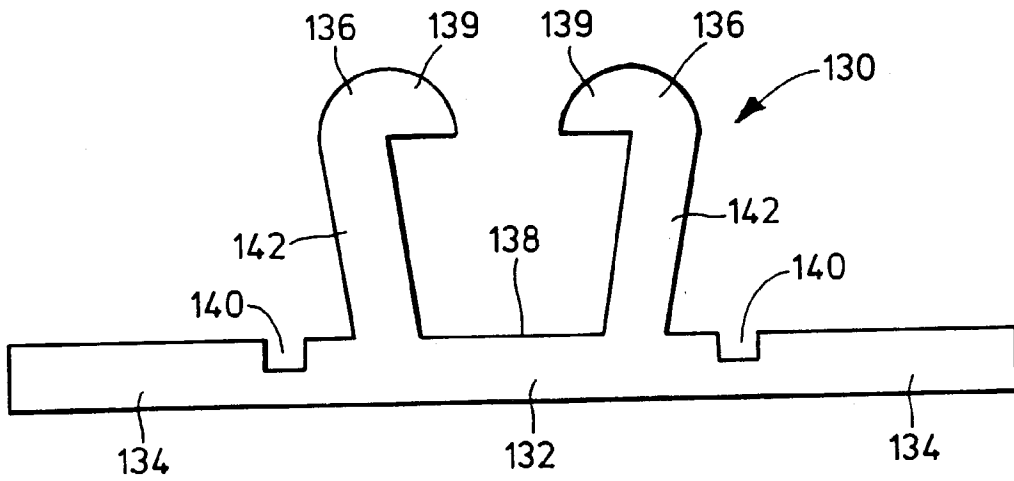
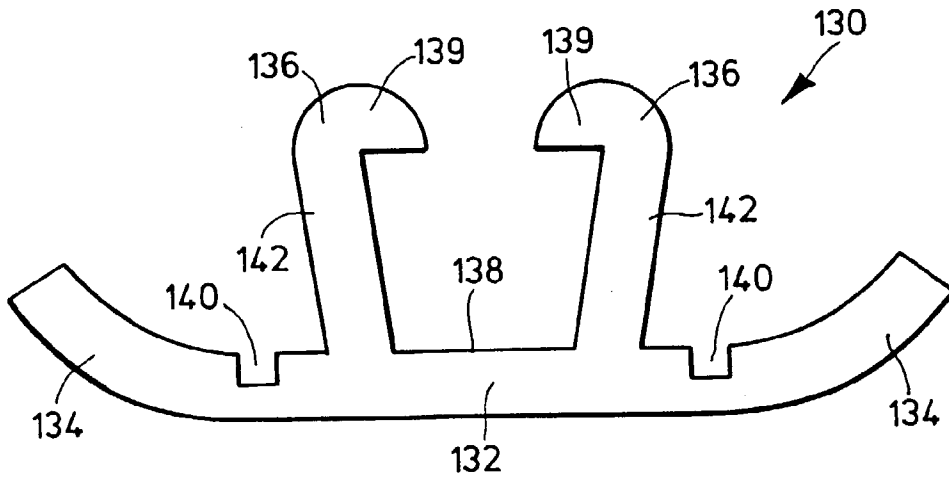


FIG. 13



CLOSURE DEVICE FOR A RECLOSABLE POUCH**TECHNICAL FIELD**

[0001] The present invention relates to closures for reclosable pouches, and more particularly, to such closures wherein at least one flange is disposed on a surface of the bag adjacent a closure element.

BACKGROUND ART

[0002] A thermoplastic bag for the storage of items typically includes a closure mechanism comprising male and female closure elements or profiles attached to bag walls. In addition, thermoplastic bags are known having guide ribs disposed on one or more internal surfaces of the thermoplastic bag closely spaced and adjacent the closure elements of the bag to assist in aligning the male and female closure elements when sealing the bag.

[0003] Hugues et al., U.S. Pat. No. 4,672,723 discloses a stabilized reclosable extruded plastic fastener. The fastener comprises a female profile on one wall of an extruded film material and a male profile on an opposite wall of the film material. Alignment ribs are spaced alongside and integral with a base area of the male profile to facilitate alignment of the male profile with the female profile during closing of the fastener.

[0004] Fisher, U.S. Pat. No. 4,736,496, owned by the assignee of the present application, discloses a wide-track integral thermoplastic closure for a reclosable thermoplastic container. The closure includes ribs on either side of an element of the closure to assist in guiding a user's fingers during closure of the thermoplastic container.

[0005] Wirth et al., U.S. Pat. No. 5,198,055 discloses two profile strips wherein each strip includes a reclosable element, preferably a rib element and a groove element. Each of the profile strips further include a flange element spaced on one side of the profile strip and a heat barrier means associated with an inside face or front side of each flange element, wherein the heat barrier section includes a thickened portion of each flange element.

[0006] Tilman, U.S. Pat. No. 5,209,572 discloses a reclosable plastic bag having a sliderless zipper. The bag includes front and rear walls sealed along three edges to form a mouth or opening. Male and female profiles are attached to internal surfaces of the front and rear walls, respectively, wherein the male and female profiles are engageable to close the opening. Two ribs are provided on an outside surface of the front wall, one on each side of the male profile, to define a valley therebetween. Similarly, two additional ribs are formed on the outside surface of the rear wall, one on each side of female profile, to define a valley therebetween. The valleys act as finger guides for the user of the bag.

[0007] Scott et al., U.S. Pat. No. 5,368,394 discloses a stabilizer wedge zipper for reclosable bags. The zipper includes male and female profiles wherein each of the profiles includes a stabilizer wedge on both sides thereof. The stabilizer wedges are parallel to the profiles and span the width of the bag in order to maintain a wide-track feel as a user closes a bag.

[0008] Johnson, U.S. Pat. No. 5,577,305 discloses a fastener assembly for reclosable plastic containers. The assem-

bly includes male and female base members each having male and female closure elements, respectively, and flanges attached thereto having ribs proximate the distal ends of the flanges. The ribs extending from the male base member are angled substantially perpendicular to the base and the ribs extending from the female base member are angled inwardly at approximately 70 degrees from the female base member. The position and orientation of the ribs increases the holding power of the female closure element when interlocked with the male closure element.

SUMMARY OF THE INVENTION

[0009] According to one aspect of the present invention, a closure for a pouch having first and second pouch walls includes male and female closure elements disposed on and separate from the first and second pouch walls, respectively. The female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member. Each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the female profile member and the first portion.

[0010] According to another aspect of the present invention, a reclosable plastic container includes first and second oppositely disposed pouch walls and male and female closure elements disposed on and separate from the first and second pouch walls, respectively. The female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member. Each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion where the second portion is disposed between and contiguous with the female profile member and the first portion.

[0011] According to yet another aspect of the present invention, a zipper tape includes male and female closure elements disposed on first and second surfaces, respectively. The female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member. Each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the female profile member and the first portion.

[0012] According to another aspect of the present invention, a closure for a pouch includes male and female closure elements disposed on first and second pouch walls, respectively. The female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member. Each of the first and second flanges has a substantially uniform thickness less than half of a thickness of the female profile member.

[0013] According to yet another aspect of the present invention, a profile plate includes a substantially planar base

portion and two profile portions symmetrical about a center of the base portion and extending from a first surface of the base portion. The base portion extends a distance beyond the profile portions equal to or greater than a thickness of the profile portions.

[0014] Other aspects and advantages of the present invention will become apparent upon consideration of the following detailed description and the attached drawings, in which like elements are assigned like reference numerals.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is an elevational view of a reclosable thermoplastic storage bag according to the present invention;

[0016] FIG. 2 is an enlarged, fragmentary, sectional view taken generally along the lines 2-2 of FIG. 1;

[0017] FIG. 3 is an enlarged sectional view similar to FIG. 2 illustrating bags produced in accordance with the present invention;

[0018] FIGS. 4 and 5 are enlarged, fragmentary, sectional view similar to FIG. 2 illustrating further embodiments of the present invention;

[0019] FIG. 6 is an enlarged, fragmentary, elevational view of a portion of zipper tape according to the present invention;

[0020] FIG. 7 is an isometric view of an apparatus for producing bags of the present invention;

[0021] FIG. 8 is an enlarged isometric view of the apparatus of FIG. 7;

[0022] FIG. 9 is an enlarged end elevational view of the apparatus of FIGS. 7 and 8; and

[0023] FIGS. 10-13 are bottom elevational views of extrusion die profile plates that may be used to produce female closure elements for thermoplastic storage bags of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] Referring to FIG. 1, a reclosable pouch in the form of a thermoplastic storage bag 20 comprises first and second body portions 22, 24 joined to one another to form first and second bag walls 26, 28. The first and second bag walls 26, 28 are joined at first and second side portions 30, 32, respectively, and at a bottom portion 34. An opening 35 is disposed at a top portion 36 of the bag 20. A closure mechanism 38 and two lips 40 are also disposed at the top portion 36 of the bag 20.

[0025] Referring to FIGS. 2 and 3, female and male closure elements 42, 44 of the closure mechanism 38 are disposed on opposing inside surfaces 46, 48 of the first and second body portions 22, 24, respectively. The female element 42 comprises a base 62 with a C-shaped profile member 64 extending therefrom, wherein the female element 42 is adapted to receive the male element 44 when pressure is exerted on the closure elements by a user's finger(s) during closing of the bag. According to a first embodiment, the female closure element 42 further comprises flanges 70 attached to each side of the base 62 of the

female closure element 42 and extending outwardly towards the bottom 34 and top 36 portions of the bag along the inside surface 46.

[0026] The male closure element 44 comprises a base 58 integral with flanking side members 54 and 56 and an arrow-shaped profile member 60 that extends from the base 58. The side members 54 and 56 are of a sufficient size and proximity to the profile member 60 such that the side members 54 and 56 move together with the member 60 when the members 60 and 64 are engaged and disengaged. The side members 54 and 56 also have a height less than the height of the profile member 60, and the members 54 and 56 extend beyond tips 68 of the C-shaped profile member 64 when the profile member 60 is engaged with the C-shaped profile member 64. Thus, at such time, the tips 68 of the C-shaped profile member 64 reside between the side members 54 and 56 and the male profile member 60.

[0027] The flanges 70 associated with the female closure element 42 include a first portion 72 and a second portion 74 having a thickness less than a thickness of the first portion 72. The second portion 74 is disposed adjacent the C-shaped profile member 64 and connects the first portion 72 to the C-shaped profile member 64. The second portion 74 has a thickness of between about 0.001 inch and about 0.005 inch and preferably about 0.0018 inch. The first portion 72 has a thickness of between about 0.03 inch and about 0.06 inch and preferably about 0.047 inch, wherein the first portion 72 has either a generally uniform thickness throughout a length thereof as seen in FIG. 2 or a varying thickness throughout a length thereof by adding ribs 77 to a surface 79 thereof as seen in FIG. 3. The second portion 74, therefore, has a thickness about one-quarter the thickness of the first portion 72 and is not completely attached to the inside surface 46 adjacent the C-shaped profile member 64, thereby creating a gap 76 between the second portion 74 of the flanges 70 and the inside surface 46. The C-shaped profile member 64 has a thickness between about 0.035 inch and 0.06 inch, preferably about 0.043 inch. The flanges 70 are colored the same color as the C-shaped profile member 64 and the base 62, thereby providing a larger colored area to the closure mechanism 38 and providing a wider area for tactile feedback.

[0028] If desired, one or more gripping ribs 75 may be disposed on the inside surfaces 46, 48 of the bag 20 between the closure elements 42 and 44 and the top portion 36 of the bag 20 as seen in FIG. 2, wherein the gripping ribs 75 are integrally extruded with the walls of the bag. Any number of gripping ribs 75 can be used, although space is necessary between adjacent ribs in order to facilitate a gripping action with a user's fingers. In a preferred embodiment, about six or seven gripping ribs 75 are disposed on each lip 40 of the bag.

[0029] In other embodiments, as seen in FIGS. 4 and 5, the female closure element 42 and the male closure element 44 may both have flanges 70 each having a first portion 72 and a second portion 74. Some or all of the second portions 74 may have a thickness less than that of the first portions 72 as seen in FIG. 4. Alternatively, some or all of the second portions 74 may have a thickness equal to that of the first portions 72 as seen in FIG. 5.

[0030] Another embodiment as shown in FIG. 6 comprises a zipper tape 78. The zipper tape 78 includes first and second thermoplastic strips 80, 82, wherein female and male

closure elements **42**, **44** are attached to or otherwise formed on the first and second thermoplastic strips **80**, **82**, respectively. The female closure element **42** further comprises flanges **70** attached to each side of the base **62** of the female closure element **42** and extending outwardly towards an upper portion **84** of the first strip **80** and a lower portion **86** of the first strip **80**. The zipper tape **78** may be attached to a folded thermoplastic sheet by any suitable conventional process and apparatus and the resulting structure may be severed and sealed at spaced locations to form individual bags.

[0031] Reclosable thermoplastic storage bags as described herein can be produced by any conventional bag-making process, such as a cast post applied process, a cast integral process, a blown process, or any other process known in the art. An alternative post applied process can also be used such as seen in FIGS. 7 and 8. Referring to such FIGS., the alternative post applied process utilizes an extrusion apparatus including a first extrusion slot die **88**, a temperature-controlled driven casting roll **90**, edge pinning devices or apparatus **92a**, **92b**, an air knife **94**, second and third extrusion dies **96a**, **96b** (which, together with the die **88**, form the extrusion apparatus) and cooling apparatus **98a**, **98b**. The extrusion die **88** receives molten thermoplastic from an extruder (not shown) and deposits the thermoplastic in sheet form as a web **100** onto the casting roll **90**. The extrusion die **88** includes a slot opening (not shown) that forms thickened areas **102**, **104** at outside edge portions **106a**, **106b** of the resulting web **100** and a relatively thinner portion **108** intermediate the thickened areas **102**, **104**. The edge portions **106a**, **106b** are pinned to the casting roll **90** by the edge pinning devices **92a**, **92b**, respectively. The web **100** is then pinned across the entire width thereof (i.e., as a whole) to the casting roll **90** by the air knife **94**.

[0032] After the web **100** is pinned to the casting roll **90**, the male and female closure elements **42**, **44** are formed on the web **100**. Preferably, the extrusion dies **96a**, **96b** receive molten thermoplastic from separate extruders and extrude the male and female closure elements **42**, **44**, respectively, onto the thickened areas **102**, **104**. Alternatively, the separate extrusion dies **96a**, **96b** may be replaced by a single extrusion die having two outlets at which the male and female closure elements **42**, **44** are simultaneously extruded onto the thickened areas **102**, **104**. In any event, as seen in FIG. 7, the angle of a face **110** of each die **96** is at least initially disposed substantially parallel to a horizontal (as seen in FIG. 9) radial line **111** extending from the center of the casting roll **90**. The position of the die **96** (or each die **96a**, **96b** individually if separate dies are used) may then be adjusted by moving the die left, right, up, or down (all as seen in FIG. 9) or the die may be tipped (i.e., angularly displaced) to adjust the angle of the die face **110** to obtain desirable results. The closure elements **42**, **44** formed by the die(s) **96** may exit the die(s) **96** at a point coincident with a vertical tangent line **112** (FIG. 9) intersecting the surface of the casting roll **90** on the side of the casting roll **90** where the web **100** is first deposited thereon. Alternatively, the closure elements **42**, **44** formed by the die(s) **96** may exit the die(s) **96** at a point displaced to the right or left (as seen in FIG. 9) of the tangent line **112**. If the extrudate exits the die(s) **96** at a point displaced to the right of the line **112**, some provision must be made at the initiation of production to attach the extrudate stream to the casting roll **90**. Thereafter, production may commence, (provided that the exit of the

die(s) **96** is not disposed too far to the right of the tangent line **112**) whereupon the melt strength of the extrude stream carries the stream into contact with the roll **90**.

[0033] Once the molten thermoplastic from the die(s) **96** has been deposited onto the web **100**, coolant is applied to the closure elements **42**, **44** by the coolant apparatus **98a**, **98b** to bring the temperature thereof below the melting point of the thermoplastic material forming the closure elements **42**, **44** as quickly as possible. Preferably, the coolant comprises water or any other suitable cooling fluid and the coolant is applied to the material of the closure elements **42**, **44** only after such material contacts the material of the web **100** so that adhesion thereto is optimized. The web **100** and the closure elements **42**, **44** are maintained in contact with the temperature-controlled casting roll **90** for a period of time as the roll **90** is rotated so that the web **100** and closure elements **42**, **44** are further cooled. The casting roll **90** should be maintained at a temperature below the melting point of the thermoplastic material(s) forming the web **100** and the closure elements **42**, **44**, typically about 20-80 degrees C.

[0034] Profile plates as seen in FIGS. 10-13 may be utilized in any suitable process to produce thermoplastic bags having a female closure element **42** with flanges **70** according to the present invention. The profile plate **130** includes a base portion aperture **132** to create the base **62** of the female closure element **42** and the flanges **70**, wherein the base portion aperture **132** can have horizontal end portions **134** as in FIGS. 10-13 or upwardly curving end portions **134** as in FIG. 13. Two profile portions apertures **136** are disposed symmetrically about a center **138** of the base portion aperture **132** of the profile plate **130**, wherein each of the profile portions apertures **136** include a tip portion **139** and a leg portion **142**. The leg portion **142** of each of the profile portion apertures **136** may be disposed perpendicular to the base portion aperture **132** as seen in FIG. 11, or may be at a slight angle outwardly with respect to a vertical axis as seen in FIGS. 10, 12, and 13. The leg portion **142** of each profile portion aperture **136** may also be slightly curved or arched (not seen). Notches **140** may be created in the base portion aperture **132** adjacent the profile portion apertures **136** to create the second, thinner portions **72**, wherein a thickness of the notches **140** is about half a thickness of the base portion aperture **132** and the end portions **134**. The notches **140** reduce the interaction between the base **62** and the flanges **70** during deposition of molten thermoplastic to form the female closure element **42**. This reduction in interaction allows formation of the C-shaped profile member **64** in a substantially undeformed shape as compared with the shape produced when the flanges **70** are not present. That is, if the notches **140** were not included in the profile plate **130** as seen in FIG. 10, the flanges **70** would be formed properly, but the C-shaped profile member **64** would tend to spread apart (i.e. would be formed with a greater distance between the tips **68** of the C-shaped profile member **64**), thereby possibly adversely affecting the engagement of the C-shaped profile member **64** with the arrow-shaped profile member **62**. Proper formation of the female closure element **42** can be attained using no notches **140** as seen in FIG. 10, but the variability would be greater.

Industrial Applicability

[0035] Closure devices according to the present invention are particularly useful for resealable closures for thermo-plastic bags or pouches. Such closure devices include a male and a female profiles wherein the female profile includes flange portions extending along an inside surface of a bag or pouch wall. The flange portions of the female profile provide a wider surface for increased tactile confirmation that closure has been achieved.

[0036] Numerous modifications will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is presented for the purpose of enabling those skilled in the art to make and use the invention and to teach the best mode of carrying out same. The exclusive rights to all modifications which come within the scope of the appended claims are reserved.

I claim:

1. A closure for a pouch having first and second pouch walls, comprising:

male and female closure elements disposed on and separate from the first and second pouch walls, respectively;

wherein the female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member;

wherein each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the female profile member and the first portion.

2. The closure of claim 1, wherein the male closure element is colored a first color and the female closure element is colored a second color.

3. The closure of claim 1, wherein the thickness of the second portion of each flange is between about 0.001 inch and about 0.005 inch.

4. The closure of claim 3, wherein the thickness of the second portion of each flange is about 0.0018 inch.

5. The closure of claim 1, wherein the thickness of the first portion of each flange is between about 0.03 inch and about 0.06 inch.

6. The closure of claim 5, wherein the thickness of the first portion of each flange is about 0.047 inch.

7. The closure of claim 1, wherein at least one of the flanges includes ribs on a surface of the flange(s).

8. The closure of claim 1, wherein the male closure element includes a male profile member and first and second flanges integral with and disposed on either side of the male profile member.

9. The closure of claim 8, wherein each of the first and second flanges integral with the male profile member includes a first portion of substantially uniform thickness less than half of a thickness of the male profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the male profile member and the first portion.

10. A reclosable plastic container, comprising:

first and second oppositely disposed pouch walls;

male and female closure elements disposed on and separate from the first and second pouch walls, respectively;

wherein the female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member;

wherein each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the female profile member and the first portion.

11. The container of claim 10, wherein the male closure element is colored a first color and the female closure element is colored a second color.

12. The container of claim 10, wherein the thickness of the second portion of each flange is between about 0.001 inch and about 0.005 inch.

13. The container of claim 12, wherein the thickness of the second portion of each flange is about 0.0018 inch.

14. The container of claim 10, wherein the thickness of the first portion of each flange is between about 0.03 inch and about 0.06 inch.

15. The container of claim 14, wherein the thickness of the first portion of each flange is about 0.047 inch.

16. The container of claim 10, wherein at least one of the flanges includes ribs on a surface of the flange(s).

17. The container of claim 10, wherein the male closure element includes a male profile member and first and second flanges integral with and disposed on either side of the male profile member.

18. The closure of claim 17, wherein each of the first and second flanges integral with the male profile member includes a first portion of substantially uniform thickness less than half of a thickness of the male profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the male profile member and the first portion.

19. A zipper tape, comprising:

male and female closure elements disposed on first and second surfaces, respectively;

wherein the female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member;

wherein each of the first and second flanges includes a first portion of substantially uniform thickness less than half of a thickness of the female profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the female profile member and the first portion.

20. The zipper tape of claim 19, wherein the male closure element is colored a first color and the female closure element is colored a second color.

21. The zipper tape of claim 19, wherein the thickness of the second portion of each flange is between about 0.001 inch and about 0.005 inch.

22. The zipper tape of claim 21, wherein the thickness of the second portion of each flange is about 0.0018 inch.

23. The zipper tape of claim 19, wherein the thickness of the first portion of each flange is between about 0.03 inch and about 0.06 inch.

24. The zipper tape of claim 23, wherein the thickness of the first portion of each flange is about 0.047 inch.

25. The zipper tape of claim 19, wherein at least one of the flanges includes ribs on a surface of the flange(s).

26. The zipper tape of claim 19, wherein the male closure element includes a male profile member and first and second flanges integral with and disposed on either side of the male profile member.

27. The zipper tape of claim 26, wherein each of the first and second flanges integral with the male profile member includes a first portion of substantially uniform thickness less than half of a thickness of the male profile member and a second portion having a thickness less than the thickness of the first portion and where the second portion is disposed between and contiguous with the male profile member and the first portion.

28. A closure for a pouch having first and second pouch walls, comprising:

male and female closure elements disposed on and separate from the first and second pouch walls, respectively;

wherein the female closure element includes a female profile member and first and second flanges integral with and disposed on either side of the female profile member; and

wherein each of the first and second flanges have a substantially uniform thickness less than half of a thickness of the female profile member.

29. The closure of claim 28, wherein the male closure element is colored a first color and the female closure element is colored a second color.

30. The closure of claim 28, wherein the thickness of each flange is between about 0.03 inch and about 0.06 inch.

31. The closure of claim 30, wherein the thickness of each flange is about 0.047 inch.

32. The closure of claim 28, wherein at least one of the flanges includes ribs on a surface of the flange(s).

33. The closure of claim 28, wherein the male closure element includes a male profile member and first and second flanges integral with and disposed on either side of the male profile member.

34. The closure of claim 28, wherein each of the first and second flanges integral with the male profile member has a substantially uniform thickness less than half of a thickness of the male profile member.

35. A profile plate, comprising:

a substantially planar base portion;

two profile portions symmetrical about a center of the base portion and extending from a first surface of the base portion; and

wherein the base portion extends a distance beyond the profile portions equal to or greater than a thickness of the profile portions.

36. The profile plate of claim 35, wherein notches are formed in the first surface of the base portion.

37. The profile plate of claim 36, wherein the notches are formed adjacent to each of the profile portions.

38. The profile plate of claim 36, wherein the notches have a thickness that is about half the thickness of a thickness of the base portion.

39. The profile plate of claim 35, wherein the profile portions extend perpendicularly from the first surface of the base portion.

40. The profile portion of claim 35, wherein the profile portions extend from a first surface of the base portion at a slight angle outwardly of a vertical axis through the center of the base portion.

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