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(54) **MEDICAL GOWN WITH A SECONDARY SLEEVE FOR EXTENDING OVER A SURGICAL GLOVE**

(52) **U.S. Cl. .... 2/48**

(76) **Inventor: W. Frederick Thompson, Gig Harbor, WA (US)**

(57) **ABSTRACT**

(21) **Appl. No.: 13/160,510**

A protective gown with a tubular overlay, or tube, on each gown sleeve attached on one end at the user's forearm as the tube extends toward the upper arm as a surgical glove is donned and the gown sleeve is tucked within the glove cuff. The tube then extends downward toward the sleeve end and over the glove cuff forming a channel in which the glove cuff is positioned and retained. The tube is secured to the glove from within the tube as it engages the glove cuff. Areas of increased frictional resistance may be added to the tube underside to engage the glove cuff secondary surface as the sleeve is tucked within the glove cuff. Increased frictional resistance may be obtained by employing strips or a coating with a low tack surface.

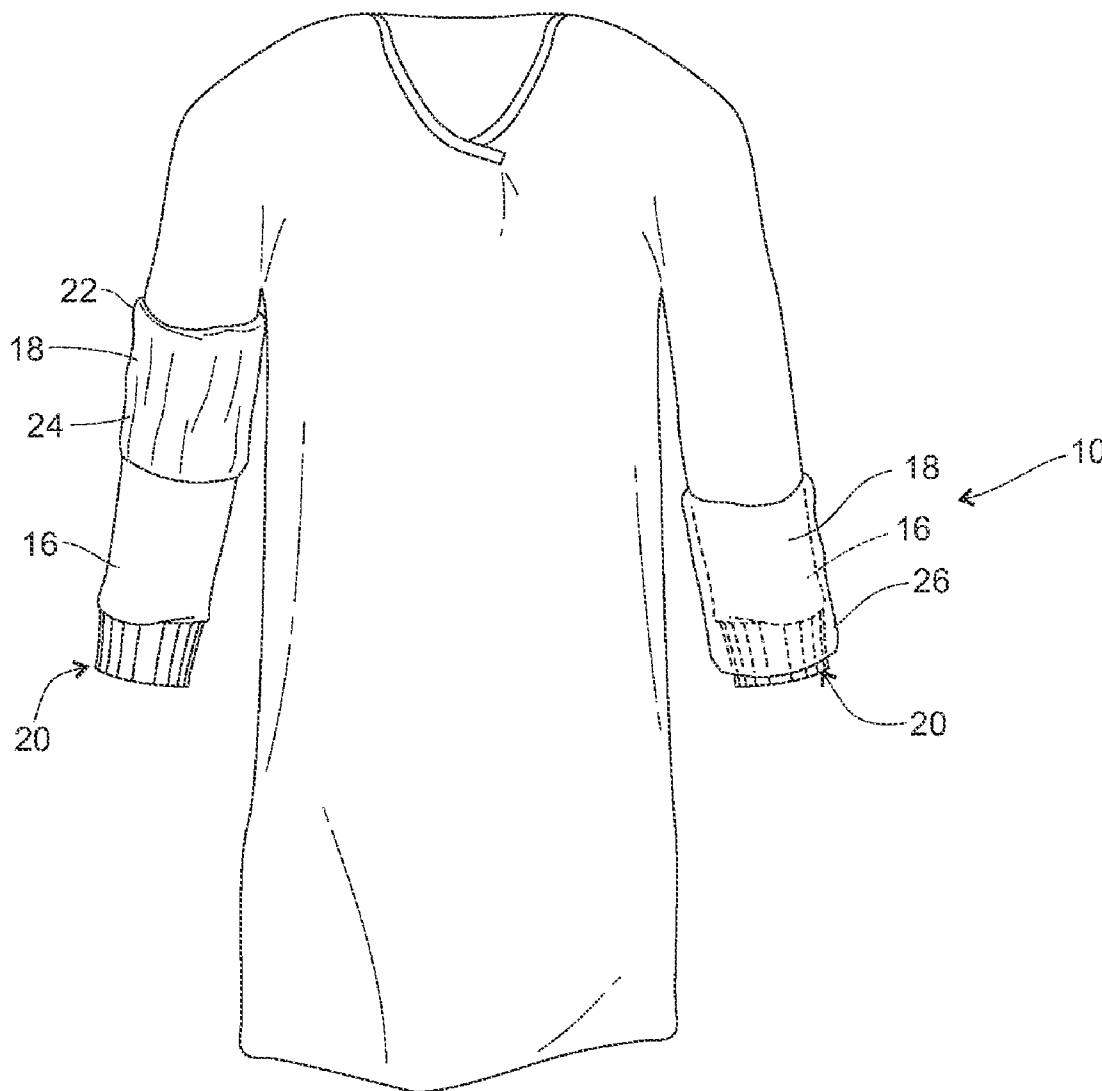
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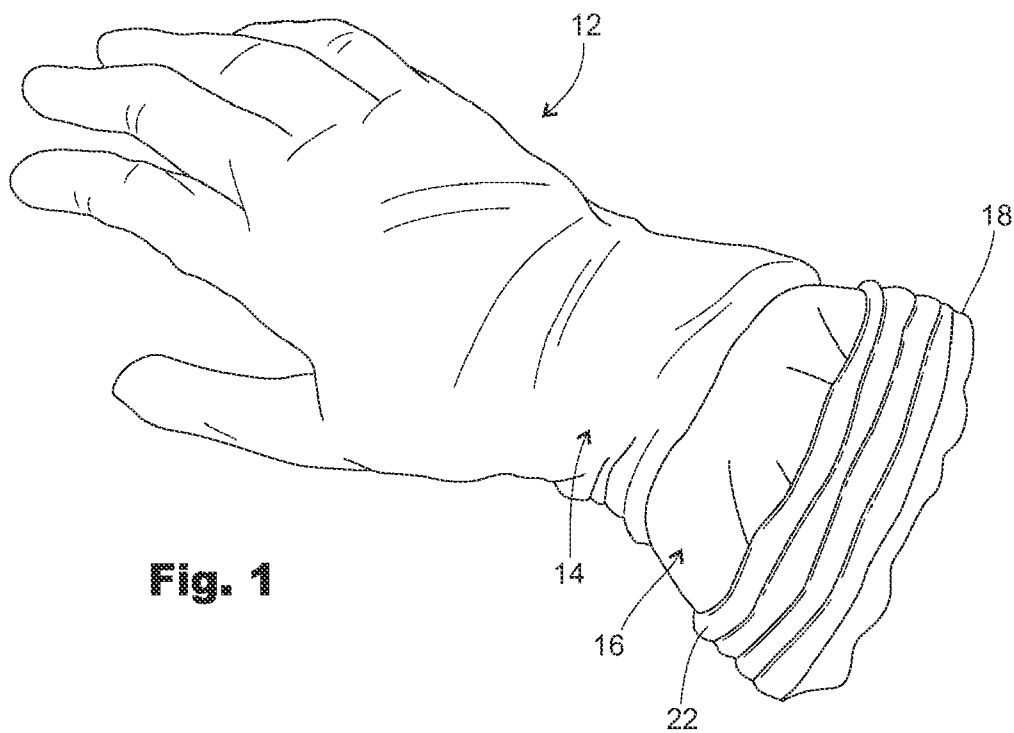
**Related U.S. Application Data**

(63) Continuation of application No. 12/201,312, filed on Aug. 29, 2008, now abandoned.

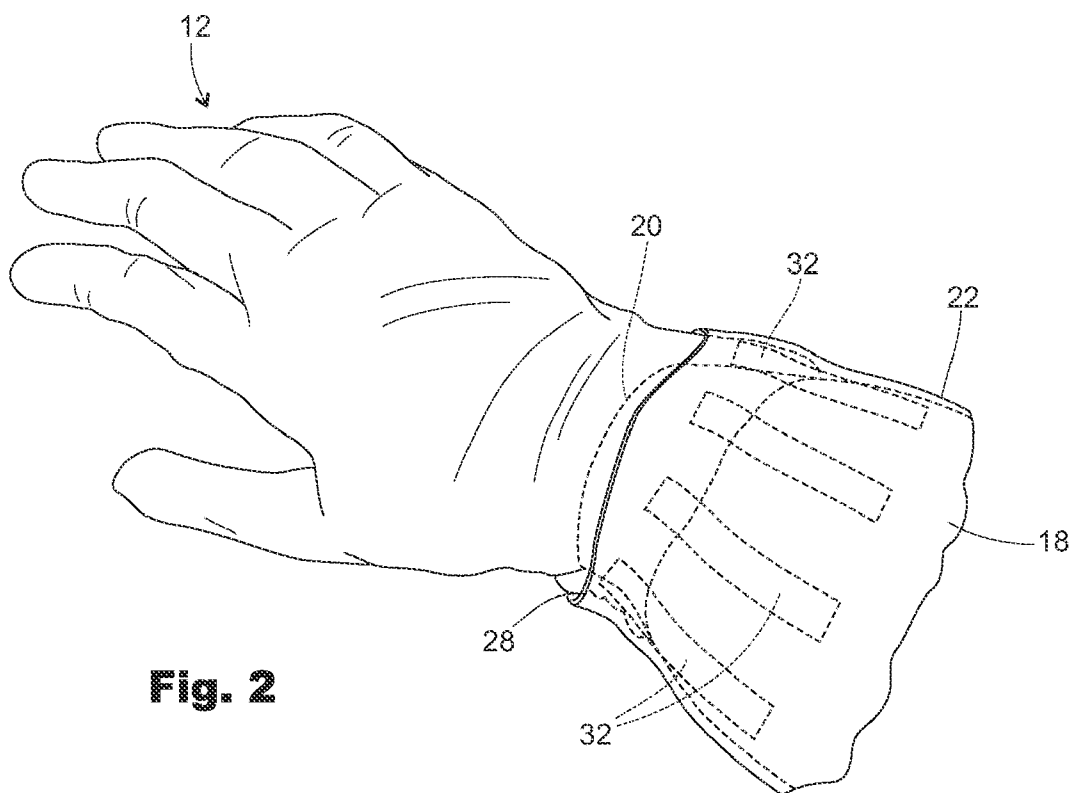
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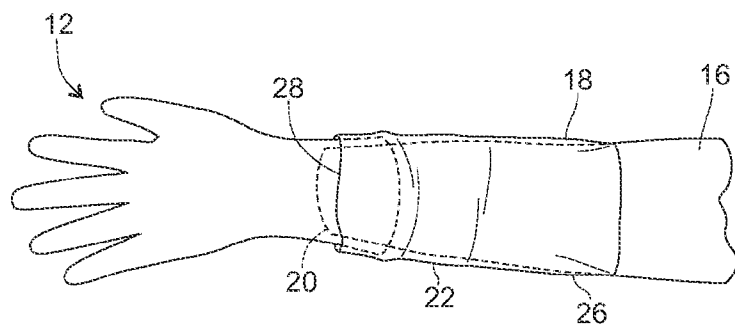
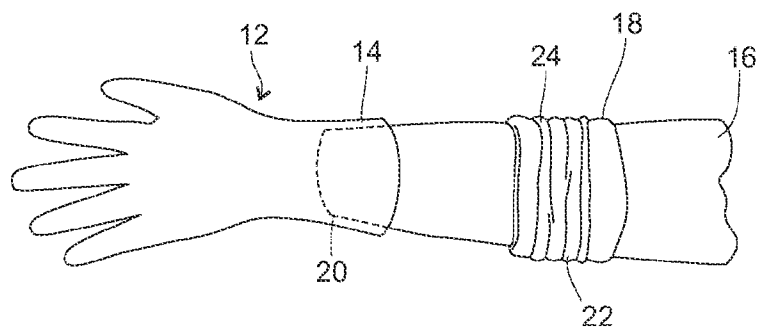
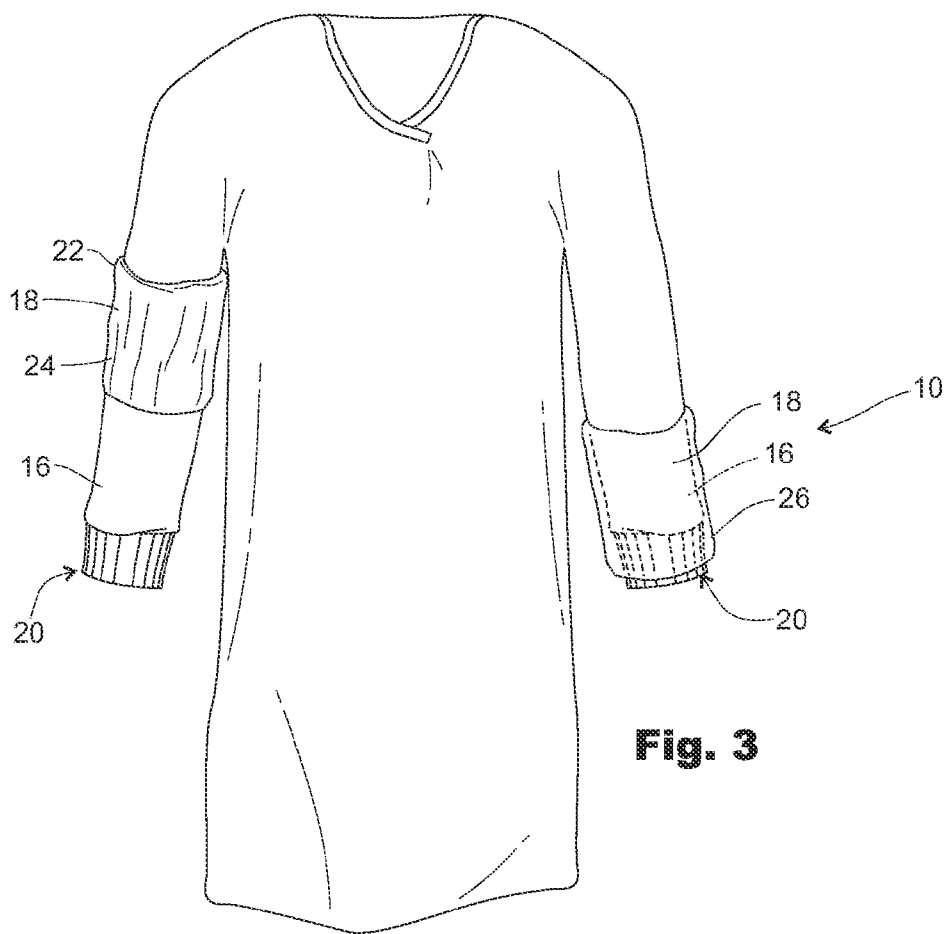


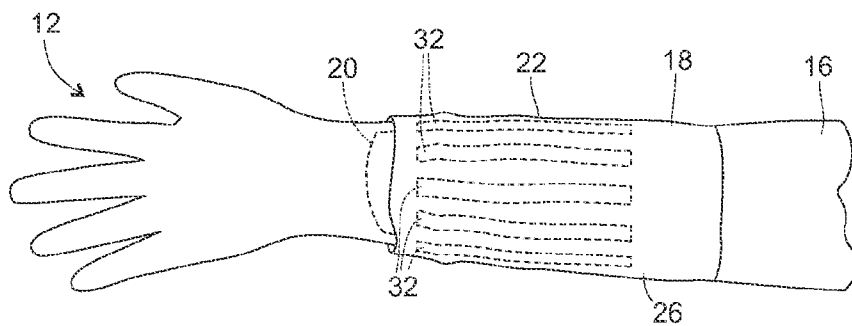


**Fig. 1**

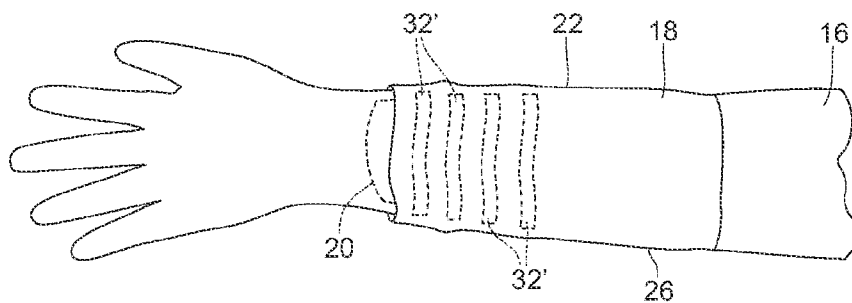


**Fig. 2**

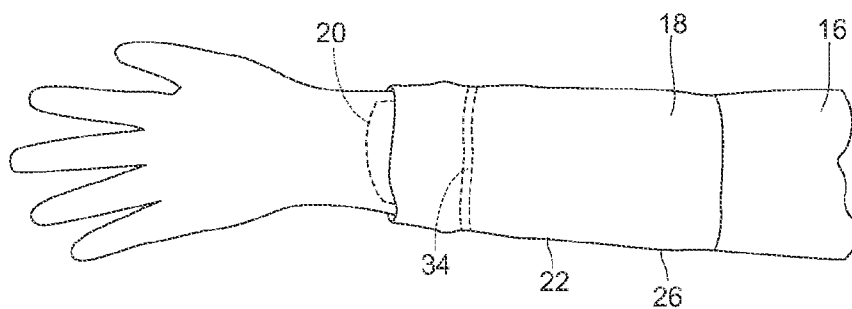




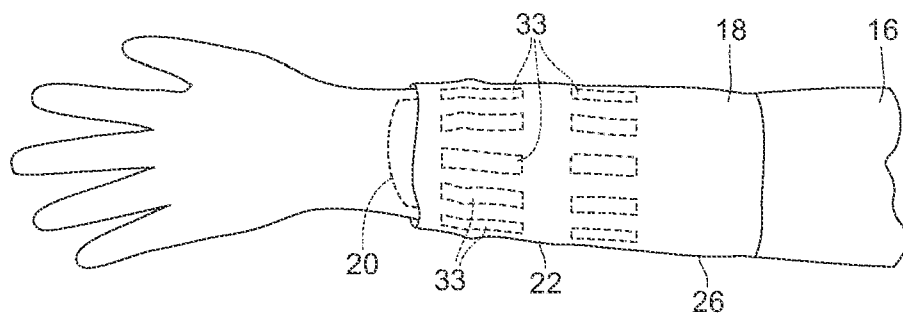
**Fig. 6**



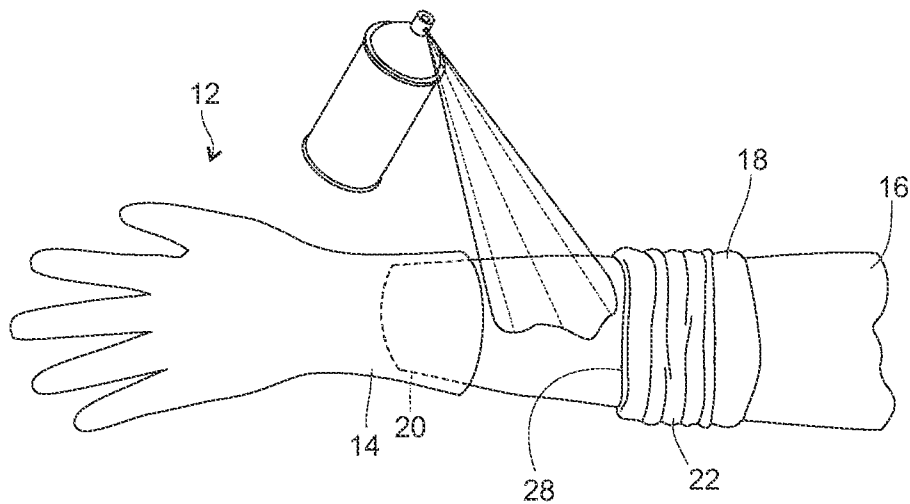
**Fig. 7**



**Fig. 8**



**Fig. 9**



**Fig. 10**

**MEDICAL GOWN WITH A SECONDARY SLEEVE FOR EXTENDING OVER A SURGICAL GLOVE**

[0001] This application is a continuation of a previous application filed Aug. 29, 2008 under application Ser. No. 12/201,312 and claims the benefit thereof.

**BACKGROUND**

[0002] 1. Field of the Invention

[0003] The present invention relates generally to surgical gowns and gloves and more specifically to a protective gown with arm sleeves to which surgical gloves attach to keep the gloves from rolling down during surgery.

[0004] 2. Prior Art

[0005] Medical gloves are used where it is important to maintain a sterile environment both to protect a surgeon and health care workers from infection from the patient and likewise to protect the patient from infection from the surgeon. To protect against transmission of bacteria through the glove, the glove must be seamless. Further, the gloves must be thin to maintain the tactile sensation and feedback response required during surgery as the surgeon performs delicate surgical procedures. Typically, the glove is formed with a generally uniform thickness from a thin flexible material such as natural rubber or an elastomer such as latex or other synthetic rubber. For purposes herein gloves from all such materials shall be collectively referred to as surgical gloves.

[0006] In use, cuffs of surgical gloves overlap a portion of the gown primary sleeve on the surgeon's forearm to maintain a sterile interface between the glove and the arm. However, the cuffs of the surgical gloves have a tendency to roll down away from the surgeon's protective gown as the surgeon's arm and hand move. In doing so, the underside of the glove contacts the outer side of the glove. Although the surgeon washes prior to surgery and is clean, the surgeon is not sterile, so his unsterile hands contaminate the inner surface of the glove when it is put on. The unsterile glove inner side thus contaminates the sterile glove outer side when the glove cuff rolls down. Additionally, it is not uncommon for the surgeon to further contaminate his gloves when he uses his other hand to unroll the glove back up his forearm and over his gown. That is, he touches the contaminated glove of one hand with the glove of his other hand resulting in both gloves losing their sterility.

[0007] Attempts to remedy glove roll-down have been variously addressed but the problem remains substantially unresolved. Modified gown sleeves have been commercially unsuccessful and the simple unmodified gown remains in common use. Adhesive tape has been used between the glove and the garment, but common adhesives used in tapes can become ineffective when they are contacted with water and body fluids and the adhesion to the gown, which may be marginal even before contact with fluids, can lose adhesion to the gown during a medical procedure. Furthermore, an adhesive between the glove and the gown limits the ability of the surgeon to change gloves quickly and easily during a procedure. (For purposes herein, the term "adhesive" without a modifier indicating a different meaning shall mean a compound conducive to establishing a chemical connection, such as a glue, but not including materials forming a mechanical connection, such as hook and loop tape.) A better solution would not depend on direct chemical adhesion to the gown. A

rubber band around the glove and sleeve has been attempted, however this practice is not recommended because the rubber band is likely not sterile and it is also subject to sliding down the forearm with the glove.

[0008] Thus, a need remains for an effective interface between a glove and a surgical gown sleeve to stabilize this transitional zone and potential for contamination.

**SUMMARY**

[0009] The present invention provides a protective gown with a tubular overlay, or tube, on the gown sleeve comprising a primary sleeve and a secondary sleeve attached at a tube first end at the user's forearm. The secondary sleeve extends toward the upper arm as a surgical glove is donned and the end of the gown primary sleeve is tucked within the glove cuff. The secondary sleeve then extends downward toward the primary sleeve end and over the glove cuff forming a channel in which the glove cuff is positioned and retained. The secondary sleeve is secured to the glove in the channel as the channel frictionally engages the glove cuff. Areas of increased frictional resistance may be added to the tube underside to engage the glove cuff. Increased frictional resistance may be obtained by employing material having a low tack surface.

[0010] In describing the invention, reference is made to a material that is mildly adhesive or condition of mildly adhering. "Mildly adhesive" material or surface or "mildly adhering" means not generally but in particular regard to surgical gloves and the unique inherent tactile nature of the material from which surgical gloves are made. Therefore the term "mildly adhesive" is that which has the characteristic of a low tack surface that causes it to releasably adhere particularly to the glove because of the interaction and inherent physical properties and nature of the glove and of the material, unenhanced by glues or chemicals or other binding agents, the result of which causes an increased friction between the glove and the material sufficient to inhibit sliding of the glove on the sleeve but allowing the sleeve to separate from the glove under gentle urging of the user. To mildly adhere means that there results an increased sliding resistance between the materials that causes surfaces to not slide relative to each other except under urging force from a user or the like. For example, silicone rubber is tacky to the touch and clings to any object or material that comes in contact with it. When silicone rubber parts come in contact with other surfaces—including other silicone surfaces—they resist motion with a friction coefficient that exceeds 1.0. Other materials like natural rubber or latex have a high coefficient of friction similar to silicone rubber, when interfaced with a typical surgical glove.

[0011] Other material that will impart a low tack surface to the sleeve is the commonly known microsphere type adhesive use in the popular item "Post-it Notes" by 3M. Other similar repositionable adhesive that provide low tack repositionable bond are common in the marketplace in the form of sprays, glue sticks and roll on applicators.

[0012] These materials are named specifically for illustration purposes only and in no way limit the materials that can be used for the purposes disclosed.

[0013] It should be appreciated that the protective garment is described in terms of a medical environment. However, the invention equally applies to other applications where it is advantageous to have an equivalent interface between a glove and a garment with sleeves. These other applications and the glove and garment employed therewith are deemed included

within this invention and within the description of glove and garment or garment sleeve described and defined herein.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is an artistic view of a gown sleeve end comprising primary sleeve and a secondary sleeve with the end of the primary sleeve tucked into a glove cuff with the secondary sleeve forming a tubular overlay, or tube, shown collapsed longitudinally to allow the surgical glove cuff to be extended over the gown primary sleeve.

[0015] FIG. 2 is an artistic view of a gown primary sleeve, shown in hidden lines, with its end, or cuff, tucked into a glove cuff and the secondary sleeve, or tubular overlay, extended over the glove cuff. Also shown in hidden lines are strips of low tack material on the inside of the tubular overlay mildly adhering to the glove cuff to increase sliding resistance between the glove cuff and the tubular overlay.

[0016] FIG. 3 is an artistic view of a protective gown showing the secondary sleeve extending from the gown primary sleeve at a primary sleeve forearm upward from its point of attachment to the primary sleeve along and over the primary sleeve, away from the point of attachment.

[0017] FIG. 4 is a side view of the gown sleeve of FIG. 1 with the primary sleeve end tucked within the cuff of the surgical glove, showing the secondary sleeve collapsed longitudinally back to its point of attachment to the primary sleeve.

[0018] FIG. 5 is a side view of the gown sleeve of FIG. 4 with the secondary sleeve extended over the surgical glove cuff.

[0019] FIG. 6 is a side view of the gown sleeve of FIG. 1 employing mildly adhesive, low tack strips on the tubular overlay formed by the secondary sleeve longitudinal with the primary sleeve that increase the sliding frictional interface with the glove cuff over which it is drawn.

[0020] FIG. 7 is a side view of the gown of FIG. 1 employing a plurality of elastic bands in the tubular overlay circumferential around the tubular overlay.

[0021] FIG. 8 is a side view of the gown of FIG. 1 employing a mildly adhesive, or low tack strip on the tubular overlay circumferential around the tubular overlay.

[0022] FIG. 9 is an artistic view of the gown of FIG. 1 employing a plurality of patches of mildly adhesive, or low tack material on the tubular overlay.

[0023] FIG. 10 is an artistic view of the gown of FIG. 1 employing a diffuse coating on either the gown primary sleeve or the tubular overlay.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] The protective garment 10 of the present invention is intended to be used in combination with a glove 12. More specifically, the protective garment 10 is primarily the type used in a medical operating room by surgeons and the glove 12 is a surgical glove. The description that follows is given in the context of a surgical gown and a surgical glove. However, this context is meant to be only representative of all gowns and gloves, which are deemed included in the description given for all purposes herein.

[0025] For purposes herein, the surgical glove 12 comprises a seamless molded flexible rubber body (deemed to include elastomeric compounds such as latex and all other synthetic rubbers) configured and sized to fit closely on a

user's hand and thin such that the glove maintains fine tactile feedback through the glove to the user's hand such that the user's sense of touch is only marginally reduced through the glove and the user's capability of grasp and manipulation is maintained nearly without compromise through the glove. The body comprises a finger portion on a closed end and a cuff 14 on an open end through which the user dons the glove 12.

[0026] The present invention then is a combination of such a protective garment 10 including arm primary sleeves 16 and such a surgical glove 12 with a glove cuff 14. For each primary sleeve 16, a secondary sleeve 18 is secured to the primary sleeve 16 a distance from a sleeve end 20 toward the user's upward arm. The secondary sleeve 18 extends from attachment on the primary sleeve 16 as a flexible and collapsible tubular overlay, or a tube 22, that can be pushed upward toward or past its point of attachment to the primary sleeve 16 while the glove is donned. The secondary sleeve 18 is extendable or pushed back and upward along the primary sleeve 16 away from the sleeve end 20 in a first position 24 as the glove cuff 14 is positioned over the sleeve end 20 without interference from the secondary sleeve 18. The secondary sleeve 18 is then extendable from its first position 24 to a second position 26 over the primary sleeve end 20 to form a tube with the glove cuff 14 sandwiched therebetween. Similarly, the secondary sleeve 18 may be simply pushed back to its point of attachment as an alternate, but equivalent, first position and then extended over the donned glove. (Both first position alternatives are deemed to be included in the further description given below.) With the secondary sleeve 18 in its second position 26, the primary sleeve 16 and the secondary sleeve 18 form a channel 28 circumferential around the primary sleeve 16 into which the glove cuff 14 is positioned. When the secondary sleeve 18 is in its second position 26 and the glove 12 is within the channel 28, the secondary sleeve 18 releasably engages the glove cuff 14 and binds the glove 12 to the garment sleeve 16 in any effective way that secures the glove cuff 14 in the channel 28 such that the glove cuff 14 does not slide or roll down absent urging by a user, typically through a frictional interface with the glove 12.

[0027] The frictional resistance may be obtained by employing a material that tends to mildly adhere releasably to the surgical glove 12 or increase frictional resistance between the glove-tube interface. The entire tube 22 may be of this material or just the tube underside or a portion of the underside of the tube 22. For these purposes, the underside means that tube portion disposed to engage the glove 12 in the channel 28. The portion may be one or a plurality of strips 32 on either the primary sleeve 16 or the secondary sleeve 18 of the material longitudinal with the sleeve 16. As a first alternative, the portion may be one or a plurality of strips 32' at least partially circumferential around the primary sleeve 16, as a plurality of patches 33. As a second alternative, frictional resistance between the glove cuff 14 and the tube 22 may be obtained by employing a material that has been diffusely applied to the primary sleeve 16 or to the undersurface of the secondary sleeve 18, or to both primary and secondary sleeve surfaces and therefore generally within the channel 28.

[0028] In an alternate embodiment, the secondary sleeve 18 may simply fit snugly against the glove cuff 14, therein making it difficult for the glove 12 to roll down. For purposes herein, use of the term "frictional resistance" is deemed to include such a snug fit. The snug fit may be achieved by an elastic band 34 circumferential around the tube 22. In normal manner, elastic band 34 cinches the secondary sleeve 18

around the primary sleeve **16** and secures the glove cuff **14** sandwiched therebetween therein preventing the cuff **14** from rolling down.

**[0029]** The preferred embodiment includes many embodiments for increasing friction or adhesion which, at the atomic level, are the same principle. Friction can be increased by increasing the friction coefficient of the material or increasing the pressure applied to the material. These embodiments are all include in the phrase “means for increasing friction or adhesion” and therefore, are not separate inventions but rather separate means for achieving the object of the same invention.

**1.** A protective garment with sleeves and sleeve ends, such as a surgical gown, the improvement comprising,

each sleeve comprising a primary sleeve and a secondary sleeve, the secondary sleeve secured to the primary sleeve at a secondary sleeve first end a distance from a primary sleeve end, the secondary sleeve extending from the first sleeve toward the primary sleeve end as a tubular overlay forming a channel circumferential around the primary sleeve into which a surgical glove cuff may be positioned such that when the surgical glove cuff is positioned over the primary sleeve end, the sleeve end being tucked within the cuff, the secondary sleeve extends over the glove cuff, the primary sleeve end and the secondary sleeve sandwiching the glove cuff therebetween and engaging the glove cuff such that the glove cuff does not inadvertently roll down.

**2.** The protective garment of claim **1** wherein the secondary sleeve is extendable back and upward along the primary sleeve away from the primary sleeve end to a first position therein facilitating glove cuff being positioned over the primary sleeve end, the secondary sleeve then being extendable from its first position to a second position over the primary sleeve at the primary sleeve end with the glove cuff sandwiched therebetween.

**3.** The protective garment of claim **1** wherein the secondary sleeve has a means for frictionally engaging said glove cuff such that the glove cuff does not slide or roll down unless purposely urged down.

**4.** The protective garment of claim **1** wherein the secondary sleeve is at least partially of material that increases friction between the secondary sleeve and the glove cuff.

**5.** The protective garment of claim **1** wherein the secondary sleeve is at least partially of material that mildly adheres releasably to said glove cuff.

**6.** The protective garment of claim **3** further comprising, a means for increasing friction or adhesion by attaching a material to the secondary sleeve inner surface disposed to engage said glove cuff when the secondary sleeve is extended over the glove cuff and the glove cuff is positioned over the primary sleeve end.

**7.** The protective garment of claim **6** wherein the means for increasing friction or adhesion comprises at least one strip of said material longitudinal with the sleeve.

**8.** The protective garment of claim **6** wherein the means for increasing friction or adhesion comprises at least one strip of said material at least partially circumferential around the sleeve.

**9.** The protective garment of claim **6** wherein the means for increasing friction or adhesion comprises said material diffusely applied to the primary sleeve or to the undersurface of the secondary sleeve, or to both primary and secondary sleeve surfaces and therefore generally within the channel.

**10.** The protective garment of claim **1** wherein the secondary sleeve at least partially fits snugly against said glove cuff increasing the friction between the secondary sleeve and the glove cuff.

**11.** The protective garment of claim **1** further comprising an elastic band circumferential within the secondary sleeve, cinching the secondary sleeve around the primary sleeve, wherein said elastic band increases the friction between the glove cuff and secondary sleeve by applying force on the outer surface of the secondary sleeve sandwiching said glove cuff between the secondary sleeve and the primary sleeve preventing the glove cuff from rolling down.

**12.** A protective garment with sleeves, such as a surgical gown, the improvement comprising,

each sleeve comprising a primary sleeve and a secondary sleeve, the secondary sleeve secured to the primary sleeve at a secondary sleeve first end a distance from a primary sleeve end, the secondary sleeve extending from the first sleeve toward the primary sleeve end as a tubular overlay forming a channel circumferential around the primary sleeve into which a surgical glove cuff may be positioned such that when the surgical glove cuff is positioned over the primary sleeve end, the sleeve end being tucked within the cuff, the secondary sleeve extends over the glove cuff, the primary sleeve end and the secondary sleeve sandwiching the glove cuff therebetween and engaging the glove cuff such that the glove cuff does not inadvertently roll down,

wherein the secondary sleeve is extendable back and upward along the primary sleeve away from the primary sleeve end to a first position therein facilitating glove cuff being positioned over the primary sleeve end, the secondary sleeve then being extendable from its first position to a second position over the primary sleeve at the primary sleeve end with the glove cuff sandwiched therebetween,

an elastic band circumferential around the secondary sleeve, cinching the secondary sleeve around the sleeve and securing said glove cuff sandwiched between primary sleeve and the secondary sleeve, preventing the cuff from rolling down.

**13.** A combination of a surgical glove and a protective garment that includes arm sleeves and a molded, seamless glove of thin flexible material that maintains fine tactical feedback to a user's hand in the glove through the material, the glove comprising a closed finger portion and an open cuff portion extending toward a user's forearm through which the user dons the glove, the improvement comprising for each sleeve, the sleeve comprising a primary sleeve and a secondary sleeve, the secondary sleeve secured to the primary sleeve at a secondary sleeve first end a distance from a sleeve end, wherein the secondary sleeve is extendable back and upward along the primary sleeve away from the sleeve end to a first position therein facilitating the primary sleeve end being tucked into said glove cuff without interference from the secondary sleeve as said glove cuff is positioned over the primary sleeve end, the secondary sleeve then being extendable from its first position to its second position over the primary sleeve end with the glove cuff sandwiched therebetween, the primary sleeve and the secondary sleeve forming a channel circumferential around the primary sleeve into which said glove cuff may be positioned, the secondary sleeve engaging the cuff releasably such that the glove does not roll down from the sleeve.



**14.** The protective garment of claim **13** wherein the secondary sleeve frictionally engages said glove cuff.

**15.** The protective garment of claim **13** wherein the channel is at least partially of material that increases sliding resistance between the channel and the glove, or similarly, mildly adheres to said glove cuff releasably.

**16.** The protective garment of claim **15** further comprising at least one patch of said material on a secondary sleeve inner surface disposed to engage said glove cuff releasably with increased sliding resistance when the glove cuff is positioned over the primary sleeve end and the secondary sleeve is extended over the glove cuff.

**17.** The protective garment of claim **15** further comprising at least one strip of said material within the channel.

**18.** The protective garment of claim **15** further comprising at least one strip of said material at least partially circumferential around the channel.

**19.** The protective garment of claim **15** wherein the secondary sleeve at least partially fits snugly against said glove cuff.

**20.** The protective garment of claim **15** further comprising an elastic band circumferential around the secondary sleeve, cinching the secondary sleeve around the primary sleeve and securing said glove cuff sandwiched between the tube and the sleeve therein preventing the glove cuff from rolling down.

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