TEXTILE SEALING APPARATUS

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ABSTRACT
A water impermeable sealing apparatus usable in textile applications, the apparatus includes a first sealing strip having a base that includes a first set of fastener elements carried on its surface in two spaced-apart areas; and extending along the first surface of the base between the two areas of the first set of fastener elements, a first sealing element is protruding from said the base. A complimentary second sealing strip also includes a base comprising a second set of fastener elements on its surface in two spaced-apart areas; and extending along the surface of the base between the two areas of the second set of fastener elements, a second sealing element is protruding from the base for non-interlocking engagement of the first sealing element when the first and second fastener elements are engaged.
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CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a Continuation-in-Part of U.S. Non-Provisional Application Ser. No. 11/875,823 filed Oct. 19, 2007, and claims the benefit of priority thereto.

BACKGROUND OF INVENTION

[0002] This application relates generally to a sealing apparatus usable in textile applications. More specifically, this application relates to a sealing apparatus that can be applied to clothing, handbags, golf bags, coolers, etc. The sealing apparatus utilizes a combination of hook and loop type separable fastener elements and sealing elements such that when the apparatus is engaged, a water impermeable seal is created.

SUMMARY

[0003] Hook and loop style separable fasteners are well known and are used to join two members detachably to each other. Described herein is a textile sealing apparatus that combines the functionality of said fasteners with a sealing mechanism such that the apparatus is water impermeable. Application of the disclosed sealing apparatus to textile goods provides a simple waterproof seal, which can be utilized for various items with closeable openings such as pockets, bags, coolers, etc. The apparatus is of simple construction and can be used anywhere it is it is desirable to have a simple mechanism of creating a separable water impermeable seal.

[0004] In particular, this application discloses a water impermeable sealing apparatus usable in textile applications, the apparatus comprising: a first sealing strip having a base comprising a first and second surface wherein the base portion includes a first set of fastener elements carried on said first surface of said base in two spaced-apart areas; extending along the first surface of the base between the two areas of the first set of fastener elements, a first sealing element protruding from said first side of said base; a second sealing strip having a base comprising a first and second surface wherein the base portion includes a second set of fastener elements carried on said first surface of said base in two spaced-apart areas; and, extending along the first surface of the base between the two areas of the second set of fastener elements, a second sealing element protruding from said first side of said base for non-interlocking engagement of said first sealing element when the first and second fastener elements are engaged.

[0005] This application also discloses a water impermeable sealing apparatus usable in textile applications, the apparatus comprising: a first sealing strip having a base comprising a first and second surface wherein the base portion includes a first set of fastener elements carried on said first surface of said base in two spaced-apart areas; extending along the first surface of the base between the two areas of the first set of fastener elements, a first sealing element protruding from said first side of said base; a second sealing strip having a base comprising a first and second surface wherein the base portion includes a second set of fastener elements carried on said first surface of said base in two spaced-apart areas; and, extending along the first surface of the base between the two areas of the second set of fastener elements, a second sealing element protruding from said first side of said base for non-interlocking engagement of said first sealing element when the first and second fastener elements are engaged.

[0006] This application further discloses a water impermeable sealing apparatus usable in textile applications, the apparatus comprising: a first sealing strip having a base comprising a first and second surface wherein the base portion includes a first set of fastener elements carried on said first surface of said base in two spaced-apart areas; extending along the first surface of the base between the two areas of the first set of fastener elements, a first sealing element protruding from said first side of said base; a second sealing strip having a base comprising a first and second surface wherein the base portion includes a second set of fastener elements carried on said first surface of said base in two spaced-apart areas; extending along the first surface of the base between the two areas of the second set of fastener elements, a second sealing element protruding from said first side of said base for non-interlocking engagement of said first sealing element when the first and second fastener elements are engaged; wherein at least one of the first and second sealing elements are magnetic such that a force of attraction is generated when the first and second sealing strips are brought together; and, wherein the base portion of at least one of the sealing strips is water impermeable.

[0007] This application also discloses a sealing apparatus usable in textile applications, the apparatus comprising: a first sealing strip having an embedded region that is non-interlocking of said first sealing element when the first and second fastener elements are engaged; wherein the first sealing element is made of a compressible material and the second sealing surface is wedge shaped such that when the first and second sealing strips are engaged, the stepped surface of the second sealing surface compresses the material of the first sealing element thereby creating a continuous water impermeable seal between the first and second sealing elements; and, wherein the base portion of at least one of the sealing strips is water impermeable.

[0008] This application further discloses a sealing apparatus usable in textile applications, the apparatus comprising: an elastomeric first sealing strip having an embedded region that is non-interlocking of said first sealing element when the first and second fastener elements are engaged; wherein the first sealing element is made of a compressible material and the second sealing surface is wedge shaped such that when the first and second sealing strips are engaged, the stepped surface of the second sealing surface compresses the material of the first sealing element thereby creating a continuous water impermeable seal between the first and second sealing elements; and, wherein the base portion of at least one of the sealing strips is water impermeable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The drawings, when considered in connection with the following description, are presented for the purpose of facilitating an understanding of the subject matter sought to be protected.
FIG. 1 is a perspective view of a first embodiment of the textile sealing apparatus shown with the sealing strips separated;

FIG. 2 is a perspective view of the apparatus in FIG. 1 showing the two sealing strips engaged;

FIGS. 3-5 sequentially illustrate the engagement of the two sealing strips of the apparatus in FIG. 1;

FIG. 6 is a perspective view of a second embodiment of the textile sealing apparatus shown with the sealing strips separated;

FIG. 7 is a perspective view of the apparatus in FIG. 6 showing the two sealing strips engaged;

FIG. 8 is a perspective view of a third embodiment of the textile sealing apparatus shown with the sealing strips separated;

FIG. 9 is a perspective view of the apparatus in FIG. 8 showing the two sealing strips engaged;

FIGS. 10-12 sequentially illustrate the engagement of the two sealing strips of the apparatus in FIG. 8;

FIG. 13 is a perspective view of a further embodiment of the invention, with two sealing strips partly abutting and connected, and partly drawn away from one another.

FIG. 14 is a perspective view of one of the sealing strips of FIG. 13.

FIG. 15 is an end view of two opposed sealing strips according to a further embodiment of the invention, shown spaced apart from one another, and

FIG. 16 is an end view of two opposed sealing strips according to a still further embodiment of the invention, shown spaced apart from one another.

FIG. 17 is an end view of two opposing sealing strips according to yet another embodiment of the invention, shown spaced apart from one another.

FIG. 18 is an end view of two opposing sealing strips according to still another embodiment of the invention, shown spaced apart from one another.

FIG. 19 is an end view of two opposing sealing strips according to an additional embodiment of the invention, shown spaced apart from one another.

FIG. 20 is an end view of two opposing sealing strips according to yet another additional embodiment of the invention, shown spaced apart from one another.

DETAILED DESCRIPTION

FIGS. 1 and 2 show a first embodiment of the textile sealing apparatus 10 of the present invention. The device 10 includes a first sealing strip 12 and a second sealing strip 14, each including a base 16 with first 18 and second surfaces 20. The base portion 16 of the first sealing strip 12 includes a first set of fastener elements 22 carried on the first surface 18 in two spaced-apart areas. As shown, the first fastener elements 22 are comprised of loop 24 structures as is common in hook and loop fasteners. The base portion 16 of the second sealing strip 14 includes a second set of fastener elements 26 carried on the first surface 18 in two spaced-apart areas. The second fastener elements 26 are comprised of hook structures 28. It should be appreciated that the hook and loop structures may be located on the opposite strips and be equally effective. Further, besides the hook and loop fastener elements shown in the figures, many other loop or fiber engaging shapes may be used, such as mushrooms, palm trees, or canted spikes.

Extending along the first surface 18 of the base portions 16, between the two areas of the first 22 and second 26 sets of fastener elements, are first 30 and second 32 sealing elements. The sealing elements are fixably attached and protrude from the base portions 16. And in the first embodiment, are comprised of planer magnets 34. The magnets 34 are oriented such that the opposite poles face each other and a force of attraction is generated when the first 12 and second 14 sealing strips are brought together. Thus, when the first 12 and second 14 sealing strips are brought together, the first 22 and second 26 fastening elements, and more specifically the loop 24 and hook 28 portions, engage each other and the magnets 34 of the first 30 and second 32 sealing elements engage one another in a non-interlocking manner, such that a water impermeable seal 36 is created. As used herein, the term "non-interlocking" refers to a seal that is distinguishable from a seal that relies on the complementary pairing of male and female components such as with a "ZIPLOC" or similar interlocking devices. It should be appreciated that the apparatus may also utilize just one magnet on one of the sealing strips that may engage with a magnet attractive surface on the opposite sealing strip and still be effective in creating a seal.

To assist in the water impermeable nature of the apparatus 10, the sealing surface of the magnets are preferably covered with an elastomeric material 38 such as rubber, latex, silicon, or like material that is resiliently compressible under a given amount of pressure. The elastomeric material 38 on the surface of the magnets 34 is at least partially compressed when the sealing strips are pressed together during the initial sealing of the apparatus 10. The compression is maintained due to the fastener elements and sealing elements acting in cooperation when the sealing strips are engaged. See FIGS. 3-5. The elastomeric material can substantially cover the magnets as shown in FIGS. 1-5, completely cover, or, alternatively, it may be applied to just the sealing surface as shown in FIGS. 6 and 7. An additional means to increase the water impermeable nature of the apparatus 10 is utilize at least one water impermeable base portion 16. Alternatively, the second surface 20 of the base portion 16 may be bound to a water impermeable layer 40. Suitable water impermeable materials for the base 16 or layer 40 are well known in the art and include synthetic polymers.

Regarding the magnets 34 used in the sealing elements, it is contemplated by the inventors that they could be of various shapes and sizes. For example, cylindrical magnets if covered or encapsulated in an elastomeric material that is molded to create a surface that is substantially planar would be effective as a sealing element.

Referring now to FIGS. 8-12, shown therein is an additional embodiment of the textile sealing apparatus 10. In this embodiment, the structures described above are the same except of the sealing elements. In this embodiment, the sealing elements are comprised of a resilient compressible portion 42 and a wedge portion 44. As shown, the resilient compressible portion 42 extends along the first surface 18 of the base portion 16 of the first sealing strip 12, and more specifically, between the two areas of the first fastener element 22. Likewise, the wedge portion 44 extends along the first surface 18 of the base portion 16 of the second sealing strip 14, and more specifically, between the two areas of the second fastener element 26. In this embodiment, the sealing wedge portion 44 is protrudes from the base portion 16. Thus, when the first 12 and second 14 sealing strips are brought together, the first 22 and second 26 fastening elements engage each other. This in turn causes the wedge surface 44 of the second sealing surface to compresses the resilient portion 42 of the first sealing element, thereby cre-
ating a continuous water impermeable seal 36 in a non-interlocking manner. The compression of the resilient portion 42 and resultant water impermeable seal 36 is maintained due to the fastener elements holding the first 12 and second 14 sealing strips together. See FIGS. 10-12. The wedge portion 44 may be made of a relatively rigid material such as rubber, plastic or other polymer. The compressible portion 42 should be sufficiently compressible such that when the wedge portion 44 comes in contact with it during the engagement of the sealing strips, it deforms the compressible portion 42 to a degree so as to create the water impermeable seal 36. Examples of compressible materials include urethane foam, pliable rubber, and silicon. It will therefore be understood that reference to elastomeric and polymeric materials will encompass both essentially inorganic substances as well as organic substances and combinations of the two.

[0031] FIG. 13 shows an embodiment of the invention wherein magnetic attraction is employed to releasably connect a first elastomeric sealing strip 50 to a second elastomeric sealing strip 52. The first elastomeric sealing strip 50 and the second elastomeric sealing strip 52 collectively form a sealing apparatus 54 which, like the previously described sealing apparatuses such as the sealing apparatus 10, may be usable in for example textile applications.

[0032] The nature of the first and second elastomeric sealing strips 50, 52 will be made using the sealing strip 50 for illustration. The second elastomeric sealing strip 52 may be a mirror image of the first elastomeric sealing strip 50. The first elastomeric sealing strip 50 may comprise a first embedded region 56 embedded with a plurality of first magnets 58, 60 or alternatively with a plurality of first individual pieces of magnetic reactive material. It will be appreciated that if magnets are provided in one of the first elastomeric sealing strip 50 and the second elastomeric sealing strip 52, then the other need have only a magnet reactive material to assure operable magnetic attraction. It does not matter which of the first and second elastomeric sealing strips 50, 52 has magnets.

[0033] The first elastomeric sealing strip 50 comprises a first flanged portion 62 connected to and projecting from one side of the embedded region 56 and integral therewith, and a second flanged portion 64 connected to and projecting from the other side of the embedded region 56 and integral therewith. As depicted herein, projection of the first and second flanged portions 62, 64 is such that these first and second flanged portions may be (but are not necessarily) coplanar and in mirror image arrangement. Because of this mirror image relationship, it may be said that the first elastomeric sealing strip 50 has a first footprint area which would correspond to the plan view that would be observed for example from above in FIG. 13 if the first elastomeric sealing strip 50 were laid out flat and viewed in plan, and the second elastomeric sealing strip 52 has a corresponding and similar second footprint area equal in width to that of the first footprint area.

[0034] The first elastomeric sealing strip 50 releasably connects to the second elastomeric sealing strip 52 when the respective magnetic members, which may be magnets or magnetic reactive materials, come into sufficient proximity such that magnetic attraction ensues. The embedded region 56 and its counterpart embedded region 66 of the second elastomeric sealing strip 52 have respective contact surfaces 68, 70, which due to the resilient or compressible nature of their constituent material, form sealing surfaces when the first and second elastomeric sealing strips 50, 52 are magnetically adhered to one another.

[0035] To this end, each one of the first magnets 58, 60 (or first individual pieces of magnetic reactive material) is located along the first elastomeric sealing strip 50 such that it comes into mutual magnetic attraction with one of the second magnets 72, 74 (or second individual pieces of magnetic reactive material) when the first elastomeric sealing strip 50 is placed in longitudinal abutment with the second elastomeric sealing strip 52, and wherein a magnetic force of attraction is generated between the first elastomeric sealing strip 50 and the second elastomeric sealing strip 52, thereby creating the seal.

[0036] FIG. 14 shows an elastomeric sealing strip, such as the elastomeric sealing strip 52 isolated from its opposed counterpart. It will be seen that a flanged portion 76 of the elastomeric sealing strip 52 is tapered such that its thickness (represented by the arrow 78 at one illustrative point along the flanged portion 76) progressively decreases with increasing distance from the center of the elastomeric sealing strip 52. The center, for purposes of determining increasing distance from the center, is represented by the projection line 80. Increasing distances to the right and to the left of the projection line are indicated by the arrows 82 and 84. The other flanged portion 86 displays similar characteristics albeit in mirror image. Again, recalling that the corresponding mating elastomeric sealing strip, such as the elastomeric sealing strip 50, may be a mirror image, the same characteristics may be present.

[0037] It should be mentioned at this point that in FIGS. 13 and 14, magnets or the like, such as the magnets 58, 60, 72, 74 in FIG. 13, which are shown in broken lines, are so shown merely to emphasize that they are embedded within their associated sealing strips, such as the sealing strips 50, 52. Because the constituent material of the sealing strips may be opaque, translucent, or transparent, the broken line rendering of these magnets or the like should not be taken to support a conclusion that they are literally concealed from view in their respective sealing strips.

[0038] FIG. 15 shows another embodiment of the invention wherein flanged portions 88, 90, 92, 94 of two corresponding, mutually mating elastomeric sealing strips 96, 98 are not tapered. Magnets 100, 102 (or corresponding magnetic reactive materials) are seen in this end view of the elastomeric sealing strips 96 and 98.

[0039] FIG. 16 shows a further embodiment of the invention wherein two corresponding, mutually mating elastomeric sealing strips 110, 112 have respective embedded regions 114, 116 which are adapted to interfit. Each embedded region 114 or 116 has a plurality of magnets 118 or 120 (or corresponding magnetic reactive materials). The embedded region 114 has a downwardly facing surface 122 (as seen in FIG. 16) which displays concavity. The embedded region 116 has a corresponding upwardly facing surface 124 (as seen in FIG. 16) which displays convexity which interfittingly cooperates with the concavity of the embedded region 114. The individual faces of the downwardly facing surface 122 and of the upwardly facing surface 124 are flat or planar, although this may be modified as desired. As is clearly shown in FIG. 16, each one of the magnets 118 and 120, and of those which are concealed behind the magnets 118 and 120, is contained within its respective embedded region 114 or 116. Each one of the magnets 118 is centered within the concavity of the elastomeric sealing strip 110, and each one of the magnets 120 and those magnets (or magnetic reactive materials) concealed therebehind in the view of FIG. 16 is centered
within the convexity of the elastomeric sealing strip 112. A centerline 126 is shown for purposes of determining these centered relationships.

[0040] It may be observed at this point that in the embodiments of FIGS. 13-16, there may be a one-to-one correspondence between each one of the magnets or individual pieces of magnetic reactive material of one sealing strip, such as the magnets 58 and 60 of the sealing strip 50 of FIG. 13, and each one of the magnets or second individual pieces of magnetic reactive material of the opposed sealing strip, such as the magnets or magnetic reactive materials 72, 74 of the sealing strip 52 in FIG. 13. It will be appreciated that one-to-one correspondence maximizes magnetic attraction while minimizing the number of embedded magnets or magnetic reactive materials. However, it would be possible to deviate from this concept. For example, a series of magnets may be provided in one sealing strip, while providing a continuous strip of magnetic reactive material in the corresponding sealing strip.

[0041] FIG. 17 shows that the characteristics of a sealing strip, such as the sealing strip 132, may display the characteristics for example of a sealing strip of the embodiments of FIGS. 13-15, while also having supplementary fastening elements such as the fastening elements 134 and 136 which may for example have the characteristics of the fastening elements 22 and 26 of the embodiment of FIG. 1, as well as magnets (or magnetic reactive materials) 138, 140.

[0042] FIG. 18 shows that the characteristics of a sealing strip, such as the sealing strips 150 and 152, may display the characteristics for example of a sealing strip of the embodiment of FIG. 16, while also having supplementary fastening elements such as the fastening elements 154 and 156 which may for example have the characteristics of the fastening elements 22 and 26 of the embodiment of FIG. 1, as well as magnets (or magnetic reactive materials) 158, 160. In the embodiment of FIG. 18, the sealing strips 150 and 152 may display the respective concavity and convexity of the sealing strips 110, 112 of FIG. 16.

[0043] FIG. 19 shows that two complementing sealing strips may have characteristics of previously described embodiments, while lacking flanged portions. For example, first and second elastomeric sealing strips 170, 172 may have respective embedded regions 174, 176 containing magnets 178, 180, as seen in the embodiment of FIG. 15, but which first and second elastomeric sealing strips 170, 172 lack flanged portions such as the flanged portions 88, 99, 92, 94 of FIG. 15.

[0044] In a similar vein, and referring to FIG. 20, two complementing sealing strips 190, 192 may display concavity and convexity in the manner of the embodiment of FIG. 16, and may essentially duplicate the structure disclosed for the embodiment of FIG. 16, while lacking flanged portions.

[0045] While the present disclosure has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this disclosure is not limited to the disclosed embodiments, but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements. For example, it is further contemplated by the inventors that the addition of multiple fastener elements and sealing elements to a given sealing apparatus would only increase the water impermeability of the apparatus. Thus, a sealing apparatus that increase the number of sealing elements and/or fastener elements should be treated as an equivalent to the apparatus described above and, therefore; would fall under the broadest interpretation of the following claims.

What is claimed is:

1. A sealing apparatus usable in textile applications, the apparatus comprising:
   a first sealing strip having an embedded region embedded with at least one magnet or at least one magnet reactive material;
   a second sealing strip having an embedded region embedded with at least one magnet or at least one magnet reactive material;
   wherein a magnetic force of attraction is generated between the first sealing strip and the second sealing strip when the first and second sealing strips are brought together, thereby creating a seal.

2. The apparatus of claim 1 wherein the first and second sealing strips further comprise flanged portions to each side of the embedded regions.

3. The apparatus of claim 2 wherein the first sealing strips are made of an elastomeric material and the flanged portions are integral with said embedded regions.

4. The apparatus of claim 2 wherein the flanged portions of said first and second sealing elements further comprise fastener elements carried on each side of said embedded regions, such that when the first sealing strip and the second sealing strips are brought together, the fastener elements engage one another.

5. The apparatus of claim 4 wherein the fastener elements comprise hooks and hook-engageable fibers.

6. The apparatus of claim 1, wherein the first and second sealing strips are made of an elastomeric material.

7. The apparatus of claim 1, wherein the embedded region of one of the first sealing strip and the second sealing strip displays concavity, and the embedded region of the other one of the first sealing strip and the second sealing strip displays convexity which interfits with the concavity.

8. A sealing apparatus usable in textile applications, the apparatus comprising: an elastomeric first sealing strip having
   an embedded region embedded with at least one magnet or at least one magnet reactive material;
   flanged portions to each side of the embedded region and integral with said embedded region;
   fastener elements carried on said flanged portions on each side of said embedded region,
   an elastomeric second sealing strip having
   an embedded region embedded with at least one magnet or at least one magnet reactive material;
   flanged portions to each side of the embedded region and integral with said embedded region;
   fastener elements carried on said flanged portions on each side of said embedded region;
   wherein a magnetic force of attraction is generated between the first sealing strip and the second sealing strip when the first and second sealing strips are brought together, thereby creating a seal; and,
   wherein when the first sealing strip and the second sealing strips are brought together, the fastener elements engage one another.
9. A sealing apparatus usable in textile applications, the apparatus comprising:

an first elastomeric sealing strip having

a first embedded region embedded with a plurality of first magnets or with a plurality of first individual pieces of magnetic reactive material, and a first flanged portion connected to and projecting from one side of the embedded region and integral with said embedded region; and a second flanged portion connected to and projecting from the other side of the embedded region and integral with said embedded region;

a second elastomeric sealing strip having

a second embedded region embedded with a plurality of second magnets or with a plurality of second individual pieces of magnetic reactive material, and a third flanged portion connected to and projecting from one side of the embedded region and integral with said embedded region, and a fourth flanged portion connected to and projecting from the other side of the embedded region and integral with said embedded region; and

wherein each one of the first magnets or first individual pieces of magnetic reactive material is located along the first sealing strip such that it comes into mutual magnetic attraction with one of the second magnets or second individual pieces of magnetic reactive material when the first elastomeric sealing strip is placed in longitudinal abutment with the second elastomeric sealing strip, and wherein a magnetic force of attraction is generated between the first elastomeric sealing strip and the second elastomeric sealing strip, thereby creating a seal.

10. The sealing apparatus of claim 9, wherein the first elastomeric sealing strip has a first footprint area, and the second elastomeric sealing strip has a second footprint area equal in width to that of the first footprint area.

11. The sealing apparatus of claim 9, wherein the first embedded region has concavity, and the second embedded region has convexity which interfittingly cooperates with the concavity of the first embedded region.

12. The sealing apparatus of claim 11, wherein the first embedded region has flat surfaces at its concavity, and the second embedded region has flat surfaces at its convexity.

13. The sealing apparatus of claim 11, wherein each one of the first magnets or the first individual pieces of magnet reactive material is contained within the first embedded region is centered within the concavity of the first elastomeric sealing strip, and wherein each one of the second magnets or the second individual pieces of magnet reactive material is centered within the convexity of the second elastomeric sealing strip.

14. The sealing apparatus of claim 9, wherein there is one-to-one correspondence between each one of the first magnets or first individual pieces of magnetic reactive material and each one of the second magnets or second individual pieces of magnetic reactive material.

15. The sealing apparatus of claim 9, wherein the first flanged portion is tapered such that its thickness progressively decreases with increasing distance from the center of the first elastomeric sealing strip and the second flanged portion is tapered such that its thickness progressively decreases with increasing distance from the center of the first elastomeric sealing strip, and

the third flanged portion is tapered such that its thickness progressively decreases with increasing distance from the center of the second elastomeric sealing strip and the fourth flanged portion is tapered such that its thickness progressively decreases with increasing distance from the center of the second elastomeric sealing strip.

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