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(54) Reclosable packaging

(57) A reclosable package or bag (2) having a mouth with a hermetic plastic zipper (4) installed therein. The hermetic zipper (4) has first (12) and second (14) interlockable profiled structures connected by a frangible connection (24) and having no flanges. The package or bag (2) is constructed such that the frangible connection (24) resides on the product side of the zipper (4), i.e., the frangible connection (24) extends inside the receptacle of the package or bag (2), when the package is in an unopened state, i.e., when the zipper (4) is closed. Preferably, the first interlockable profiled structure (12) has at least one male member (20) with an expanded head and the second interlockable profiled structure has at least one female member (22) with a groove for receiving the expanded head of a male member (20).

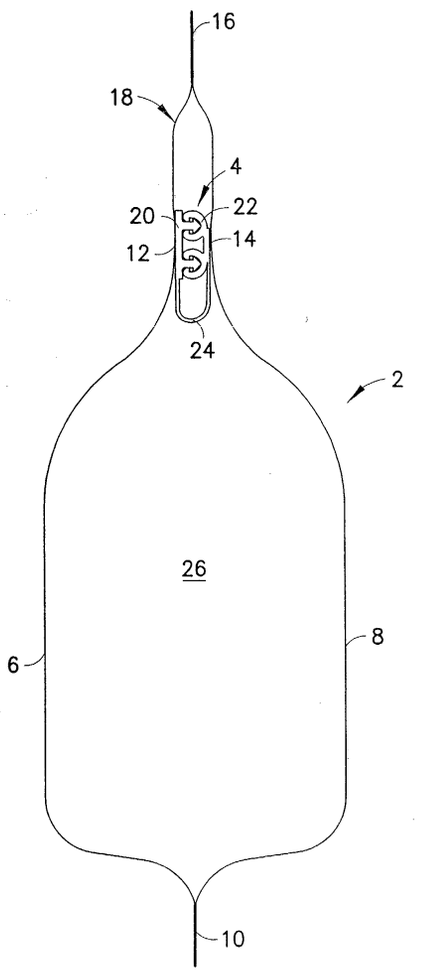

FIG.1

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Description

[0001] The present invention relates to bags or packages such as may be formed from plastic film and having an openable mouth with a reclosable extruded plastic fastener or zipper situated inside the mouth. The zipper has complementary profiles that are interlocked when the zipper is closed and can be separated to open the zipper. Bags or packages of this kind are well known and in widespread use.

[0002] In the use of plastic bags and packages, particularly for foodstuffs, it is important that the bag be hermetically sealed and tamper evident until the purchaser acquires the bag and its contents, takes them home, and opens the bag or package for the first time. It is then commercially attractive and useful for the consumer that the bag or package be reclosable so that its contents may be protected. Flexible plastic zippers have proven to be excellent for reclosable bags, because they may be manufactured with high-speed equipment and are reliable for repeated reuse.

[0003] A typical zipper has a grooved member at one side of the bag mouth and a ribbed member at the other side, which rib may interlock into the groove when the sides of the mouth of the bag are pressed together. Alternatively, a strip having a plurality of ribs may be on one side of the bag mouth, while a strip having a plurality of channels may be on the other side, the ribs locking into the respective channels when the sides of the mouth of the bag are pressed together. In the latter case, there may be no difference in appearance between the two fastener strips, as the ribs may simply be the intervals between channels on a strip that may lock into another of the same kind. In general, some form of male/female inter-engagement is used to join the two sides of the bag mouth together. The fastener strips are bonded in some manner to the material from which the bags themselves are manufactured. Usually, pull flanges extend above the ribbed and grooved fastener strips, which pull flanges may be pulled apart for access to the interior of the bag.

[0004] It is known to provide a zipper package construction that is designed to undergo some permanent change in the package appearance when the package is opened for the first time. In particular, it is known to provide a zipper package with a sealed header that extends over the zipper and encloses the zipper. For example, the header may comprise extensions of the front and rear package walls, the extensions being joined by a seal. The seal may be a peel seal, which may be readily ruptured by a consumer to expose the zipper, or a "hard" seal, the latter being a seal that is not intended to be broken. In the case of a header formed using a hard seal, it is known to provide the package header with one or more lines of perforations that must be torn open by a consumer to obtain access to the slider. In place of a line of perforations (or to facilitate tearing the package along the line of perforations), it is also known to provide one or more notches at a side edge of the header for starting a tear across the header. In any event, the header must be opened before access can be had to the zipper. If a package evidences a torn header before the package is purchased by a consumer, this should indicate to the consumer that the package has been tampered with, e.g., previously opened.

[0005] The perforations in a sealed header allow oxygen to enter the space between the header and the closed zipper. Since a typical zipper having no additional gasket or sealing means is not hermetic, oxygen in the chamber under the sealed header can penetrate the closed zipper and enter the receptacle that holds the contents of the package. In the case of many kinds of foodstuff, e.g., chunk cheese, the presence of oxygen inside the receptacle will spoil the food product. Thus, it is common in reclosable packaging of perishable food products such as chunk cheese to incorporate a colored tear strip, instead of perforations, to allow the customer to access the package.

[0006] There is a need for a hermetic zipper design that would allow perishable food products to be packaged in bags having perforations, instead of the more expensive-to-manufacture tear strips, in the sealed header. The inventors are currently unaware of any device for dispensing and sealing tear strips transverse to the web (film) direction.

[0007] The present invention is directed to a plastic zipper for hermetically sealing the contents of a reclosable package or bag and to a method for manufacturing such a zipper. The hermetic zipper comprises first and second interlockable profiled structures connected by a frangible connection. The interlockable profiled structures and the frangible connection are mono-extruded and fused, the frangible connection acting as a cast flange. Preferably the first interlockable profiled structure comprises at least one male member having an expanded head and the second interlockable profiled structure comprises at least one female member having a groove for receiving the expanded head of a male member. The extruded interlockable profiled structures do not have flanges.

[0008] The invention is further directed to a reclosable package or bag comprising a receptacle having a mouth at its upper end and having a plastic hermetic zipper installed in the mouth. The zipper comprises first and second interlockable profiled structures connected by a frangible connection and not having flanges. The package or bag is constructed so that the frangible connection resides on the product side of the zipper, i.e., the frangible connection extends inside the receptacle of the package or bag, when the package is in an unopened state, i.e., when the zipper is closed.

[0009] In accordance with the preferred embodiment of the invention, each of the first and second interlockable profiled structures of the zipper comprises a respective base surface. These base surfaces are on opposing sides of the zipper when the first and second in-

terlockable profiled structures are interlocked with each other. The receptacle comprises first and second walls, the first wall being heat sealed to at least a portion of the base surface of the first interlockable profiled structure and the second wall being heat sealed to at least a portion of the base surface of the second interlockable profiled structure. The frangible connection comprises first and second edges, and the receptacle further comprises first and second side seals, wherein the first side seal seals the first wall to the second wall with the first edge of the frangible connection blended into the first side seal, and the second side seal seals the first wall to the second wall with the second edge of the frangible connection blended into the second side seal. In accordance with the preferred embodiment, the package further comprises an enclosed header that encloses the zipper. A line of perforations for tearing open the package are preferably formed in the header.

[0010] In accordance with the preferred embodiment of the invention, a zipper comprising interlockable profiled structures with a frangible connection is manufactured by a method comprising the following steps: continuously extruding a layer of plastic material; continuously extruding plastic material in the form of first and second interlockable profiled structures; joining the first interlockable profiled structure to a first lateral portion of the layer; and joining the second interlockable profiled structure to a second lateral portion of the layer. The first and second lateral portions of the layer are separated by an intermediate lateral portion of the layer. The extruding steps are preferably performed concurrently. The layer has a thickness such that the intermediate lateral portion of the layer is easily breakable by a consumer, e.g., by pulling apart the interlocked profiled structures. Alternatively, the extruded layer may have a central region with a thickness less than the thickness of the remainder of the extruded layer. When the resulting zipper is incorporated in a reclosable package or bag, the tear during opening by the consumer will occur in the thinned region of the frangible connection.

[0011] Particular embodiments in accordance with this invention will now be described with reference to the accompanying drawings; in which:-

FIG. 1 is a sectional view of a reclosable bag having a plastic hermetic zipper in accordance with one preferred embodiment of the invention;

FIG. 2 is a schematic showing a plastic zipper having a frangible connection in accordance with one preferred embodiment of the invention. The zipper is shown in a closed state;

FIGS. 3 and 4 are schematics illustrating respective steps of a method for manufacturing a plastic zipper having a frangible connection in accordance with the preferred embodiment shown in FIG. 2;

FIG. 5 is a schematic illustrating an automated system for applying a plastic zipper to folded plastic film;

FIG. 6 is a schematic illustrating a portion of a station for heat sealing a plastic zipper to folded thermoplastic film, which station is incorporated in the system depicted in FIG. 5;

FIG. 7 is a schematic showing a plastic zipper having a frangible connection in accordance with another preferred embodiment of the invention. The zipper is shown, in a closed state; and,

FIGS. 8 and 9 are schematics illustrating respective steps of a method for manufacturing a plastic zipper having a frangible connection in accordance with the preferred embodiment shown in FIG. 7.

[0012] Reference will now be made to the drawings, in which similar elements in different drawings bear the same reference numerals. The structure of a reclosable bag having a flexible plastic zipper with a frangible connection for hermetically sealing the interior volume of the bag is shown in FIG. 1. The reclosable bag is generally indicated by the reference numeral 2, while the zipper is generally indicated by reference numeral 4. It should be understood that the zipper shown in FIG. 1 can be installed in a reclosable bag of the type shown in FIG. 1 or in any other reclosable package having a mouth which can be opened and closed by a flexible plastic zipper installed in the mouth.

[0013] Still referring to FIG. 1, a bag 2 may be made from any suitable sheet material or plastic film and comprises opposite wall panels 6 and 8, which may be secured together at opposite side edges of the bag by seams (not shown). The opposing bottoms of the wall panels 6 and 8 may be joined, for example, by means of a heat seal 10 made in conventional fashion, e.g., by application of heat and pressure or ultrasonic energy. Typically, the bottom of the package is formed by a fold in the original packaging film. Optionally, the bag may be provided with side gussets having respective junctures with the front and rear wall panels. In the latter case, the bag may also be provided with a bottom panel having respective junctures with the front and rear wall panels and with the side gussets.

[0014] At its top end, the bag 2 has an openable mouth, on the inside of which is an extruded plastic zipper 4. The zipper 4 comprises a pair of interlockable profiled structures 20 and 22 and a frangible connection 24 joined to the interlockable profiled structures. The wall panels 6 and 8 are respectively sealed to the base surfaces of the interlockable profiled structures 20 and 22 by hard seals 12 and 14. Alternatively, the interlockable profiled structures can be attached to the wall panels by adhesive. The front and rear wall panels 6 and 8 preferably extend beyond the heat seals 12 and 14 to form an enclosed header 18. These upward extensions of wall panels 6 and 8 may be joined at the top by a heat seal 16. Preferably, however, the top of the enclosed header is formed by a fold in the original packaging film. Alternatively, the enclosed header 18 could be formed by folding a separate piece of plastic material and seal-

ing the ends of the folded piece to the respective interlockable profiled structures.

[0015] In accordance with the preferred embodiment of the invention, the frangible connection 24 extends between the respective interlockable profiled structures 20 and 22. When the zipper is closed, as depicted in FIG. 1, the frangible connection 24 is folded, with the fold extending into the interior volume 26 of the receptacle, on the so-called "product side" of the zipper. The frangible connection must extend across the full length of the mouth in which the zipper is installed, from one side seal of the receptacle to the other side seal, with the side edges of the folded frangible connection 24 being blended into the respective side seals of the package. The side seals (not shown in FIG. 1) may be formed in a conventional manner, e.g., ultrasonically or by means of heat sealing. The result is that the edges of the folded connection 24 are captured in and hermetically sealed by the side seals. The hard seals 12 and 14, in conjunction with the side seals that capture the side edges of connection 24, enable the frangible connection 24 of the zipper 4 to act as a hermetic seal, preventing the admission of air into the interior volume 26 of the bag until that hermetic seal is broken. Preferably the connection 24 is thin enough to provide for easy tearing open by the consumer and easy blending into the ultrasonically or heat sealed side seals. In the preferred embodiments shown in the drawings, the entire connection has a constant thickness, but this is not necessary. The connection 24 could have a central section extending in the machine direction which is thinner than the remainder of the connection to facilitate tearing. The placement of the connection 24 on the product side provides leverage when the consumer attempts to tear open the connection 24 by pulling apart the interlockable profiled structures 20 and 22.

[0016] The closed zipper 4 depicted in FIG. 1 can be seen in greater detail in FIG. 2. The zipper 4 is preferably an extruded plastic structure comprising a first interlockable profiled structure 20 having two male members 28 and 28', and a second interlockable profiled structure 22 having two female members 30 and 30'. Each male member has a generally arrow-shaped rib-like male profile; each female member has a complementary, generally groove-shaped female profile. Each interlockable profiled structure further comprises a respective base 32 and 34. Preferably, each base 32 and 34 is a resiliently flexible self-supporting structure having a thickness greater than the thickness of the receptacle walls of the package or bag in which the zipper will be installed. FIG. 2 shows male member 28 engaged in female member 30 and male member 28' engaged in female member 30'.

[0017] In a typical zipper, the profile of each male member has a stem flanked by shoulders of the main rib portion of the profile, and a tip of the profile points toward the opposing female member, the tip 32 being the point of the male member furthest away from the base of the profiled structure. The profile of each female member comprises a pair of gripper jaws extending from a base or root of the female member. Each jaw comprises a wall and a hook integrally formed at the distal end of the respective wall. The hooks are inclined and generally directed toward each other, the distal ends of the hooks defining a mouth that communicates with a groove defined by the walls and root of the female member. The groove of the female member receives the head of the male member when the zipper is closed, as shown in FIG. 2.

[0018] When the male members 28 and 28' are properly aligned with and then moved into engagement with the opposing female members 30 and 30', the head of each male member will penetrate the opening in the opposing female member. As the head of each male member penetrates, the resilient hooks of the opposing gripper jaws are pushed toward the groove root of the corresponding female member and are cammed apart by the inclined surfaces running from the tip to the shoulders of each male member. The camming force exerted on the hooks of each female member by the head of the penetrating male member is transferred to the resilient walls of the gripper jaws, causing those walls to flex outwardly. The walls are flexed outward, in opposite directions, until the hooks of the female member pass by and snap into interlocking relation behind the shoulders of the male member. The heads of the male members 28 and 28' are received in the grooves of the female members 30 and 30' respectively and held there by the interlocked hooks, this situation constituting the closed state of the zipper.

[0019] To open the closed zipper, the two sides of the zipper are pulled apart with sufficient force to pull the heads of the male members out of the female members. When the shoulders of the male members clear the hooks of the outwardly flexed gripper jaws, the male and female members are no longer interlocked and the zipper is open.

[0020] FIGS. 3 and 4 illustrate first and second steps of a method for manufacturing a plastic zipper having a frangible connection in accordance with the preferred embodiment of FIG. 2. The first step, symbolically represented in FIG. 3, comprises the concurrent continuous extrusion of plastic material out three orifices of a die to form a layer 24, a profiled structure 20 having a base 32 and a pair of male members 28 and 28' supported by the base 32, and a profiled structure 22 having a base 34 and a pair of female members 30 and 30' supported by the base 34. In the next step depicted in FIG. 4, the profiled structures 20 and 22 are joined to respective lateral portions of the extruded layer 24. Preferably, the layer 24 is continuously extruded concurrently with the profiled structures 20 and 22. The plastic material exiting the die orifices is in a sticky or partially molten state. The profiled structures 20 and 22 are joined to the layer 24 upon contact and fused thereto by subsequent cooling, e.g., by immersion in water. In accordance with the

preferred embodiment, the intermediate portion of the layer (between the profiled structures) is frangible. As used herein, the term "frangible" means that, when the zipper is installed in the mouth of a plastic package or bag, the intermediate portion of layer 24 can be readily torn when the zipper halves are pulled apart by the consumer. FIG. 4 shows the finished zipper in an unfastened, i.e., open state, while FIG. 2 shows the finished zipper with the profiled structures interlocked, i.e., in a closed state.

[0021] FIG. 5 is a schematic illustrating an automated system for applying a plastic zipper tape to folded plastic film. Package film 36 is paid off a roll 38 of the same at an unwind station. Downstream a pull roller (not shown) is provided for driving the film 36 through the machine. A V-shaped board or folder plow 40 positioned downstream of the film roll 38 folds the package film 34 about a bottom crease 42 to form opposing package walls 44 and 46. (Although FIG. 5 depicts the package walls 44 and 46 as having different heights, the person skilled in the art will recognize that their heights may be equal.) The folded film assumes a generally V shape with front and back walls 44 and 46 on either side of the fold in a substantially vertical plane.

[0022] At the same time, a zipper tape 48, with the zipper halves interlocked, is paid off a roll 50 of the same and fed between the advancing package walls. The zipper tape is turned from a substantially vertical orientation to a substantially horizontal orientation (shown by dashed lines) by a guide roller 52. The zipper tape is positioned near the fold in the bottom of the packaging film, so that the folded bottom region will later become the enclosed header of the package.

[0023] The zipper tape 48 is sealed to the opposing package wails 44 and 46 at a pair of sealing stations. The first sealing station comprises a pair of opposing seal bars 54, as seen in FIG. 6. The second sealing station also comprises a pair of opposing seal bars 56, only one of which is visible in FIG. 5. The sets of opposing seal bars at the two sealing stations are located at the elevation of the horizontally continuously moving zipper tape and are in contact with the continuously moving package walls that sandwich that zipper tape. The seal bars apply constant heat and pressure for sealing the thermoplastic film of the package walls to the base surfaces of the profiled structures of the zipper. Alternatively, one sealing station or more than two sealing stations could be used. The intermediate result is a continuous web of folded thermoplastic film with a zipper tape sealed between the opposing walls of the film. This zippered folded web of packaging film is then passed under a second V-shaped board 58 to unfold the film. The unfolded zippered film is then conveyed to a form-fill-seal machine, e.g., a horizontal form-fill-seal machine (not shown in FIG. 5).

[0024] In the case of a cheese packing plant, for example, the cheese would be placed on the zippered film. A horizontal form-fill-seal machine would fold panel 44 to form the bottom of the package, seal panel 44 to the opposing panel 46, stomp the zipper ultrasonically at locations corresponding to the side seals, form the side seals by application of heat and pressure, form perforations in the header, and then cut the package to width. All of these steps can be performed by well-known techniques. Most chunk cheese packages use a red tear strip to enable the consumer to access the contents of a hermetically sealed package or bag. The hermetic seal provided by the present invention would allow the cheese packager to use perforations in the header for opening the package, while still preventing oxygen from entering the unopened package and spoiling the product, thereby eliminating the need for a tear strip.

[0025] In the case of a tortilla packing plant, for example, the zippered film is not unfolded. Instead, an ultrasonic presealer crushes (i.e., stomps) the zipper in what will be the sides of the bag (in this case, the zipper is on top). Then the side seals are formed by application of heat and pressure in a well-known manner. Each bag is then cut to width and stacked on a conveyor for final packaging. In this case the bag bottom would be open to allow a converter to hand pack tortillas and then run the filled packages through another sealer to make the bottom seal. This "tortilla" film being thin lends itself better to a perforated header. Also polymeric film (nonlaminated) stretches and thus does not tear well.

[0026] A zipper 4' in accordance with a second preferred embodiment of the invention is shown in FIG. 7 in a closed state. The zipper 4' is preferably an extruded plastic structure comprising a first interlockable profiled structure 20' having one male member 28 and a second interlockable profiled structure 22' having one female member 30. The male member has a generally arrow-shaped rib-like male profile of the type previously described; the female member has a complementary, generally groove-shaped female profile of the type previously described. Each interlockable profiled structure further comprises a respective base 32 and 34. Preferably, each base 32 and 34 is a resiliently flexible self-supporting structure having a thickness greater than the thickness of the receptacle walls of the package or bag in which the zipper will be installed. FIG. 7 shows male member 28 engaged in female member 30.

[0027] When the male member 28 is properly aligned with and then moved into engagement with the female members 30, the head of the male member will penetrate the opening in the female member. As the head of the male member penetrates, the resilient hooks of the opposing gripper jaws are pushed toward the groove root of the corresponding female member and are cammed apart in the manner previously described, causing the resilient walls of the gripper jaws to flex outwardly, in opposite directions, until the hooks of the female member pass by and snap into interlocking relation behind the shoulders of the male member. The head of the male member 28 is thus held by the interlocked hooks of the female member 30 to maintain the closed

state of the zipper.

[0028] FIGS. 8 and 9 illustrate first and second steps of a method for manufacturing a plastic zipper having a frangible connection in accordance with the preferred embodiment of FIG. 7. The first step, symbolically represented in FIG. 8, comprises the concurrent continuous extrusion of plastic material out three orifices of a die to form a layer 24, a profiled structure 20' having a base 32 and a single male member 28 supported by the base 32, and a profiled structure 22' having a base 34 and a single female member 30 supported by the base 34. In the next step depicted in FIG. 9, the profiled structures 20' and 22' are joined to respective lateral portions of the extruded layer 24. Preferably, the layer 24 is continuously extruded concurrently with the profiled structures 20' and 22'. The plastic material exiting the die orifices is in a sticky or partially molten state. The profiled structures 20' and 22' are joined to the layer 24 upon contact and fused thereto by subsequent cooling. In accordance with the preferred embodiment, the intermediate portion of the layer (between the profiled structures) is frangible. FIG. 9 shows the finished zipper in an unfastened, i.e., open state, while FIG. 7 shows the finished zipper with the profiled structures interlocked, i.e., in a closed state.

[0029] Numerous configurations for the interlockable male and female members are known in the art. The present invention is not limited to use with male members having an arrow-shaped head. Male members having expanded heads with other shapes may be used. For example, instead of an expanded head having a pointed tip, the front face of the expanded head may be rounded. In other words, the head could have a semicircular profile instead of a triangular profile. Alternatively, the expanded head of the male member could have a trapezoidal profile.

[0030] In addition, although the interlockable profiled structures can be fused directly to the walls of the packaging material, this is not necessary to practice of the present invention. For example, the interlockable profiled structures could be attached to the wall panels of the package or bag by means of intermediate thermoplastic bonding strips or by means of adhesive.

[0031] Modifications may be made to adapt a particular situation to the teachings of the invention. For example, the zipper halves and frangible connection need not be extruded from the same plastic material. More specifically, the connection could be made of a material that is more brittle than the material used to form the zipper halves.

[0032] As used in the claims, the term "package" includes bags, pouches, and any other type of packaging in which a flexible plastic zipper can be incorporated.

Claims

1. A package comprising a receptacle having a mouth at an upper end, and a plastic hermetic zipper attached to said mouth, wherein said hermetic zipper comprises first and second interlockable profiled structures without flanges and a frangible connection connecting said first interlockable profiled structure to said second interlockable profiled structure, wherein said frangible connection extends inside said receptacle on a product side of said zipper when said zipper is closed.

2. The package as recited in claim 1, wherein each of said first and second interlockable profiled structures comprises a respective base surface, said base surfaces being on opposing sides of said zipper when said first and second interlockable profiled structures are interlocked with each other, and wherein said receptacle comprises first and second walls, said first wall being heat sealed to at least a portion of said base surface of said first interlockable profiled structure and said second wall being heat sealed to at least a portion of said base surface of said second interlockable profiled structure.

3. The package as recited in claim 1, wherein said first interlockable profiled structure comprises a male member having an expanded head and said second interlockable profiled structure comprises a female member having a groove for receiving said expanded head of said male member.

4. The package as recited in claim 1, wherein said frangible connection comprises first and second edges, and said receptacle comprises first and second walls and first and second side seals, wherein said first side seal seals said first wall to said second wall with said first edge of said frangible connection blended into said first side seal, and said second side seal seals said first wall to said second wall with said second edge of said frangible connection blended into said second side seal.

5. The package as recited in claim 1, further comprising an enclosed header that encloses said zipper, wherein a line of perforations is formed in said header.

6. A method of manufacturing a plastic zipper comprising the steps of:

   continuously extruding a layer of plastic material;
   continuously extruding plastic material in the form of first and second interlockable profiled structures without flanges;
   joining said first interlockable profiled structure to a first lateral portion of said layer; and
   joining said second interlockable profiled structure to a second lateral portion of said layer,

wherein said first and second lateral portions of said layer are separated by an intermediate lateral portion of said layer.

7. The method as recited in claim 6, wherein said extruding steps are performed concurrently.

8. The method as recited in claim 6, wherein said layer has a thickness such that said intermediate lateral portion of said layer is easily breakable by a consumer.

9. The method as recited in claim 6, wherein said first interlockable profiled structure comprises a base and a male member having an expanded head and said second interlockable profiled structure comprises a base and a female member having a groove for receiving said expanded head of said male member, said first and second lateral portions of said layer being respectively joined to said bases of said first and second interlockable profiled structures on a side of said bases which is respectively opposite to said male and female members.

10. A method of manufacturing a plastic zipper comprising the step of concurrently continuously extruding first and second interlockable profiled structures and a web out respective die orifices arranged so that said continuously extruded first interlockable profiled structure lands on a first lateral portion of said web, and said continuously extruded second interlockable profiled structure lands on a second lateral portion of said web, said first and second lateral portions of said web being separated by an intermediate lateral portion of said web.

11. The method as recited in claim 10, wherein said first and second interlockable profiled structures and said web are made of the same plastic material.

12. The method as recited in claim 10, wherein said first and second interlockable profiled structures are made of the same plastic material and said web is made of a different plastic material.

13. The method as recited in claim 10, wherein said web has a thickness such that said intermediate lateral portion of said web is easily breakable by a consumer.

14. The method as recited in claim 10, wherein said first interlockable profiled structure comprises a male member having an expanded head and said second interlockable profiled structure comprises a female member having a groove for receiving said expanded head of said male member.

15. A plastic zipper comprising first and second interlockable profiled structures without flanges and a frangible connection which connects said first interlockable profiled structure to said second interlockable profiled structure, said frangible connection being disposed on one side of said first and second interlockable profiled structures when said zipper is closed.

16. The zipper as recited in claim 15, wherein each of said first and second interlockable profiled structures comprises a respective base having first and second sides, and said frangible connection connects said first sides of said bases of said first and second interlockable profiled structures.

17. The zipper as recited in claim 14, wherein said first interlockable profiled structure comprises a male member having an expanded head and said second interlockable profiled structure comprises a female member having a groove for receiving said expanded head of said male member.

18. A package comprising a receptacle having a mouth at an upper end, first and second interlockable profiled structures respectively attached to opposing sides of said mouth and interlocked with each other, and a frangible connection connected to said first interlockable profiled structure along a first juncture, connected to said second interlockable profiled structure along a second juncture, and connected to said receptacle along third and fourth junctures, wherein said frangible connection hermetically seals an inner volume of said receptacle and said first and second interlockable profiled structures do not have flanges.

19. The package as recited in claim 18, wherein said first interlockable profiled structure comprises a male member having an expanded head and said second interlockable profiled structure comprises a female member having a groove for receiving said expanded head of said male member.

20. The package as recited in claim 18, wherein said frangible connection comprises first and second edges, and said receptacle comprises first and second walls and first and second side seals, wherein said first side seal seals said first wall to said second wall with said first edge of said frangible connection blended into said first side seal, and said second side seal seals said first wall to said second wall with said second edge of said frangible connection blended into said second side seal.

21. The package as recited in claim 18, further comprising an enclosed header enclosing said first and second interlockable profiled structures, wherein a line of perforations is formed in said header.

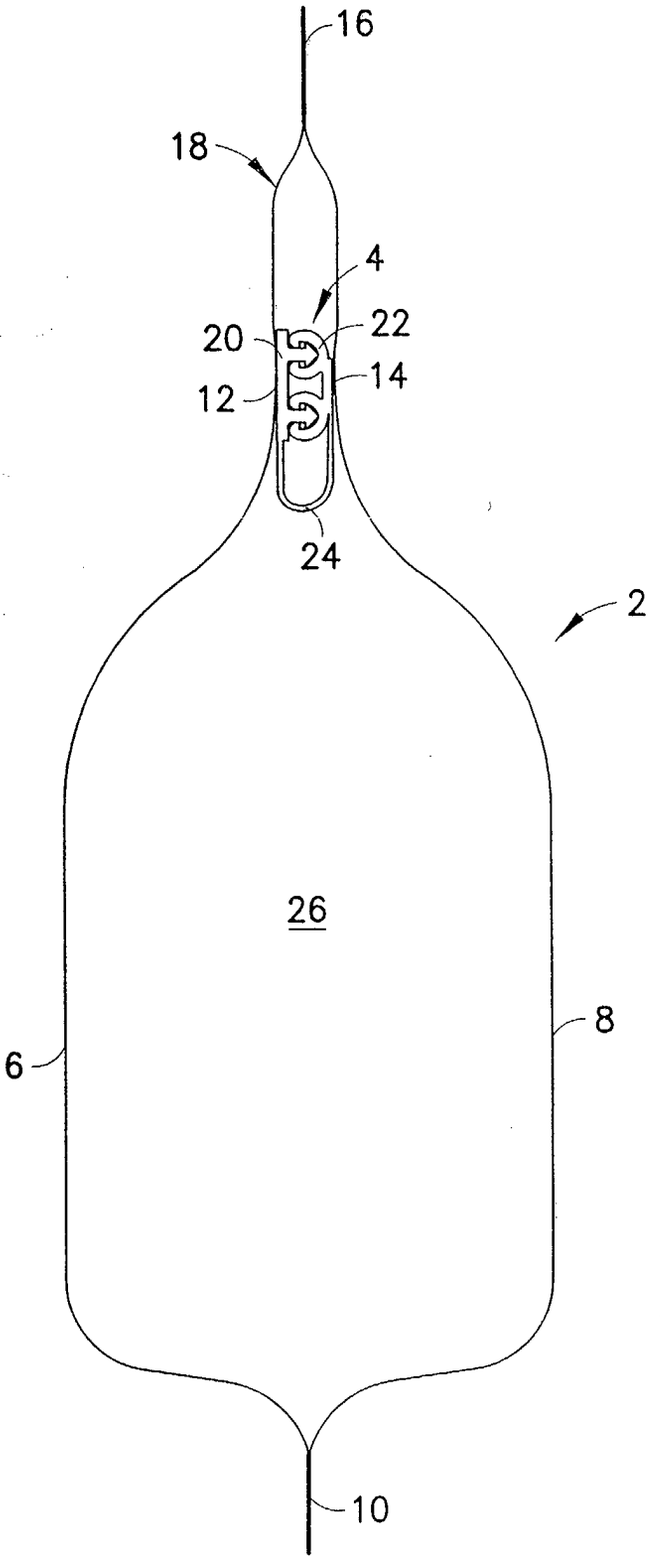


FIG. 1

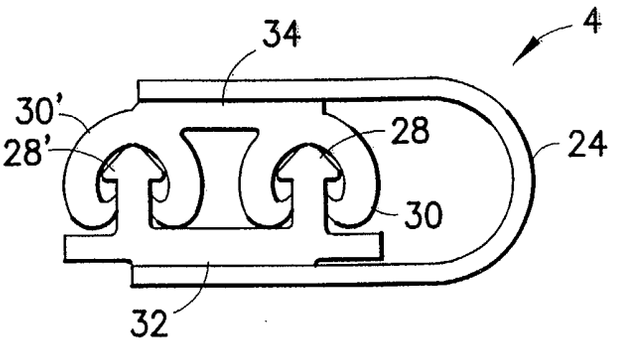
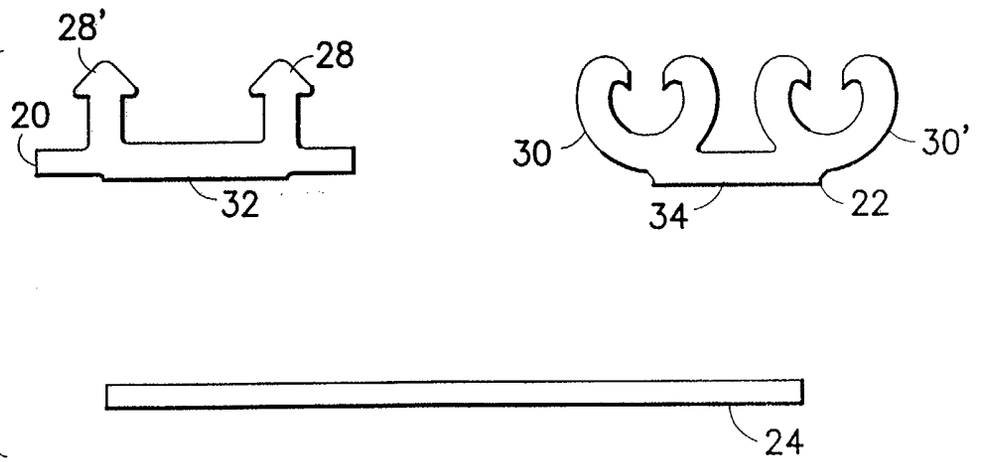


FIG.2

FIG.3



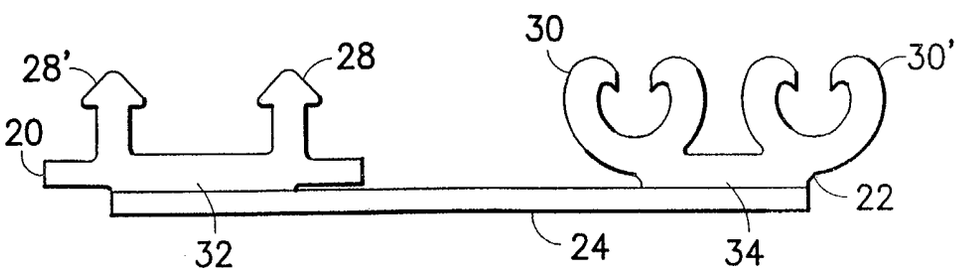


FIG.4

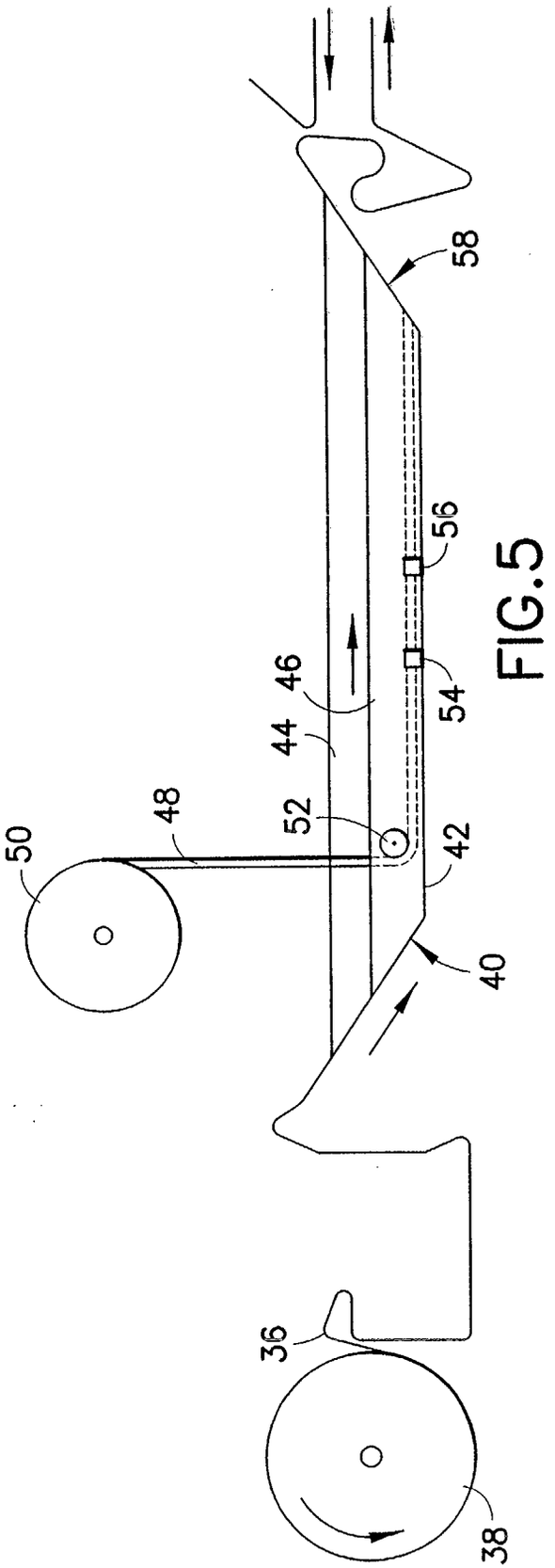
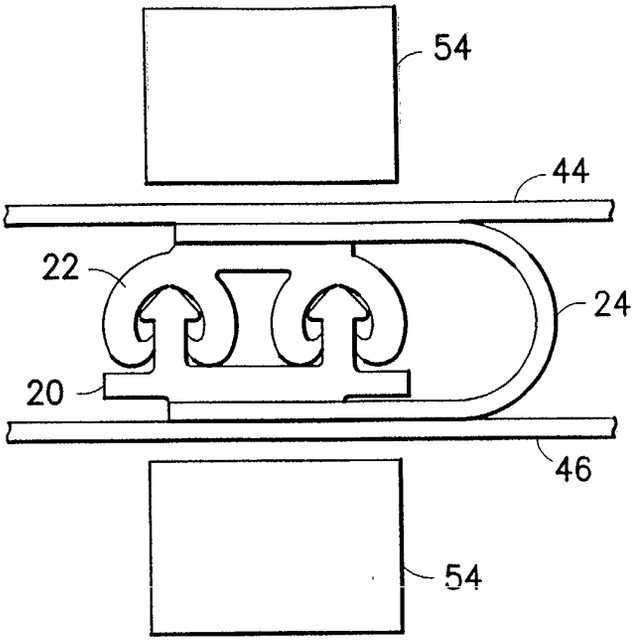


FIG.5

FIG.6



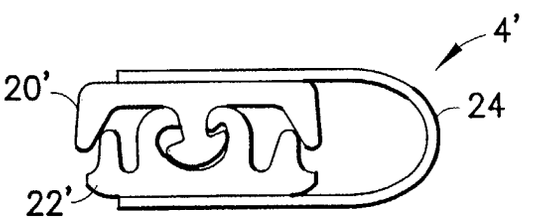


FIG.7

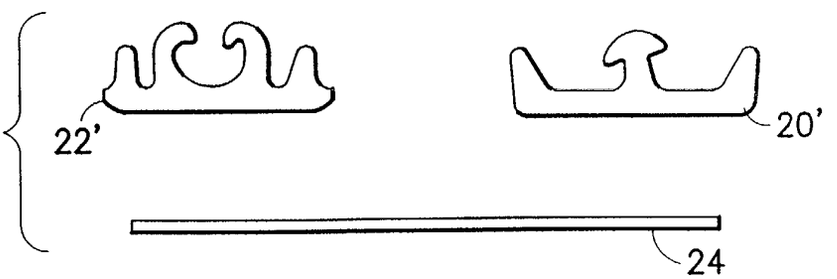


FIG.8

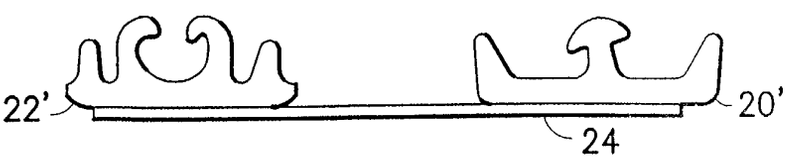


FIG.9