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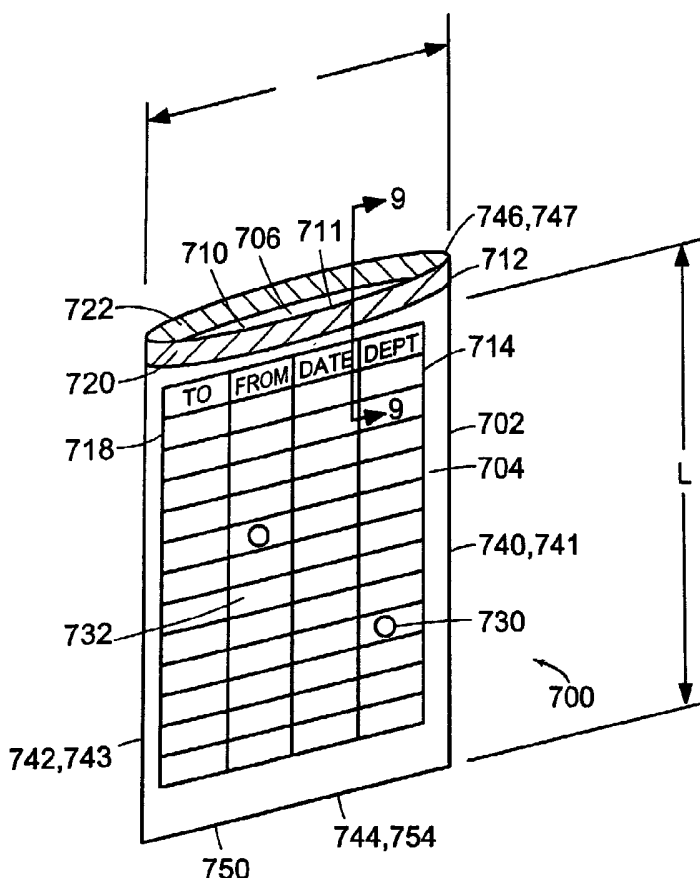
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[Continued on next page]

(54) Title: RECLOSABLE BAGS



(57) Abstract: A reclosable mailer (700, 700a, 800) includes a body (702, 802) having first (704, 804) and second (706, 806) opposing side walls. Edges (740, 741, 742, 743, 744, 745, 808, 809, 810, 811, 812, 813) of the side walls (704, 706, 804, 806) are joined to form therebetween a pouch (710, 816) having an open end (711, 818). The first (704, 804) and second (706, 806) opposing side walls have a width (W) and length (L) sufficient to allow the pouch (710, 816) to accommodate an unfolded 8 x 11 (20.32 x 27.94 cm) inch piece of paper, and an outer surface of at least one of the side walls (704, 706, 804, 806) includes an area (718, 834) markable with ink for identifying an intended recipient of the mailer. The mailer includes a closure (712, 822) that has first (720, 850) and second (722, 852) fastener strips. The first fastener strip (720, 850) includes a strip form base that has an array of discrete first fastener elements integrally molded with and extending from the base. The second fastener strip (722, 852, 596, 104) includes a plurality of second fastener elements engageable by the first fastener elements. The fastener strips (720, 722, 850, 852) are permanently attached to the body (702, 802) and positioned to releasably engage one another to close the open end (711, 818) of the pouch (710, 816).



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RECLOSABLE BAGS

TECHNICAL FIELD

This invention relates to reclosable bags.

BACKGROUND

5 In recent years, the usage of reclosable bags has become more and more prevalent. From the home to the largest commercial enterprises, reclosable bags have become an invaluable resource. Recosable bags come in many different sizes and styles allowing users to organize the bags and their contents in an organized and efficient manner.

10 In addition, advances in manufacturing technology have enabled the production of reclosable bags that are disposable. This provides further convenience to the user, because it eliminates the need for cleaning the bag or taking other steps to allow for future use of the bag.

 The present invention improves upon previously existing reclosable bags by
15 providing a reclosable bag with a closure that can be more easily and, in certain circumstances, more reliably closed.

SUMMARY

 In one aspect of the invention, a reclosable bag includes a body and a closure. The body has a first opposing side wall and a second opposing side wall, and the first
20 and second side walls have edges that are joined to form a pouch having an open end. The closure includes first and second elongated fastener strips that each have longitudinal upper and lower regions. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base, and the second fastener strip includes a plurality of second
25 fastener elements. One of the first and second fastener strips is permanently attached at both its upper and lower regions to an inner surface of the second opposing side wall and another of the first and second fastener strips is permanently attached at its upper region to an inner surface of the first opposing side wall and is free at its lower

region along at least a central portion of the first opposing sidewall. The first and second fastener elements are adapted to releasably engage one another to close the open end of the bag.

In some cases, the body is comprised of polyethylene.

5 One of the edges of the first opposing side wall and one of the edges of the second opposing side walls are joined by a fold in a single sheet of bag material forming both side walls, in some instances. The fold, in many cases, is located at the edges opposite the open end of the bag.

10 In some instances, the strip form base is formed of resin contiguous with the fastener elements and permanently attached to the inner surface of the corresponding side wall. The strip form base is welded to the inner surface of the corresponding side wall in many cases. In some cases, the strip form base and the inner surface of the corresponding side wall, in another embodiment, are comprised of compatible resin. In some instances, the strip form base and the inner surface of the corresponding side
15 wall are comprised of polyethylene.

In many preferred embodiments, the first fastener elements are hooks and the second fastener elements are loops. In some cases, the hooks have a height of between about 0.010 and 0.020 inch (0.25 and 0.5 millimeter). In some instances, the hooks have a height of about 0.015 inch (0.38 millimeter). The hooks, in many
20 instances, are in the form of J-hooks. The loops, in many cases, are in the form of a non-woven material. Further, the loops are preferably encapsulated in and thereby permanently secured to the second fastener strip.

In another aspect of the invention, a reclosable bag includes a body and a closure. The body has a first opposing side wall and a second opposing side wall.
25 Edges of the side walls are joined to form a pouch having an open end. The closure includes first and second elongated fastener strips. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base. The second fastener strip includes a plurality of second fastener elements engageable by the first fastener elements. The fastener
30 strips are permanently attached to the body and positioned to releasably engage one another to close the open end of the bag.

In some instances, the strip form base being formed of resin contiguous with the fastener elements and permanently adhesively attached to the inner surface of the first side wall. In some instances, the strip form base is welded to the inner surface of the first side wall. In many cases, the strip form base and the inner surface of the first side wall are comprised of compatible resin. In some instances, the strip form base and the inner surface of the first side wall are comprised of polyethylene.

In some embodiments, the first fastener strip is attached to an inner surface of the first side wall and the second fastener strip is attached to an inner surface of the second side wall. In many cases, one of the first and second fastener strips is attached at both an upper region and a lower region to a corresponding side wall and the other fastener strip is attached at an upper region to a corresponding side wall and free at a lower region along at least a central portion of the corresponding side wall. The second fastener, in some cases, is attached at both an upper region and a lower region to the second side wall.

The body includes a flap extending from one of the first and the second side walls in some instances. In many cases, one of the fastener strips is permanently attached to an inner surface of the flap.

In many instances, the body is comprised of polyethylene.

The first and second opposing side walls, in many embodiments, are joined at one edge by a fold in a single sheet of bag material. In some instances, the fold is located at the edge opposite the open end of the bag.

In yet another aspect of the invention, a reclosable mailer includes a body and a closure. The body has first and second opposing side walls. Edges of the side walls are joined to form a pouch having an open end. The first and second opposing side walls have a width and length sufficient to allow the pouch to accommodate an unfolded 8 x 11 inch (20 by 28 centimeter) piece of paper. Further, an outer surface of at least one of the side walls includes an area markable with pencil and/or ink for identifying an intended recipient of the mailer. The closure includes first and second fastener strips. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base, the second fastener strip including a plurality of second fastener elements engageable by the first fastener elements. The fastener strips are permanently attached to the

body and positioned to releasably engage one another to close the open end of the pouch.

In many cases, the fastener strips are permanently adhesively attached to the first and second side walls. In some instances, the first fastener strip is attached to an inner surface of the first side wall and the second fastener strip is attached to an inner
5 surface of the second side wall. In some cases, the fastener strips are welded to the inner surfaces of the first and second side walls. The welds, in some instances, have a height of between about 0.030 and 0.040 inch (0.76 and 1.0 millimeter).

In many cases, the body includes a flap extending from one of the side walls.
10 One of the fastener strips is permanently attached to an inner surface of the flap in some cases.

The body, in many instances, is comprised of polyethylene.

In some cases, the side walls are joined at one edge by a fold in a single sheet of bag material. The fold, in many instances, is located at the edge opposite the open
15 end of the bag.

The side walls preferably have a width of between 8 and 12 inches (20 and 30 centimeters) and a height of between 12 and 16 inches (30 and 40 centimeters). In some instances, the side walls have a width of about 10 inches and a height of about 13 inches (33 centimeters) to the inner edge of the closure.

20 The side walls are preferably opaque for security of the contents of the mailer.

At least one of the side walls may include viewing holes for viewing contents within the bag. The viewing holes preferably have a radius of between about 1/4 and 1/2 inch (6 and 12 millimeters).

In some embodiments, the markable area is comprised of a markable ink
25 printed on the bag body. In many cases, the markable area includes a grid suitable for inscribing at least a name and a location of an intended recipient of the mailer.

Preferably, the fastener strips have heights between about 1/4 inch and 1 inch (6 and 25 millimeters), as measured perpendicular to the bag opening. The fastener strip heights are more preferably about 3/8 inch (9.5 millimeters).

30 The first fastener strip, in many instances, is attached to an inner surface of the first side wall and the second fastener strip is attached to an inner surface of the second side wall. In some instances, one of the first and second fastener strips is

attached at both an upper region and a lower region to a corresponding side wall and the other fastener strip is attached at an upper region to a corresponding side wall and free at a lower region along at least a central portion of the corresponding side wall.

The first fastener elements are, in many cases, in the form of hooks and the
5 second fastener elements are in the form of loops. In many instances the hooks have a height of between about 0.010 and 0.020 inch (0.25 and 0.5 millimeter), preferably about 0.015 inch (0.38 millimeter). For example, the hooks may be in the form of J-hooks and the loops in the form of a non-woven loop material.

In another aspect of the invention, a method of delivering mail in a mailer
10 includes depositing documents within a pouch of a body of the mailer, releasably engaging the first and second fastener strips, and transporting the mailer from a first location to a second location. The body of the mailer has first and second opposing side walls which are joined along three edges to form the pouch. The pouch has an open end. The first and second opposing side walls have a width and length sufficient
15 to allow the pouch to accommodate an unfolded 8 x 11 inch (20 by 28 centimeter) piece of paper. An outer surface of at least one of the side walls includes an area markable with ink for identifying an intended recipient of the mailer. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base. The second fastener
20 strip includes a plurality of second fastener elements which are engageable by the first fastener elements. The first and second fastener strips are positioned to releasably engage one another to close the open end of the mailer.

In many cases, the method includes viewing the documents within the pouch through a viewing hole defined in at least one side wall.

25 In some instances, the method includes marking a name of an intended recipient of the mailer on the markable area prior to transporting the mailer.

According to another aspect of the invention, a reclosable tamper evident bag includes a body and a closure. The body has a first opposing side wall and a second opposing side wall. The first and the second side walls have edges, which are joined
30 to form a pouch having an open end and a closure end. The open end is capable of being permanently sealed by a user. The closure includes first and second elongated fastener strips each having a longitudinal upper region and a longitudinal lower

region. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base. The second fastener strip includes a plurality of second fastener elements. The first and the second fastener strips are permanently attached to inner surfaces of the first and second side walls. The first fastener elements and the second fastener elements are adapted to releasably engage one another to close the closure end of the bag.

In many instances, the closure end is adapted to be either permanently heat-sealed or permanently pressure-sealed.

The body is comprised of polyethylene in many cases.

In some instances, the side walls are joined at one edge by a fold in a single sheet of bag material. The closure end, in some cases, is located opposite the open end.

The pouch is preferably capable of accommodating an unfolded 8 x 10 inch (20 by 28 centimeter) piece of paper.

In some cases, at least one side wall includes a markable area capable of being marked with ink.

One of the first and second fastener strips, in some cases, is attached at both an upper region and a lower region to a corresponding side wall and the other fastener strip is attached at an upper region to a corresponding side wall and free at a lower region along at least a central portion of the corresponding side wall.

In many embodiments, the first fastener elements are hooks and the second fastener elements are loops.

According to another aspect of the invention, a method for using a reclosable, tamper-evident bag includes inserting contents into a pouch, permanently sealing the open end, transporting the bag and its contents to an intended recipient, unsealing a closure end of the bag, disengaging fastener strips, removing the contents from the pouch, replacing the contents and/or inserting new contents into the pouch, and reusing the bag as a folder to contain and organize the contents and/or new contents. The bag includes a body having a first opposing side wall and a second opposing side wall. The first and second side walls have edges, which are joined to form the pouch having the open end and the closure end. The open end is capable of being permanently sealed by a user. The bag further includes a closure including first and

second elongated fastener strips. The first fastener strip includes a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base. The second fastener strip includes a plurality of second fastener elements. The first and the second fastener strips are permanently attached to inner surfaces of the first and second side walls, and the first fastener elements and the second fastener elements are adapted to releasably engage one another to close the closure end of the bag.

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view of a reclosable bag.

Fig. 2 is a cross-sectional view taken along line 2-2 in Fig. 1.

Fig. 3 is a perspective view of a composite touch fastener in the form of a unitary closure.

Fig. 4 shows a method for forming an anti-peel weld pattern.

Fig. 5 is a perspective view of a reclosable bag having a flap.

Fig. 5A is a cross-sectional view taken along line 5A-5A in Fig. 5.

Fig. 6 shows hook-to-hook or self-engaging fastener engagement.

Fig. 7 is a cross-sectional view, taken along line 7-7 in Fig. 6.

Fig. 8 is a perspective view of a first reclosable mailer.

Fig. 9 is a cross-sectional view taken along line 9-9 in Fig. 8.

Fig. 10 is a perspective view of a second reclosable mailer.

Fig. 11 is a perspective view of a reclosable, tamper-evident bag.

Figs. 11A and 11B are cross-sectional views, taken along lines 11A-11A and 11B-11B in Fig. 11, respectively.

Fig. 12 shows a cross-section of a closure end of an alternate tamper-evident bag construction.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

Referring to FIG. 1, reclosable bag 600 includes a body 602 and a closure 604. Body 602 includes a first opposing side wall 606 and a second opposing side wall 608, each of which has respective right edges 650, 651, left edges 652, 653, bottom edges 654, 655, and top edges 656, 657. In a preferred embodiment, top edges 656, 657 are not joined together in at least a central portion 642 of side walls 606, 608 and bottom edges 654, 655 are joined at a fold 660 in a single sheet of bag film. This configuration results in open end 614 being located at the top of bag 600 opposite fold 660. However, any suitable arrangement capable of forming a pouch having an open end may be used. For example, bag 600 may be formed from two separate sheets of bag material sealed at selected corresponding edges.

As shown in FIG. 2, closure 604 includes a hook fastener strip 618 and a loop fastener strip 620. Hook fastener strip 618 includes a strip form base 622 and an array of hook fastener elements 624 integrally molded with and extending from base 622. Loop fastener strip 620 includes a band of non-woven material forming engageable loop fastener elements 626 secured to a resin base. Hook and loop fasteners 618, 620 are arranged such that fastener elements 624, 626 engage one another to close open end 614. Fastener elements 624 are preferably J-hooks having a height between about 0.010 inch and about 0.020 inch (most preferably about 0.015 inch) and loop elements 626 are of a non-woven fiber material encapsulated in fastener strip 620. Suitable loop materials also include woven and knit loop materials.

Preferably, hook fastener strip 618 is attached to an inner surface 628 of side wall 606 and loop fastener strip 620 is attached to an inner surface 630 of side wall 608. More particularly, hook and loop fastener strips 618, 620 are preferably attached to inner surfaces 628, 630 in a configuration which provides anti-peel advantages. Hook fastener strip 618, is attached along its entire length at both its upper region 638 and its lower region 640 to first side wall 606. Loop fastener strip 620, on the other hand, is attached at its upper region 639 and remains free at its lower region 641 along at least a central portion 642 (shown in FIG. 1) of second side wall 608. For many applications, it will be suitable that either the hook fastener strip 618 be attached at its upper region 764 and its lower region 766 and the loop fastener strip be attached at

only its upper region 770, or vice versa. Therefore, other suitable configurations may be preferred.

For example, an anti-peel configuration with the hook fastener strip unattached along its lower edge allows users to more easily disengage fastener strips 618, 620 while maintaining resistance to peel forces originating within the bag. Alternatively, the loop fastener strip may be attached at its upper region 639 and free at its lower region 641, with the hook fastener strip attached at both its upper region 638 and its lower region 640, as shown.

Methods of attaching the closure to the bag include, but are not limited to, welding (e.g., heat sonic or RF means), gluing, or stitching. One preferable method of attaching a closure to a bag of a compatible resin is by directly welding the resin of the closure substrate to the resin of the bag, as discussed below. In this manner, a polyethylene closure may be readily welded to a polyethylene bag.

Preferably, the resin of the closure is compatible with the resin of the bag body, to enable direct welding of the two together. In some cases, the resin of the closure bases and the bag body are both polyethylene.

Although the embodiments discussed above include a closure having two separate fastener strips, a unitary closure may also be used. Referring to Fig. 3, a lengthwise-continuous closure 100, such as for sealing a bag, consists of a thin, sheet-form resin substrate 102 with lengthwise-continuous, parallel bands 106, 104 having hook and loop fastener elements 196, 194 on its front face 108. Bands 104, 106 are equally spaced from the center "C" of the closure, such that when the closure is folded longitudinally at "C" to cover front face 108, hook fastener elements 196 engage and retain loop fastener elements 194 to form a releasable fastening. Hook fastener elements 196 are integrally molded with and extend from front face 108. In this embodiment, hook fastener elements 196 are in the form of J-hooks that extend, in rows, along the length of the closure. One example of a suitable fastener element shape is the CFM29 hook shape (of about 0.015 inch or 0.38 millimeter in height), available in various products sold by Velcro USA in Manchester, New Hampshire.

Band 104 consists of a preformed, non-woven web of polymer fibers, which may include a stabilizing binder, and which are bonded to front face 108 of substrate 102 at various points across the width and length of the web. Thus, in this

embodiment, loop fastener elements 194 are loops. Suitable loop materials include those disclosed in U.S. Patent Nos. 6,342,285 and 6,329,016, the entire disclosures of which are hereby incorporated by reference as if fully set forth.

Preferably, the non-woven loop material in band 104 is very thin, such as less
5 than about 0.040 inch (1.0 millimeter) thick (more preferably, less than about 0.020 inch or 2 millimeters thick), with web fibers held in a laterally stretched condition and freestanding loop structures extending from its exposed surface. As discussed in the above-referenced patents, the loop structures extend from associated knots in the stretched web, which may be stabilized by liquid binder wicked into the knots and
10 cured. Between knots, the thin fiber mat is not very dense and is sheer enough to permit images to be readily seen through it. Overall, the loop material has a basis weight (in its preformed state, including any pre-applied binder) of less than about 4 ounces per square yard (136 grams per square meter), preferably less than about 2 ounces per square yard (68 grams per square meter). Other details of this loop
15 material may be found in the above-referenced applications. For applications in which the loop material is partially penetrated by resin of the substrate as the substrate is formed (as discussed below), the needled loop material is preferably only stretched in a transverse direction only about 22 percent to leave a fair amount of loft and avoid total penetration.

20 In some instances, loop material of band 104 is partially encapsulated directly in resin of the substrate as the substrate is formed in a continuous molding process. In other cases, it is bonded to the formed substrate, either by ultrasonic bonding, welding, or adhesives.

Some lightweight knits are also suitable loop materials for certain
25 applications. Examples of such knits are Product 19902 from Guilford Knits in Greenville, South Carolina, which is of polyester fibers and has a basis weight of only about 1.6 ounces per square yard (54 grams per square meter). For a heavier knit, we prefer Guilford's Product 19029, a nylon knit of about 3.3 ounces per square yard (112 grams per square meter). Lightweight knit products are also available from TYBOR
30 (e.g., part number 4211A) in Spain, and MIZARD in Italy.

Referring back to Fig. 2, a unitary closure 604 (shown in dashed lines), rather than a closure including two separately formed fastener strips, may be attached at the

upper end of a bag 600. Unitary closure 604 is attached at the upper end of a bag 428. Unitary closure 604 has a band of hook fastener elements extending from its outer surface and exposed for engaging loop fibers. Unitary closure 604 may include a grasping rib and be configured to tear above the band of hook fastener elements such that the outer hooks remain on the opened bag. The outer hooks may be useful, for instance, for hanging bag 600 from a display rack covered with loop material.

The welding pattern shown in Fig. 2 provides the anti-peel advantages discussed above, as the lower region of hook fastener strip 618 of closure 604 remains unattached to inner surface 630 of side wall 608. One method of forming such a weld pattern is shown in Fig. 4, in which closure 604 is simultaneously welded to side walls 606, 608 by heated jaws 472 and 474, respectively. Advantageously, loop fastener elements 626 are arranged on closure 604 to overlap both upper and lower region weld zones, inhibiting any permanent welding together of hook and loop fastener strips 618, 620. For applications in which a small amount of bonding between hook and loop fastener strips 618, 620 is acceptable (or desirable), a chilled jaw 476 against second side wall 608 adjacent the lower weld zone prevents any undesirable bonding of lower region 641 of loop fastener strip 620 to side wall 608. The method of forming an anti-peel attachment discussed above may also be used where the closure includes two separate fastener strips rather than a unitary closure.

As an alternative to positioning hook and loop fastener strips on opposing inner faces of the bag, as shown in the embodiments discussed above, the fastener strips may be permanently adhered to the bag body in any suitable manner capable of allowing releasable engagement between fastener strips to close the open end of the bag. Referring to FIG. 5, for example, body 602a includes a flap 632 which extends from first side wall 606. Hook fastener strip 618 is permanently attached to an inner face 634 of flap 632. In this embodiment, loop fastener strip 620 is attached to outer surface 637 of second side wall 608. Thus, hook and loop fastener elements 624, 626 of fastener strips 618, 620 may engage one another when flap 632 is folded over towards outer surface 637. While flap 632 extends from first side wall 606, hook fastener strip 618 is attached to flap 632, and loop fastener strip 620 is attached to second side wall 608, other suitable configurations may be used.

Referring to Fig. 6, a closure 590 has two mating bands of hook-shaped fastener elements 592. In one band, extending from one side 594 of the closure strip, the fastener elements all face to the left, while from the other side 596 of the closure strip the fastener elements all face to the right. As the bands of fastener elements 592 are pressed further together from the position shown, the tips of the hook-shaped fastener elements interlock to engage the two bands of elements. When pulled apart, the flexible tips extend to clear the tips of the other band of elements and then snap back to their original hook shape. This is one example of what is known in the closure industry as “self-engaging” fasteners – those in which the engaging fastener elements are of a similar structure. Other forms of self-engaging fastener elements include mushrooms, for example, such as the “DUAL-LOCK” fastener product marketed by Minnesota Mining and Manufacturing, Inc. With self-engaging hook-shaped fastening, we prefer to mold the hooks to have a greater thickness “ T_h ” than the spacing “ S_r ” between adjacent rows of elements (as shown in Fig. 7), such that the bands cannot be separated by moving one side of the closure strip laterally across the rows of fastener elements of the other side of the closure strip. The CFM-15 and CFM-29 hook shapes marketed by Velcro USA in Manchester, New Hampshire, can be useful for self-engaging fasteners. The hook-shaped fastener elements should be spaced along their rows so as to provide sufficient clearance for the tips of a mating row of hooks to extend between adjacent hooks of the row. The optimal spacing will depend upon the selected hook shape and the strength of engagement desired. With mating arrays of mushroom-type fastener elements, the mushroom density of the opposing arrays should be different to avoid “dead-heading” the mushrooms (i.e., forcing the mushroom heads to deform rather than causing their stems to bend). One array may have, for example, a fastener element density on the order of about 50 to 200 fastener elements per square inch (8 to 31 per square centimeter), while the density of fastener elements in the other array is of the order of about 500 to 2000 per square inch (78 to 310 per square centimeter). Optimal density matches will depend upon the desired engagement and disengagement loads, among other things. Suitable sizes and patterns of self-engaging mushroom-shaped hook element arrays can be found in pending U.S. Patent application 10/050,669, the entire contents of which are incorporated herein by reference. Self-engaging bands of fastener elements may be

substituted for the loop and hook bands of any of the above-described closure strips to form self-engaging closures for various applications.

Preferably, whether hook and loop bands or self-engaging fastener bands are employed, the mating bands of the closure are advantageously configured to be engaged with a very low engagement force. We measure engagement force by measuring the facial load required between mating halves of a one-inch long (25 millimeter long) length of closure strip to engage the closure. Disengagement peel force is measured as the load required to peel such a one-inch (25 millimeter) strip of closure apart. The closure can provide an advantageously low engagement force of, for instance, less than about one pound over a lineal inch of the closure (11 Newtons per lineal centimeter), and a low disengagement peel force of less than about two pounds per lineal inch (23 Newtons per lineal centimeter). Preferably, practically no engagement force is required, the bags being essentially "self-closing." In many cases, we have found that the bags can be closed simply by grasping opposite edges of the bag near the closure and pulling them apart. This can provide significant advantage for those suffering with arthritis or carpal tunnel syndrome over profile strip closures, for example. In industrial bag-loading processes, bags may be loaded and stacked without manually closing the closures, the entire stack of bags closed either by their combined weight or by a quick press on the whole stack. The combination of the CFM29 hook and the TYBOR knit loop discussed herein can provide an average disengagement peel resistance of only about 0.15 pounds per inch of width (1.7 Newtons per centimeter of width) and an average shear resistance of only about 9.0 pounds per square inch (6.2 Newtons per square centimeter).

Materials other than polyethylene, such as polypropylene, polyester, nylon, and other thermoplastics and their co-polymers, may be employed. For example, laminated or co-extruded bag films can have inner surfaces of a material weld-compatible with the material of the closure base or substrate, and an outer surface of a material chosen for other properties, such as durability or impermeability.

As evident from the embodiments described above, these reclosable bags are useful in many applications. By "bag", we mean to include all packages with flexible sides, including but not limited to standable pouches and flexible cartons.

As shown in FIG. 8, reclosable mailer 700 includes a body 702 and a closure 712. Body 702 includes a first opposing side wall 704 and a second opposing side wall 706 each having respective right edges 740, 741, left edges 742, 743, bottom edges 744, 745, and top edges 746, 747. Edges 740-747 may be joined in accordance
5 with any of the methods discussed above, or any other suitable method, to form a pouch 710 having an open end 711. In a preferred embodiment, top edges 746, 747 are not joined together but are slightly offset in height to enable ease of opening, and bottom edges 744, 745 are joined at a fold 750 in the bag film, which results in open end 711 being located at the top of bag 700 opposite fold 750. However, as noted
10 above, other suitable arrangements capable of forming a pouch having an open end may be used.

Opposing side walls 704, 706 have a width and length sufficient to allow pouch 710 to accommodate an 8 x 11 inch (20 by 28 centimeter) piece of paper. Preferably, side walls 704, 706 have an overall width "W" of between about 8 and 12
15 inches (20 and 30 centimeters) (more preferably, about 10 inches or 25 centimeters) and an overall length of between about 12 and 16 inches (30 and 40 centimeters) (more preferably, a length "L" of about 13 inches or 33 centimeters to the inner edge of the closure, as shown), with radiant bead seals of no more than about 1/64 inch (0.4 millimeter) width along the side edges.

20 Additionally, the outer surface of at least one of side walls 704, 706 preferably includes a markable area 718, which is capable of being marked with pencil lead and/or ink for identifying an intended recipient of mailer 700. Preferably, area 718 is markable with common inks found in ballpoint and felt tip pens. Area 718 is preferably printed with a markable ink, such as Jannel Inprint White No. 8632, printed
25 onto outer surface 714 of first side wall 704 and/or outer surface (not shown) of second side wall 706.

Markable area 718 preferably includes a grid 732 with multiple designated locations on which to write a name and location of an intended recipient of mailer 700. Additionally, designated locations for other relevant information may be
30 provided on grid 732. Similar to markable area 718, grid 732 may be applied to markable area 718 or to one or both of outer surfaces 716, 718 themselves using markable ink. Alternatively, other suitable methods may be used.

Preferably, body 702 is formed of polyethylene. In one case, the body is of a coextrusion of low-density polyethylene (LDPE) and high-density polyethylene (HDPE). For example, the two materials can be coextruded in layers, with the LDPE on the inner surface of the bag for ease of attaching the fastener strips, and the HDPE
5 on the outer surface of the bag for increased toughness, wear resistance and writability. We have found that HDPE may be sufficiently markable that no imprintable ink is necessary in the markable area of the mailer. Homogenized coextrusions are also useful. As noted above, other suitable materials such as polypropylene or a combination of the two materials may be used.

10 Side walls 704, 706 are preferably opaque. The opacity of the side walls helps to ensure confidentiality of the bag contents. In some instances, first and/or second side walls 704, 706 have at least one viewing hole 730 to allow a user of mailer 700 to determine whether there are any contents within pouch 710. Viewing holes 730 preferably have a radius of between about 1/4 and about 1/2 inch. However, any
15 suitable size and shape capable of allowing a user to detect contents within pouch 710 without unreasonably diminishing confidentiality of the contents may be used.

Closure 712 includes hook and loop fastener strips 618, 620 as described above. Preferably, hook and loop fastener strips are between about 1/4 and 1 inch (6 and 25 millimeters) in width (more preferably, about 3/8 inch or 9.5 millimeters).

20 Referring to FIG. 9, hook and loop fastener strips 618, 620 are preferably attached to inner surfaces 760, 762 of side walls 704, 706 in a configuration which provides anti-peel advantages. More specifically, hook fastener strip 618 is attached at its upper region 764 while it remains free at its lower region 766 along at least a central portion 768 (shown in FIG. 8) first side wall 704. Loop fastener strip 620, on
25 the other hand, is attached along its entire length at both its upper region 770 and its lower region 772 to second side wall 706.

In another embodiment, as shown in FIG. 10, a mailer 700a is formed of similar construction to the bag of FIG. 5. Body 702 includes a flap 736, which extends from first side wall 704. Hook fastener strip 618 is attached to inner face 738
30 of flap 736. In this embodiment, hook and loop fastener strips 618, 620 would engage one another when flap 736 is folded over towards outer surface 716 of second side wall 706 to which loop fastener strip 620 is attached. Flap 736 may extend from

either first side wall 704 or second side wall 706. Further, the configuration of fastener strips 618, 620 may be reversed such that hook fastener strip 618 is attached to outer surface 716 and loop fastener strip is attached to inner face 738. If hook engageable materials are to be placed on the envelope, for example, the hook strip
5 should be placed on outer surface 716.

Referring to FIG. 11, a reclosable, tamper-evident mailer 800 includes a body 802 and a closure 822. Body 802 includes a first opposing side wall 804 and a second opposing side wall 806, each of which has respective right edges 808, 809, left edges 810, 811, bottom edges 812, 813, and top edges 814, 815. Edges 808-815 may be
10 joined in accordance with any of the methods discussed above, or any other suitable method, to form a pouch 816 having an open end 818. One pair of opposing right edges 808, 809, left edges 810, 811, bottom edges 812, 813, and top edges 814, 815 is preferably joined by a fold 825 in a single sheet of bag material. Fold 825 is preferably located opposite open end 818.

15 Open end 818 is capable of being permanently sealed. Preferably, open end 818 is capable of being heat-sealed, such as with a sealing iron, or pressure-sealed. For example, as shown in Fig. 11A, opposing bands 860 of pressure-sensitive adhesive are carried on the inner faces of the mailer and covered with respective release liners 862.

20 One pair of opposing right edges 808, 809, left edges 810, 811, bottom edges 812, 813, and top edges 814, 815 is joined in a manner to form an closure end 820. Preferably, closure end 820 is formed at fold 825 by providing perforations through both side walls 804, 806 to allow a user to remove the bottom portion of bag 800 containing fold 825. Alternatively, as shown in FIG. 11B, closure end 820 may be
25 comprised of a unitary closure 822 attached to each opposing side wall 804, 806, as discussed above.

In some cases, as shown in FIG. 12, side walls 804, 806 may be joined at closure end 820. Side walls 804, 806 may be torn at perforations 875 to allow access to closure 822 such that closure end 820 may be opened and releasably closed. Hang
30 holes (not shown) may also be provided through the side walls below the perforations, for hanging the filled bag from a display rack.

Closure 822 includes a hook fastener strip 850 and a loop fastener strip 852, attached to respective inner surfaces of opposing side walls 804, 806 and positioned to allow releasable engagement of one another to close closure end 820. Further, fastener strips 850, 852 are preferably attached to inner surfaces of side walls 804, 806 in an anti-peel configuration as discussed above.

In this embodiment, contents are inserted into pouch 816 and then open end 818 is permanently sealed. The contents may only then be removed by irreparably tearing closure 822. This enables one to detect upon reasonable inspection whether the bag has been opened. Further, after the seal at closure end 820 has been broken, bag 800 may be used to store contents as closure 822 enables a user to open and close closure end 820 and open end 818 remains permanently sealed.

For example, tamper-evident mailer 800 may be used to transport sensitive or confidential papers to an initial recipient, and then used by that recipient to store the transported materials or to forward the papers to another recipient. Such mailers may be particularly suited for transporting evidence from a crime scene to a secure area, or for transporting vials of body fluid and tissue samples to a laboratory for testing, or for bank deposits or medication packaging.

Body 802 is preferably formed of polyethylene. Alternatively, polypropylene or a combination of the two materials may be used. Further, side walls 804, 806 are preferably sized to enable pouch 816 to accommodate an unfolded 8 x 10 inch (20 by 28 centimeter) piece of paper, so as to accommodate standard letter and A4 sizes. At least one of side walls 804, 806 preferably includes a markable addressing area 834 capable of being marked as discussed above.

Other bag constructions, and suitable bag making methods, are disclosed in U.S. Pat. No. 6,202,260, PCT Application No. PCT/US99/26261, and U.S. Patent Applications 60/228,819 and 60/159,489, the entire contents of which are hereby incorporated by reference.

A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, bag bodies may be formed of non-resin film, or cellophanes, or closure strips may be adhered to bag

bodies with adhesives. Accordingly, other embodiments are within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A reclosable mailer (700,700a,800) comprising:
a body (702,802) having first (704,804) and second (706,806) opposing side walls, edges (740,741,742,743,744,745,808,809,810,811,812,813) of the side walls
5 (704,706,804,806) being joined to form therebetween a pouch (710,816) having an open end (711,818), wherein the first (704,804) and second (706,806) opposing side walls have a width (W) and length (L) sufficient to allow the pouch (710,816) to accommodate an unfolded 8 x 11 (20.32 x 27.94 cm) inch piece of paper, and wherein an outer surface of at least one of the side walls (704,706,804,806) includes an area
10 (718,834) markable with ink for identifying an intended recipient of the mailer; and
a closure (712,822) including first (720,850) and second (722,852) fastener strips, the first fastener strip (720,850) including a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base, the second fastener strip (722,852,596,104) including a plurality of second fastener
15 elements engageable by the first fastener elements, the fastener strips (720,722,850,852) being permanently attached to the body (702,802) and positioned to releasably engage one another to close the open end (711,818) of the pouch (710,816).
- 20 2. The reclosable mailer (700,700a,800) of claim 1, wherein the first fastener strip (720,850) is permanently attached to one of the first (704,804) and second (706,806) side walls and the second fastener strip (722,852) is attached to another of the first (704,804) and second (706,806) side walls, preferably the first fastener strip (720,850) is attached to an inner surface (760) of the first side wall
25 (704,804) and the second fastener strip (722,852) is attached to an inner surface (762) of the second side wall (706,806).
3. The reclosable mailer (700,700a,800) of claim 2, wherein the fastener strips (720,722,850,852) are welded to the inner surfaces of the first (704,804) and
30 second (706,806) side walls.

4. The reclosable mailer (700,700a,800) of claim 3, wherein the welds have a height of between about 0.030 inch (0.076 cm) and about 0.040 inch (0.102 cm).

5 5. The reclosable mailer (700a) of any of the above claims, wherein the body (702) includes a flap (736) extending from one of the side walls (704,706).

6. The reclosable mailer (700a) of claim 5, wherein one of the fastener strips (720,722) is permanently attached to an inner surface (738) of the flap (736).

10

7. The reclosable mailer (700, 700a, 800) of any of the above claims, wherein the body (702,802) is comprised of polyethylene.

8. The reclosable mailer (700,700a,800) of any of the above claims,
15 wherein the side walls (704,706,804,806) are joined along at least one edge (740,741,742,743,744,745,808,809,810,811,812,813) by a fold (750,825) in a single sheet of bag material, the fold (750,825) preferably located opposite the open end (711,818) of the mailer (700,700a,800).

20 9. The reclosable mailer (700,700a,800) of any of the above claims, wherein the side walls (704,706,804,806) have a width between about 8 inches (20.32 cm) and about 12 inches (30.48 cm) and a height between about 12 inches (30.48 cm) and about 16 inches (40.64 cm), e.g., a width of about 10 inches (25.4 cm) and a height of about 14 1/8 inches (35.88 cm).

25

10. The reclosable mailer (700,700a,800) of any of the above claims, wherein the side walls (704,706,804,806) are opaque.

11. The reclosable mailer (700,700a) of any of the above claims, wherein
30 at least one of the side walls (704,706) includes viewing holes (730) for viewing contents within the mailer (700,700a), the viewing holes (730) preferably having a radius of between about 1/4 inch (0.64 cm) and about 1/2 inch (1.27 cm).

12. The reclosable mailer (700,700a,800) of any of the above claims, wherein the markable area (718,834) is comprised of a markable ink printed on the body (702,802).

5

13. The reclosable mailer (700,700a) of any of the above claims, wherein the markable area (718) includes a grid (732) suitable for inscribing at least a name and a location of an intended recipient of the mailer (700,700a).

10

14. The reclosable mailer (700,700a,800) of any of the above claims, wherein the fastener strips (720,722,850,852) have heights of between about 1/4 inch (0.64 cm) and about 1 inch (2.54 cm), e.g., about 3/8 inch (0.953 cm).

15

15. The reclosable mailer (700,700a,800) of any of the above claims, wherein the first fastener strip (720,850) is attached to an inner surface (760) of the first side wall (704,804) and the second fastener strip (722,852) is attached to an inner surface (762) of the second side wall (706,806).

20

16. The reclosable mailer (700,700a,800) of claim 15, wherein one of the first (720,850) and second (722,852) fastener strips is attached at both an upper region (764,770) and a lower region (766,772) to one of the first and second side walls (704,706,804,806) and the other fastener strip (720,722,850,852) is attached at an upper region (764,770) to another of the first (704,804) and second (706,806) side walls and free at a lower region (766,772) along at least a central portion of another of

25

the first (704,804) and second (706,806) side walls.

17. The reclosable mailer (700,700a,800) of any of the above claims, wherein the first fastener elements are in the form of hooks and the second fastener elements are in the form of loops.

30

18. The reclosable mailer (700,700a,800) of claim 17, wherein the hooks have a height of between about 0.010 inch (0.025 cm) and about .020 inch (0.051 cm), e.g., about .015 inch (0.038 cm).

5 19. The reclosable mailer (700,700a,800) of claim 18, wherein the hooks are in the form of J-hooks.

20. The reclosable mailer (700,700a,800) of any of the above claims, wherein the loops are in the form of a non-woven loop material.

10

21. A method of delivering mail in a mailer (700,700a,800) comprising: depositing documents within the pouch of the reclosable mailer of any of claims 1-20;

15 releasably engaging the first (720,850) and the second (722,852) fastener strips, the first fastener strip (720,850) including a strip form base having an array of discrete first fastener elements integrally molded with and extending from the base, the second fastener strip including a plurality of second fastener elements engageable by the first fastener elements and positioned to releasably engage one another to close the open end (711,834) of the mailer; and

20 transporting the mailer (700,700a,800) from a first location to a second location.

22. The method of claim 21, further comprising viewing the contents within the pouch (710,816) through a viewing hole (730) defined in at least one side wall (704,706,804,806).

25

23. The method of claim 21 or 22, further comprising marking a name of an intended recipient of the mailer (700,700a,800) on the markable area (718,852) prior to transporting the mailer (700,700a,800).

30

24. A reclosable tamper evident bag (600,700,700a,800) comprising:

a body (602,602a,702,802) having a first opposing side wall (606,704,804) and a second opposing side wall (608,706,806), the first (606,704,804) and the second (608,706,806) side walls having edges (650,651,652,653,654,655,740,741,742,743,744,745,808,809,810,811,812,813), the edges (650,651,652,653,654,655,740,741,742,743,744,745,808,809,810,811,812,813) being joined to form therebetween a pouch (710,816) having an open end (614,711,818) and an closure end (820), wherein the open end (614,711,818) is capable of being permanently sealed closed by a user; and

a closure (604,712,822) including first (618,720,850) and second (620,722,852) elongated fastener strips each having a longitudinal upper region (638,639,764,770) and a longitudinal lower region (640,641,766,772), the first fastener strip (618,720,850) including a strip form base (622) having an array of discrete first fastener elements (620) integrally molded with and extending from the base (622), the second fastener strip (620,722,852) including a plurality of second fastener elements (e.g., 626 of Fig. 2), wherein the first fastener strip (620,722,852) is permanently attached to an inner surface (628,630,760,762) of one of the first (606,704,804) and second (608,706,806) side walls and the second fastener strip (620,722,852) is permanently attached to an inner surface (628,630,760,762) of another of the first (606,704,804) and second (608,706,806) side walls, and wherein the first fastener elements (620) and the second fastener elements are adapted to releasably engage one another to close the closure end (820) of the bag (600,700,700a,800).

25. The reclosable tamper-evident bag (800) of claim 24, wherein the closure end (820) is adapted to be permanently heat-sealed closed or wherein the closure end (820) is adapted to be permanently pressure-sealed closed.

26. The reclosable tamper-evident bag (600,700,700a,800) of claim 24 or 25, wherein the body (602,602a,702,802) is comprised of polyethylene.

30

27. The reclosable tamper-evident bag (600,700,700a,800) of any of claims 24-26, wherein the side walls (606,608,704,706,804,806) are joined along at

least one edge

(650,651,652,653,654,655,740,741,742,743,744,745,808,809,810,811,812,813) by a fold (660,750,825) in a single sheet of bag material.

5 28. The reclosable tamper-evident bag (800) of any of claims 24-27, wherein the closure end (820) is located opposite the open end (818).

 29. The reclosable tamper-evident bag (600,700,700a,800) of any of claims 24-28, wherein the pouch (710,816) is capable of accommodating an unfolded
10 8 x 10 inch (20.32 x 25.4 cm) piece of paper.

 30. The reclosable tamper-evident bag (800) of claim 29, wherein an outer surface of at least one of the side walls (804,806) includes a markable area (834) capable of being marked with ink.

15

 31. The reclosable tamper-evident bag (600,700,700a,800) of any of claims 24-30, wherein the fastener strips (618,620,720,722,850,852) have a height of about 3/8 inch (0.953 cm).

20 32. The reclosable tamper-evident bag (600,700,700a,800) of any of claims 24-31, wherein one of the first (618,720,850) and second (620,722,852) fastener strips is attached at both an upper region (638,639,764,770) and a lower region (640,641,766,772) to one of the first (606,704,804) and second (608,706,806) side walls and the other fastener strip (618,620,720,722,850,852) is attached at an
25 upper region (638,639,764,770) to another of the first (606,704,804) and second (608,706,806) side walls and free at a lower region (640,641,766,772) along at least a central portion of another of the first (606,704,804) and second (608,706,806) side walls.

30 33. The reclosable tamper-evident bag (600,700,700a,800) of any of claims 24-32, wherein the first fastener elements are hooks and the second fastener elements are loops.

34. A method of handling and delivering articles, the method including:
providing the tamper-evident bag (600,700,700a,800) of any of claims 24-33;
permanently sealing the open end (614,711,818);
5 transporting the bag (600,700,700a,800) and its contents to an intended
recipient;
unsealing a closure end (820) of the bag (600,700,700a,800);
removing the contents from the pouch (710,816);
replacing the contents and/or inserting new contents into the pouch (710,816);
10 engaging first (for example, 618 of Fig. 2) and second (for example, 626 of
Fig. 2) fastener elements to reclose the closure end (820); and
reusing the bag (600,700,700a,800) to contain and organize the replaced
contents and/or new contents.

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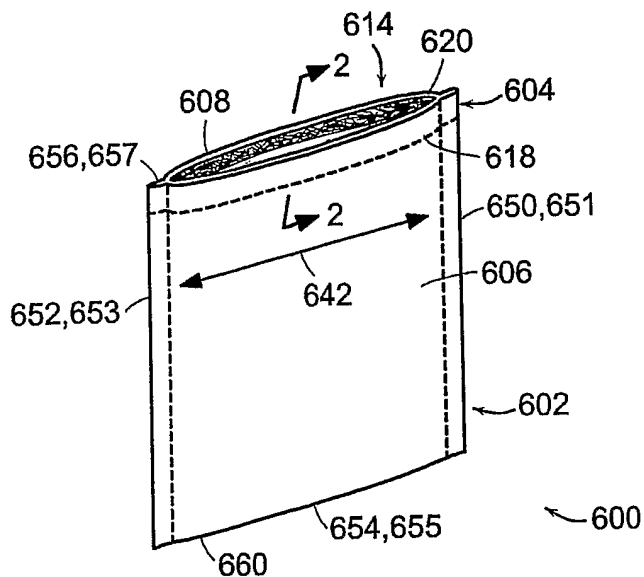


FIG. 1

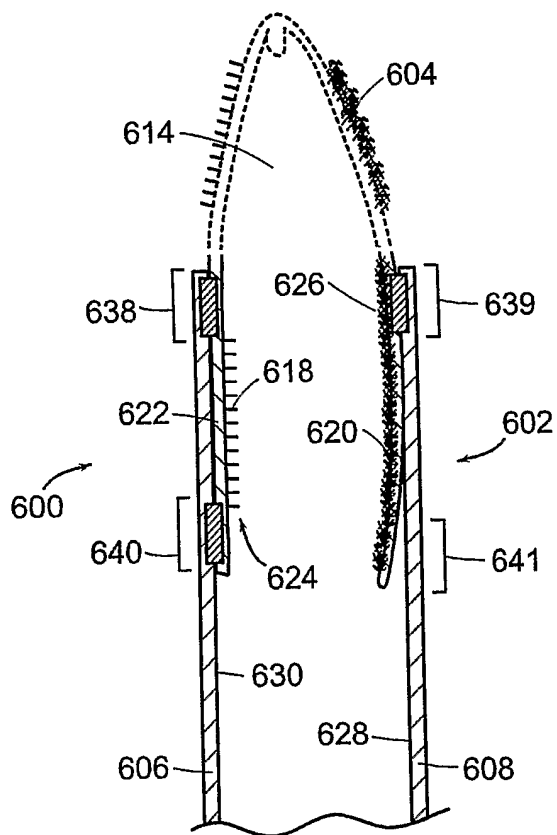


FIG. 2

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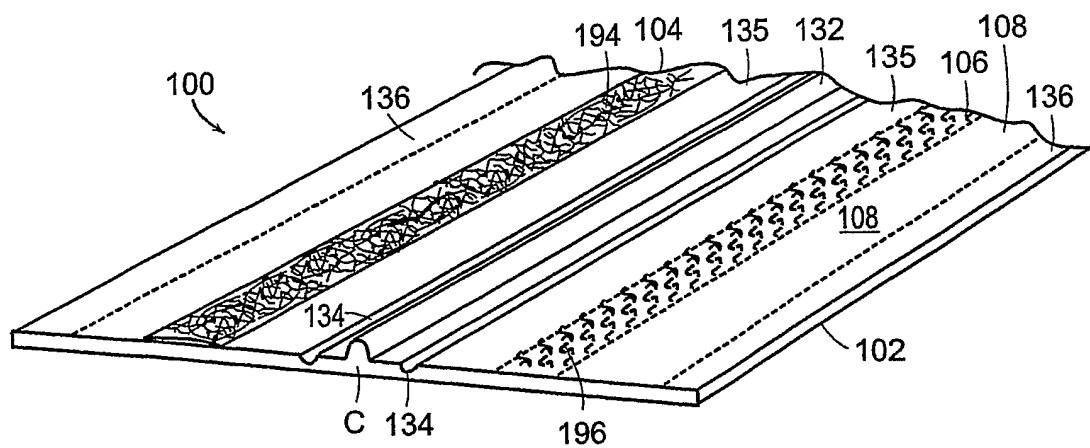


FIG. 3

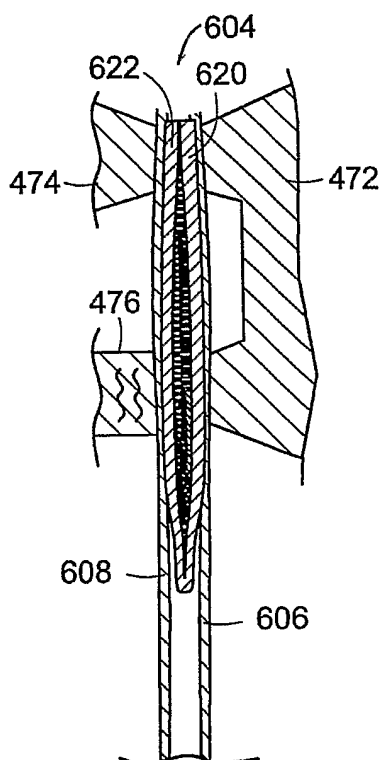


FIG. 4

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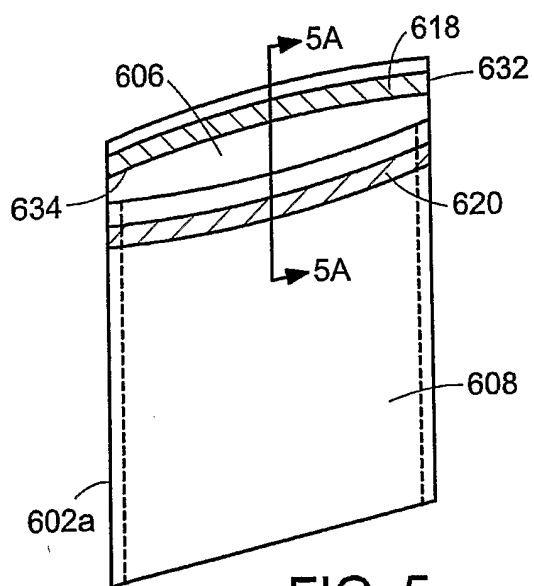


FIG. 5

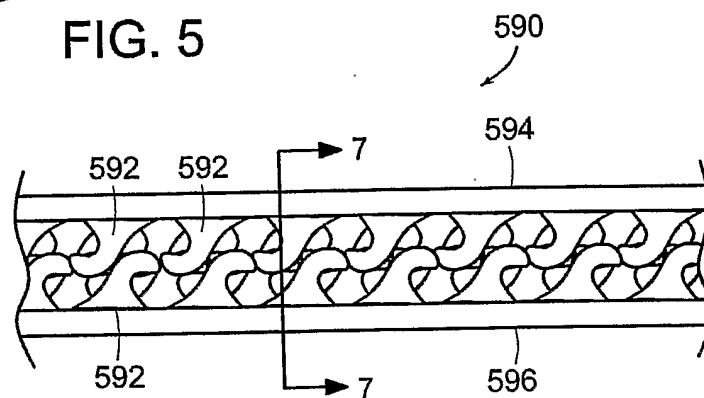


FIG. 6

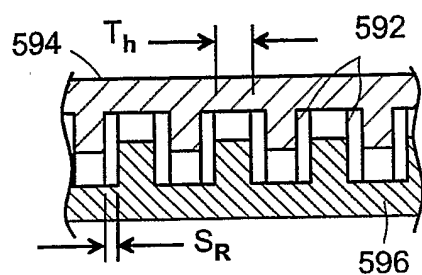


FIG. 7

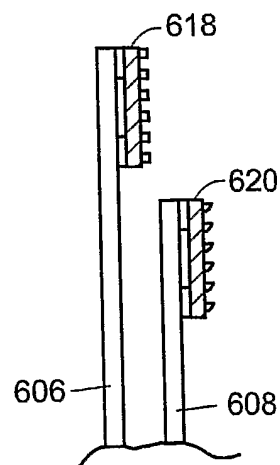


FIG. 5A

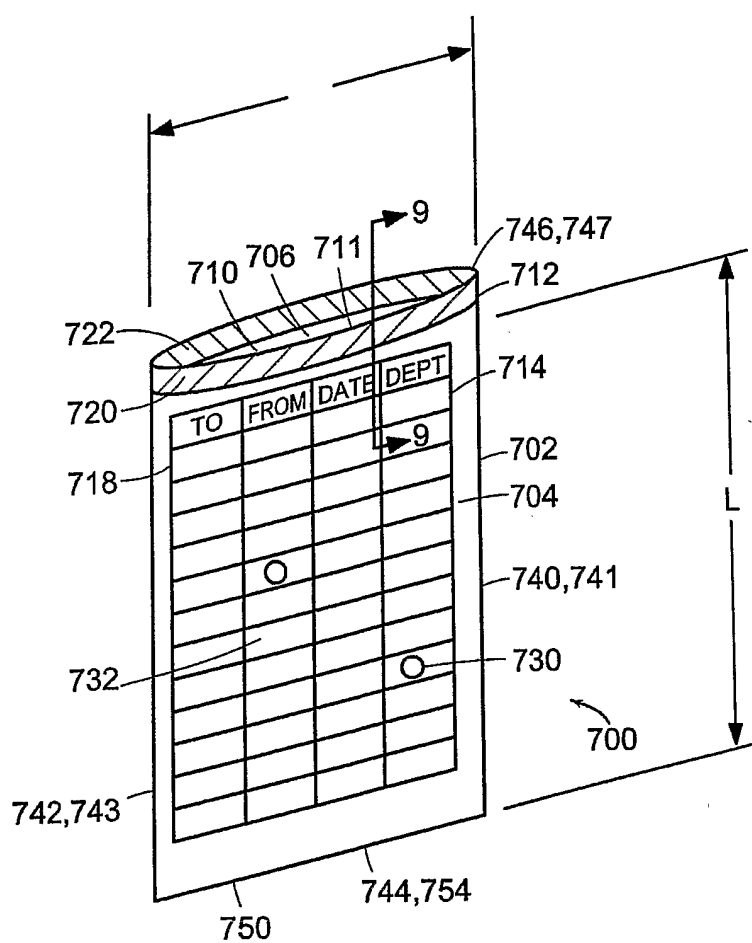


FIG. 8

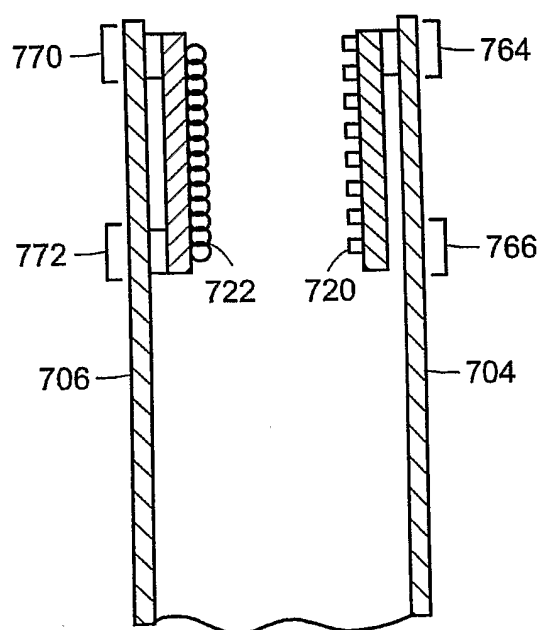


FIG. 9

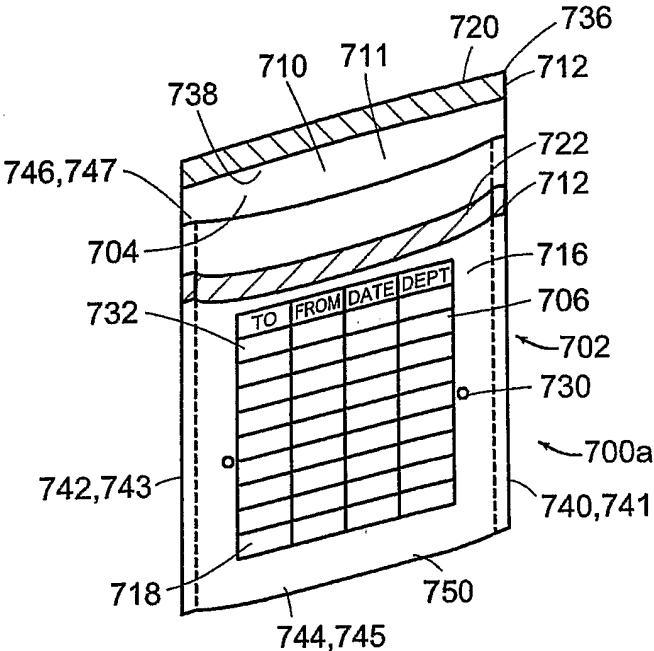


FIG. 10

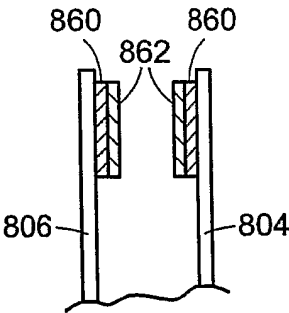


FIG. 11A

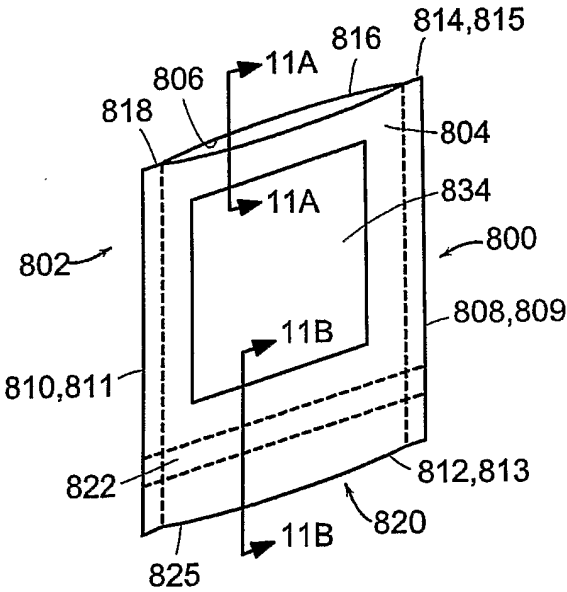


FIG. 11

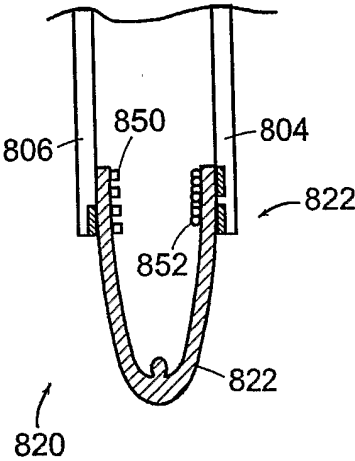


FIG. 11B

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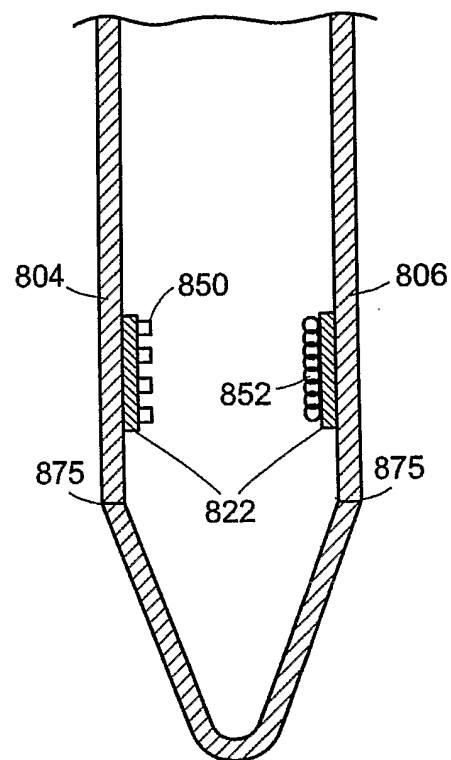


FIG. 12