Airtight waterproof zipper, method for mounting the same, and article incorporating the same.

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Abstract
A fluid resistant article which includes a panel portion formed of a flexible fluid resistant material having a first side surface and an opposite second side surface where the panel portion has an elongate opening formed therethrough. The article also includes a fluid resistant zipper including a zipper tape supporting a pair of first teeth and a set of second teeth that are engagable and disengagable with one another to define an opening state and a closed state. The zipper tape is secured in a substantially sealed manner to a margin area of the panel portion adjacent to the elongate opening. There is also at least one finger hold disposed proximate to one of the zipper and configured for engagement by a user's finger to assist operating the zipper.
AIRIGHT WATERPROOF ZIPPER, METHOD FOR MOUNTING THE SAME, AND ARTICLE INCORPORATING THE SAME

BACKGROUND

[0001] Zippers have been in use since at least 1851 when Elias Howe patented the first variant of the zipper in the United States (U.S. Pat. No. 8,540). Since then zippers have been used in a wide variety of applications including duffel bags, tents, boots, sleeping bags, clothing such as jeans, or anywhere that two edges of fabric need to be temporarily joined.

[0002] Zipper inventors and manufacturers alike deserve a great deal of credit for their innovative designs and creative applications of the zipper. These efforts have made the zipper an extremely useful and versatile device that is used in hundreds of different applications. However, there remains room for further improvements in the application of zippers, especially as zipper technology evolves. For example, waterproof/airtight zippers such as those available from various zipper manufacturers present new challenges to waterproof/airtight garment and product designers. One of the challenges associated with waterproof/airtight zippers has to do with the environment in which the zipper is intended to be used. Specifically, the waterproof/airtight zipper is intended to be used in a fluidic environment and thus the garment or product designer is challenged with how to seal the zipper into the article to be sealed. For example, waterproof/airtight zippers are ideal for use in waterproof duffel bags, dry suits used for scuba diving, and waders and boots used for fishing. The designer cannot simply sew the zipper into the product and achieve a waterproof/airtight seal. A more robust and reliable seal is needed.

[0003] Waterproof/airtight zippers pose an additional challenge to designers of waterproof/airtight articles. Most waterproof/airtight zippers by their design require a larger than normal amount of force to operate the zipper in either direction when compared with a conventional zipper. The amount of force required to operate a waterproof/airtight zipper is significantly greater than that which garment materials and mounting methods are normally designed to handle. The stress and strain resulting from the operating force of the waterproof/airtight zipper can cause the garment material to eventually tear. Similarly, the repetitive stress applied to the juncture between the zipper and garment can fatigue the seal between the zipper and the garment resulting in leaks.

[0004] Accordingly, there remains a need to provide a new and improved method for sealing a waterproof/airtight zipper to a garment or product. In addition, there remains a need for an improved zipper that reduces the strain placed on the seam between a waterproof/airtight zipper and the material to which it is mounted. The improved waterproof/airtight zipper and mounting method described herein are directed to meeting these needs.

SUMMARY

[0005] Provided is an improved airtight/waterproof zipper and method for mounting the same. A fluid-resistant article, which incorporates the zipper and method is also disclosed. The fluid-resistant article is comprised of a panel portion formed from a flexible fluid-resistant material that has a first side surface and an opposite second side. An elongate opening is formed in the panel portion in order to provide access to the interior of the fluid-resistant article. The fluid-resistant zipper, which includes a zipper tape supporting a set of first teeth and a set of second teeth that are engageable and disengageable with one another, is secured and sealed to a margin area of the panel portion adjacent to the elongate opening. At least one fingerhold is disposed proximate to one end of the zipper and is configured for engagement by the finger of a user in order to assist the user in operating the zipper.

[0006] The fluid-resistant article may also include an elongate flap, which covers the zipper on one of the sides of the zipper. In a preferred embodiment of the fluid-resistant article, a zipper tape and an edge margin of the flap are located on the interior of the article. The fingerholds may be formed integrally with the flap. For instance, the flap may be formed with a generally rectangular piece of material, having first and second long edges and a pair of transverse short edges extending therebetween and intersecting along the long edges to define corners. These corner portions may be folded over to form fingerholds. The flap may be constructed of polypropylene, nylon, or the like. The zipper and the flap may also be stitched to the material around the perimeter margin of the elongate opening. In order to seal the stitching, a heat-activated tape may be used on the interior of the article. The fluid-resistant article may be of any type of article, which resists a fluid such as liquid or gas. Some examples of such a fluid resistant article are hazardous material suits, fire suits, dry suits, dry bags, dive suits, waders, space suits, tents, shipping packages, household storage bags, map cases, chart cases, kayaks, skirts, backpack covers, computer cases, electronic device cases, watercraft containers, inflatable cases, flotation bags, flotation devices, waterproof pockets, fishing vest pockets, smell-proof pockets, wetsuits, jackets, sleeping bags, rain gear, boots, kayak jackets, wind breakers, and wind proof fleeces.

[0007] Also contemplated, is a garment for use in a fluidic environment that can be worn by a wearer who has a torso and a central medial axis. The garment body is formed of a fluid-resistant material, which has a trunk portion and extends around at least some of the trunk of the wearer when in a worn state. A fluid-resistant zipper is disposed on the garment such that it is in generally transverse orientation relative the wearer’s central medial axis. The fluid-resistant zipper, includes a zipper tape supporting a set of first teeth and a set of second teeth, which are engageable and disengageable with one another thereby to define an open state and a closed state. The garment may also include at least one fingerhold, which is disposed near one end of the zipper and configured for engagement by a user’s finger to assist operating the zipper.

[0008] The garment may also include an elongate flap, which is covering the zipper on the exterior side of the garment. In addition, the fingerhold may be formed integrally with the flap. The trunk portion of the garment may be adapted to extend around the waist of the wearer and include a crotch portion with a pair of leg portions extending therefrom, such as in the case of a pair of pants or shorts. In this case the zipper may be disposed proximate the crotch portion of the garment. The trunk portion of the garment may also be adapted to extend around the chest of the wearer such as a vest, jacket, or shirt.

[0009] Also contemplated is a method for mounting a fluid-resistant zipper in an article, which has a panel portion formed of a flexible, fluid resistant material. The method is comprised of forming an elongate opening through the panel and securing a fluid-resistant zipper in a substantially sealed manner to a margin area of the panel portion. The zipper is secured adjacent to the elongate opening. At least one
fingerhold is disposed proximate an end of the zipper whereby a user can engage the fingerhold when operating the zipper. The zipper and the fingerhold are stitched around a perimeter margin of the elongate opening. The stitching may be subsequently sealed with an appropriate sealing tape or glue. The method may further include disposing an elongate flap for covering zipper on a side thereof corresponding to one of the first and second side surfaces.

[0010] It should be understood that an improvement to a garment adapted for use in a fluidic environment is also contemplated. In a garment adapted for use in a fluidic environment which has a trunk portion with a central medial axis and that is adapted to extend around at least some of the torso of the wearer, the improvement is comprised of a fluid-resistant zipper that includes a zipper tape supporting a set of first teeth and a set of second teeth engageable and disengageable with one another thereby to define an open state and a closed state. In the improvement, the zipper is disposed on the garment in a generally transverse orientation to the central medial axis.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 illustrates a waterproof/airtight zipper, according to an exemplary embodiment of the present invention, in a partially open state that includes strain relief pull loops according to a first exemplary embodiment;

[0012] FIG. 2 is a partial exploded view of the zipper assembly depicted in FIG. 1;

[0013] FIG. 3A illustrates the uniformed strain relief loop shown in FIGS. 1 and 2;

[0014] FIG. 3B shows the first step in the process of forming the strain relief loop as shown in FIGS. 1 and 2;

[0015] FIG. 3C shows the second and final step in forming the strain relief loop as shown in FIGS. 1 and 2;

[0016] FIG. 4 is an exploded view of the mounted zipper assembly, which illustrates a method of mounting a waterproof/airtight zipper into a panel portion of an article of manufacture;

[0017] FIG. 5A illustrates the waterproof/airtight zipper of FIG. 4 in the mounted state on a panel portion where an article of manufacture is shown in phantom;

[0018] FIG. 5B is similar to FIG. 5A, which illustrates the waterproof/airtight zipper of FIG. 4 in the mounted state, but where panel portion of the article of manufacture is shown solid;

[0019] FIG. 6 illustrates the primary tape seal that was introduced in FIG. 4;

[0020] FIG. 7 illustrates the covering tape seal as was introduced in FIG. 4;

[0021] FIG. 8 is a cross section of the zipper assembly in the mounted state as shown about lines 8-8 in FIG. 5B;

[0022] FIG. 9 illustrates the zipper assembly mounted into a garment, here shown as a pair of waders, in a vertical orientation;

[0023] FIG. 10 illustrates a second exemplary embodiment of a waterproof/airtight zipper according to the present invention, which is mounted into a pair of waders in a horizontal orientation;

[0024] FIG. 11 is an exploded view of the waterproof/airtight zipper assembly shown in FIG. 10, which illustrates another method of mounting a waterproof/airtight zipper into a panel of material;

[0025] FIG. 12 illustrates the waterproof/airtight zipper assembly of FIG. 11 in the mounted state; and

[0026] FIG. 13 is a cross section of the zipper assembly in the mounted state as shown about lines 13-13 in FIG. 12.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0027] FIG. 1 illustrates a waterproof/airtight zipper 10 according to an exemplary embodiment of the present invention that includes many of the features of a standard waterproof/airtight zipper, such as zipper tape 14 with a plurality of engagement teeth 12 disposed along an opening formed in the zipper tape 14 with the addition of a pair of strain relief loops 20 according to the present invention. Engagement teeth 12 are engaged and disengaged through the use of slider 11. Slider 11 is disposed along zipper engagement teeth 12 on one side of the zipper tape 14, which is herein defined as the slider side of the zipper. Typically the slider side of the zipper is the side that is exposed to the fluidic environment against which the zipper is intended to seal. For convenience and consistency, this is the convention used in this application. However, it should be noted that the zipper may be oriented with the slider side of the zipper facing away from the fluidic environment depending on the application. FIG. 1 shows waterproof/airtight zipper 10 in a partially opened state. When the zipper is in the fully opened state slider 11 is located at the open end 17 of the zipper 10. Conversely, when the zipper is in the fully closed state, slider 11 is positioned at the closed end 16. The detailed construction of standard waterproof zippers are known in the art and are described in various patents, such as U.S. Pat. No. 6,681,455 to Ichikawa which is incorporated herein by reference. Zipper 10 may be constructed with plastic or metal teeth as is known in the art. Waterproof/airtight zippers are available from various manufacturers such as for example YKK Corporation of America, Tizip Vertriebs GmbH (Tizip®), and Riri USA Inc.

[0028] According to the exemplary embodiment of the present invention the existing waterproof/airtight zipper is improved by adding strain relief loops 20. In this embodiment, strain relief loops 20 are attached to the zipper tape 14 on both ends of the zipper opening. It should be understood that attaching only one strain relief loop to either end of the zipper is also contemplated. As illustrated, loops 20 are positioned in close proximity to both the closed end 16 and open end 17 of the zipper 10. Strain relief loops 20 provide a convenient grip or fingerhold for exerting an opposing force that counteracts the force applied to slider 11 via pull-tab 13. By providing the opposing force through strain relief loop 20 directly to the zipper tape 14, the pulling force associated with operating the zipper is isolated to the construction of zipper 10, which is designed to handle such stresses. This arrangement prevents the stresses associated with operating zipper 10 from being transferred to the panel portion 100 in which the zipper 10 is mounted. The more closely strain relief loops 20 are mounted to ends 16 and 17 of the zipper, the greater the effectiveness of the strain relief.

[0029] Use of strain relief loops 20 disclosed herein is a substantial improvement to standard waterproof/airtight zippers. It has been found in practice that conventional waterproof zippers transfer enough force to the material in which the zipper is mounted to tear the material. Also, where stitching is used to mount the zipper, the force transferred is sufficient to break the stitching. Finally, where the zipper is mounted with adhesive, repeated operation of the zipper can delaminate the materials as well as break the adhesive joint.

[0030] With reference to FIG. 2, zipper 10 is shown in a partially exploded state in order to more clearly illustrate the attachment of strain relief loops 20. Strain relief loop 20 is
a substantially elongated rectangular piece of webbing 21 (see FIGS. 3A-C). The webbing may be formed from nylon, polypropylene, or the like. The loop is formed by bending webbing 21 in a half loop, which is then attached to zipper tape 14. As shown in FIG. 2, the strain relief loop 20 is attached to zipper tape 14 with stitching 24. As illustrated, stitching 24 is configured in a series of box patterns. As can be seen in FIG. 2, the box patterns consist of a rectangular or square shaped outline of stitching with diagonal stitching extending from opposite corners. This configuration is typically known as box stitching. Zipper tape 14 is typically constructed from a waterproof/airtight material. In order to help maintain the waterproof/airtight integrity of the zipper tape 14 where stitching 24 penetrates the tape, an adhesive material 22 may be disposed between strain relief loops 20 and zipper tape 14. Adhesive material 22 may be glue, adhesive tape, or another appropriate material for sealing stitching 24. Adhesive material 22 may also provide a convenient means to hold strain relief loop 20 in place while stitching 24 is applied.

[0031] FIGS. 3A-3C illustrate the formation of strain relief loop 20 as depicted in FIGS. 1 and 2. The first step in forming the strain relief loop 20 is to take webbing 21 and fold end 26 along fold line 23 into the page, which thereby results in the configuration as shown in FIG. 3B. The second step in forming the strain relief loop 20 is to fold second end 27 of webbing 21 along fold line 25 into the page, which results in the final configuration as shown in FIG. 3C.

[0032] FIG. 4 is an exploded view depicting the mounting of zipper assembly 30 according to the broadest embodiment of the present invention. Zipper assembly 30 comprises of a primary tape seal 40, a covering tape seal 50, and the waterproof/airtight zipper 10, which is mounted to panel portion 100. Panel portion 100 is a waterproof/airtight material typically used in garments and waterproof products. Primary seal 40 and covering seal 50 are constructed of sealing tape, which is a heat activated waterproof/airtight sealing material that acts to bond materials together while remaining flexible. Such sealing tape is known in the art and is available from manufacturers such as W. L. Gore & Associates, Inc. marketed under the trademark GoreTex®. As can be seen with reference to FIGS. 4 and 8, primary tape seal 40 is interposed between waterproof zipper 10 and the panel portion 100. Both panel portion 100 and primary tape seal 40 have an opening 102 and 42 respectively. Openings 102 and 42 are sized and configured such that the engagement teeth 12, slider 11, and strain relief loops 20 protrude through openings 102 and 42. Primary tape seal 40 acts to bond the slider side of zipper tape 14 to the dry side 107 of the panel portion 100. Primary tape seal 40 acts as a primary seal between the zipper 10 and the panel portion 100. This primary seal is, by itself, sufficient to seal the zipper assembly 10 to the material 100. Once the zipper 10 has been bonded to the panel portion 100 with primary tape seal 40, covering seal 50 may be applied in order to sandwich zipper 10 and primary tape seal 40 between panel portion 100 and covering tape seal 50. Covering tape seal 50 provides a secondary seal to ensure that no leakage occurs. Covering tape seal 50 includes an opening 52 to allow access through zipper 10 when the zipper is in the open state. The layering of the tape seals in relation to zipper 10 and panel portion 100 can be better understood with reference to FIG. 8. In order to activate the seals and thereby bond and seal zipper 10 to the panel portion 100, heat is applied to the layers with a heat-sealing press. The Crossover Sealer from Geo Knight & Co., Inc. is a suitable heat-sealing press. The seals are heated to between 250° and 400° Fahrenheit for a period of 1 to 10 seconds. Primary and covering seals 40 and 50 may be bonded in sequence or concurrently.

[0033] FIGS. 5A and 5B depict the zipper assembly 30 in its mounted state. Panel portion 100 is shown in phantom in FIG. 5A to show the assembled components of the zipper assembly 30 - zipper 10, primary tape seal 40, and covering tape seal 50. Turning to FIG. 5B, it can be seen that only the slider 11, engagement teeth 12, and strain relief loops 20 protrude through opening 102. It should be noted that the slider 11 and engagement teeth 12 protrude through the wet side 105, that is the exterior, of panel portion 100, whereas the sealing structures, specifically, primary and covering tape seals 40 and 50 respectively are contained on the dry side 107, that is the interior, of the panel portion 100.

[0034] Now turning to FIGS. 6 and 8, primary seal 40 will now be discussed in more detail. Primary seal 40 has a length L1 and a width W1. These dimensions should substantially match the length and width of zipper tape 14. Primary seal 40 may also be formed with chamfers 44. Opening 42 is sized and configured to allow the zipper slide 11, engagement teeth 12, and strain relief loops 20 to protrude through the opening. Opening 42 has a length L2 and a width Y1. Width Y1 is selected so as to allow the zipper and slide 11 to operate freely. On the ends of opening 42 are triangular openings with a width X2 and formed with an acute angle “a”. These triangular portions of opening 42 allow strain relief loops 20 to protrude through the opening 42. Accordingly, width X2 of opening 42 matches dimension X1 of the strain relief loop as shown in FIG. 3C. It should be noted that this method of mounting a waterproof zipper does not necessarily have to include an opening of this exact configuration.

[0035] FIGS. 7 and 8 show detail of covering tape seal 50. Covering tape seal 50 has an overall length L3 and a width W2. Preferably, the length L3 and width W2 of covering tape seal 50 are larger than the length L1 and width W1 of primary seal 40. Covering seal 50 being larger than primary seal 40 allows for covering seal 50 to overlap the edges of primary seal 40 with overlap region 55 thereby providing a secondary or back up seal (see FIG. 8). Opening 52 has a length L4 and a width Y2. Length L4 is equal to the length of the opening in zipper 15. Width Y2 need only be large enough to provide access into the garment or article when the zipper is in the open position.

[0036] FIG. 9 illustrates the zipper assembly 30 mounted proximate to the crotch area 62 of wader 60. Axis A represents the central medial axis of the wearer of wader 60. In this construction the zipper assembly 30 is mounted in a vertical orientation relative to axis A, which is the convention for zippers in garments. FIG. 10 illustrates a second exemplary embodiment of a waterproof/airtight zipper 230 according to the present invention, which is mounted into wader 260 in a horizontal or transverse orientation relative to axis A’. It has been found in practice that horizontally orienting the zipper assembly 230 results in some unexpected advantages. For example, when one bends over or sits down the zipper 230 is oriented generally parallel with the folds that naturally occur in the wader 260. A vertically oriented zipper is perpendicular to these folds and resists the wearer’s movement. A horizontally oriented zipper 230 allows more freedom of movement and puts less stress on the zipper that could result in leaking. Horizontally orienting the zipper also has the advantage of opening more readily. The weight of a wader pulling down against the suspenders tends to cause a vertically oriented zipper to remain closed. On the other hand, the weight of the waders has an advan-
tagorous tendency to cause a horizontally oriented zipper to open, thereby allowing ready access to the interior of the garment or waders.

In a second exemplary embodiment of the present invention, as illustrated in FIG. 11, it can be seen that the zipper assembly 230 includes a flap 240. Flap 240 provides protection for the zipper 210. The protection afforded by flap 240 is particularly useful where the zipper assembly 230 is incorporated into fishing waders 260 as shown in FIG. 10, because flap 240 prevents fishing line from tangling with the zipper teeth 212, slider 211, or pull tab 215. Flap 240 may be constructed from polypropylene or nylon material or the like. Flap 240 also provides finger pockets 220, which provide a convenient fingerhold for exerting an opposing force that counteracts the force applied to slider 211 via pull-tab 215. Pockets 220 are formed by folding under the corners 242 of flap 240 prior to assembly as shown in FIG. 11.

The construction of zipper assembly 230 is best shown in FIGS. 11 and 13. FIG. 11 is an exploded view depicting the mounting of zipper assembly 230 according to the method of the second exemplary embodiment of the present invention. Zipper assembly 230 is comprised of a flap 240, a covering tape seal 250, and a waterproof/airtight zipper 210, which is mounted by gluing and stitching the components to panel portion 200. Panel portion 200 is any waterproof/airtight material typically used in garments and waterproof products such as a wader. For example, the wader material may be a breathable material, such as those available from Gore-Tex® or a neoprene material, to name a few. With reference to FIGS. 11, 12, and 13, waterproof zipper 210 is adhered to the dry side 207 of panel portion 200 with suitable glue 270 applied to the slider side of waterproof zipper 210. One such suitable glue is Aquaseal® marketed by McNett™ Corporation. Also, Cotol-240™ marketed by McNett™ Corporation may be used to accelerate the curing process. Flap 240 is assembled on one side of opening 202 between zipper tape 214 and waterproof material 200. It should be noted that in this embodiment the edge margin 203 of opening 202 is rolled under to provide a finished edge. The glue 270 may be applied as a liquid or as double-sided tape. After the zipper 210 and flap 240 are glued in position, they are stitched 275 around the perimeter of opening 202 to secure the zipper 210 and flap 240 to the panel portion 200. Once the zipper 210 and flap 240 have been bonded to the panel portion 200 with glue 270 and stitched 275, covering seal 250 may be applied in order to seal stitching 275. Covering seal 250 may be constructed of Gore-Tex® sealing tape as described above. Covering tape seal 250 includes an opening 252 to allow access through zipper 210 when the zipper is in the opened state. The layering of the flap 240 and tape seal 250 in relation to zipper 210 and panel portion 200 can be better understood with reference to FIG. 13. In order to activate the seals and glue to thereby bond and seal zipper 210 to the panel portion 200, heat is applied to covering seal 250 with a heat-sealing press as described above.

Accordingly, the article, zipper, and method have been described with some degree of particularity directed to the exemplary embodiments. It should be appreciated, though, that modifications or changes may be made to the exemplary embodiment without departing from the concepts contained herein.

1. A fluid-resistant article, comprising:
   A. a panel portion formed of a flexible fluid-resistant material having a first side surface and an opposite second side surface, said panel portion having an elongate opening formed therethrough;
   B. a fluid-resistant zipper including a zipper tape supporting a set of first teeth and a set of second teeth engageable and disengageable with one another thereby to define an open state and closed state, said zipper tape secured in a substantially sealed manner to a margin area of said panel portion adjacent to the elongate opening; and
   C. at least one first fingerhold disposed proximate to one end of said zipper and configured for engagement by a user’s finger to assist operating said zipper.

2. A fluid-resistant article according to claim 1 further comprising an elongate flap covering said zipper on a side thereof corresponding to one of said first and second side surfaces.

3. A fluid-resistant article according to claim 2 wherein said article has an interior, said tape and an edge margin of said flap are located interiorly of said article.

4. A fluid-resistant article according to claim 2 wherein said fingerhold is formed integrally with said flap.

5. A fluid-resistant article according to claim 4 wherein said flap is formed from a generally rectangular piece of material having first and second long edges and a pair of transverse short edges extending therebetween and intersecting the long edges to define corners and wherein a corner portion of said piece being folded over thereby to form said fingerhold.

6. A fluid-resistant article according to claim 2 wherein said flap is constructed of polypropylene.

7. A fluid-resistant article according to claim 2 wherein said zipper and said flap are stitched to said material around a perimeter margin of said elongate opening.

8. A fluid-resistant article according to claim 7 wherein said stitching is sealed with heat activated tape.

9. A fluid-resistant article according to claim 1 including first and second fingerholds respectively disposed at opposite first and second ends of said zipper.

10. A fluid-resistant article according to claim 9 further comprising an elongate flap covering said zipper on a side thereof corresponding to one of said first and second side surfaces.

11. A fluid-resistant article according to claim 10 wherein said flap is formed from a generally rectangular piece of material having first and second long edges and a pair of transverse short edges extending therebetween and intersecting the long edges to define corners and wherein first and second corner portions of said piece are folded over thereby to form said first and second fingerholds.

12. A fluid-resistant article according to claim 1, wherein said article is selected from the group consisting of hazardous material suits, fire suits, dry suits, dry bags, bivy sacks, waders, space suits, tents, shipping packages, household storage bags, map cases, chart cases, kayak skirts, backpack covers, computer cases, electronic device cases, watercraft containers, inflatable cases, flotation bags, flotation devices, waterproof pockets, fishing vest pockets, smell-proof pockets, wetsuits, jackets, sleeping bags, rain gear, boots, kayak jackets, wind breakers, and windproof fleeces.
13. A garment for use in a fluidic environment and adapted to be worn by a wearer who has a torso with a central medial axis, comprising:
   A. a garment body formed of a fluid-resistant material and having a trunk portion and adapted to extend around at least some of the trunk of the wearer when in a worn state; and
   B. a fluid-resistant zipper including a zipper tape supporting a set of first teeth and a set of second teeth engageable and disengageable with one another thereby to define an open state and closed state, said zipper being disposed on said garment such that it is in generally transverse orientation relative said axis.
14. A fluid-resistant garment according to claim 13 including at least one first fingerhold disposed proximate to one end of said zipper and configured for engagement by a user’s finger to assist operating said zipper.
15. A fluid-resistant garment according to claim 14 wherein said garment has an interior and an exterior, said garment including an elongate flap covering said zipper on a side thereof corresponding to said exterior, said fingerhold being formed integrally with said flap.
16. A fluid-resistant garment according to claim 15 wherein said flap is formed from a generally rectangular piece of material having first and second long edges and a pair of transverse short edges extending therebetween and intersecting the long edges to define corners and wherein a corner portion of said piece being folded over thereby to form said fingerhold.
17. A fluid-resistant garment according to claim 13 wherein said garment has an interior and an exterior, said garment including an elongate flap covering said zipper on a side thereof corresponding to said exterior.
18. A fluid-resistant garment according to claim 17 wherein said tape and an edge margin of said flap are located interiorly of said garment.
19. A fluid-resistant garment according to claim 17 wherein said flap is constructed of polypropylene.
20. A fluid-resistant garment according to claim 17 wherein said zipper and said flap are stitched to said material around a perimeter margin of said elongate opening.
21. A fluid-resistant garment according to claim 20 wherein said stitching is sealed with heat activated tape.
22. A fluid-resistant garment according to claim 13 including first and second fingerholds respectively disposed at opposite first and second ends of said zipper.
23. A fluid-resistant garment according to claim 22 wherein said garment has an interior and an exterior, said garment including an elongate flap covering said zipper on a side thereof corresponding to said exterior.
24. A fluid-resistant garment according to claim 23 wherein said flap is formed from a generally rectangular piece of material having first and second long edges and a pair of transverse short edges extending therebetween and intersecting the long edges to define corners and wherein first and second corner portions of said piece are folded over thereby to form said first and second fingerholds.
25. A fluid-resistant garment according to claim 13 wherein said trunk portion is adapted to extend around the waist of the wearer and includes a crotch portion with a pair of leg portions extending therefrom.
26. A fluid-resistant garment according to claim 25 wherein said zipper is disposed proximate said crotch portion.
27. A fluid-resistant garment according to claim 13 wherein said trunk portion is adapted to extend around the chest of the wearer.
28. A method for mounting a fluid-resistant zipper in an article having a panel portion formed of a flexible fluid-resistant material having a first side surface and an opposite second side surface comprising:
   A. forming an elongate opening through said panel;
   B. securing a fluid-resistant zipper in a substantially sealed manner to a margin area of said panel portion adjacent to the elongate opening, said zipper including a zipper tape supporting a set of first teeth and a set of second teeth engageable and disengageable with one another thereby to define an open state and closed state;
   C. disposing at least one fingerhold proximate an end of said zipper, whereby a user can engage said fingerhold when operating said zipper;
   D. stitching said zipper and said fingerhold to said material around a perimeter margin of said opening; and
   E. sealing said stitching.
29. The method according to claim 28 further comprising disposing an elongate flap covering said zipper on a side thereof corresponding to one of said first and second side surfaces.
30. The method according to claim 29 wherein said article has an interior, said tape and an edge margin of said flap are located interiorly of said article.
31. The method according to claim 29 wherein said fingerhold is formed integrally with said flap.
32. The method according to claim 31 wherein said flap is formed from a generally rectangular piece of material having first and second long edges and a pair of transverse short edges extending therebetween and intersecting the long edges to define corners and wherein a corner portion of said piece is folded over thereby to form said fingerhold.
33. In a garment adapted for use in a fluidic environment having a trunk portion with a central medial axis and adapted to extend around at least some of the torso of the wearer, the improvement comprising: a fluid-resistant zipper including a zipper tape supporting a set of first teeth and a set of second teeth engageable and disengageable with one another thereby to define an open state and closed state, said zipper being disposed on said garment in generally transverse orientation to said axis.
34. The improvement of claim 33 wherein said trunk portion is adapted to extend around the waist of the wearer and includes a crotch portion with a pair of leg portions extending therefrom.
35. The improvement of claim 34 wherein said zipper is disposed proximate said crotch portion.