

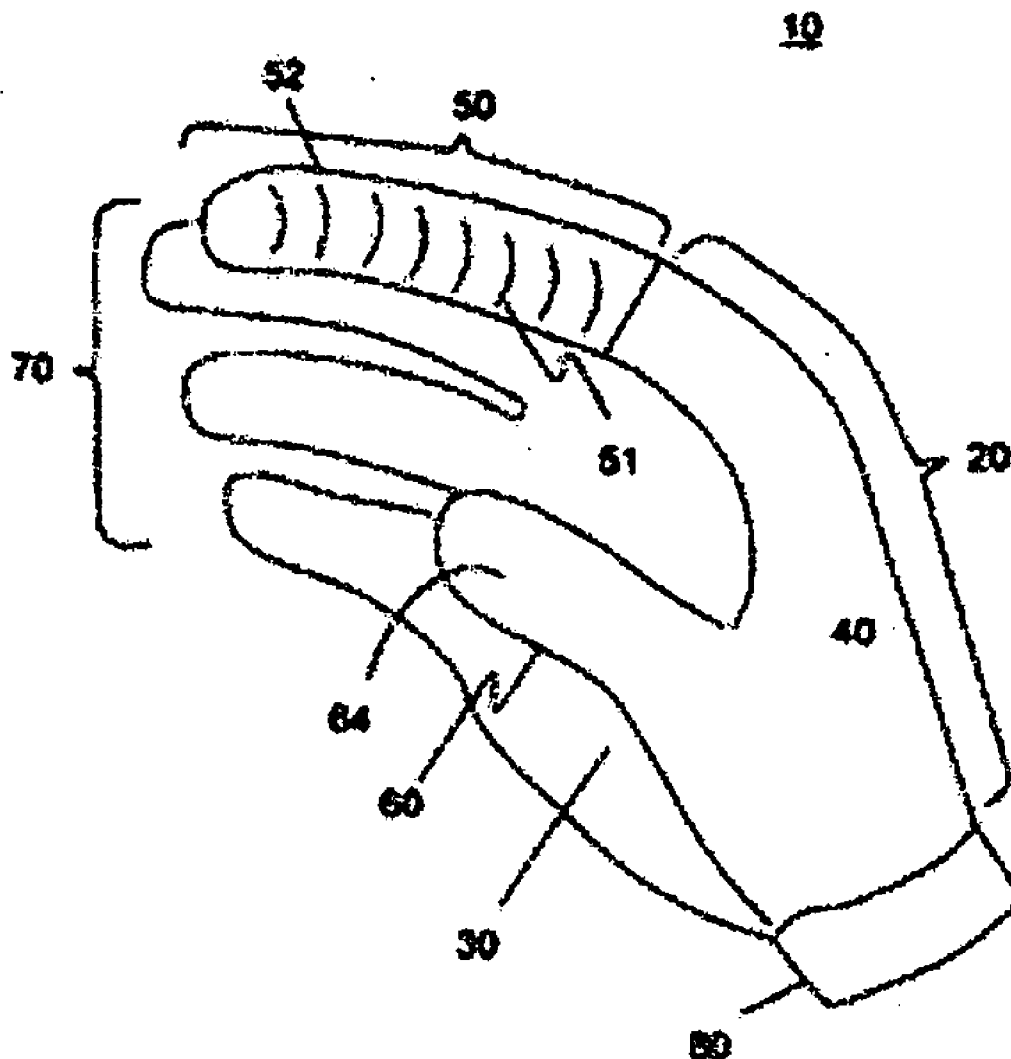


US 20070199130A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0199130 A1****Gray**(43) **Pub. Date: Aug. 30, 2007**(54) **ENDOSCOPY GLOVE**(52) **U.S. Cl. .... 2/159**(76) **Inventor: Brent M. Gray, College Station, TX (US)**(57) **ABSTRACT**

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An endoscopy glove made of a material that provides a user with body fluid protection, tactile sensation and gripping ability for manipulating an endoscope when body fluids are present. The endoscopy glove has a body portion, a finger covering portion and a thumb covering. The body portion has a palmar surface and a dorsal surface where the palmar surface is a material having absorbing and gripping characteristics even when wet. The finger covering portion includes an index finger covering and a remaining finger covering portion where the index finger covering has a tactile portion that is a material having tactile characteristics similar to surgical gloves.

(21) **Appl. No.: 11/307,818**(22) **Filed: Feb. 24, 2006****Publication Classification**(51) **Int. Cl. A41D 19/00 (2006.01)**



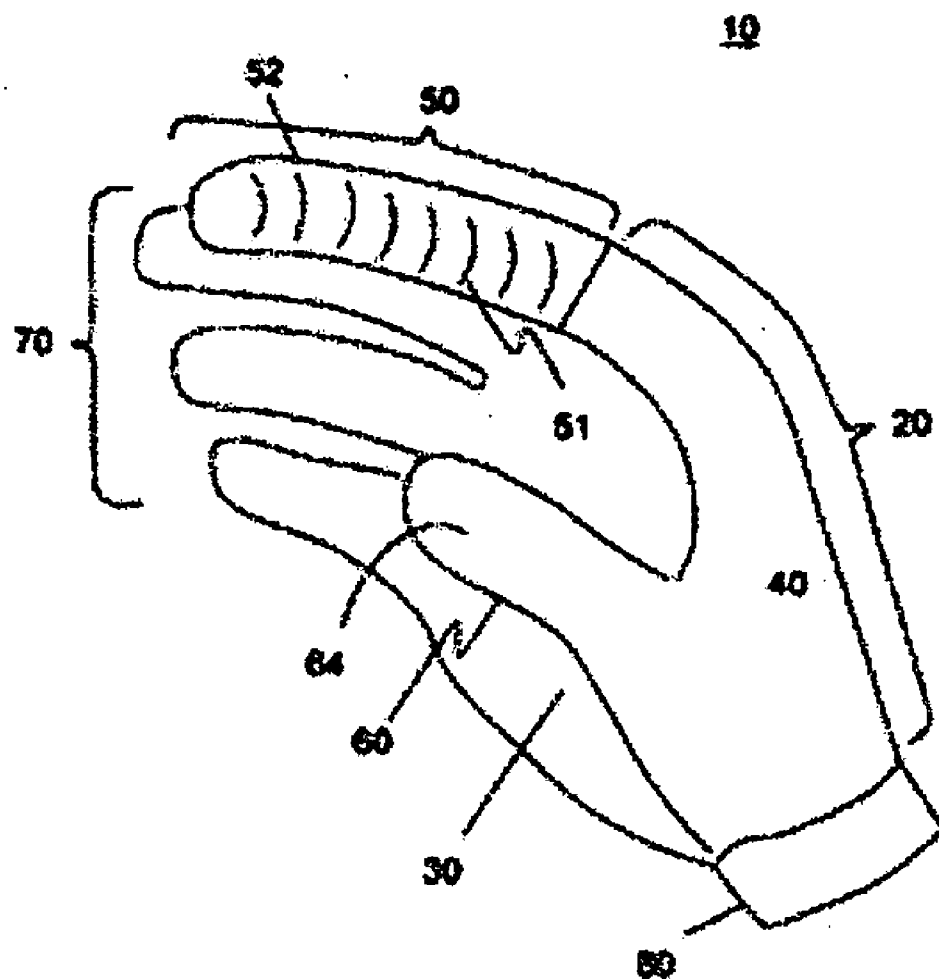


Fig. 1



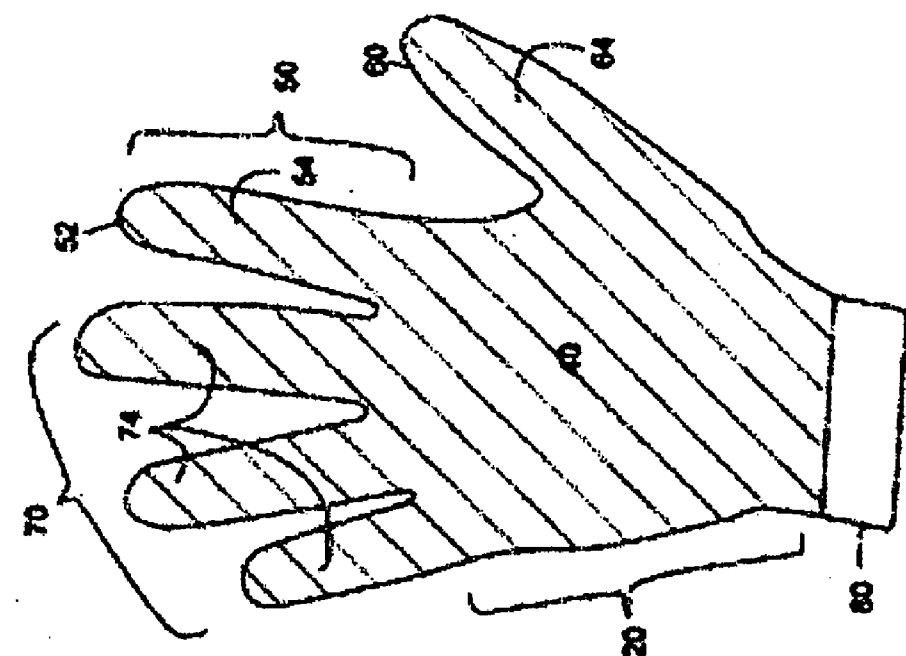


Fig. 2a

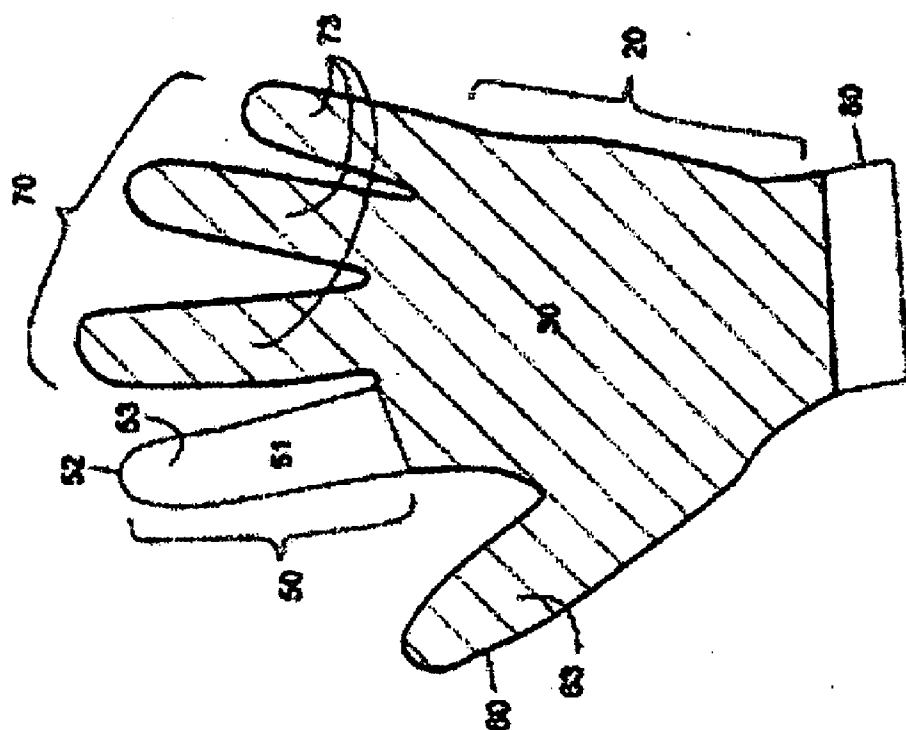


Fig. 2b



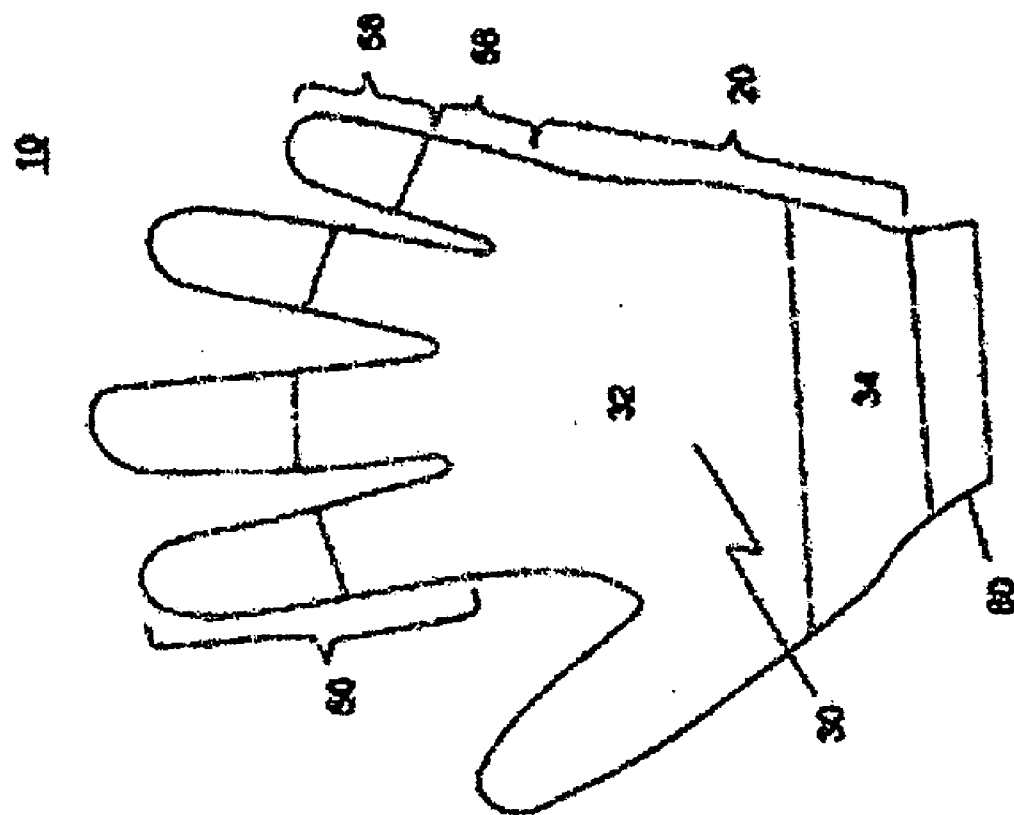


Fig. 3



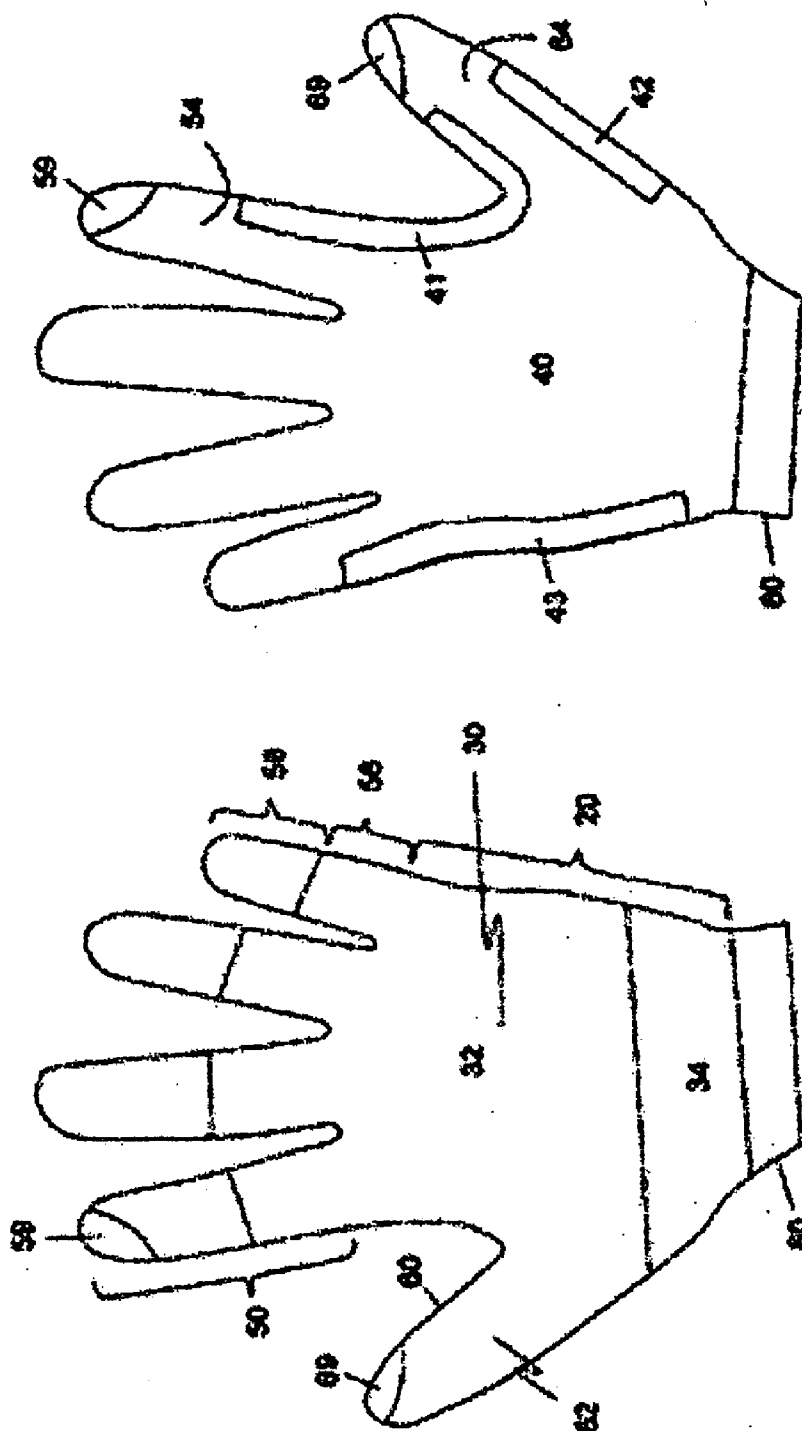


Fig. 4b

Fig. 4a



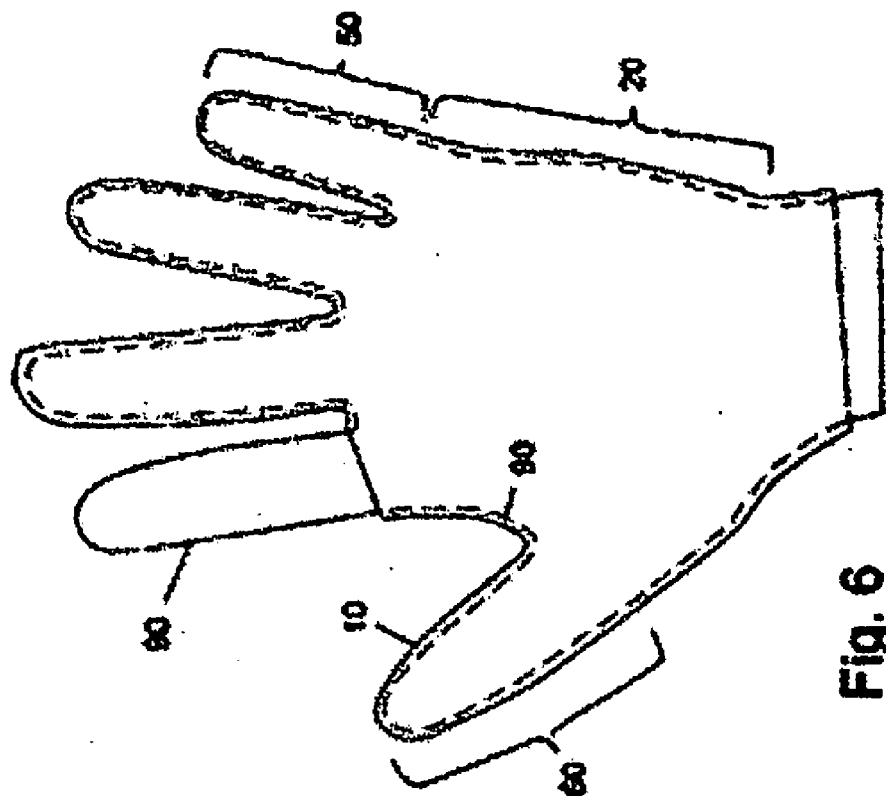


Fig. 6

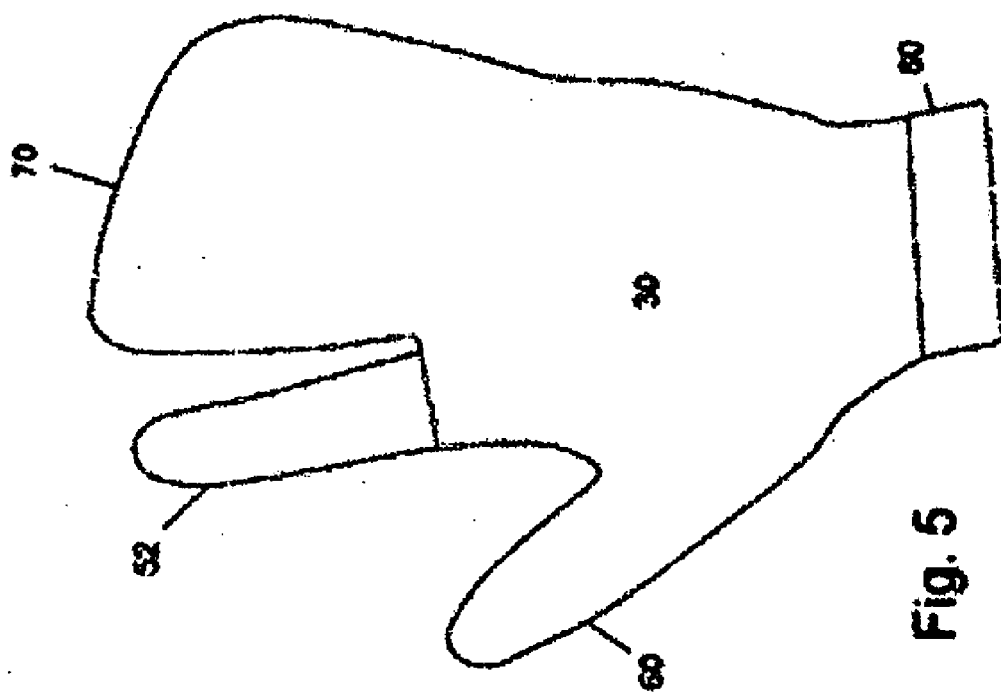


Fig. 5



## ENDOSCOPY GLOVE

### BACKGROUND OF THE INVENTION

#### [0001] 1. Field of the Invention

[0002] The present invention relates generally to gloves. Particularly, the present invention relates to an endoscopy glove used for medical procedures.

#### [0003] 2. Description of the Prior Art

[0004] Gloves are worn for a variety of reasons. Gloves can be worn decoratively, for protection, or to improve object handling. As a protective layer, gloves shield the hand from external elements such as temperature, contaminants, sharp materials, and impact forces. To improve object handling, gloves can be contoured to make them more adhesive.

[0005] Gloves are worn consistently in the medical profession. They provide a barrier of protection between the patient and doctor to prevent the transmission of infection or contaminants. Typically, medical gloves are pin-hole free to provide an impenetrable barrier of protection to both the patient and the doctor. Medical gloves are also thin to retain tactile sensation and hand dexterity. Invasive procedures are a particular application in which tactile sensation, hand dexterity, and protection are necessary.

[0006] Endoscopy is a minimally invasive medical procedure. This is a method which introduces instruments into the body through natural cavities or through small incisions. Degree of care is critical in this type of environment because of the specialized nature of the procedures. For this reason, handling of endoscopic tools is particularly important. Although surgical gloves have been used to perform endoscopic procedures, they suffer from a serious disadvantage. When surgical gloves get wet, as is the case in the presence of body fluids, they lose their gripping capabilities. In fact, they become slippery. The presence of body fluids or liquids between the surgical glove and the endoscopic tool makes the tool slippery and, thus, more difficult to handle. In other words, surgical gloves lack the proper gripping characteristics for handling the endoscope when body fluids are present.

[0007] The issue of increased glove grip has been addressed for uses other than in medical procedures and several solutions have been proposed. Several of these devices have been disclosed.

[0008] One solution to improving grip is the use of suction cups on a glove. U.S. Pat. No. 6,427,248 (2002, Albert) and U.S. Pat. No. 6,675,392 (2004, Albert) disclose a control-enhancing material which includes a plurality of recesses, such as suction cups, positioned on the palm portion of a bowling glove. The control-enhancing material is positioned at all or some of the areas on the glove that contact the bowling ball. These areas include the underside of the index, middle, ring, and little fingers as well as the thumb. The control enhancing material works to grip the surface of the bowling ball by a suction force and a friction force.

[0009] Another device, U.S. Pat. No. 6,526,593 (2003, Sajovic) and U.S. Pat. No. 6,745,403 (2004, Sajovic), disclose a glove comprising a palm, a thumb, at least one finger, and a plurality of suction devices attached to the palm, at least one finger, or both. The suction devices have a Shore A durometer reading from about 20 to about 90.

[0010] U.S. Pat. No. 6,081,928 (2000, Bourne) discloses a thin elastomeric glove with enhanced gripping surfaces molded into the gripping surfaces of the glove. The enhanced gripping surface is molded into each of the finger and thumb tips and body portions of the glove. The enhanced gripping surface may be comprised of a plurality of concave indentations molded into the gripping surfaces of the glove or a plurality of suction cups molded into the gripping surfaces of the glove.

[0011] Another solution to improve grip is the use of a coating adhered to the glove. U.S. Pat. No. 4,555,813 (1985, Johnson) discloses an improved abrasion and cut resistant surface for work gloves, work shoes, and like wearing apparel. The surface of the glove provides a porous surface that is also breathable and has moisture absorbing properties. The surface is a foam surface laminated to a substrate. The foam, prior to lamination, may be foamed using mechanical or chemical means with varying amounts of air depending upon the degree of abrasion resistance required.

[0012] U.S. Pat. No. 4,567,612 (1986, Johnson) discloses an improved slip and/or skid resistant surface for work gloves, work shoes, floor coverings in work areas, and the like. The surface has a porous gripping surface which is particularly useful in greasy and oily environments. The surface is a foam surface laminated to a substrate. The foam, prior to lamination, may be foamed with varying amounts of air, through mechanical or chemical means, depending upon the degree of abrasion resistance required.

[0013] U.S. Pat. No. 5,146,628 (1992, Herrmann) discloses a glove having a patterned polyurethane coating adhered to the outer surface of the glove to give the glove slip-resistant and gripping properties. The coating is formed from a mixture of a pre-mixed thixotropic component and a cross-linking agent. The coating is applied to the glove as a strip and then cured.

[0014] Other prior art devices choose a material more amenable to gripping. U.S. Pat. No. 5,467,484 (1995, Drescher, et al.) discloses a non-slip glove having a front panel cut from a multi-layered laminated, flexible, sheet material where a polymer compound exhibiting a relatively high coefficient of friction is supported upon an inner fabric layer. It has a rear panel of breathable, elastic fabric having a hand-like shape substantially similar to the front panel. There is a cuff secured to the bottom of the front and rear panels and an eyelet lining in the cuff for fastening the glove to a retaining surface to prevent loss. Additionally, there is a light reflective material joined to the rear panel for increasing the visibility of the glove in conditions of low light.

[0015] U.S. Pat. No. 4,561,122 (1985 Stanley et al.) discloses a protective glove constructed of shock-absorbent material. The glove pads the critical areas of wrap-around grasp yet permits unimpeded finger tip feel by exposing the distal phalanges. The glove also preserves the normal palmar/dorsal balance of sensation during flexion and extension by covering the palmar curve and dorsal surfaces of the second-innermost joints such that the glove exerts forces on the palmar surface and joints in proportion to the forces caused by normal compression and stretching at those perspective positions on an unprotected hand.

[0016] A primary disadvantage to these devices is that they do not retain their gripping action when wet. Another



disadvantage of these prior art devices is that increased gripping capabilities are provided at the expense of tactile sensation in the palmar region of the glove.

[0017] Therefore, what is needed is a glove that provides improved gripping characteristics. What is also needed is a glove that provides improved gripping characteristics even when wet. What is further needed is a glove that retains sufficient tactile feeling for manipulating medical instruments.

#### SUMMARY OF THE INVENTION

[0018] Present day surgical gloves provide the tactile feeling required for surgical procedures. Most surgical procedures, however, expose the gloved hands of the caregiver to body fluids. Body fluids make the surface of the surgical glove slippery, which is especially burdensome when handling medical equipment.

[0019] Therefore, it is an object of the present invention to provide a glove for use with medical equipment. It is another object of the present invention to provide a glove for use with endoscopic instruments. It is a further object of the present invention to provide a glove which retains its gripping action even when wet, i.e. exposed to body fluids. It is yet another object of the present invention to provide a glove that maintains its gripping capabilities when exposed to body fluids and provides sufficient tactile feeling for the intended use. It is another object of the present invention to make a glove that is inexpensive to manufacture.

[0020] The present invention achieves these and other objectives by providing an endoscopy glove that maintains its gripping capability when exposed to body fluid while retaining sufficient tactile sensation for handling medical instruments. The material used to provide the gripping capability must also provide absorbency to wick away the wet fluid so that the material retains its gripping characteristics. The endoscopy glove of the present invention may be structured as (1) a complete overglove for use over a surgical glove, (2) an overglove that exposes portions of a surgical glove or (3) a single-use glove that provides gripping action when wet and prevents cross-contamination.

[0021] In one embodiment, the endoscopy glove of the present invention includes at least palmar side areas that incorporate a material/fabric having both absorbency, wicking and friction characteristics. The absorbency characteristics enable these at least palmar side areas to absorb and wick away the body fluid that gets on the medical instrument such as, for example, an endoscope and the like, and then transferred to the glove of the user as the user handles the medical instrument. The friction characteristics enable these at least palmar side areas to continue providing the gripping capabilities of the glove even when the glove of the user is exposed to the transferred body fluids, i.e. even when wet.

[0022] In another embodiment of the present invention, the endoscopy glove includes a body portion, a finger covering portion and a thumb covering. The body portion has a palmar surface and a dorsal surface. The palmar surface has areas with material/fabric that provide the absorbency, wicking and friction characteristics disclosed above. The finger covering portion includes an index finger covering and a remaining finger covering portion. The index finger covering has a tactile portion that does not have the

gripping-when-wet characteristics of the palmar surface of the body portion. The tactile portion of the index finger may optionally be limited to the palmar side.

[0023] In another embodiment of the present invention, the finger covering portion has a distal region and a proximal region. The distal region of the finger covering portion is the tactile region while the proximal region has the material/fabric that provides the absorbency, wicking and friction/gripping characteristics disclosed. In another embodiment of the present invention, the distal region of the remaining finger covering portion is made of material/fabric substantially equal to the palmar surface of the body portion.

[0024] In yet another embodiment of the present invention, the dorsal surface of the body portion does not have the gripping-when-wet material/fabric present at the palmar surface and has material substantially equal to the tactile portion of the index finger covering.

[0025] In still another embodiment, the present invention has a finger distal region and a finger proximal region of the finger covering portion. The finger distal region has an index finger tip region that is the tactile portion while the remaining areas incorporate the material having the gripping-when-wet characteristics.

[0026] In another embodiment of the present invention, the body portion has an absorbent, grip-enhancing palmar surface with a wrap-around dorsal portion. Like the palmar surface, the wrap-around dorsal portion incorporates the material/fabric having the gripping-when-wet characteristics substantially equal to the palmar surface. This allows for improved gripping along the side of the hand and between the thumb and index finger when these areas are moistened by the presence of body fluids.

[0027] The present invention is designed to provide better gripping of endoscopes, especially those used in colonoscopies. It is particularly important that the index finger or a portion of the index finger provides sufficient tactile feeling while the remainder of the glove (especially on the palm side) preferably incorporates a material/fabric of the present invention to provide a surface having the heretofore mentioned absorbing, wicking and gripping characteristics. The material can be any material/fabric, synthetic or natural, that maintains a gripping action even when wet to prevent the slippery feeling characteristic of surgical gloves when manipulating the endoscope. Examples of usable materials include latex, terry cloth, paper, gauze, synthetic polymers, and the like. The gripping, absorbing and wicking characteristics of the glove may be achieved by varying the type of material in different areas of the glove or combining different materials or laminating one material to another in the locations required by the present invention. An additional feature of the material for the preferred embodiment would be a material that also absorbs moisture from the hand of the user inside the glove.

[0028] The gloves of the present invention may be single use or multiple use gloves. The advantages of a single use glove are that no cleaning/sterilization is required and there is no concern about cross-contamination. In the alternative, the advantages of a multiple use glove is that it is reusable. Unlike single use gloves, a multiple use glove should be durable yet easily laundered.

[0029] The present invention also includes a combination embodiment. The combination embodiment includes a sur-



gical glove and an index fingerless terry cloth-like glove that fits over the surgical glove. The terry cloth-like-glove provides the absorbing, wicking and gripping characteristics for manipulating an endoscope while the absence of an index finger on the terry cloth-like glove allows the tactile feeling provided by the surgical glove. This embodiment is a less expensive alternative that is reusable and easily sterilized.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIG. 1 is a perspective view of one embodiment of the endoscopy glove of the present invention.

[0031] FIG. 2a is a front view of another embodiment of the present invention showing the palmar surface of the glove made of the gripping-when-wet material/fabric while the entire palmar surface of the index finger has a different material.

[0032] FIG. 2b is a back view of the embodiment in FIG. 2a of the present invention.

[0033] FIG. 3 is a front view of another embodiment of the present invention showing the distal region of the fingers having a material other than the gripping-when-wet material.

[0034] FIG. 4a is a front view of another alternative embodiment of the present invention showing the palmar surface having various portions with different materials where the tactile portions are at and near the tips of the thumb and index finger.

[0035] FIG. 4b is a back view of the embodiment in FIG. 4a of the present invention.

[0036] FIG. 5 is a front view of the palmar surface of another embodiment of the present invention showing two finger portions.

[0037] FIG. 6 is a plan view of another embodiment of the present invention showing a combination glove over glove.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0038] The preferred embodiment(s) of the present invention is illustrated in FIGS. 1-6. FIG. 1 illustrates a perspective view of endoscopy glove 10 of the present invention. Endoscopy glove 10 includes body portion 20, a finger covering portion 50, a thumb covering 60, and an optional sleeve 80. Body portion 20 includes a palmar surface 30 and a dorsal surface 40. Finger covering portion 50 includes an index finger covering 52 and a remaining finger portion covering 70. Index finger covering 52 has a tactile portion 51. Tactile portion 51 provides the user with relatively good tactile feeling when manipulating an endoscope. The preferred tactile feeling is similar to the feeling provided by surgical gloves. The remaining portions of endoscopy glove 10 may be made of a material/fabric that provides absorbency, wicking and gripping action when wet. However, at least palmar surface 30 incorporates the absorbing and grip enhancing material that provides glove 10 with the non-slip advantage of the present invention when body fluids are present.

[0039] Turning now to FIG. 2a, there is illustrated a front view of an alternative embodiment of the embodiment shown in FIG. 1. Endoscopy glove 10 includes palmar

surface 30 of body portion 20 located between finger covering portion 50, thumb covering 60, and optional sleeve 80. Finger covering portion 50 includes index finger covering 52 and remaining finger portion 70. Index finger covering 52 includes tactile portion 51 on a palmar side 53 while palmar side 73 of remaining finger portion 70 has the absorbing/gripping characteristics similar to palmar surface 30 of body portion 20. FIG. 2b illustrates a back view of endoscopy glove 10. The entire dorsal side 40 of body portion 20 as well as dorsal side 54 of index finger covering 52, dorsal side 74 of remaining finger portion 70 and dorsal side 64 of thumb covering 60 have the absorbing/gripping characteristics substantially similar to palmar surface 30 of body portion 20. Effectively, the entire surface of endoscopy glove 10 has absorbing and gripping characteristics and only the palmar side 53 of index finger covering 52 incorporates a material similar to the tactile characteristics of a surgical glove.

[0040] Endoscopy glove 10 can be made of any suitable material that provides the aforementioned absorbing and gripping characteristics needed to manipulate an endoscope even when body fluids are present. Examples of a material that may provide the absorbing and gripping characteristics include terry cloth, paper, gauze, synthetic polymers having absorbing and/or wicking properties, and any combination of materials that provide the characteristics required for endoscopy glove 10. Additionally, endoscopy glove 10 can be made for single use or multiple use depending on the material selection as described above. Endoscopy glove 10 can be made in various sizes to accommodate the various hand sizes of different users. Optional sleeve 80 is made of any suitable material commonly used for various types of gloves.

[0041] In this embodiment, it is noted that tactile portion 51 of index finger covering 52 is composed of a glove material that provides tactile feeling comparable to that provided by a surgical glove. The remaining portions of endoscopy glove 10 are composed of material/fabric that provides the aforementioned absorbing, wicking and gripping characteristics.

[0042] FIG. 3 illustrates a front view of the palmar surface of another embodiment of the present invention. In this embodiment, endoscopy glove 10 includes palmar surface 30 of body portion 20 located between finger covering portion 50, thumb covering 60, and optional sleeve 80. Finger covering portion 50 is divided into two regions—a finger proximal region 56 and a finger distal region 58. Palmar surface 30 is divided into two regions—upper palmar region 32 and lower palmar region 34. Finger distal region 58 of finger covering portion 50 and lower palmar region 34 of palmar surface 30 are the tactile areas and are composed of material that is characteristically different relative to the rest of endoscopy glove 10. Preferably, the material is similar to the material typically used for a surgical glove. Finger proximal region 56 of finger covering portion 50, thumb covering 60, and upper palmar region 32 of palmar surface 30 are composed of the material/fabric having the absorbency, wicking and gripping characteristics when wet while the material at distal region 58 of finger covering portion 50 may be another material having characteristics somewhere between the characteristics of typical surgical gloves and the absorbing, wicking and gripping characteristics of the preferred material/fabric of the present



invention. In another variation, only the palmar surfaces of finger distal region 58 has tactile characteristics while the remaining surfaces of endoscopy glove 10 have the absorbing and gripping characteristics.

[0043] Turning now to FIG. 4a, there is illustrated a front view of the palmar surface of an alternate embodiment of the present invention. Endoscopy glove 10 includes palmar surface 30 of body portion 20 located between finger covering portion 50, thumb covering 60, and optional sleeve 80. Finger covering portion 50 is divided into two regions—a finger proximal region 56 and finger distal region 58. Index finger covering 52 has a third region, finger tip region 59. Finger tip region 59 is substantially circular and preferably, slightly skewed toward thumb 60. Finger tip region 59 of index finger covering 52 extends to dorsal side 54 of index finger covering 52. Thumb covering 60 includes two regions—a thumb proximal region 62 and thumb tip region 69. Thumb tip region 69 is substantially circular and preferably, slightly skewed toward index finger covering 52.

[0044] Thumb tip region 69 of thumb covering 60 extends to dorsal side 64 of thumb covering 60, as can be seen in FIG. 4b. Palmar surface 30 is divided into two regions—upper palmar region 32 and lower palmar region 34. Finger tip region 59 of index finger covering 52 and thumb tip region 64 of thumb covering 60 are composed of a material having tactile characteristics similar to that of a surgical glove. Finger distal region 58 of finger covering 50 and lower region 34 of palmar surface 30 are composed of a material that is either the same or different from the material in finger tip region 59 of index finger covering 52. Finger proximal region 56 of finger covering 50, thumb proximal region 62 of thumb covering 60, and upper palmar region 32 of palmar surface 30 are composed of the material/fabric having the absorbing and gripping characteristics even when wet that is required when glove 10 encounters the presence of body fluids. The absorbing and gripping characteristics material of finger proximal region 56 of finger covering 50, thumb proximal region 62 of thumb covering 60, and upper palmar region 32 of palmar surface 30 extends into dorsal surface 40 at dorsal portions 41, 42 and 43, as illustrated in FIG. 4b. It should be noted that dorsal surface 40 including the dorsal sides of finger covering portion 50 may be made of a material similar to the material used for finger distal region 58.

[0045] It should be understood that remaining finger portion covering 70 may be individual finger coverings as illustrated in FIGS. 1-4 or it may be a covering for the second, third and fourth fingers as illustrated in FIG. 5. Remaining finger portion covering 70 may have a structure more like a mit where the second, third and fourth fingers occupy the same space within endoscopy glove 10. It is further noted that the embodiment in FIG. 5 may also have any of the “zones” or “areas” of tactile/absorbing/gripping characteristics disclosed herein or any other zone or area configuration so long as glove 10 provides both the necessary tactile feature needed for easy finger manipulation of the equipment and the absorbing and gripping feature needed even when wet to avoid the slippery interface commonly experienced between conventional surgical gloves and the equipment when exposed to body fluids.

[0046] Turning now to FIG. 6, there is illustrated another embodiment of the present invention. This embodiment is a

combination system which allows endoscopy glove 10 to be worn as an over-glove. Surgical glove 90 is worn directly over a hand (not shown). Endoscopy glove 10 is worn over surgical glove 90. Endoscopy glove 10 includes a body portion 20, thumb covering 60, and finger covering portion 50 which does not include an index finger covering. Endoscopy glove 10 provides the absorbing and gripping characteristics even when wet from the presence of body fluids while the index finger of the surgical glove provides the tactile portion for manipulating the endoscope. Although any of the materials previously listed can be used for endoscopy glove 10 as an over-glove, a terry cloth-like material is the preferred material for this particular embodiment for reasons of cost, reusability and cleanability.

[0047] Although the preferred embodiments of the present invention have been described herein, the above description is merely illustrative. Further modification of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

What is claimed is:

1. An endoscopy glove comprising:

a body portion having a palmar surface and a dorsal surface, said palmar surface comprising a material having absorbing and gripping characteristics even when wet;

a finger covering portion extending from said body portion including an index finger covering and a remaining finger covering portion, said index finger covering having a tactile portion; and

a thumb covering extending from said body.

2. The endoscopy glove of claim 1 wherein said index finger covering has a palmar side and a dorsal side wherein said palmar side of said index finger covering is said tactile portion.

3. The endoscopy glove of claim 1 wherein said finger covering portion has a distal region and a proximal region wherein said distal region of said finger covering portion is said tactile portion.

4. The endoscopy glove of claim 3 wherein said distal region of said remaining finger covering portion is a material substantially similar to said palmar surface of said body portion.

5. The endoscopy glove of claim 4 wherein said dorsal surface of said body portion is a material substantially similar to said tactile portion of said index finger covering.

6. The endoscopy glove of claim 1 wherein said finger covering portion has a finger distal region and a finger proximal region, wherein said index finger covering has an index finger tip region, said index finger tip region being said tactile portion.

7. The endoscopy glove of claim 6 wherein said thumb covering has a thumb proximal region and a thumb tip region wherein said thumb tip region is a material substantially similar to said tactile portion of said index finger covering.

8. The endoscopy glove of claim 6 wherein said finger distal region is a material with characteristics between said material of said index finger tip region and said palmar surface of said body portion.

9. The endoscopy glove of claim 8 wherein said palmar surface of said body portion has an upper palmar region and



a lower palmar region wherein said lower palmar region is a material substantially similar to said finger distal region.

**10.** The endoscopy glove of claim 9 wherein said dorsal surface of said body portion is a material substantially similar to said material of said lower palmar region.

**11.** The endoscopy glove of claim 10 wherein said proximal region of said finger covering portion is said material used for said upper palmar region of said palmar surface.

**12.** The endoscopy glove of claim 11 wherein said thumb proximal region is said material used for said upper palmar region of said palmar surface.

**13.** The endoscopy glove of claim 12 wherein said dorsal surface of said body portion is said material used for said lower palmar region of said palmar surface.

**14.** The endoscopy glove of claim 1 wherein said palmar surface of said body portion has a wrap-around dorsal portion that provides dorsal portions adjacent said palmar surface between said index finger covering and said thumb covering, along the side of said glove at a little finger side and along the side of said thumb covering, said wrap-around

dorsal portion having the same absorbing and gripping characteristics of said palmar surface.

**15.** The endoscopy glove of claim 1 further comprising a wrist sleeve portion.

**16.** An endoscopy glove and surgical glove combination, said combination comprising:

a surgical glove; and

an index fingerless glove made of a terry cloth-like material wherein said glove fits over said surgical glove.

**17.** An endoscopy glove made from a material that provides a user with body fluid protection, tactile sensation and gripping ability for manipulating an endoscope when body fluids are present.

**18.** The glove of claim 17 wherein said material is a combination of a material having gripping action when wet and a surgical glove barrier material.

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