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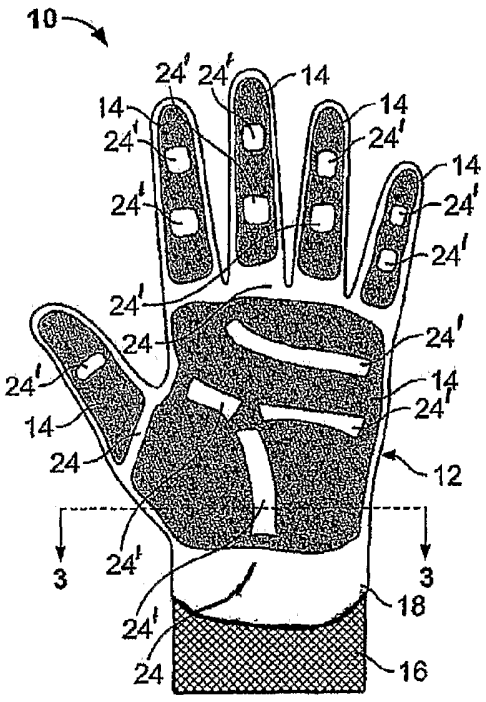

(57) Abstract: Disclosed herein is a multilayer glove (10) and a method of manufacture thereof. The multilayer glove (10) preferably includes a fabric substrate (16) and a protective coating (18) disposed on the fabric substrate (16) to form a composite (12) therewith. The multilayer glove (10) preferably also includes one or more reinforcing elements (14) bonded to the protective coating (18). The reinforcing elements (14) and the protective coating (18) are preferably formed from nitrite foam rubber. Additional embodiments of the invention are disclosed herein.

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GLOVES WITH REINFORCING ELEMENTS AND METHODS FOR MAKING SAME

Cross-Reference to Related Applications

The present application claims the benefit of U.S. Provisional Application No. 60/562,920, filed April 16, 2004, and U.S. Utility Application No. (not yet known), filed April 15, 2005, both of which are hereby incorporated by reference in their entirety for all purposes.

Field of the Invention

The present invention relates to a glove having multiple layers and methods of manufacture thereof.

Background of the Invention

Gloves of the prior art are constructed of various materials and are used for various purposes. For example, the prior art includes workman gloves, surgical gloves, driving gloves, household gloves, skiing gloves, and gloves for providing warmth. Gloves of the prior art have typically been formed from leather, polyvinyl chloride, rubber, and fabric. It is also known in the art to provide composites, such as fabric gloves dip-coated with a natural or nitrile rubber.

The prior art also includes gloves having fabric and leather reinforcing elements that are mechanically fastened to a glove. For example, the prior art includes fabric and leather strips sewn onto the outer surface of the glove. The fabric and leather reinforcing elements are positioned on sections of

the glove corresponding to the fingertips, the knuckles, the wrist, the palm, and/or the back side of the hand. Although fabric and leather reinforcing elements increase a glove's grip and wear resistance, they are expensive materials and must be mechanically fastened to the glove. This increases the total manufacturing cost of the glove, as well as the final retail price paid by consumers.

It is also known in the art to provide a glove having polyvinyl chloride patches bonded to an underlying fabric. For example, U.S. Patent No. 6,185,747 discloses polyvinyl chloride patches that are metal-screened to the fibers of the underlying fabric. Unfortunately, the bond between the screened polyvinyl chloride and the fibers causes the fibers to stiffen, which in turn causes discomfort and potential irritation to the hands of a person wearing the glove. Furthermore, the fabric of the glove is exposed in multiple locations, such as in the areas between the polyvinyl chloride patches. This forms vulnerable areas that have low wear resistance and that are easily susceptible to puncture and/or chemical penetration.

What is needed in the art is a glove that provides good grip at a low-cost and does so without unnecessarily compromising the wear resistance or comfort of the glove.

Summary of the Invention

Preferred embodiments of the invention overcome the disadvantages and shortcomings of the prior art by providing a multilayer glove

that includes a fabric substrate, an intermediate layer of resilient material, and an outer layer of resilient material. The fabric substrate is in the form of a glove and has an outer surface. The intermediate layer of resilient material is preferably applied to the fabric substrate so as to completely cover at least a portion of the outer surface of the fabric substrate. The outer layer of resilient material is preferably bonded to one or more selected areas of the intermediate layer such that the outer layer is separated from the fabric substrate by the intermediate layer. The intermediate layer and the outer layers may be formed from the same resilient material or from different resilient materials.

In a first embodiment of the invention, the fabric substrate is formed from a one piece seamless string-knit having the shape of a glove. However, any suitable fabric may be used, such as a woven, nonwoven, or knit fabric. The intermediate layer is preferably formed from a protective coating, such as nitrile rubber foam. However, any suitable resilient material may be used, such as silicone, polyurethane, polyvinyl chloride or other 100% solid plastic resins, solvent solutions of similar resins, as well as natural rubber or synthetic rubber solutions or emulsion forms of plastic or rubbers. These materials also may be expanded or foamed. These materials may be expanded or foamed. In the first embodiment of the invention, the fabric substrate and the intermediate layer form a composite. In some embodiments of the invention, the multilayer glove 10 includes a substrate formed from plastic and/or rubber.

In the first embodiment of the invention, the outer layer comprises one or more reinforcing elements that bond with the protective coating.

However, any suitable resilient material may be used, such as silicone, polyurethane, polyvinyl chloride or other 100% solid plastic resins, solvent solutions of similar resins, as well as natural rubber or synthetic rubber solutions or emulsion forms of plastic or rubbers. These materials also may be expanded or foamed. The reinforcing elements preferably have a substantially uniform thickness that is in the range of about twenty mil to about eighty mil, though the reinforcing elements can be of a thickness outside this range.

Each individual reinforcing element preferably has one or more openings, referenced herein as relief areas, formed therethrough. The plurality of reinforcing elements preferably also forms relief areas therebetween. The relief areas are preferably positioned so as to be aligned with the joints and creases of a human hand inserted into the multilayer glove.

In a second embodiment of the invention, at least one of the reinforcing elements is formed to have a first color, and at least another one of the plurality of the reinforcing elements is formed to have a second color. In this respect, a manufacturer may manipulate the colors of the reinforcing elements to form a novel design.

Additional embodiments of the invention are disclosed herein. For example, the multilayer glove may have reinforcing elements positioned at the areas of the fabric substrate corresponding with the knuckles and fingertips of the hand. As another example, the multilayer glove may have a reinforcing element

with a mesh pattern formed therein. Methods for manufacturing a multilayer glove are also disclosed herein.

Brief Description of the Drawings

For a more complete understanding of the present invention, reference is made to the following detailed description of various exemplary embodiments considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a top view showing a first embodiment of a multilayer glove (left hand) having a fabric substrate, a protective coating, and a plurality of reinforcing elements;

FIG. 2 is a top view showing the fabric substrate and protective coating of FIG. 1;

FIG. 3 is a sectional view taken along line 3-3 of FIG. 1;

FIG. 4 is a top view showing a second embodiment of a multilayer glove (left hand) having a fabric substrate, a protective coating, and a plurality of reinforcing elements, two of said reinforcing elements being formed to have a first color and the other reinforcing elements being formed to have a second color;

FIG. 5 is a top view showing a third embodiment of a multilayer glove (right hand) having a fabric substrate, a protective coating, and a plurality of reinforcing elements;

FIG. 6 is a top view showing a fourth embodiment of a multilayer glove (left hand) having a fabric substrate, a protective coating, and a plurality of reinforcing elements having a mesh pattern formed therein;

FIG. 7 is a perspective view showing a mesh member used to create the mesh pattern of FIG. 6;

FIG. 8 is a top view showing a fifth embodiment of a multilayer glove (right hand) having a fabric substrate, a protective coating, and a plurality of reinforcing elements having another mesh pattern formed therein;

FIG. 9 is a flow chart showing an embodiment of a method for forming the multilayer glove shown in FIG. 1;

FIG. 10 is a top view showing an embodiment of structure used in the performance of the method of FIG. 9, said structure including a mask and a squeegee;

FIG. 11 is a sectional view of the mask taken along line 11-11 of FIG. 10;

FIG. 12 is a top view showing another embodiment of the structure used in the performance of the method of FIG. 9; and

FIG. 13 is a top view showing yet another embodiment of the structure used in the performance of the method of FIG. 9.

Detailed Description of the Exemplary Embodiments

Referring to FIGS. 1 and 3, a first embodiment of a multilayer glove 10 includes a composite 12 and a plurality of reinforcing elements 14. The composite 12 includes a fabric substrate 16 and a protective coating 18 and is shown in FIG. 2 without the reinforcing elements 14. With reference to FIGS. 1-3, the fabric substrate 16, protective coating 18, and reinforcing elements 14 will now be individually described.

The fabric substrate 16 has a shape similar to a human hand. The fabric substrate 16 is preferably string-knit. However, the fabric substrate 16 may be formed from any suitable natural or synthetic material, such as a woven, nonwoven, or knit fabric. In some embodiments of the invention, the multilayer glove 10 includes a substrate formed from plastic and/or rubber.

The protective coating 18 is preferably dip-coated onto the fabric substrate 16. The protective coating 18 may be disposed on part or all of the fabric substrate 16. Preferably, the protective coating 18 is at least disposed on those portions of the fabric substrate 16 alignable with the fingers, knuckles, and palm of the human hand. The protective coating 18 is preferably formed from nitrile, and is more preferably formed from nitrile foam rubber. However, any suitable resilient material may be used, such as silicone, polyurethane, polyvinyl chloride or other 100% solid plastic resins, solvent solutions of similar resins, as well as natural rubber or synthetic rubber solutions or emulsion forms of plastic or rubbers. These materials also may be expanded or foamed. In some embodiments of the invention, the protective coating 18 is formed from neoprene and/or styrene butadiene rubbers.

As discussed above, the fabric substrate 16 and the protective coating 18 preferably form a composite 12. In this regard, the fabric substrate 16 and the protective coating 18 each contribute desirable properties to the composite 12 as a whole. For example, in the preferred embodiments, the fabric substrate 16 provides comfort to a person wearing the multilayer glove 10, while the protective coating 18 increases the wear resistance of the multilayer glove 10

and decreases the susceptibility of the multilayer glove 10 to puncture and/or chemical penetration.

Continuing with principal reference to FIGS. 1-3, the multilayer glove 10 includes a plurality of reinforcing elements 14 bonded to the protective coating 18. FIG. 1 shows six reinforcing elements 14 bonding directly with the protective coating 18. The plurality of reinforcing elements 14 have relief areas 24 formed therebetween, and each individual reinforcing element 14 preferably has at least one relief area 24' formed therethrough. The relief areas 24, 24' are preferably positioned to align with the creases and joints of a human hand inserted into the multilayer glove 10. Among other advantages, the relief areas 24, 24' facilitate easy flexing of the human hand. Relief areas 24, 24' are shown to be formed all the way through to the protective coating 18. However, in an alternative embodiment, it is not required that the relief areas 24, 24' be formed all the way through to the protective coating 18.

Preferably, the thickness of a reinforcing element 14, referenced herein as RE_T, is substantially uniform throughout the reinforcing element 14. It is also preferable that the variance in thickness RE_T of a reinforcing element 14 not be so great as to be immediately detectable by the naked human eye. The thickness RE_T of a reinforcing element 14 is preferably between one mil and one hundred fifty mil, and is more preferably between twenty mil and eighty mil. It should be obvious to one skilled in the art that the stated preferences regarding thickness do not necessarily apply to the relief areas 24, 24'.

The reinforcing elements 14 are preferably formed from nitrile rubber and are more preferably formed from nitrile foam rubber. However, any suitable resilient material may be used, such as silicone, polyurethane, polyvinyl chloride or other 100% solid plastic resins, solvent solutions of similar resins, as well as natural rubber or synthetic rubber solutions or emulsion forms of plastic or rubbers. These materials also may be expanded or foamed. In some embodiments of the invention, the protective coating 18 is formed from neoprene and/or styrene butadiene rubbers.

As discussed above, the reinforcing elements 14 preferably bond with the protective coating 18. Such bonding is preferably a chemical bond and is more preferably a vulcanized bond. Such vulcanized bonding is preferably caused by the reinforcing elements 14 being cured while on the protective coating 18 for integration therewith. Suitable bonding may be caused by other processes, such as molding. In some embodiments of the invention, the reinforcing elements do not bond with the fabric substrate 16.

It is recognized that bonding of reinforcing elements is enhanced by making the coating material similar to the reinforcing material, such as by using a nitrile rubber dipped coating in the intermediate layer and Nitrile rubber in the outer layer. By way of example, if it was desired to have a natural rubber coated glove reinforced with Nitrile rubber, it would be advantageous to blend the Nitrile rubber with at least some natural rubber to enhance bonding of the two layers. Further, this would take place in most cases when the rubber materials were in latex form.

The multilayer glove 10 may include additional features (not shown), such as a cuff, hook and loop fasteners, finger and/or knuckle guards, additional layers, a label, a clasp for securing a pair of multilayer gloves together, and any other suitable feature(s) that are now or hereafter known in the art. For example, a sample embodiment (not shown) of the multilayer glove 10, has the following features: (1) a composite 12 having a fabric substrate 16 and a protective coating 18 disposed on a portion of the fabric substrate 16 corresponding with the palm; (2) a plurality of reinforcing elements 14 bonding to the protective coating 18 at the palm; (3) a fabric weave fastened to the composite 12 at the back of the fingers; (4) finger guards fastened to the fabric weave; (5) a logo sewn onto the composite 12; and (6) a Velcro cuff strap.

It should be clear to one skilled in the art that the multilayer glove 10, generally, and/or the composite 12 can include additional layers, structures, and/or materials as desired. By way of nonlimiting example, the multilayer glove 10 may include an additional layer (not shown) disposed between the fabric substrate 12 and the protective coating 18. As another example, an additional layer (not shown) may be disposed between the protective coating 18 and the reinforcing elements 14 to form a composite.

Referring to FIG. 4, a second embodiment of the present invention is illustrated. Elements illustrated in FIG. 4 which correspond substantially to the elements described above with reference to FIGS. 1-3 have been designated by corresponding reference numerals increased by one hundred. The embodiment

of the present invention shown in FIG. 4 is constructed in manners consistent with the foregoing description of the multilayer glove 10 shown in FIGS. 1 and 3, unless it is stated otherwise.

With reference to FIG. 4, a multilayer glove 110 has a fabric substrate 116 and a protective coating 118. The multilayer glove 110 further includes reinforcing elements 114 of a first color and additional reinforcing elements 126 having a second color. FIG. 4 shows sixteen reinforcing elements 114 of a first color and two additional reinforcing elements 126 of the second color. The reinforcing elements 114, 126 preferably form relief areas 124 therebetween. However, in contrast to each individual reinforcing element 14 shown in FIG. 1, each of the individual reinforcing elements 114, 126 does not have a relief area 24' formed therethrough.

The reinforcing material(s) that form the reinforcing elements 114, 126 are preferably pigmented prior to being cured and/or dried, so as to cause the coloring of each reinforcing element 114, 126 to be disposed therethrough, respectively. The reinforcing elements 114, 126 may be positioned at any suitable location. As shown, it is preferred that the reinforcing elements 114, 126 be positioned directly on the coating layer 18 for bonding therewith. In an alternative embodiment, one or more additional reinforcing elements 126 may be disposed on top of one more of the reinforcing elements 114 (not shown).

Referring to FIG. 5, a third embodiment of the present invention is illustrated. Elements illustrated in FIG. 5 which correspond substantially to the

elements described above with reference to FIGS. 1-3 have been designated by corresponding reference numerals increased by two hundred. The embodiment of the present invention shown in FIG. 5 is constructed in manners consistent with the foregoing description of the multilayer glove 10 shown in FIGS. 1 and 3, unless it is stated otherwise.

With reference to FIG. 5, a multilayer glove 210 has a fabric substrate 216 and a protective coating 218 formed on the back of the hand. Multilayer glove 210 further includes reinforcing elements 214 formed at the fingertips, knuckles, and back of the hand. As shown in FIG. 5, it is not required that the reinforcing elements 214 be positioned to form relief areas 24, and it is not required that individual reinforcing elements 214 have a relief area 24' formed therethrough.

Referring to FIG. 6, a fourth embodiment of the present invention is illustrated. Elements illustrated in FIG. 6 which correspond substantially to the elements described above with reference to FIGS. 1-3 have been designated by corresponding reference numerals increased by three hundred. The embodiment of the present invention shown in FIG. 6 is constructed in manners consistent with the foregoing description of the multilayer glove 10 shown in FIGS. 1 and 3, unless it is stated otherwise.

With reference to FIG. 6, the multilayer glove 310 has a fabric substrate 316 and a protective coating 318. Multilayer glove 310 further includes a plurality of reinforcing elements 314, which are collectively designated in FIG.6

using a single reference numeral. The reinforcing elements 314 of FIG. 6 are shown to have a pattern matching the pattern of mesh member 328 shown in FIG. 7. As further discussed below, one or more mesh members 328 may be used to form the reinforcing elements 314 and the mesh member may form an impression in the reinforcing elements 14, which is referenced herein as a "mesh pattern." A sample mesh pattern is best shown in FIG. 6. The sample mesh pattern has alternating crests and troughs, the width of each crest being about one-sixteenth (1/16) of an inch, and the width of each trough being about one-sixteenth (1/16) of an inch. Any suitable mesh pattern may be formed in a reinforcing element 314.

Referring to FIG. 8, another example of a mesh pattern is illustrated. FIG. 8 shows a multilayer glove 410 having a composite 412 formed from a fabric substrate 416 and a protective coating 418. Multilayer glove 410 further includes a plurality of reinforcing elements 414 formed on the protective coating 318, which are collectively designated in FIG.8 using a single reference numeral. The reinforcing elements 414 are positioned to be alignable with the index finger when a human hand is inserted into the multilayer glove 410. Multilayer glove 410 also has a fabric logo 430 sewn onto a portion of the fabric substrate 416 extending past a sample boundary of the protective coating 418. The logo will be further discussed below with respect to a method of the invention.

With principal reference to FIGS. 9 - 11, a preferred method of forming the multilayer glove 10 of FIG. 1 is described and referenced generally as

assembly method 532. Although the assembly method 532 will principally be discussed in connection with multilayer glove 10, it will be apparent to one of ordinary skill the art that the assembly method 532 can be easily modified to form other multilayer gloves of the present invention.

At securing step 534, an operator secures an end of a former 650 to the fabric substrate 16 and another end of the former 650 to a conveyor system (not shown). The former 650 preferably comprises a flat steel plate for spreading the fabric substrate 16 into a flat, hand-shaped form; however, the former 650 may comprise a three dimensional ceramic structure. The conveyor system preferably advances the fabric substrate 16 through the steps of assembly method 532.

At coating step 536, the conveyor system dips the fabric substrate 16 into a coating material, such as nitrile rubber. Any suitable coating material may be used, however, any suitable resilient material may be used, such as silicone, polyurethane, polyvinyl chloride or other 100% solid plastic resins, solvent solutions of similar resins, as well as natural rubber or synthetic rubber solutions or emulsion forms of plastic or rubbers. These materials also may be expanded or foamed. In some embodiments of the invention, the coating material may be neoprene and/or styrene butadiene rubber.

At curing step 538, the coating material is cured and/or dried, preferably forming a composite 12 having the fabric substrate 16 and the protective coating 18. As discussed, additional layers and/or materials may, in

some embodiments of the invention, be positioned over the protective coating 18 and/or between the fabric substrate 16 and protective coating 18.

At application step 540, a reinforcing material 660, such as nitrile latex rubber, is applied in a liquid state to the protective coating 18 to form reinforcing elements 14. However, the reinforcing elements 14 can be strengthened to increase cut and abrasion resistance by adding reinforcing fibers and/or reinforcing mineral fillers such as Nylon, polyester, Kevlar fibers, Mica, calcium carbonate, etc.

Referring to FIGS. 10 and 11, a mask 654 is provided that includes a frame 656 and a sheet 658 circumscribed by the frame 656. The sheet 658 preferably has a plurality of mesh members 628 formed therein. The sheet is preferably formed from a material that, but for the mesh members 628, is otherwise impenetrable by the reinforcing material 660. The sheet 658 is preferably formed from metal and is more preferably formed from nickel; however, the sheet 658 may be formed from any suitable material.

Referring to FIG. 10, a squeegee 652 may be used to force the liquid reinforcing material 660 to pass through the mesh members 628 to form the reinforcing elements 14 on the protective coating 18. The amount of reinforcing material 660 forced through each mesh member 628 may depend on the dimensions of the mesh member 628, the viscosity of the reinforcing material 660, and the magnitude and direction of the force applied to and by the squeegee 652. The squeegee 652 can be moved manually or under computer control.

The mesh members 628 shown in FIG. 10 shall now be further discussed in connection with the application step 540. The relative positioning and size of each of the plurality of mesh members 628 corresponds to the orientation of the reinforcing elements 14 to be formed on the glove substrate 12. At the same time, the pattern of each individual mesh member 628 may also correspond to a mesh pattern formed in reinforcing elements 14.

Referring to FIG. 11, each of the mesh members 628 preferably has a thickness, referenced herein as thickness S_T, between about six mil and about two hundred mil, though the thickness may be selected as desired and is in relation to the thickness of the reinforcing element 14 created therefrom. More preferably, each of the mesh members 628 has a thickness S_T between about twenty mil and about eighty mil. Among other advantages, the mesh members 628 help achieve a substantially uniform thickness within each reinforcing element 14 by maintaining the form of each reinforcing element 14 during one or more processing steps. Although FIG. 10 shows that the mesh members 628 are formed in a sheet 658 circumscribed by a frame 656, a mesh member can be used without a sheet 658 or a frame 656, such as the mesh member 328 shown in FIG. 7.

In some embodiments of the assembly method 532, a sheet 658 may have openings, rather than mesh members 628, formed therein (not shown). In said embodiments, a mesh member 328, such as that shown in FIG. 7, can be placed on top of said sheet 658, and reinforcing material 660 can be passed

through the mesh member 328 prior to passing through the openings formed in the sheet 658.

FIG. 12 shows an alternative structure used in performing the application step 540 of the assembly method 532 of FIG. 9. A mask 754 is provided having a frame 756 enclosing a sheet 758 that has a single mesh member 728 formed therein. A squeegee 752 is used to force the liquid reinforcing material 760 through the single mesh member 758.

In some embodiments of the assembly method 532, the logo 430 and bands of elastomer may be applied, preferably around the wrist and contemporaneously with the reinforcing elements 14.

FIG. 13 shows another alternative structure used in performing the application step 540 of the assembly method 532 of FIG. 9. A dispensing assembly, represented schematically as dispensing assembly 862, could be used to create reinforcing elements 814 from droplets of reinforcing material 860 positioned next to each other. The head of the dispensing assembly 862 applies the droplets via a nozzle from a reservoir of liquid reinforcing material, such as nitrile rubber. The droplets are positioned on the glove substrate close to one another so that they coalesce with one another to form reinforcing element 814. The initial distance separating each droplet is larger dependent upon the viscosity of the reinforcing material, the size of the droplets, etc.

Referring to FIG. 13, the nozzle of the dispensing assembly 862 may be heated if the rubber to be dripped is solid at room temperature, or it may not be heated if the rubber to be dripped is a liquid at room temperature. The nozzle of dispensing assembly 862 may be of different shapes to produce different shaped droplets of reinforcing material 860. The dispensing assembly 862, components thereof, and/or the former 650 may move in the x-y plane, for example, to cause the droplets to fall into positions for forming the reinforcing element 814. As with other aspects of assembly method 532, movement may be computer-controlled or manual. Computer control is preferred for producing large reinforcing elements 814 accurately.

Although the preferred embodiments of the application step 540 have been herein shown and described in detail, it should be appreciated by one skilled in the art that there are other ways in which reinforcing material can be passed through a mesh member to form reinforcing elements. For example, a glove substrate could be fully or partially enclosed within a mask having mesh members formed therein. The enclosed glove substrate could be dipped into a reinforcing material, such as nitrile or another material. As another example, reinforcing material could be applied to the protective coating and the reinforcing materials could be shaped by applying solvents, acids, and/or other chemicals to desired areas of the reinforcing material. The reinforcing elements could also be molded.

At curing step 542, the conveyor system transports the glove substrate 12 and reinforcing elements 14 to apparatus for drying and/or curing.

The reinforcing elements 14 preferably form a vulcanized bond with the protective coating 18.

At application step 544, additional reinforcing material may be applied to the outer surface of the glove substrate. This is particularly useful for manufacturing the multilayer glove 110 shown in FIG. 2, because it presents an opportunity to add reinforcing elements 126 of a color different from the color of reinforcing elements 114 applied at the first application step 540. Application step 544 is similar to application step 540; however, the mask, mesh members, sheets, and/or frames used in application step 544 may be sized and positioned to avoid any interference from the reinforcing elements 114 already applied at application step 540. Said size and position is dependent at least in part on the chosen colors, sizes, and positioning of the desired reinforcing elements 114, 126.

At curing step 546, the additional reinforcing elements 126 are cured. It should be clear to one of ordinary skill in the art that application step 544 and curing step 546 are analogous to application step 540 and curing step 542, and that said steps can be repeated as desired to add reinforcing elements of a third color, a fourth color, etc. In some embodiments of the invention, the additional reinforcing elements 126 of the second color may be disposed on top of the reinforcing elements 114 of the first color.

At removal step 548, the operator removes the multilayer glove 10 from the former 650 and the conveyor system returns to its initial position, where

the operator can place a new fabric substrate 16 on the former 650 for processing in accordance with the steps of assembly method 532.

Preferred embodiments of the invention presented herein thus provide for a multilayer glove that has a good grip at a low manufacturing cost. In the preferred embodiments, the materials are preferably durable, long-lasting, aesthetically pleasing and provide good wear resistance and comfort. It will be understood that the embodiments of the present invention described herein are merely exemplary and that a person skilled in the art may make many variations and modifications without departing from the spirit and the scope of the invention. All such variations and modifications, including those discussed above, are intended to be included within the scope of the invention as defined in the appended claims.

Claims

What is claimed is:

1. A multilayer glove, comprising:

a substrate in the form of a glove and having an outer surface;

an intermediate layer of resilient material applied to said substrate so as to completely cover at least a portion of said outer surface thereof; and

an outer layer of resilient material bonded to at least one selected area of said intermediate layer such that said outer layer is separated from said substrate by said intermediate layer.

2. The multilayer glove of Claim 1, wherein said outer layer and said intermediate layer form a vulcanized bond.

3. The multilayer glove of Claim 1, wherein said substrate is a fabric substrate.

4. The multiplayer glove of Claim 3, wherein said fabric substrate is formed from a string-knit fabric.

5. The multilayer glove of Claim 4, wherein said outer layer and said intermediate layer are formed from nitrile foam rubber.

6. The multilayer glove of Claim 1, wherein said intermediate layer of resilient material is formed from nitrile foam rubber.

7. The multilayer glove of Claim 1, wherein said intermediate layer of resilient material is formed from a member of the group consisting of silicone, polyurethane, polyvinyl chloride, natural rubber, and synthetic rubber.

8. The multilayer glove of Claim 1, wherein said outer layer of resilient material is formed from nitrile foam rubber.

9. The multilayer glove of Claim 1, wherein said outer layer of resilient material is formed from a member of the group consisting of silicone, polyurethane, polyvinyl chloride, natural rubber, and synthetic rubber.

10. The multilayer glove of Claim 1, wherein said outer layer of resilient material comprises a reinforcing element.

11. The multilayer glove of Claim 10, wherein said reinforcing element has at least one relief area formed therethrough.

12. The multilayer glove of Claim 10, wherein said reinforcing element has a substantially uniform thickness.

13. The multilayer glove of Claim 10, wherein said reinforcing element has a thickness of about 20 – 80 mil.

14. The multilayer glove of Claim 10, wherein said reinforcing element is formed on a palm side thereof.

15. The multilayer glove of Claim 11, comprising a finger guard secured on a backhand side of thereof.

16. The multilayer glove of Claim 1, wherein said outer layer of resilient material comprises a plurality of the reinforcing elements.

17. The multilayer glove of Claim 16, wherein said plurality of reinforcing elements has at least one relief area formed therebetween.

18. The multilayer glove of Claim 16, wherein at least one of the plurality of reinforcing elements are formed to have a first color, and wherein at least another one of the plurality of reinforcing elements are formed to have a second color.

19. A multilayer glove, comprising:

a fabric substrate in the form of a glove and having an outer surface;

an intermediate layer of resilient material applied to said fabric substrate so as to completely cover at least a portion of said outer surface thereof; and

an outer layer of resilient material bonded to a palm area of said intermediate layer such that said outer layer is separated from said fabric

substrate by said intermediate layer, said outer layer including at least one reinforcing element forming a vulcanized bond with the intermediate layer.

20. The multilayer glove of Claim 19, wherein said fabric substrate comprises a string-knit fabric, and wherein said intermediate layer and the outer layer are formed from nitrile rubber.

21. A method of manufacturing a multilayer glove, comprising:

providing a fabric substrate having an outer surface in the form of a glove; and

applying an intermediate layer of resilient material to said fabric substrate so as to completely cover at least a portion of said outer surface thereof; and

bonding an outer layer of resilient material to at least one selected area of said intermediate layer such that said outer layer is separated from said fabric substrate by said intermediate layer.

22. The method of Claim 21, wherein applying the intermediate layer comprises passing reinforcing material through a mesh member onto the intermediate layer.

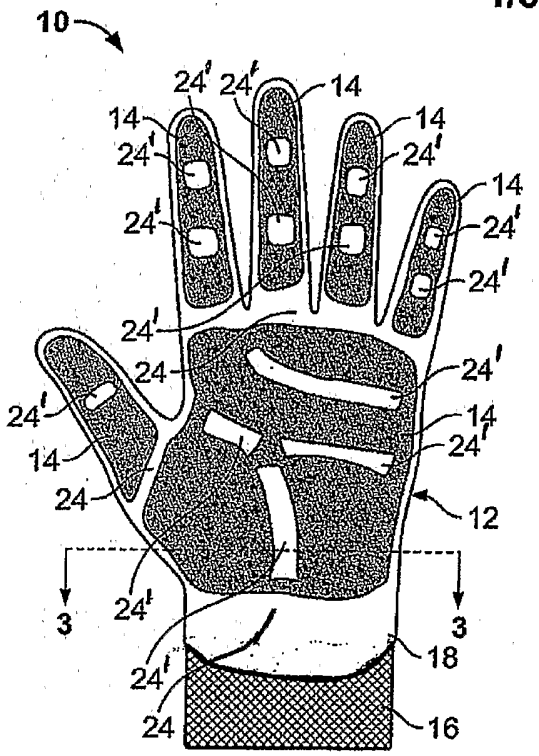

FIG. 1

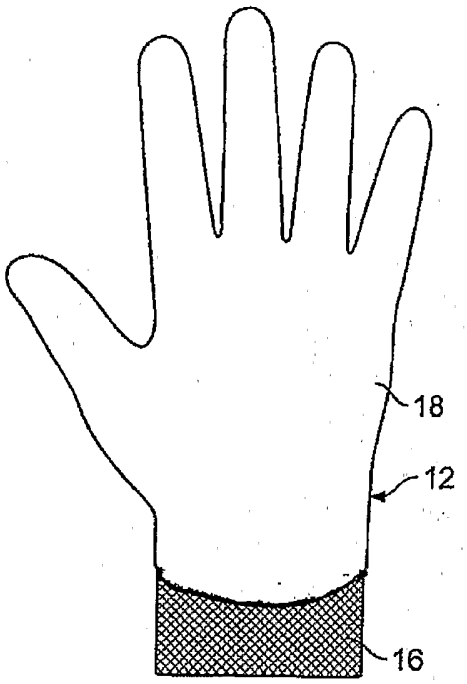

FIG. 2

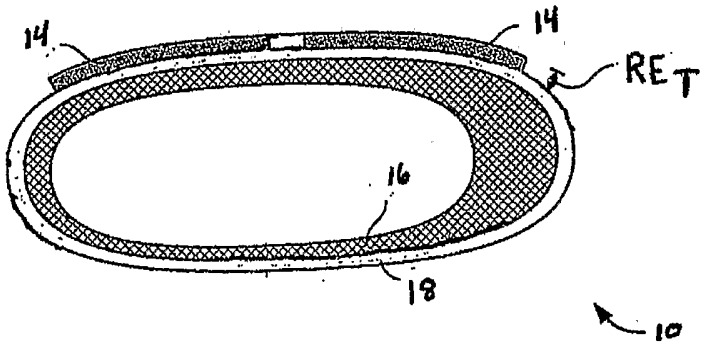

FIG. 3

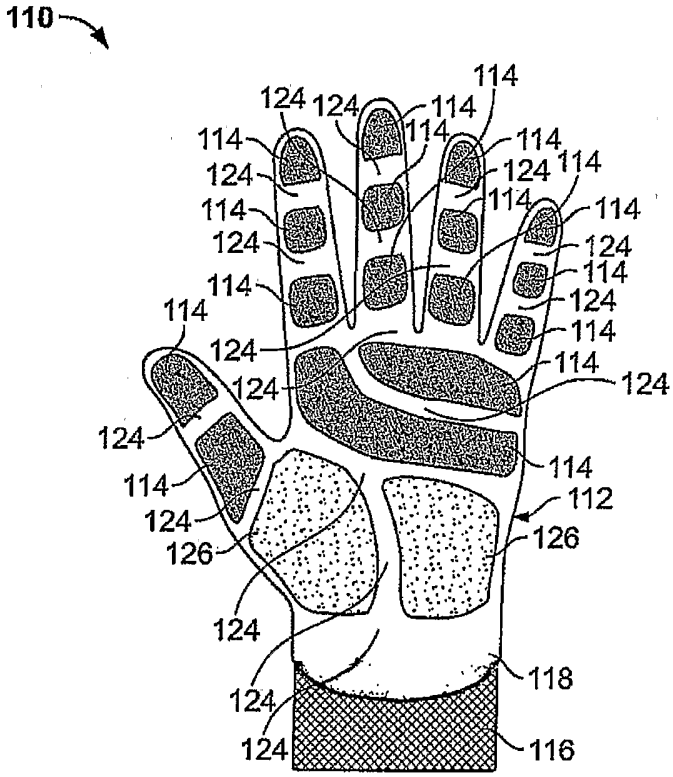

FIG. 4

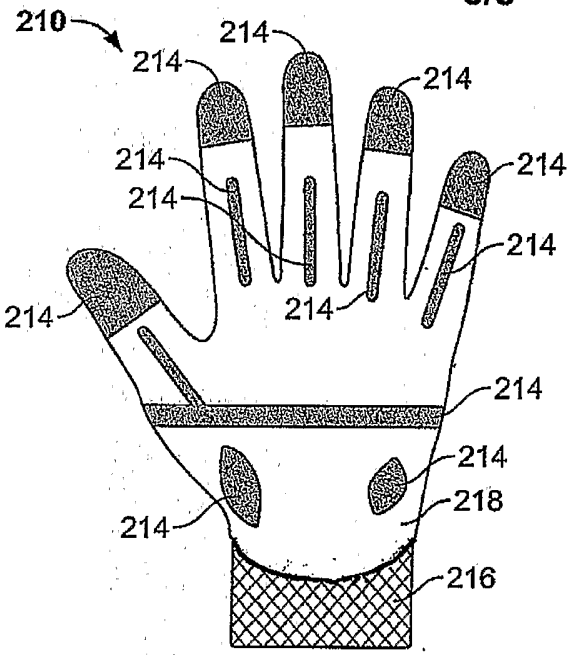
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FIG. 5

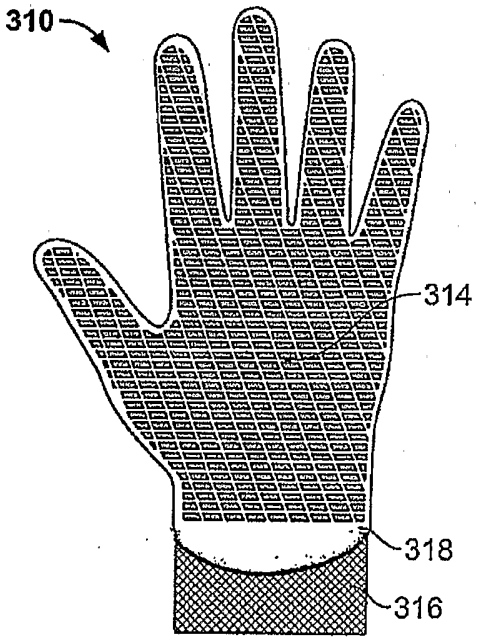
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FIG. 6

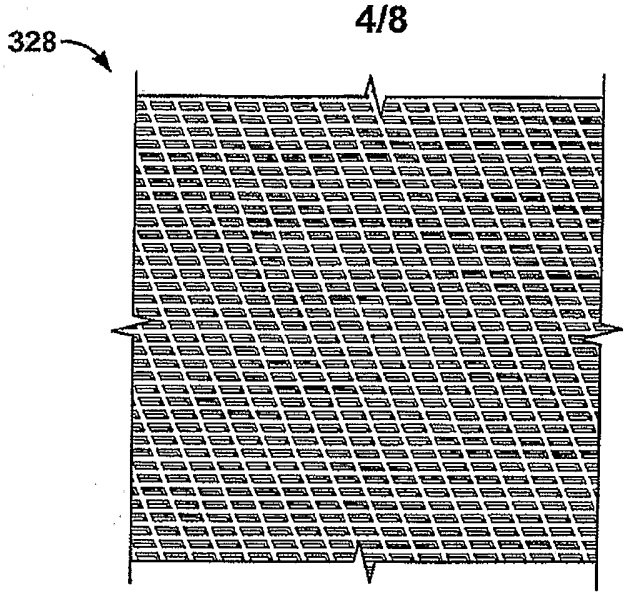

FIG. 7

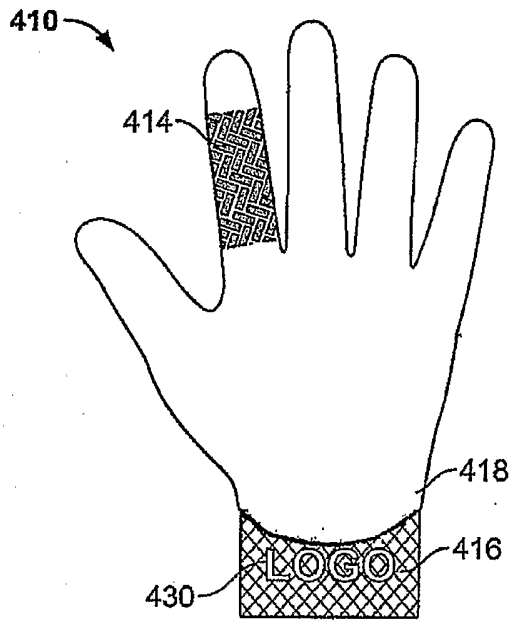

FIG. 8

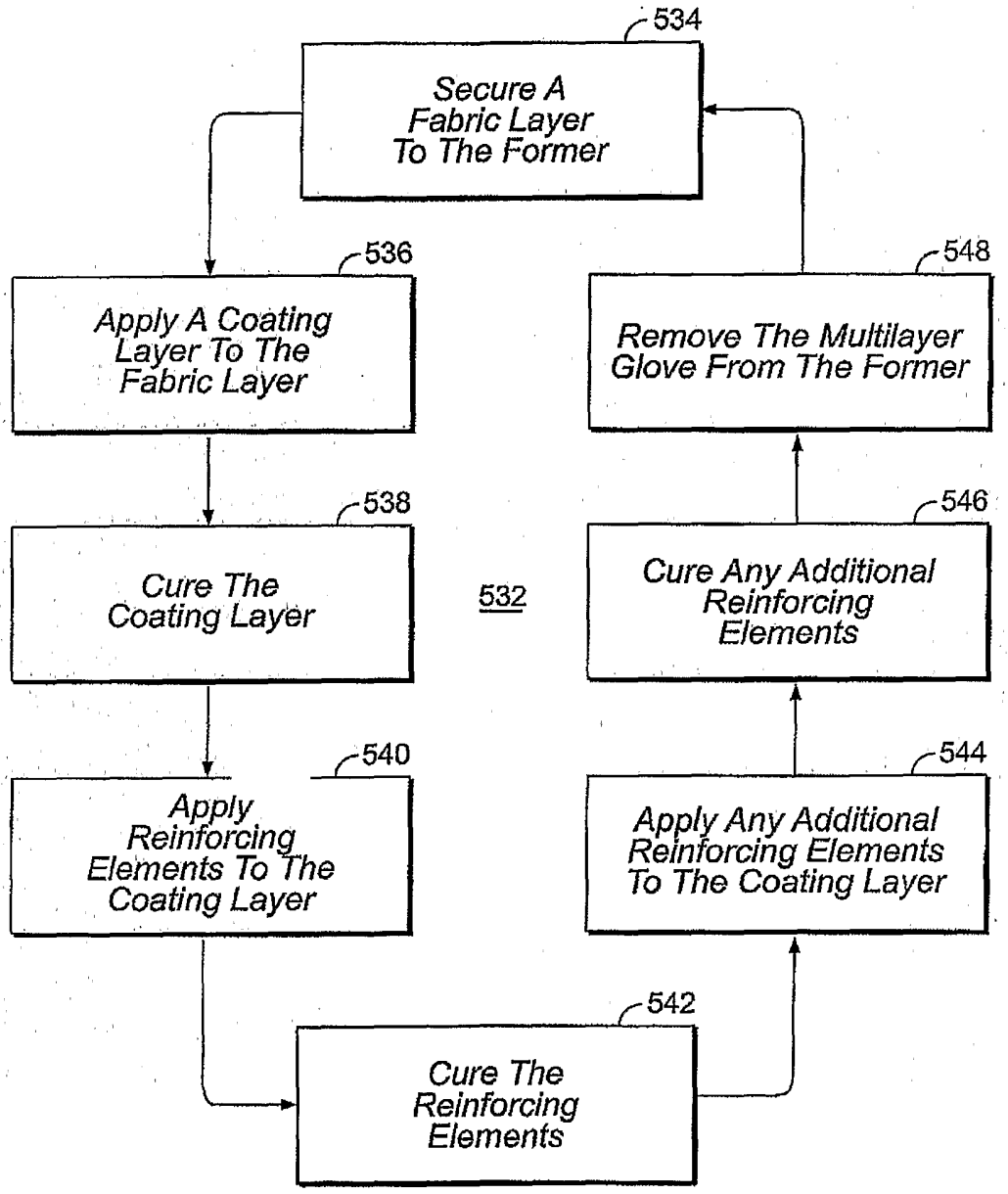
534
Secure A Fabric Layer To The Former
536
Apply A Coating Layer To The Fabric Layer
538
Cure The Coating Layer
540
Apply Reinforcing Elements To The Coating Layer
542
Cure The Reinforcing Elements
544
Apply Any Additional Reinforcing Elements To The Coating Layer
546
Cure Any Additional Reinforcing Elements
548
Remove The Multilayer Glove From The Former
532

FIG. 9

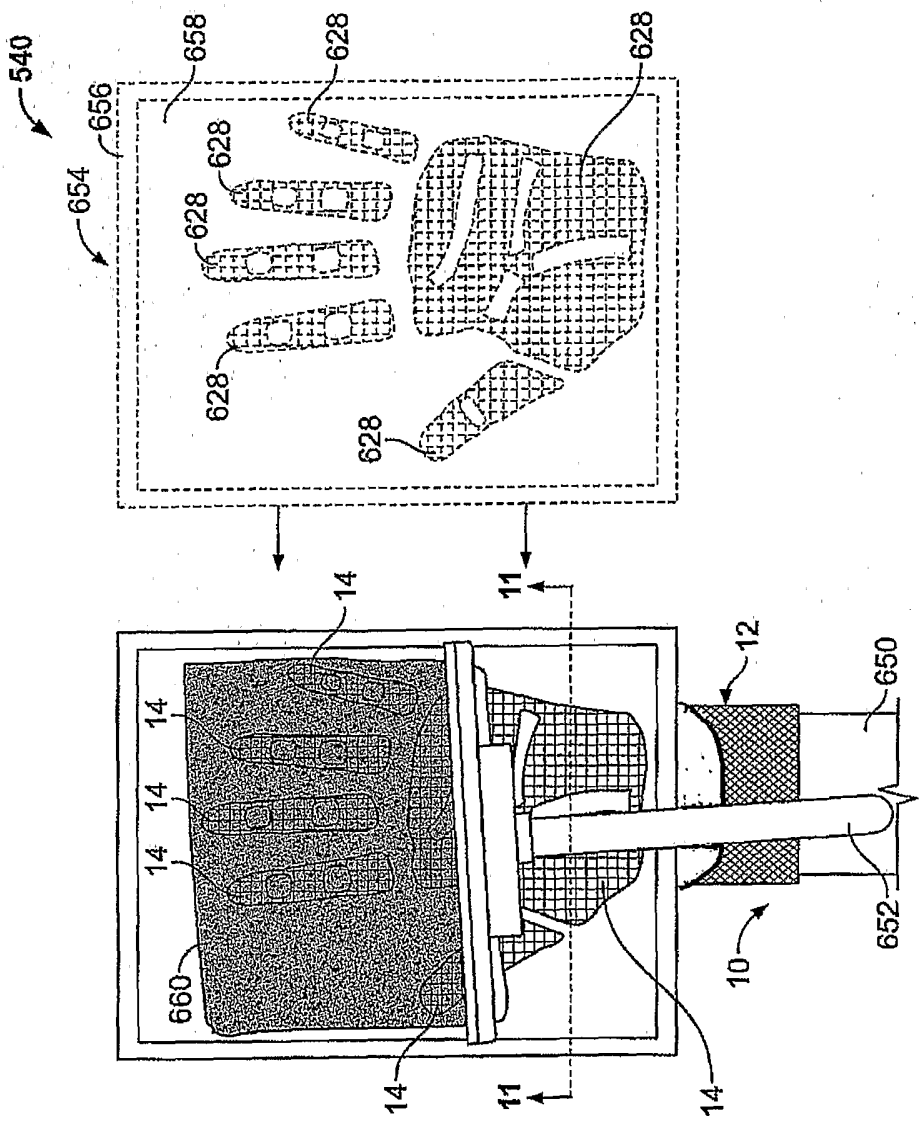
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FIG. 10

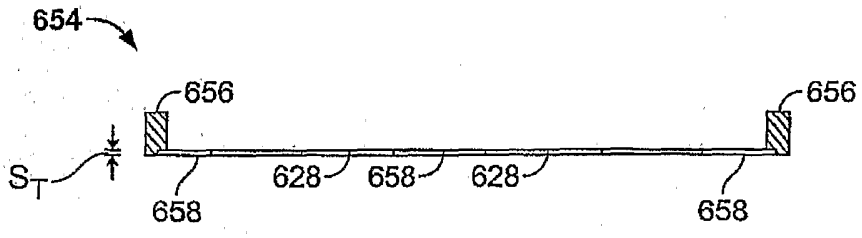
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FIG. 11

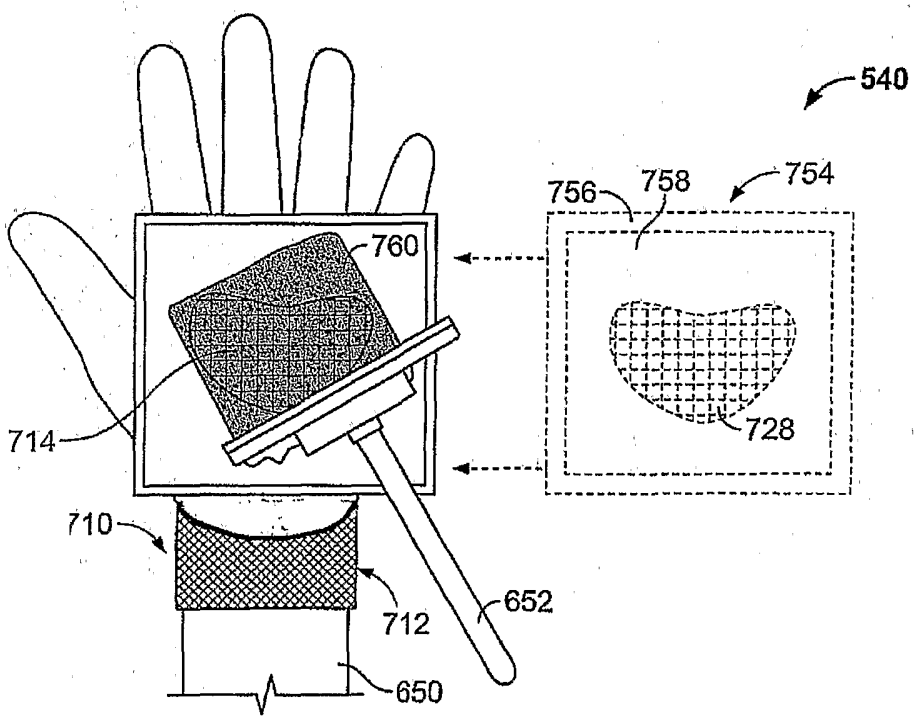
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FIG. 12

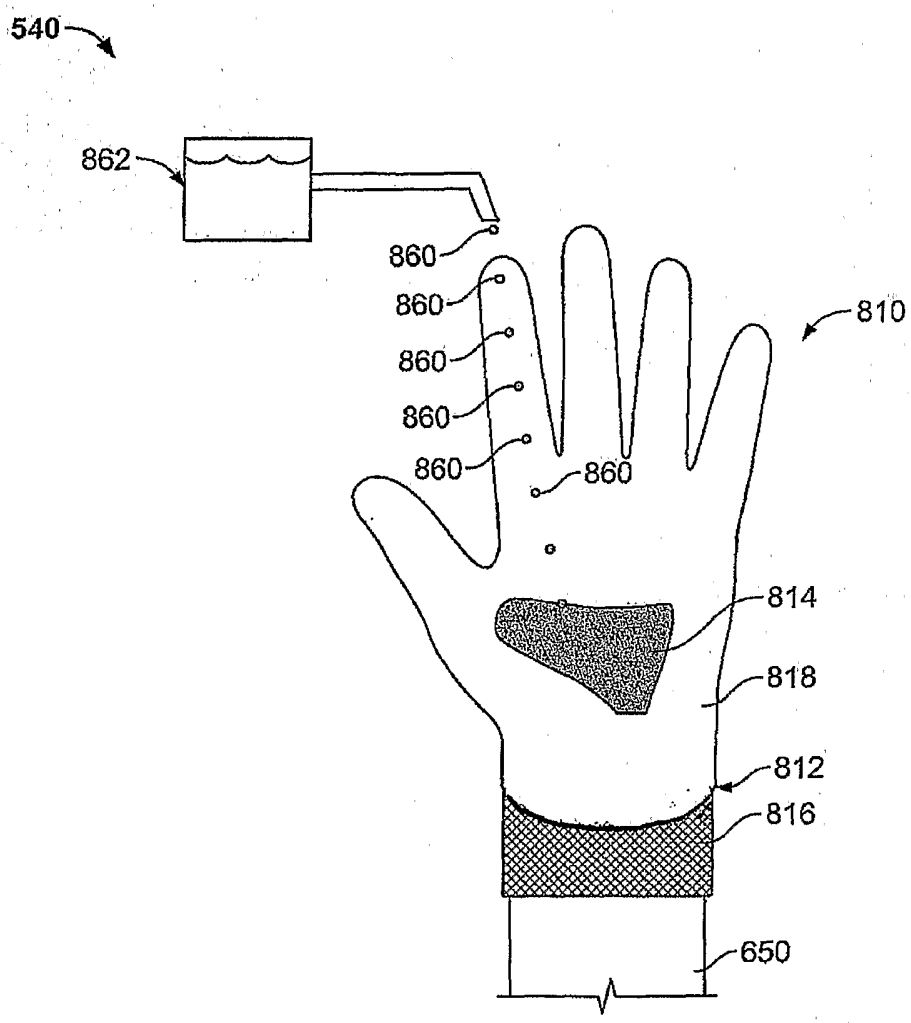

FIG. 13