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(54) **CYCLING GLOVE**

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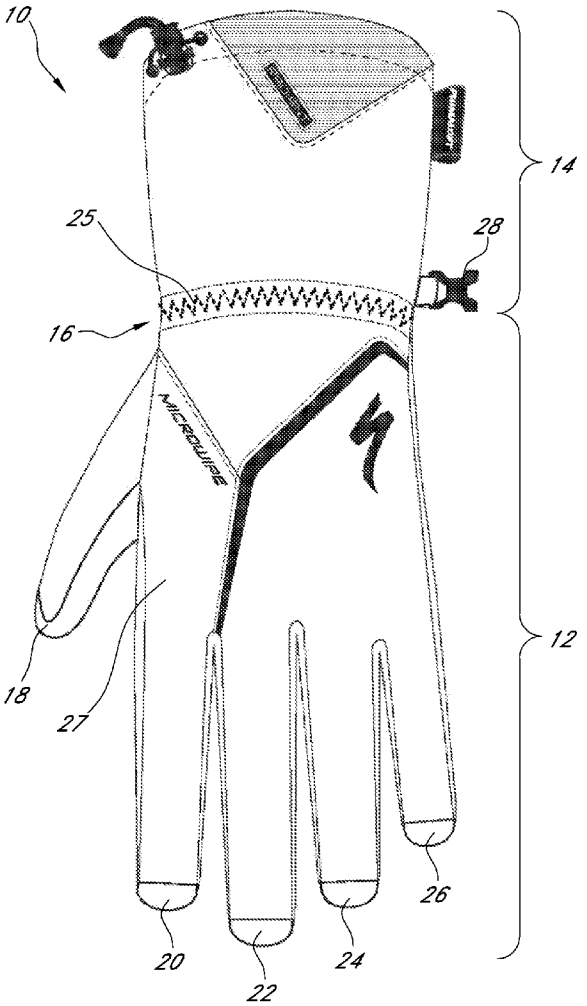
(57) **ABSTRACT**

A glove, such as a cycling glove, for use with a capacitive touchscreen device has a back side and a palm side. The glove has an outer shell substantially forming an outer surface of the glove on the back side and the palm side of the glove. An inner liner substantially forms an inner surface of the glove. A waterproof layer can be positioned between the outer shell and the inner liner. A conductive strip can be positioned within the glove with a first end extending from the glove at a fingertip. A second end can contact a user's skin when the glove is on the user's hand.



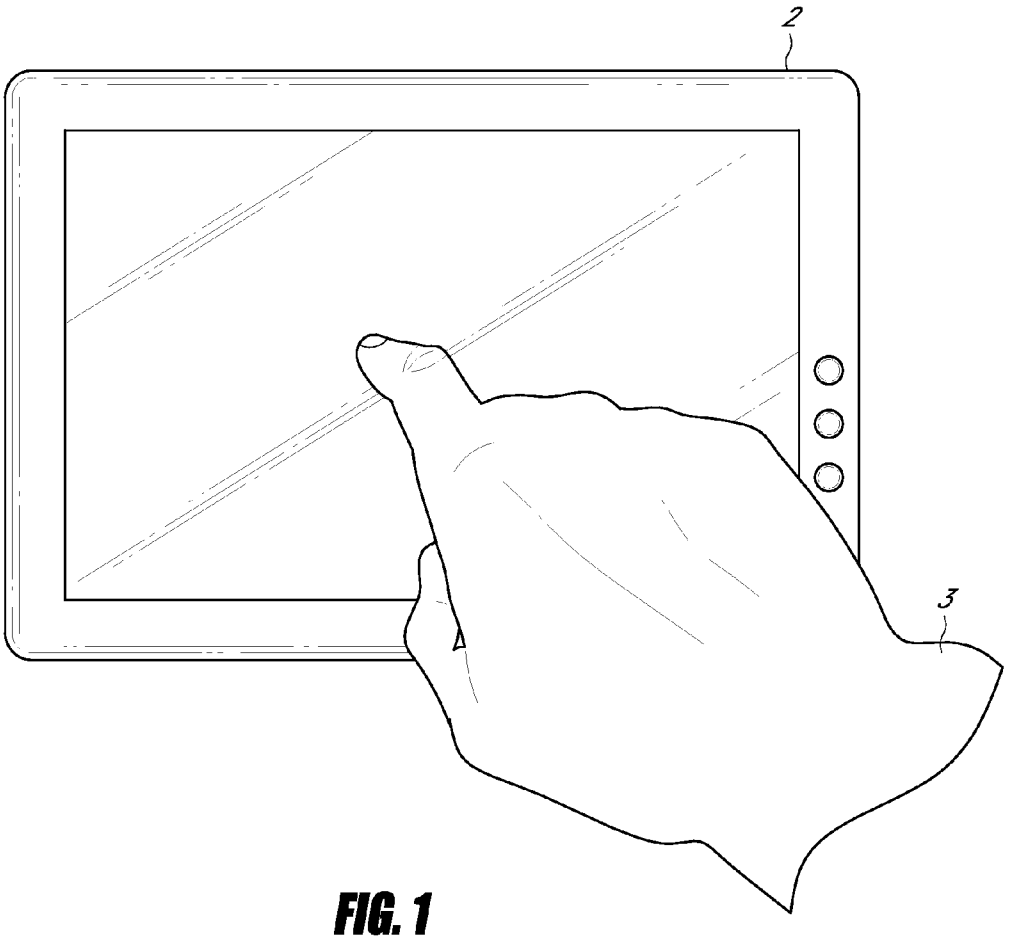


FIG. 1

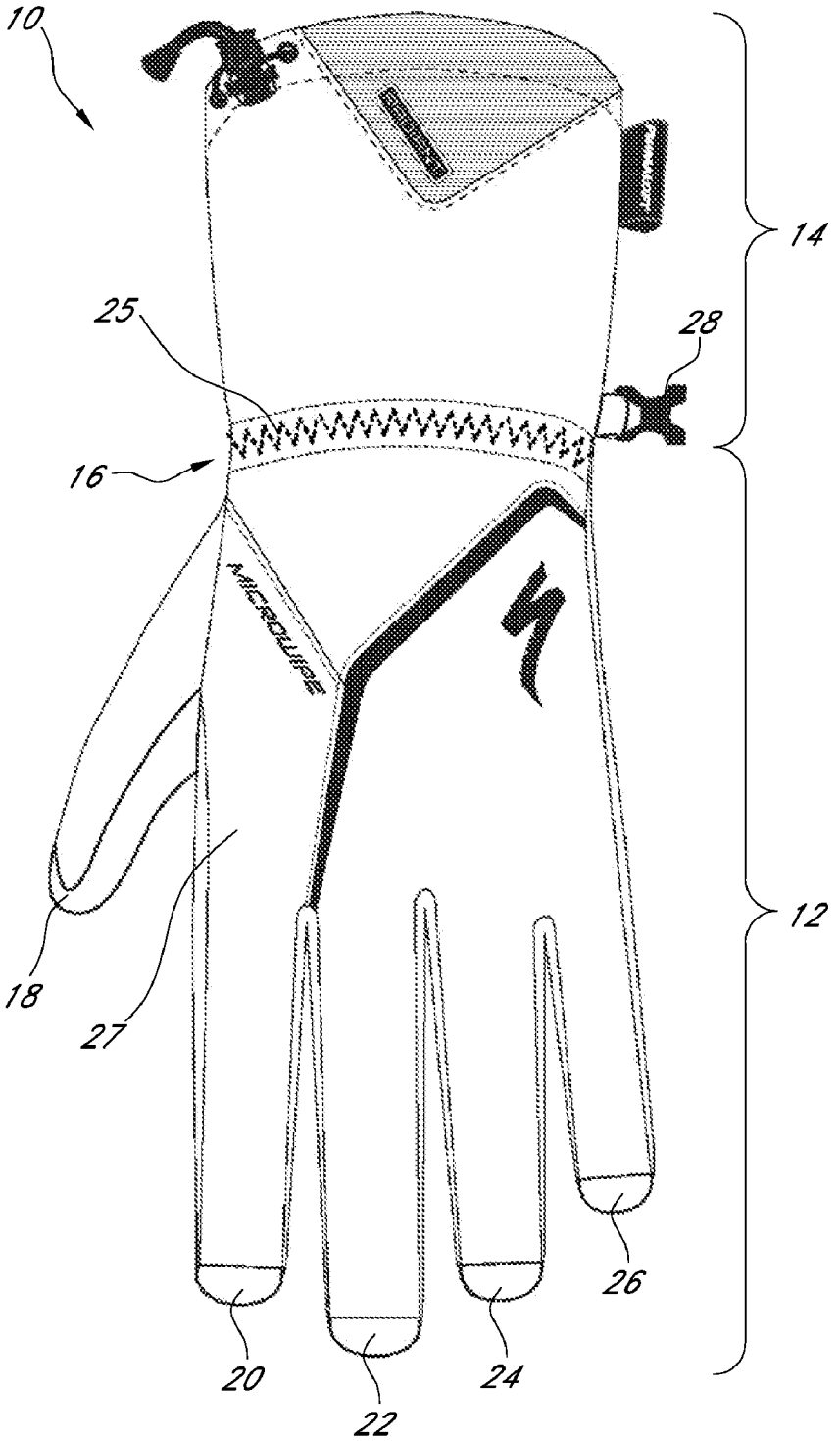


FIG. 2

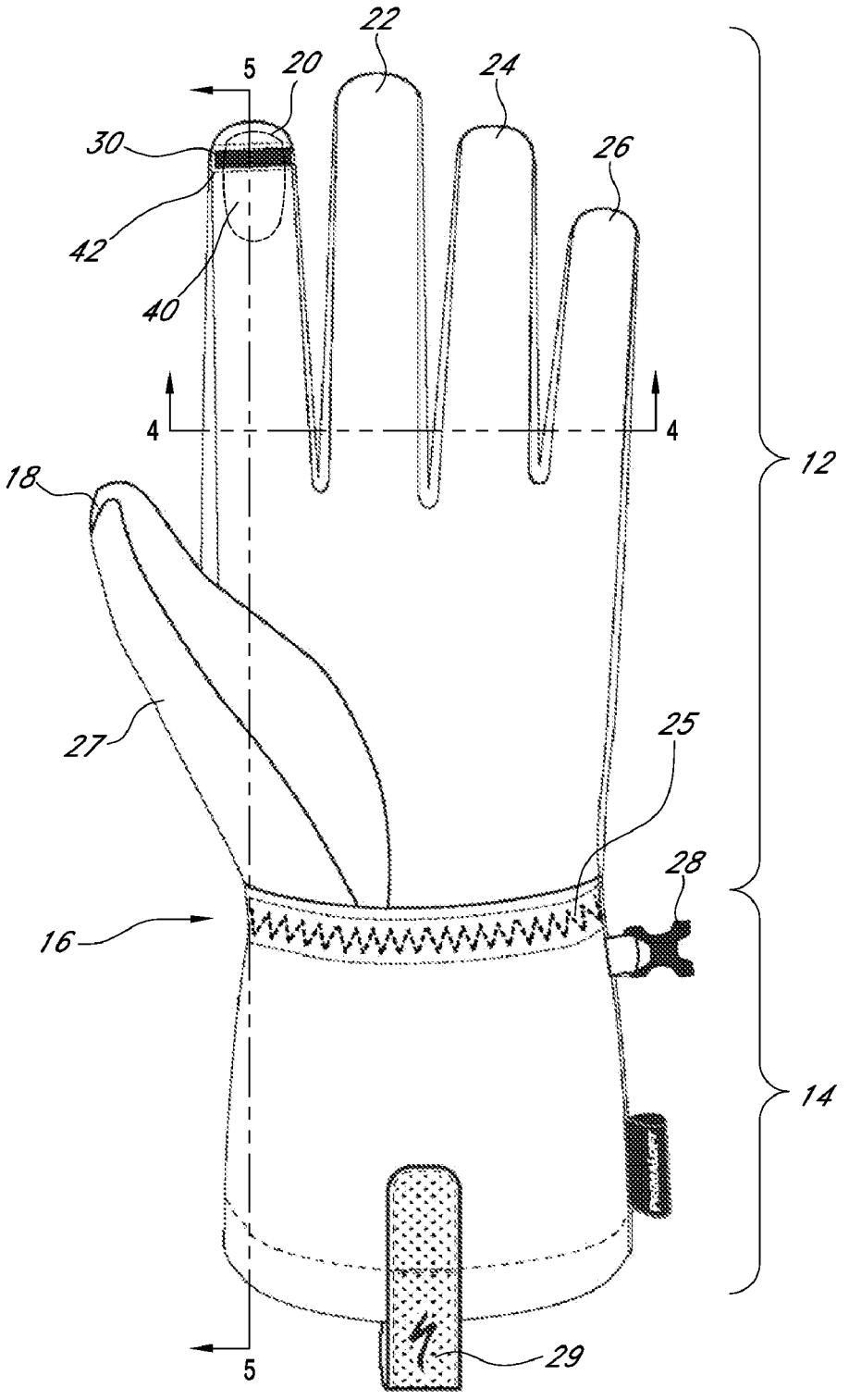


FIG. 3

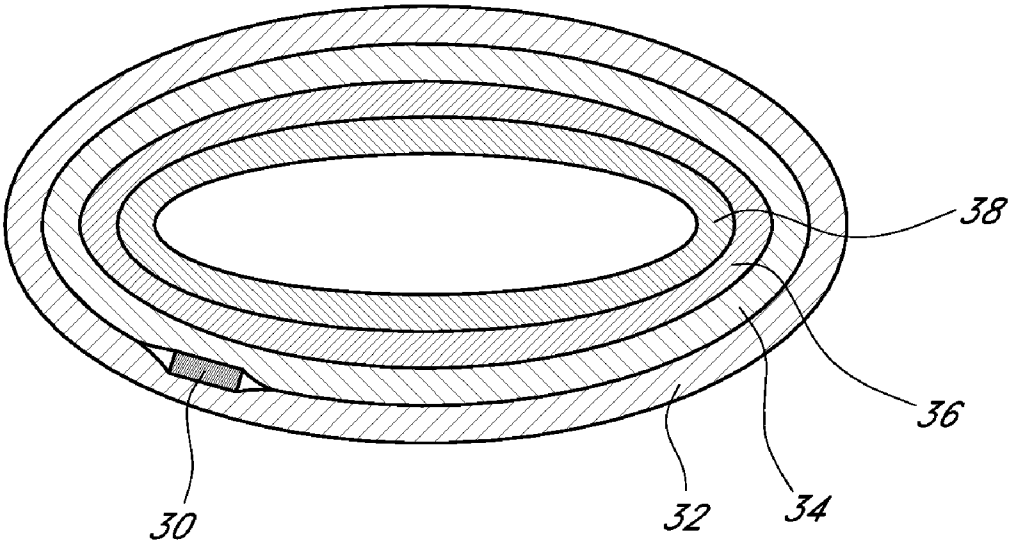


FIG. 4

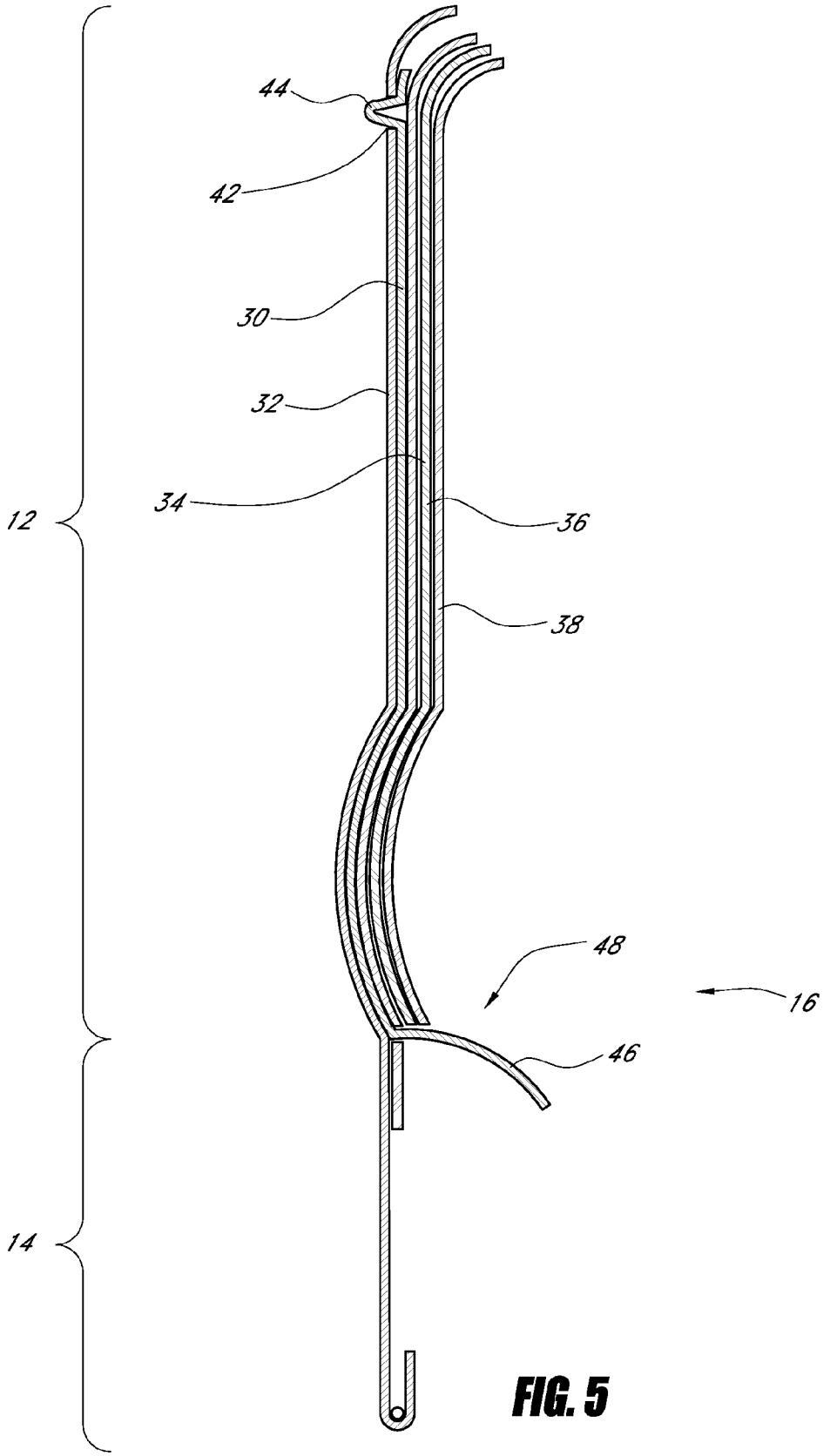


FIG. 5

CYCLING GLOVE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] Certain embodiments disclosed herein relate generally to hand coverings that can be used with touchscreen devices. In particular, cycling gloves for use with capacitive touchscreen devices.

[0003] 2. Description of the Related Art

[0004] A capacitive touchscreen device **2** includes a touchscreen panel generally made of an insulator, such as glass, coated with a transparent conductor, such as indium tin oxide. As the human body **3** is also an electrical conductor, touching the surface of the screen, as in FIG. **1**, results in a distortion of the screen's electrostatic field, measurable as a change in capacitance. Different technologies may be used to determine the location of the touch. The location is then sent to the controller for processing. Unlike other types of touchscreen technologies (e.g. resistive touchscreen), one cannot use a capacitive touchscreen device **2** through most types of electrically insulating material, such as gloves. This aspect of capacitive touchscreen devices **2** becomes very apparent in cool, cold, or wet weather and can be a great disadvantage.

SUMMARY OF THE INVENTION

[0005] Capacitive touchscreen technology is used in many popular consumer electronics. This can be problematic for cyclists and others when wearing gloves while engaging in a sport. For example, a capacitive touchscreen cyclocomputer, watch, GPS, or phone can be difficult to use while the cyclist is wearing full fingered gloves. Thus, there is a general need for improvement in gloves, such as cycling gloves, which can be utilized with capacitive touchscreen devices.

[0006] According to some embodiments, a glove, preferably a cycling glove, can include a plurality of fabric layers including a waterproof layer and a conductive strip that runs from a finger tip of the glove to the cuff, contacting the user's skin at the cuff without compromising the waterproof layer.

[0007] According to some embodiments, a glove can include a plurality of fabric layers including a waterproof layer and a conductive strip that runs from a finger tip to the bottom extent of the waterproof layer and passes around the waterproof layer into the interior of the glove, contacting the user's skin without compromising the waterproof layer.

[0008] Some embodiments of a glove, such as a cycling glove have a back side and a palm side. The glove can comprise an outer shell, an inner liner, a waterproof layer, and a conductive strip. The outer shell can substantially form an outer surface of the glove on the back side and the palm side of the glove. The inner liner can substantially form an inner surface of the glove on the back side and the palm side of the glove. The waterproof layer can be positioned between the outer shell and the inner liner on the back side and the palm side of the glove. The conductive strip can have a first end, a second end, and a connecting section extending between the first and second ends. The first end can pass through the outer shell to form a segment of the outer surface of the glove at a fingertip portion of a finger portion of the glove. The connecting section of the strip can extend from the index finger portion to a wrist portion of the glove while positioned between the outer shell and the waterproof layer. The second end can be at the wrist portion and can extend therefrom such that the second end will contact skin of the user when the glove is on the user's hand.

[0009] This second end may pass through a seam at the wrist portion and extend therefrom such that the second end will contact skin of the user when the glove is on the user's hand. The second end of the conductive strip can also be configured to contact skin on the palm side of the wrist when the glove is on the user's hand. Also, the glove may include a cuff portion extending from the wrist portion. The conductive strip can be made in many different ways and may comprise at least one of metallic plated fabric, metallic fibers and metallic yarn. The glove may also include an insulation layer positioned between the waterproof layer and the inner liner on the back side and the palm side of the glove.

[0010] In some embodiments, a cycling glove comprises a hand portion and a cuff portion extending from the hand portion, the glove having a back side and a palm side. The glove may also include an outer shell, an inner liner, a waterproof layer positioned between the outer shell and the inner liner, and a metallic ribbon. The outer shell can substantially form an outer surface of the glove on the back side and the palm side of the glove. The inner liner can substantially define an interior cavity at the hand portion of the glove and form an inner surface of the interior cavity on the back side and the palm side of the hand portion of the glove. The metallic ribbon can have a first end positioned at a fingertip of the hand portion and forming a part of the outer surface at the fingertip. The ribbon can be positioned between the outer shell and the waterproof layer from the fingertip to the cuff portion and a second end of the ribbon can pass through a seam on the palm side of the glove and extend into the interior cavity.

[0011] Some embodiments of the glove can have the seam located where the cuff portion extends from the hand portion. An elastic band may be positioned at the seam. The metallic ribbon can comprise at least one of metallic plated fabric, metallic fibers and metallic yarn.

[0012] The cycling glove can further include an insulation layer. The insulation layer can have heavier insulation on the back side of the glove as compared to the palm side. The inner liner can be a fleece liner or other type of material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Various embodiments are depicted in the accompanying drawings for illustrative purposes, and should in no way be interpreted as limiting the scope of the inventions, in which like reference characters denote corresponding features consistently throughout similar embodiments.

[0014] FIG. **1** shows a user interfacing with a touchscreen device.

[0015] FIG. **2** is a back side view of a glove.

[0016] FIG. **3** is a palm side view of the glove of FIG. **2**.

[0017] FIG. **4** illustrates a schematic cross-section of the glove taken along line **4-4** of FIG. **3**.

[0018] FIG. **5** illustrates a schematic cross-section of part of the glove taken along line **5-5** of FIG. **3**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] A glove is a garment designed generally for covering the hand of a user. Gloves generally have separate sheaths or openings for each finger and the thumb, though as used herein, the term "glove" can include any type of hand cover-

ing including a mitten, a lobster claw, muff, etc. In addition, the term glove can also include coats, jackets, sweaters, and long sleeve shirts that include a hand covering at the end of or attached to the sleeve.

[0020] Gloves are generally intended to protect and comfort hands against cold or heat, damage by friction, abrasion or chemicals, and disease. Gloves are made of all different types of materials including cloth, knitted or felted wool, leather, rubber, latex, neoprene, and KEVLAR®.

[0021] Cycling gloves are gloves designed for cycling. They generally fulfill three functions: warmth, comfort and protection. The design of most modern bicycles is such that the rider's hands remain on the handlebars while cycling, a position that leaves them exposed to weather. The hands are also relatively inactive, and do not have a great deal of muscle mass, which also contributes to the possibility of chill. Cycling also places a good deal of stress on the hands, in the form of prolonged pressure against handlebars and transmission of sudden road shocks through handlebars to the hands. Padded gloves can be useful to combat these stresses. Finally, as putting a hand out to break a fall is a natural reaction; many cyclists choose to wear gloves all year round to help avoid skin damage from a fall. These same or similar issues arise in many other sports besides cycling, such as skating, skiing, motocross, baseball, football, golf, etc. In addition, the gloves described herein can be any type of glove including: general purpose gloves, work gloves, sport gloves, recreational gloves, gardening gloves, etc.

[0022] Generally, when a person wants to use their capacitive touchscreen device and they have gloves on, they will need to use a stylus, or they will have to take their gloves off. This can be problematic for cyclists due to the demands of riding.

[0023] It is undesirable to use conductive thread piercing the glove fabric for winter gloves with a water resistance/proof liner. This is because piercing the glove fabric requires compromising the water resistance/proof liner which would then provide an access channel for water to enter the glove.

[0024] Looking now at FIGS. **2-3**, an improved glove **10** will be described which addresses some of the problems above. It will be understood that the gloves described herein can be used with devices other than capacitive touchscreen devices, and can be used to address problems other than those discussed herein.

[0025] FIGS. **2-3** show respectively, a back side and a palm side of the glove **10**. The glove **10** as shown includes a hand portion **12** and a cuff portion **14** extending from the hand portion **14**. The cuff portion **14** is generally attached to the hand portion **12** at or near a wrist area **16**. It will be understood that the glove **10** may or may not include a cuff portion **14** and that the cuff portion **14** can be a fairly long or a fairly short length. For example, the cuff portion **14** can be tucked into the jacket of the user to avoid the wrists being chilled.

[0026] The glove **10** can also include a thumb **18**, and fingers, including an index finger **20**, a middle finger **22**, a ring finger **24** and a pinky finger **26**. As has been mentioned, one or more of the fingers may be combined to form a lobster claw, a mitten, or other design.

[0027] The glove **10** shown is the left side of a pair of cycling gloves, designed generally for use on the user's left hand. The right side is not shown but can be essentially a mirror image of the left side, the main exception being the configuration of the buckle or clip **28**. The left side glove **10** is shown with a female side release buckle. The right side glove can have a corresponding male side release buckle. The buckles can allow the gloves to be connected together when desired.

[0028] The glove **10** can include elastic **25** in one or more locations to help secure the glove **10** to the user's hand. For example, elastic **25** can be located internally at the wrist area **16**. The elastic **25** can extend all the way around the glove **10** or around only a portion of the glove **10**.

[0029] Moving now to FIGS. **4** and **5**, the construction of a glove **10** including a waterproof layer will be described. It will be understood that the glove **10** can be constructed in ways other than those described. In particular, the number of layers and whether the particular layer extends all the way around or only partially around the glove can vary greatly.

[0030] FIGS. **4** and **5** show that the glove **10** includes four primary layers. The glove **10** has an outer shell **32**, a waterproof layer **34**, an insulation layer **36** and an inner liner **38**. In some embodiments, the glove does not include a separate insulation layer, or includes additional insulation layers. In addition, the position of the insulation layer **36** within the glove and between the various layers can vary.

[0031] The glove **10** has an outer shell **32**. The outer shell **32** can form an outer surface of the glove on the back side and the palm side of the glove as shown. The outer shell **32** can be made of a single material or multiple materials. For example, the palm side of the outer shell **32** may be a different material from the back side of the outer shell **32**. The palm side may be made of or treated to provide non-slip characteristics. The outer shell **32** can include various features depending on the desired use of the glove. The outer shell **32** can be made of or treated to provide a waterproof exterior. The outer shell **32** can include padding, such as foam or gel padding, protective plating, such as carbon fiber protective plating, full grained leather palms, a microfiber or terry cloth wipe **27** near the thumb for absorbing/wiping perspiration from the user's brow, a pull tab **29** to help with putting the glove on, etc. Some of these features may be incorporated into other layers, as well as, or instead of being part of the outer shell **32**. For example, padding may be part of the inner liner **38**.

[0032] The glove **10** may include a waterproof layer **34**. The waterproof layer **34** can be positioned between the outer shell **34** and the inner liner **38** on both the back side and the palm side of the glove **10**. It is generally desirable that the waterproof layer **34** cover the entire hand of the user such that water does not contact the user's hand, even where the outer shell has become wet. Thus, the waterproof layer **34** should desirably be impermeable to water and should not be compromised by making holes in the layer that could provide access paths through the waterproof layer **34** for water to pass through to the user's hand. Thus, the waterproof layer can be a bag or waterproof membrane liner.

[0033] Though the waterproof layer **34** preferably covers the entire hand of the user, the waterproof layer may extend over the fingers to the top of the palm, the middle of the palm, or below the palm. It may also extend to ⅔ or ⅓ of the way to the bottom of the palm. The waterproof layer **34** may cover more than just the hand and may also cover the wrist, and/or the forearm or a portion of the forearm of the user.

[0034] The glove **10** can include an inner liner **38**. The inner liner **38** can substantially form an inner surface of the glove on the back side and the palm side of the glove **10**. In some embodiments, the inner liner **38** can be fixed to or removable

from the glove **10**, for example, removable and washable. In some embodiments, the inner liner **38** comprises a fleece liner.

[0035] The glove **10** may also include an insulation layer **36**. The insulation layer **36** may provide insulation in addition to that provided by the other layers. For example, the inner liner **38** can provide a layer of insulation and the insulation layer **36** can provide additional insulation on top of the insulation from the inner liner **38**. In some embodiments, the insulation layer **36** comprises heavier insulation on the back side of the glove **10** as compared to the palm side.

[0036] The various layers generally extend throughout at least the hand portion **12** of the glove **10**. For example, as shown, the waterproof layer **34**, and the insulation layer **36** extend only in the hand portion **12**, while the outer shell **32** extends through both the hand portion **12** and the cuff portion **14**. Other configurations are also possible.

[0037] A conductive material **30** can also be provided within the glove **10**. The conductive material **30** can be used to provide an electrical conduit from the skin of the user to a portion of the glove **10** for use with a capacitive touchscreen device. This can allow the user to use a capacitive touchscreen device with the glove still on.

[0038] As shown in FIGS. **2-5**, the conductive material **30** extends from a fingertip region **40** to the wrist area **16**. From the wrist area **16**, the conductive material **30** can extend into the glove **10**, such as into the hand cavity formed in the glove for receiving the user's hand. The conductive material **30** can then contact skin at the hand, wrist, and/or another part of the user's body. This skin contact can ensure that the electricity can be conducted between the fingertip portion **40** and the user. It will be understood that the first end **44** of conductive material **30** at the fingertip portion **40** can located anywhere on the glove **10**. It will also be understood that the second end **46** of the conductive material **30** can extend into the hand cavity at any location within the glove including within the hand portion **12** and/or within the cuff portion **14**. Preferably the conductive material **30** passes around the waterproof layer **34** and does not comprise the waterproof layer **34** in any way.

[0039] In some embodiments, the conductive material **30** extends into the interior of the glove **10** at the bottom extent of the waterproof layer **34**. Thus, if the waterproof layer **30** covers the entire hand of the user, the conductive material **30** may extend into the glove interior at or below the bottom of the hand. In other configurations, where the waterproof layer **34** covers more or less than the entire hand, such as the fingers, portions of the palm, the wrist, etc. as discussed above, the conductive material **30** may extend into the glove interior at or below this same point. It should also be understood that the conductive material **30** may wrap around the waterproof layer **34** and may extend into the glove interior at a point other than where the conductive material **30** wraps around the waterproof layer **34**.

[0040] It should also be understood that though the conductive material **30** may extend into the glove interior at or below a certain point in the glove, the conductive material may be directed in one or more directions from that point. Thus, the conductive material **30** may extend into the glove interior below a certain point, but be directed upwards and may extend back past that same point.

[0041] The first end **44** of the conductive material **30** can form a part of the outer surface of the glove **10**. As can be seen in FIG. **5**, part of the first end **44** can pass through a hole **42** in the outer shell **32**. The first end **44** may be flush with or protrude out from the surface of the outer shell **32**. The first end **44** can include a point, groove, rib, strut, tread, bump, texture, and/or other feature to help ensure the conductive material **30** will contact the capacitive touchscreen in the desired manner.

[0042] The second end **46** can extend into the hand cavity of the glove through a seam **48**. The seam **48** can be located at any location within the glove **10** and is preferably located at the wrist area **16** where the hand portion **12** and cuff portion **14** meet. The second end **46** can for a tab or extension that extends past the seam **48**. The second end **46** can be loose or secured within the glove. As shown, the second end **46** is substantially loose after passing through the seam **48** and can therefore extend into either or both of the hand portion **12** and the cuff portion **14** of the glove **10**.

[0043] Elastic, buttons, and/or VELCRO® can be used to help ensure that the second end **46** contacts the skin of the user. For example, elastic **25** can be used to secure and/or hold the second end **46** to the skin. A jacket or coat, for example, with elastic, buttons, and/or VELCRO® may also help serve this purpose.

[0044] The conductive material **30** is preferably provided in the form of a conductive band, strip, or ribbon, but can also take other forms. The conductive material **30** can be metallic plated fabric, metallic fibers and/or metallic yarn. The conductive material **30** can further be fibers composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal.

[0045] The glove **10** can provide a minimally exposed conductive material **30** to beneficially protect the conductive material **30** from damage. For example, if the conductive material is exposed, on an outside surface of the glove, it will be subject to wear and tear, tarnishing, breaking of fibers, and other things that could reduce the conductivity of the conductive material **30**. The glove **10** beneficially protects the conductive material and extends the life of the conductive material and the glove as a tool for using with a capacitive touchscreen.

[0046] The glove **10** is can be compatible with a variety of touchscreen devices. The glove **10** can have conductive material running between the outer layer at the palm and the inner liner of the glove. The conductive material can run all the way to the cuff, and touches the skin of the rider at the cuff, sending an electrical charge to the capacitive touchscreen. The glove **10** can have a conductive strip expending from outside the finger to the wrist or cuff area. The glove **10** can route conductive material around the water-proof layer so that the conductive material can touch the rider's skin.

[0047] Although this invention has been disclosed in the context of certain preferred embodiments and examples, it will be understood by those skilled in the art that the present invention extends beyond the specifically disclosed embodiments to other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof. In addition, while a number of variations of the invention have been shown and described in detail, other modifications, which are within the scope of this invention, will be readily apparent to those of skill in the art based upon this disclosure. It is also contemplated that various combinations or subcombinations of the specific features and aspects of the embodiments may be made and still fall within the scope of the invention. Accordingly, it should be understood that various features and aspects of the disclosed embodiments can be combined with or substituted for one another in order to form

varying modes of the disclosed invention. Thus, it is intended that the scope of the present invention herein disclosed should not be limited by the particular disclosed embodiments described above, but should be determined only by a fair reading of the claims that follow.

[0048] Similarly, this method of disclosure, is not to be interpreted as reflecting an intention that any claim require more features than are expressly recited in that claim. Rather, as the following claims reflect, inventive aspects lie in a combination of fewer than all features of any single foregoing disclosed embodiment. Thus, the claims following the Detailed Description are hereby expressly incorporated into this Detailed Description, with each claim standing on its own as a separate embodiment.

What is claimed is:

1. A cycling glove for use with a capacitive touchscreen device, the glove having a back side and a palm side comprising:

an outer shell substantially forming an outer surface of the glove on the back side and the palm side of the glove;

an inner liner substantially forming an inner surface of the glove on the back side and the palm side of the glove;

a waterproof layer positioned between the outer shell and the inner liner on the back side and the palm side of the glove; and

a conductive strip having a first end, a second end, and a connecting section extending between the first and second ends, the first end passing through the outer shell to form a segment of the outer surface of the glove at a fingertip portion of a finger portion of the glove, the connecting section of the strip extending from the index finger portion to a wrist portion of the glove and positioned between the outer shell and the waterproof layer, the second end at the wrist portion and extending therefrom such that the second end will contact skin of the user when the glove is on the user's hand.

2. The cycling glove of claim **1**, wherein the second end passes through a seam at the wrist portion and extends therefrom such that the second end will contact skin of the user when the glove is on the user's hand.

3. The cycling glove of claim **1**, wherein the glove further comprises a cuff portion extending from the wrist portion.

4. The cycling glove of claim **1**, wherein the conductive strip comprises at least one of metallic plated fabric, metallic fibers and metallic yarn.

5. The cycling glove of claim **1**, wherein second end of the conductive strip is configured to contact skin on the palm side of the wrist when the glove is on the user's hand.

6. The cycling glove of claim **1**, wherein the finger portion comprises at least one of an index finger portion, a middle finger portion and a thumb portion.

7. The cycling glove of claim **1**, wherein the segment of the outer surface of the glove at a fingertip portion is on the palm side of the glove.

8. The cycling glove of claim **1**, wherein further comprising an insulation layer positioned between the waterproof layer and the inner liner on the back side and the palm side of the glove.

9. The cycling glove of claim **8**, wherein the insulation layer comprises heavier insulation on the back side of the glove as compared to the palm side.

10. The cycling glove of claim **1**, wherein the inner liner comprises a fleece liner.

11. The cycling glove of claim **1**, wherein the outer shell comprises at least one of padding, protective plating, leather, a microfiber wipe, a terry cloth wipe, and a pull tab.

12. A cycling glove comprising:

a hand portion and a cuff portion extending from the hand portion, the glove having a back side and a palm side;

an outer shell substantially forming an outer surface of the glove on the back side and the palm side of the glove;

an inner liner substantially defining an interior cavity at the hand portion of the glove and forming an inner surface of the interior cavity on the back side and the palm side of the hand portion of the glove;

a waterproof layer positioned between the outer shell and the inner liner on the back side and the palm side of the hand portion of the glove; and

a metallic ribbon having a first end positioned at a fingertip of the hand portion and forming a part of the outer surface at the fingertip, the ribbon positioned between the outer shell and the waterproof layer from the fingertip to the cuff portion and a second end of the ribbon passing through a seam on the palm side of the glove and extending into the interior cavity.

13. The cycling glove of claim **12**, wherein the seam is located where the cuff portion extends from the hand portion.

14. The cycling glove of claim **13**, further comprising an elastic band positioned at the seam.

15. The cycling glove of claim **12**, wherein the metallic ribbon comprises at least one of metallic plated fabric, metallic fibers and metallic yarn.

16. The cycling glove of claim **12**, wherein the outer shell comprises a fabric material having non-slip or durable material on the palm side and a microfiber wipe on a thumb portion.

17. The cycling glove of claim **16**, wherein the outer shell further comprises padding on the palm side.

18. The cycling glove of claim **12**, further comprising an insulation layer.

19. The cycling glove of claim **18**, wherein the insulation layer comprises heavier insulation on the back side of the glove as compared to the palm side.

20. The cycling glove of claim **12**, wherein the inner liner comprises a fleece liner.

* * * * *