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3,372,438

PEEL RESISTANT TAPE ASSEMBLY

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FIG. 1

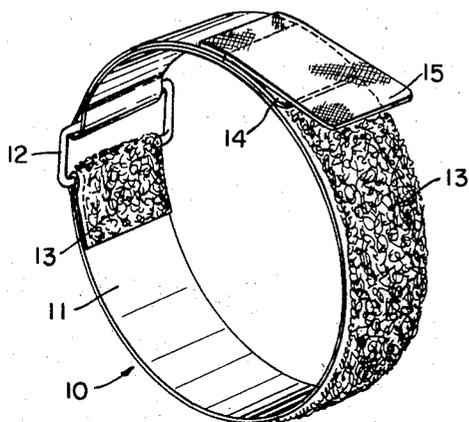


FIG. 2

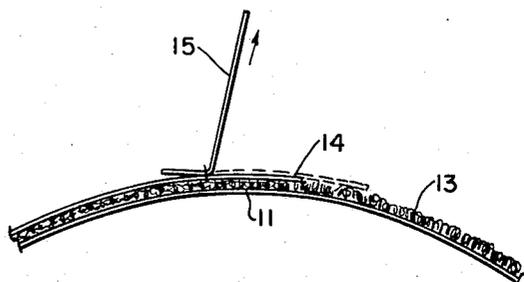


FIG. 3

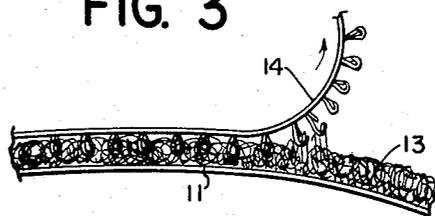


FIG. 4

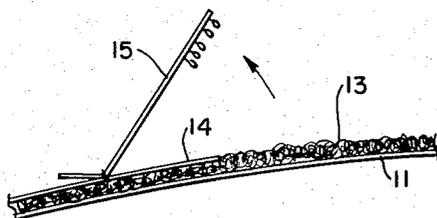
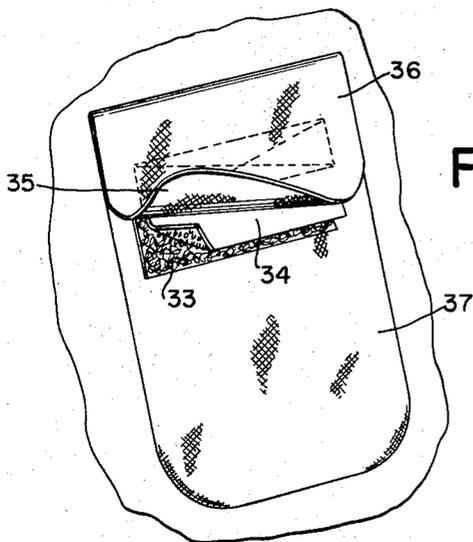


FIG. 5



FIG. 6



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**PEEL RESISTANT TAPE ASSEMBLY**

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 5 Claims. (Cl. 24-16)

This invention relates generally to a peel resistant tape assembly and more particularly to a tape assembly having complementary overlapping gripper type fasteners which are separable by peeling and to means for resisting a peeling force applied to an endmost portion of an overlapping portion of the tape.

Wide usage has been made of the complementary gripping tape type fastening means disclosed in U.S. Patent No. 2,717,437 due to its ability to resist separation by shearing forces parallel to the interfacial plane of engagement between the coating strips, yet easily separating in response to a peeling force essentially normal to one end of the same plane of engagement.

Frequently, such fastening means are used in a manner in which an end of one of the coating strips is exposed to the danger of having a force unintentionally separate the engaged tapes. This situation might exist where tapes of complementary hook and pile fastening material are used to secure items such as straps used to bind packing boxes, or flaps used to protect the contents of pockets. For example, a strap having adjacent hook and pile tapes attached to one side may be passed through a buckle and doubled back so that the two adjacent tapes will be folded over each other and be engaged to secure the strap in position. The end of the strap, however, remains exposed so that a force, such as from a grasping hand or an adjacent object, could catch the exposed end, create a force essentially normal to the plane of engagement thereby separating the tapes and releasing the strap.

In the case of a pocket, it is desirable to have a protective flap securing means which will not be unintentionally released by an external force yet might be easily released in response to an internal pressure as would be desirable for example in pilots' vests having a pocket containing a water activated inflatable life preserver balloon.

It is therefore an object of this invention to provide a means to protect the exposed end of coating gripper type fastening tapes from unintentional peeling, and to provide a protecting piece which might be readily gripped without separation of the tapes.

Broadly stated, this invention relates to a tape assembly of the type having complementary overlapping gripper-type fasteners on individual portions of the assembly. One of the complementary fasteners is a plurality of hooks and the other a plurality of pile elements which, when placed in overlapping face-to-face contact, interengage and will resist separation by forces applied substantially parallel to the interfacial plane along an end of one of the engaged portions. The improvement in the assembly is in means for resisting a peeling force applied to an endmost portion of the overlapping of the portions and consists of a separate tab member secured to a side of the overlapping tab portion opposite to the side faced with one of the complementary fasteners which is free from engagement with a marginal end portion of the overlapping tap portion. It is characteristic of this assembly that a peeling force applied to the tab converts the peeling force into shearing forces along the engaged marginal end portion of the overlapping portion and thereby resists separation.

Referring to the drawings in which preferred embodiments of my invention are shown:

FIG. 1 is a perspective view of a strap incorporating one form of the invention in which the complementary gripping tapes are shown engaged;

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FIG. 2 is an enlarged partial cross-sectional view of complementary gripping tape showing a protective tab according to the invention;

FIG. 3 is a cross-sectional view similar to FIG. 2 showing a hook and pile tape during separation;

FIG. 4 is a cross-sectional view similar to FIG. 2 showing a further form of protective tab having an extending engaging surface;

FIG. 5 is a view similar to FIG. 4 showing the protective tab in an engaged position;

FIG. 6 is a perspective view showing a further embodiment of my invention in which the marginal portion of a pocket flap serves as a protective tab.

As shown in FIG. 1, a tape assembly 10 is comprised of a single elongated strap 11 and a D-ring 12. The strap is formed of two lengths 13 and 14 of tape joined end to end to form an integral extended length of tape. A first length 13 of tape is looped around the D-ring 12 to hold the D-ring at one end thereof and a second length 14 of tape overlaps and is secured to the first length 13 of tape by means such as sewing or cementing to form a continuous extended strap. The first length 13 of tape has one surface defined by pile formed of a plurality of closely positioned loops, and the second length 14 of tape has one surface defined by a plurality of hooking elements. When joined, the two lengths of tape form a continuous strap surface of pile or hook. Of course, the hooking elements can be on the first length and the pile on the second length if found more desirable.

During use, the second length 14 of tape is passed through the D-ring 12 and folded back so that the surface defined by a plurality of hooking elements is placed in overlapping face-to-face contact with the first length 13 of tape having a surface defined by pile. In this manner, the adjacent tape portions of strap 11 interengage one another to secure the strap in the desired position.

A separate tab member 15 is secured to the second length 14 of tape on the side opposite that having a surface defined by a complementary gripping element. One end of tab 15 is made fast, for example by sewing or by an adhesive, while the opposite end freely overlies a marginal endmost portion of tape 14 and, if desired, extends beyond the endmost edge.

If it is desired to grip the end of the strap 11 in order to move the object bound therein or to adjust the strap relative to the bound object, or if a proximate object is inadvertently pushed against the exposed end of strap 11, the tab 15 will serve to protect the end of length 14 of tape from undesired peeling forces tending to separate the engaged fastening tapes.

The above-referred to protection is afforded by transferring those peeling forces which would normally act at the end of length 14 of tape to tab 15. As seen by FIG. 3, a force acting essentially normal to the end of length 14 of tape will cause the engaged gripping elements to peel apart. However, if the same force is transferred to the tab 15, it will be resolved into shearing components acting substantially parallel to the interfacial plane of engagement between the fastening tapes, which forces due to the nature of the fastening means will then be strongly resisted thus preventing separation of the tapes.

It is apparent that the longer the portion between the point at which tab 15 is affixed to the length 14 of tape and the endmost edge thereof, the greater will be the area over which the resolved components are distributed. It is, therefore, desirable not to have tab 15 affixed too close to the end of length 14 of tape.

FIGS. 4 and 5 disclose a second embodiment in which a portion of tab 15 extending beyond the endmost edge of length 14 of tape is faced with a complementary gripping surface so that tab 15 will generally be held flush with the engaged tapes. Only when the external peeling

force is great enough to separate this extending portion from the underlying coating surface will the peeling force be resolved into shearing components, as explained above, to resist further separation of the engaged tapes. The shear forces can be selectively adjusted by moving seam 2 to left or right.

FIG. 6 shows a further embodiment in which the protective tab is defined by the marginal portion 35 of a pocket flap 36. In this construction one of the complementary gripping elements, for example a length 33 of pile tape, is secured to the outer portion of a pocket 37 by sewing or other means. A coating complementary fastening means is contained on a length 34 of hook tape fastened to the underside of the pocket flap 36 so that a marginal portion of flap 36 is free from engagement with an endmost portion of length 34 of hook tape. In this manner, the marginal portion of the pocket flap 36 serves as a protective tab means.

An unintentional force applied to the pocket flap 36 such as might be caused by brushing against undergrowth or by the upwardly rushing air met by a parachutist or a pilot forced to eject from the airplane would apply a peeling force to the marginal portion of the pocket flap 36. This peeling force would, however, not be transferred to the edge of the underlying length 34 of hook tape thereby separating the fastening means, but instead the peeling force would be reduced to a shearing force acting along the plane of interengagement between the complementary gripping tapes and in this manner be dissipated. To easily lift the pocket flap 36 it is necessary to grasp the lower edge of the underlying length 34 of hook tape and peel it away from the cooperating length 33 of pile tape.

A further advantage of the above pocket construction is that when the pocket contains a safety device such as a water activated inflatable balloon, inflation of the balloon will create an internal pressure which, when acting on the upper portion of the pocket flap 36, will tend to push the flap outwardly thereby peeling the hook tape 34 away from the pile tape 33. If the upper edge of the length 34 of hook tape is secured to the flap 36 there will be no resolution of the separating force into the shearing forces and the pocket flap 36 will be released to free the inflating balloon by the relatively low inflation pressure of the balloon.

It is therefore seen that a pocket construction incorporating my peel resistant tape assembly will be protected from unintentional opening by external forces yet may be readily opened by an internal pressure.

While I have disclosed particular peel resistant tape assembly constructions, it is apparent that slight deviations from the constructions shown could be made and still utilize my invention, which is more particularly described in the appended claims.

I claim:

1. In a tape assembly of the type having complementary overlapping gripper type fasteners on individual portions thereof, one of said complementary fasteners being a plurality of hooks and the other a plurality of pile elements which when placed in overlapping face-to-face contact interengage and resist separation by forces substantially parallel to the interfacial plane of engagement between the portions and are readily separable by peeling forces applied substantially normal to said interfacial plane along an end of one of the engaged portions, the

improvement in combination therewith in means for resisting a peeling force applied to an endmost portion of the overlapping of said portions comprising a separate tab member secured to a side of said overlapping tape portion opposite the side faced with one of said complementary fasteners but free from engagement with a marginal endmost portion thereof so that a peeling force applied to said tab is converted into shearing forces along the engaged marginal end portion of the overlapping portion thereby resisting separation.

2. A tape assembly according to claim 1 wherein said tab member extends beyond the endmost edge of said overlapping tape portion.

3. A tape assembly according to claim 2 wherein a portion of said tab which extends beyond said endmost edge is faced with one of said complementary fasteners and overlaps and is engageable with a portion of the tape to hold the tab flush with the tape.

4. A tape assembly according to claim 1 having an elongated strap portion and a D-ring, said strap portion comprising a first length of tape looped around said D-ring to hold said D-ring at one end thereof and having one surface defined by a plurality of closely positioned pile-like loops, a second length of tape joined end to end with said first length of tape to form an integral length of tape having one surface defined by a plurality of hooking elements, said first and second lengths of tape forming adjacent complementary gripping surfaces for securing said strap upon the passing of said second length of tape through said D-ring and placed in interengaging face-to-face contact with said first length of tape, and a tab member secured at one end to said second length of tape on one side opposite said surface defined by a plurality of hooking elements and being free from engagement with a marginal endmost portion of said second length of tape so that peeling forces applied to said tab are converted into shearing forces along the interfacial plane of engagement between said lengths of complementary gripping tape thereby resisting separation.

5. A tape assembly according to claim 1 having a pocket portion and a pocket flap portion, said pocket portion having secured to its outer surface a first length of tape having one surface defined by a plurality of closely positioned pile-like loops and said pocket flap portion having secured to its underside a second length of tape having one surface defined by a plurality of hooking elements, said second length of tape being attached to said pocket flap wherein a marginal portion of said pocket flap freely overlies a marginal portion of said second length of tape to form a protective tap portion; said first and second lengths of tape forming complementary gripping surfaces for adjustably securing said pocket flaps to said pocket upon placing said first and second lengths of tape in face-to-face contact.

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