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(54) **DISPOSABLE STETHOSCOPE COVERS AND METHODS OF USE**

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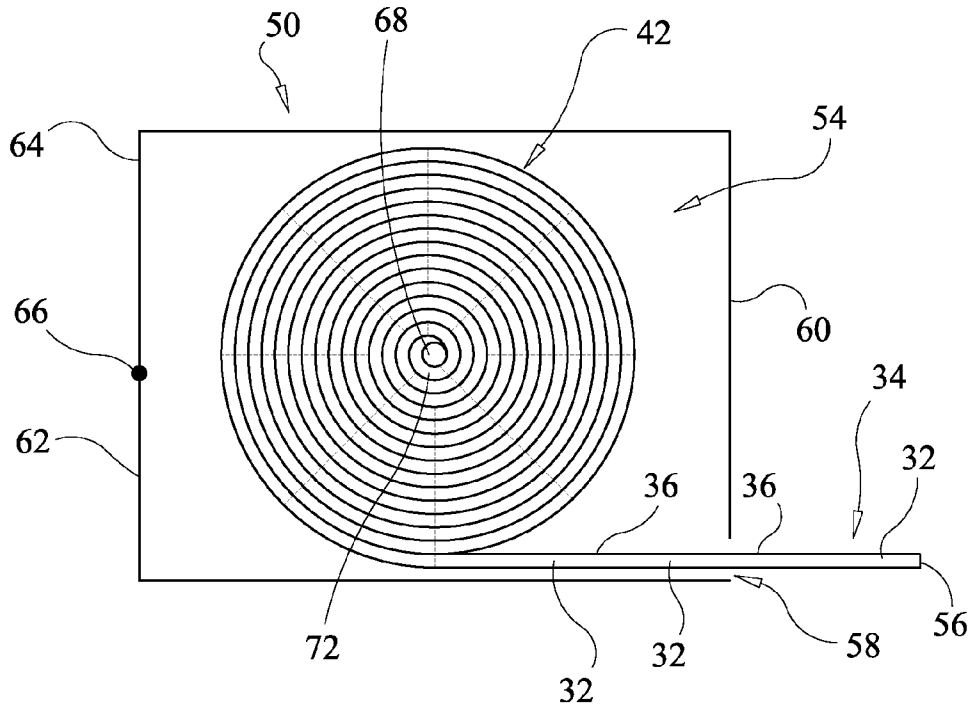
(57) **ABSTRACT**

A dispensing system is provided including a plurality of instrument covers defining an elongated strip. The strip includes a first surface and an opposite second surface. The first surface includes a material having adhesion properties. The strip is arranged in a roll such that the material contacts the second surface to maintain the strip in the roll. Methods of use are disclosed.



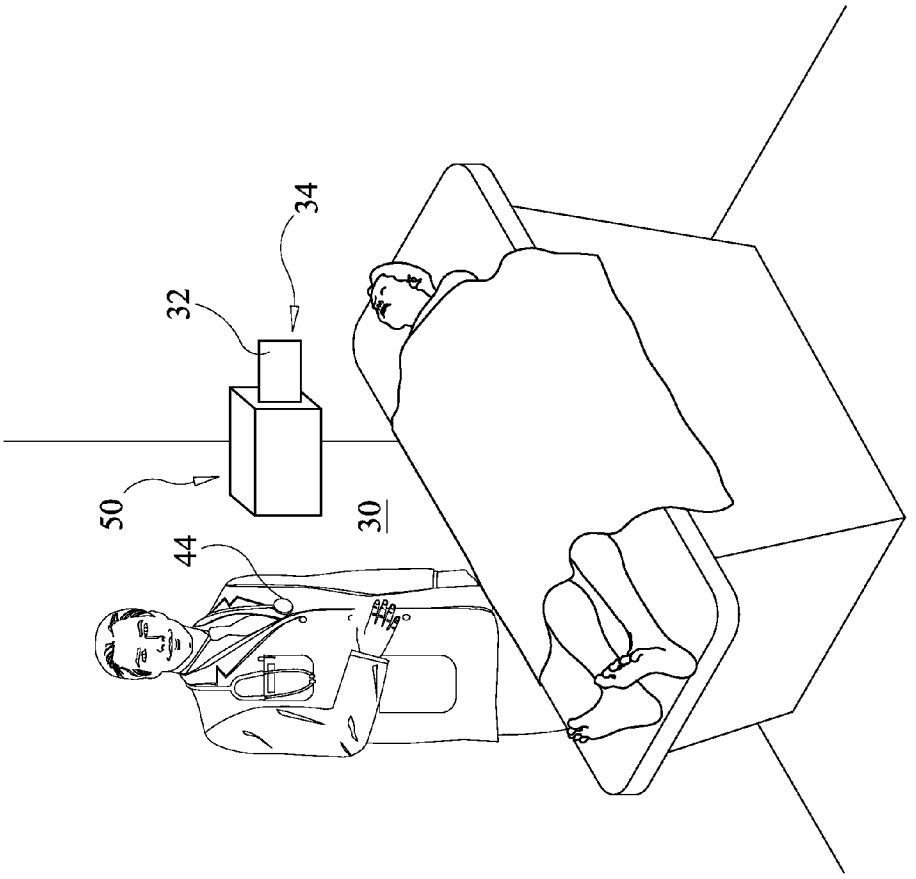


FIG. 1

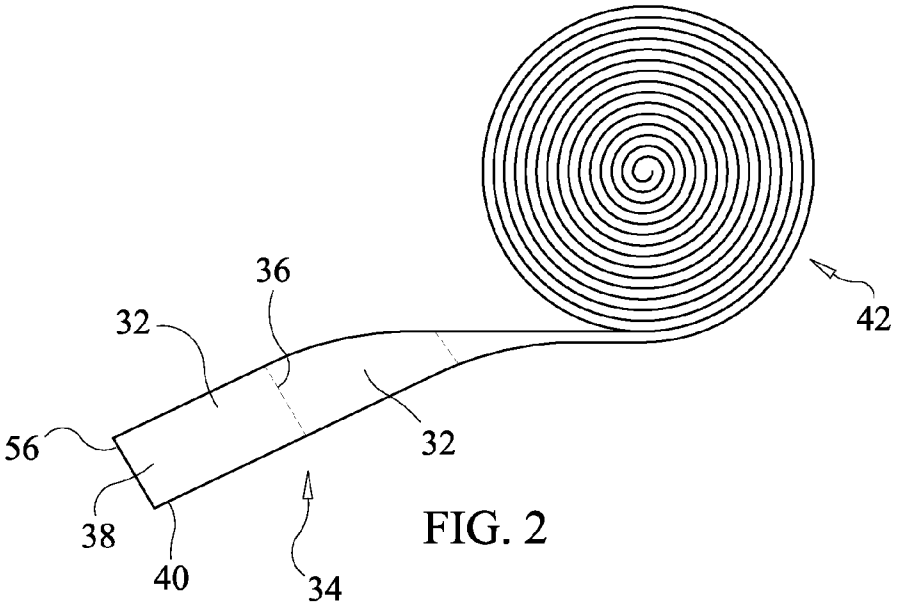


FIG. 2

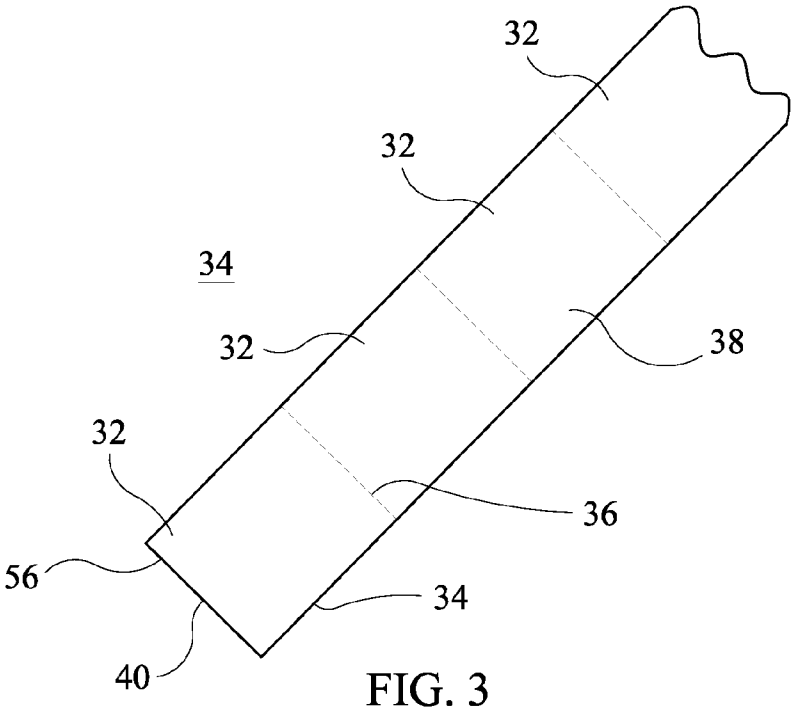


FIG. 3

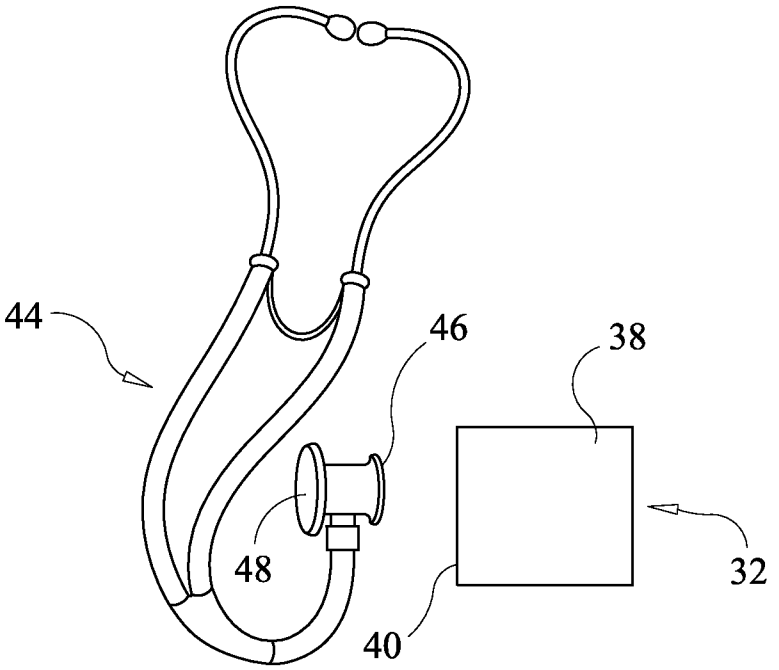


FIG. 4

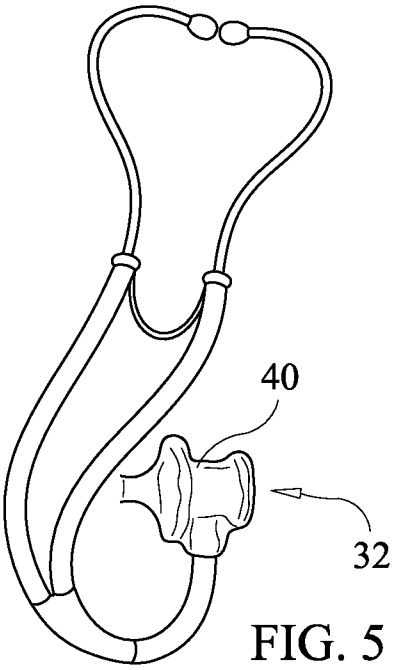


FIG. 5

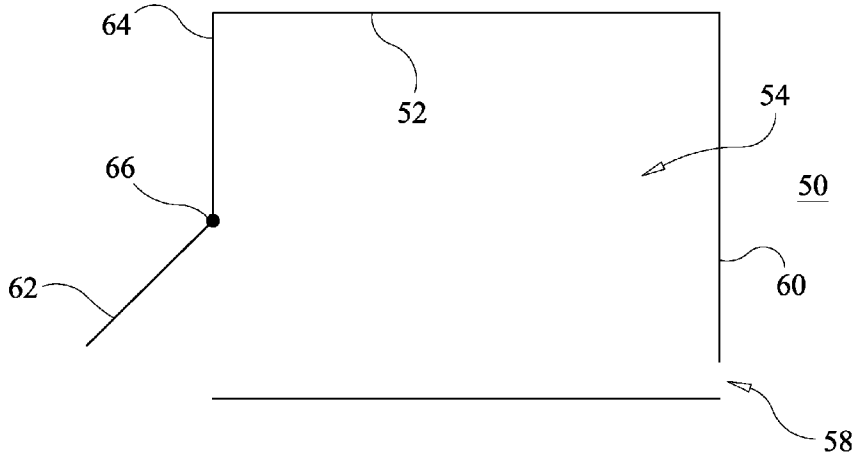

64
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FIG. 6

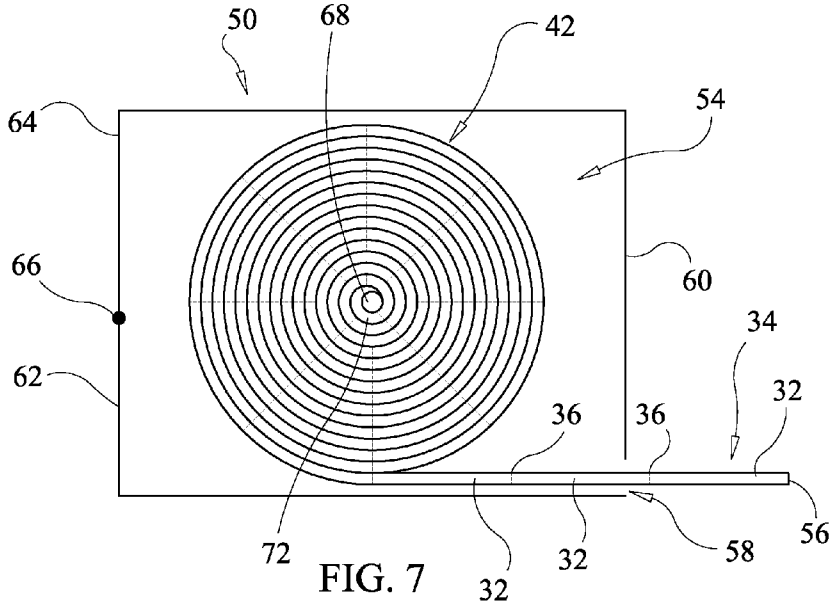
50
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FIG. 7

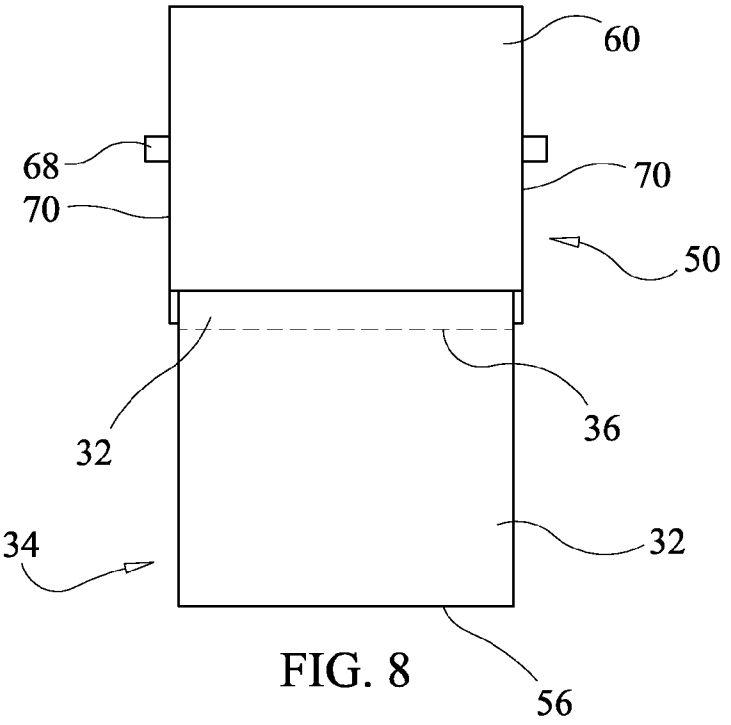

FIG. 8

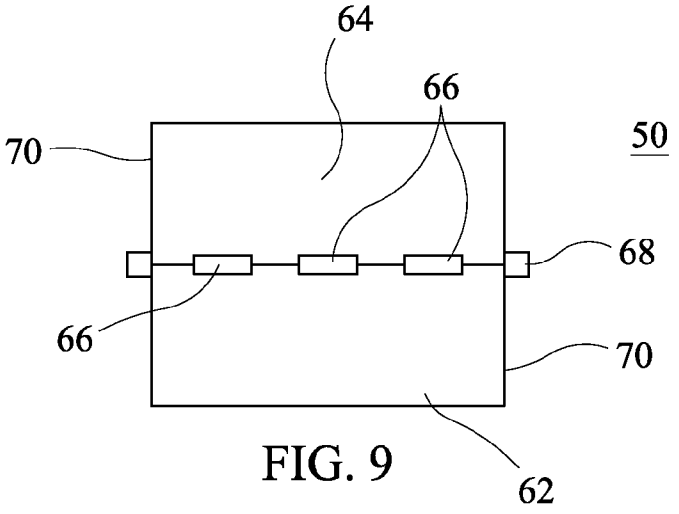

FIG. 9

DISPOSABLE STETHOSCOPE COVERS AND METHODS OF USE

TECHNICAL FIELD

[0001] The present disclosure generally relates to medical devices, and more particularly to a dispensing system that stores and dispenses covers for medical devices such as, for example, stethoscopes. Methods of use are also disclosed.

BACKGROUND

[0002] A stethoscope is an acoustic medical device typically used by a physician or medical care provider to monitor sounds in a patient's organs and/or pathways (respiratory, cardiac, arterial, etc.). Stethoscopes typically include a chest piece for placement against the patient for sensing relatively high frequency sound, an air-filled hollow tube to transmit the sound from the chest piece, and ear tubes to receive the sound from the air-filled hollow tube and transmit the sound via ear tips to the physician or medical care provider. The chest piece is generally known to include a head and a diaphragm which is the part of the chest piece placed against the patient. When the diaphragm is placed on the patient, bodily sounds vibrate the diaphragm creating acoustic pressure sound waves which travel up the air-filled hollow tube and ear tubes to the listener's ears. The physician or medical care provider may then be better able to diagnose a condition or whether the patient's organs or pathways are functioning normally.

[0003] In use, the head and diaphragm of a stethoscope can easily be contaminated with bacteria and other contaminants as stethoscopes are typically used on several different patients every hour, the patients being affected by different contaminants. Physicians or medical care providers in a hospital setting see about 20-30 patients an hour including neonatal and pediatric patients, surgery patients, cancer and infectious disease patients and often examine these patients using the same stethoscope. Medical providers typically employ a stethoscope on most of the patients they see in a hospital setting and anywhere between 6-12 patients per hour in an office setting. Transmission of bacterial infections among patients, particularly in a hospital setting, is of great concern especially in view of the development of antibiotic-resistant strains of staphylococcal infections and other resistant strains of bacteria, viruses, and fungal infections. Examples of resistant strains of bacteria include but are limited to, vancomycin resistant *enterococcus* and *clostridium dificile*; viruses such as hepatitis B and C; and fungal infections such as aspergillosis candida.

[0004] Protective covers for stethoscopes are known. Typical covers include a thin sheet of plastic having an adhesive backing which can be applied over the diaphragm of a stethoscope before use on each new patient. After use, the cover is typically removed and discarded. These covers can function adequately, however, too often do problems arise with the use of such covers. Such problems include the cover falling off the stethoscope during application, the cover not fitting with an air-tight seal on the diaphragm during application, poor acoustic transmission and the transmission of microorganisms, fluids or other contaminants to the head of the stethoscope and in some cases, the diaphragm of the stethoscope. Most often the design is cumbersome and takes too much time to deploy.

[0005] Accordingly, a need exists for a cover for the head and diaphragm of a stethoscope that will securely fit onto the head and diaphragm of the stethescope, can be easily applied to the diaphragm to form a substantially air-tight seal without any air bubbles or wrinkling of the cover, is acoustically transmissive and protects against the transmission of microorganisms and fluids. A need also exists for a cover for a head and diaphragm of a stethoscope that is easy and quick to deploy since the time that a medical provider has with a patient is limited. Further, there is a need for an inexpensive system for efficiently dispensing covers for physicians and medical care providers.

SUMMARY

[0006] Accordingly, a dispensing system and method for dispensing instrument covers are provided. In one embodiment, in accordance with the principles of the present disclosure, the system includes a plurality of instrument covers defining an elongated strip. The strip comprises a first surface and an opposite second surface. The first surface comprises a material having adhesion properties. The strip is arranged in a roll such that the material contacts the second surface to maintain the strip in the roll.

[0007] In one embodiment, in accordance with the principles of the present disclosure, the system includes a plurality of instrument covers defining an elongated strip. The instrument covers are acoustically transmissive and substantially impermeable to microorganisms and fluids. The instrument covers are separated from one another by a series of perforations. The strip comprises a first surface and an opposite second surface having non-stick properties. The first surface comprising a material having adhesion properties. The strip is arranged in a roll such that the material contacts the second surface to maintain the strip in the roll. A housing comprises an antimicrobial material. The housing is configured for mounting on a vertical surface or a horizontal surface. The housing includes an inner surface defining a cavity including an antimicrobial ultraviolet light source and the roll disposed therein such that a first end of the strip extends through an opening in the housing. A stethoscope includes a diaphragm and an opposite head. Each of the instrument covers are sized and configured to removably cover the diaphragm and the head simultaneously by form-fitting a respective first surface with outer surfaces of the diaphragm and the head. The strip comprises one or more of polyvinyl chloride, polyvinylidene chloride, low density polyethylene, linear low density polyethylene, polyisobutene, poly[ethylene-vinylacetate] copolymer and lightweight aluminum foil. The material comprises one or more of a cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber, ethylene-vinyl acetate, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether and a tackifier. At least one of the material, the first surface and the second surface comprises an antimicrobial substance that can neutralize or destroy microbes.

[0008] In one embodiment, in accordance with the principles of the present disclosure, a method for dispensing instrument covers is provided. The method comprises the steps of: providing an elongated strip defining a plurality of instrument covers separated from one another by a series of perforations, the strip comprising a first surface and an opposite second surface, the first surface comprising a material having adhesion properties, the strip being arranged in a roll such that the material contacts the second surface to maintain the strip in the roll; providing a housing configured for mounting on a vertical surface or a horizontal surface, the housing

including an inner surface defining a cavity; disposing the roll within the cavity such that a first end of the strip is aligned with an opening in the housing; rotating the roll in a first direction about a transverse axis such that the first end of the strip translates axially through the opening; providing a stethoscope comprising a diaphragm and an opposite head; breaking off the instrument cover that engages the stethoscope from the strip; and engaging the first surface with the diaphragm and the head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present disclosure will become more readily apparent from the specific description accompanied by the following drawings, in which:

[0010] FIG. **1** is a plan view of one embodiment of a system in accordance with the principles of the present disclosure shown in a hospital setting;

[0011] FIG. **2** is a perspective view of a component of the system shown in FIG. **1**;

[0012] FIG. **3** is a breakaway, perspective view of a component of the system shown in FIG. **1**;

[0013] FIG. **4** is a perspective view of components of the system shown in FIG. **1**;

[0014] FIG. **5** is a perspective view of components of the system shown in FIG. **1**;

[0015] FIG. **6** is a side, cross sectional view of a component of the system shown in FIG. **1**;

[0016] FIG. **7** is a side, cross sectional view of components of the system shown in FIG. **1**;

[0017] FIG. **8** is a front view of components of the system shown in FIG. **1**; and

[0018] FIG. **9** is a rear view of a component of the system shown in FIG.

[0019] Like reference numerals indicate similar parts throughout the figures.

DETAILED DESCRIPTION

[0020] The exemplary embodiments of the dispensing system and related methods of use disclosed are discussed in terms of medical devices, and more particularly to a dispensing system that stores and dispenses covers for medical devices. It is envisioned that the dispensing system and method may be employed in a hospital setting or a medical practitioner's examination room or office. The dispensing system and method include a device configured to hold and dispense a roll of acoustically transmissive instrument covers configured to securely fit onto the head and diaphragm of a medical instrument, such as, for example, a stethoscope such that the instrument cover forms an air-tight seal without any air bubbles or wrinkling of the instrument cover to prevent cross-contamination from patient to patient. It is envisioned that the dispensing system may be configured as a kit with multiple sized and configured components, such as, for example, a plurality of rolls of instrument covers wherein each roll includes instrument covers that have a different size and shape than instrument covers included in other rolls in the kit.

[0021] The present disclosure may be understood more readily by reference to the following detailed description of the disclosure taken in connection with the accompanying drawing figures, which form a part of this disclosure. It is to be understood that this disclosure is not limited to the specific devices, methods, conditions or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only and is not intended to be limiting of the claimed disclosure. Also, as used in the specification and including the appended claims, the singular forms "a," "an," and "the" include the plural, and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" or "approximately" one particular value and/or to "about" or "approximately" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment. It is also understood that all spatial references, such as, for example, horizontal, vertical, top, upper, lower, bottom, left and right, are for illustrative purposes only and can be varied within the scope of the disclosure. For example, the references "upper" and "lower" are relative and used only in the context to the other, and are not necessarily "superior" and "inferior".

[0022] The following disclosure includes a description of a dispensing system for holding and dispensing instrument covers. The disclosure also includes a description of related methods of employing the disclosed dispensing system. Alternate embodiments are also disclosed. Reference will now be made in detail to the exemplary embodiments of the present disclosure, which are illustrated in the accompanying figures. Turning now to FIGS. **1-9**, there are illustrated components of a dispensing system, such as, for example, a dispensing system **30** and embodiments in accordance with the principles of the present disclosure.

[0023] The components of system **30** can be fabricated from biologically acceptable materials suitable for medical applications, depending on the particular application and/or preference of a medical practitioner. For example, the components of system **30**, individually or collectively, can be fabricated from materials such as cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber, ethylene-vinyl acetate, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether, a tackifier, antimicrobial and/or antiseptic materials including but are not limited to: alcohols such as ethanol, 1-propanol and 2-propanol/isopropanol or mixtures of these alcohols; sodium bicarbonate; hydrogen peroxide; benzalkonium chloride; chlorohexidine; hexachlorophene; iodine compounds; and combinations thereof. Antimicrobial materials that can be used include but are not limited to: beta-lactam antibiotics (such as penicillin, cephalosporin); protein synthesis inhibitors (such as aminoglycosides, macrolides, tetracycline, chloramphenicol, polypeptides); sulphonamides; cotrimoxazole; quinolones; anti-viral agents; anti-fungal agents; anti-cancer drugs; anti-malarial drugs; anti-tuberculosis drugs; anti-leprotic drugs; anti-protozoal drugs and combinations thereof. In some embodiments, the components of system **30**, individually or collectively, can be fabricated from materials such as polyvinyl chloride, polyvinylidene chloride, low density polyethylene, linear low density polyethylene, polyisobutene, poly [ethylene-vinylacetate] copolymer, lightweight aluminum foil and combinations thereof. In some embodiments, the components of system **30**, individually or collectively, can be fabricated from materials such as stainless steel alloys, commercially pure titanium, titanium alloys, Grade 5 titanium,

super-elastic titanium alloys, cobalt-chrome alloys, stainless steel alloys, superelastic metallic alloys (e.g., Nitinol, super elasto-plastic metals, such as GUM METAL® manufactured by Toyota Material Incorporated of Japan), ceramics and composites thereof such as calcium phosphate (e.g., SKELITE™ manufactured by Biologix Inc.), thermoplastics such as polyaryletherketone (PAEK) including polyetheretherketone (PEEK), polyetherketoneketone (PEKK) and polyetherketone (PEK), carbon-PEEK composites, PEEK-$BaSO_4$ polymeric rubbers, polyethylene terephthalate (PET), fabric, silicone, polyurethane, silicone-polyurethane copolymers, polymeric rubbers, polyolefin rubbers, hydrogels, semi-rigid and rigid materials, elastomers, rubbers, thermoplastic elastomers, thermoset elastomers, elastomeric composites, rigid polymers including polyphenylene, polyamide, polyimide, polyetherimide, polyethylene, epoxy, partially resorbable materials, such as, for example, composites of metals and calcium-based ceramics, composites of PEEK and calcium based ceramics, composites of PEEK with resorbable polymers, totally resorbable materials, such as, for example, calcium based ceramics such as calcium phosphate, tri-calcium phosphate (TCP), hydroxyapatite (HA)-TCP, calcium sulfate, or other resorbable polymers such as polyaetide, polyglycolide, polytyrosine carbonate, polycaroplaetohe and their combinations. Various components of system **30** may have material composites, including the above materials, to achieve various desired characteristics such as strength, rigidity, elasticity, compliance, biomechanical performance, durability and radiolucency or imaging preference. It is envisioned that the components of system **30** may be comprise antimicrobial and/or antiseptic materials. The components of system **30**, individually or collectively, may also be fabricated from a heterogeneous material such as a combination of two or more of the above-described materials. The components of system **30** may be monolithically formed or integrally connected.

[0024] System **30** includes a plurality of instrument covers **32** defining an elongated strip **34**. Strip **34** comprises a material that is acoustically transmissive and substantially impermeable to microorganisms and fluids. In some embodiments, strip **34** comprises polyvinyl chloride, polyvinylidene chloride, low density polyethylene, linear low density polyethylene, polyisobutene, poly[ethylene-vinylacetate copolymer, lightweight aluminum foil and combinations thereof.

[0025] Covers **32** are separated from one another by a zone of weakness, such as, for example, a series of perforations **36**. Perforations **36** extend through a first surface **38** of strip **34** and a second surface **40** of strip **34**, the distance between surfaces **38**, **40** defining a thickness of strip **34**. In some embodiments, perforations **36** extend through surface **38** without extending through surface **40**. In some embodiments, perforations **36** extend through surface **40** without extending through surface **38**. Perforations **36** have a substantially rectangular or square configuration and are uniformly spaced apart from one another between opposite side surfaces of strip **34**. In some embodiments, perforations **36** include a single perforation that extends the entire distance between the side surfaces of strip **34**. In some embodiments, perforations **36** may be variously configured and dimensioned, such as, for example, oval, oblong, triangular, square, polygonal, irregular, uniform, non-uniform, offset, staggered, undulating, arcuate, variable and/or tapered, depending on the requirements of a particular application. Each series of perforations **36** separates strip **34** into individual covers **32**. Each series of perforations **36** is linearly arranged such that each series of perforations **36** extends perpendicular to an axis defined by strip **34**. In some embodiments, each series of perforations **36** may be disposed at alternate orientations relative to the axis defined by strip **34**, such as, for example, transverse and/or other angular orientations such as acute or obtuse. Each series of perforations **36** is uniformly spaced from an adjacent series of perforations **36** such that covers **32** have the same size and shape.

[0026] The distance between one series of perforations **36** and the next series of perforations **36** defines the size of the elongated rectangular covers. The size of each individual cover may vary throughout the same roll or between rolls. In one embodiment in accordance with the principles of the present disclosure, the cover is sized so that it covers the head of a standard stethoscope including the diaphragm and the back portion of the head of the stethoscope. In another embodiment the size of the cover are sized to cover the diaphragm, back portion of the head as well as a portion of the tubing attached to the head to transfer sound to the ear pieces. For example, the covers can be about 4 inches by about 6 inches, 3 inches by about 5 inches, 2.5 inches by 4 inches, as well as any size in between. It is contemplated that various sizes can be available according to the type of medicine being practiced. For example, a covers for a pediatric stethoscope may be smaller in size than a stethoscope of adults.

[0027] In one embodiment in accordance with the principles of the present disclosure, the covers may contain indicia on one or both sides of the cover. The indicia can indicate the medical facility that it is being used, the doctor's office, a company logo or have action heroes, animals, or other children characters that can be used in treating children.

[0028] Surface **38** comprises a material having adhesion and/or adherent properties. Strip **34** is arranged in a roll **42** such that the material having adhesion and/or adherent properties contacts surface **40** to maintain strip **34** in roll **42**. In some embodiments, surface **38** is sprayed or coated with the material having adhesion and/or adherent properties. In some embodiments, the material having adhesion and/or adherent properties forms surface **38** of strip **34**. That is, the material having adhesion and/or adherent properties is integrally formed with strip **34** to provide surface **38** with adhesion and/or adherent properties. The material having adhesion and/or adherent properties may include one or more of a cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber, ethylene-vinyl acetate, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether and a tackifier. In some embodiments, the adhesive and/or adherent material further includes an antimicrobial and/or antiseptic material. Antiseptic materials that can be used include but are not limited to: alcohols such as ethanol, 1-propanol and 2-propanol/isopropanol or mixtures of these alcohols; sodium bicarbonate; hydrogen peroxide; benzalkonium chloride; chlorohexidine; hexachlorophene; iodine compounds; and combinations thereof. Antimicrobial materials that can be used include but are not limited to: beta-lactam antibiotics (such as penicillin, cephalosporin); protein synthesis inhibitors (such as aminoglycosides, macrolides, tetracycline, chloramphenicol, polypeptides); sulphonamides; cotrimoxazole; quinolones; anti-viral agents; anti-fungal agents; anti-cancer drugs; anti-malarial drugs; anti-tuberculosis drugs; anti-leprotic drugs; anti-protozoal drugs; and combinations thereof. In some embodiments, the antimicrobial material is at least partially removable so that at least a portion of the

antimicrobial material is left behind as covers **32** are removed from a medical device or instrument, such as, for example, a stethoscope **44**. In some embodiments, the material having adhesion and/or adherent properties is sprayed or coated with weak adhesive non-toxic glue, such as, for example, spirit gum, when additional adherency is desired. That is, the amount of adherency may be adjusted by coating or spraying the material having adhesion and/or adherent properties with the weak adhesive. In embodiments in which the material having adhesion and/or adherent properties is coated or sprayed onto surface **38**, it is envisioned that the material having adhesion and/or adherent properties may be sprayed or coated with one or more layers of the weak adhesive before or after the material having adhesion and/or adherent properties is applied to surface **38**. In embodiments in which the material having adhesion and/or adherent properties forms surface **38**, the one or more layers of the weak adhesive may be sprayed onto the material before the material is formed into surface **38**. In some embodiments, surface **38** comprises a material that accumulates static electricity to impart surface **38** with adhesion and/or adherent properties.

[0029] In some embodiments, surface **40** is sprayed or coated with a material having non-stick properties and/or is glossy to prevent the material having adhesion and/or adherent properties and/or surface **38** from sticking to surface **40** when strip **34** is arranged in roll **42**. In some embodiments, the material having non-stick properties forms surface **40** of strip **34**. That is, the material having non-stick properties is integrally formed with strip **34** to provide surface **40** with non-stick properties. In some embodiments, surface **40** is coated with a powder to prevent the material having adhesion and/or adherent properties and/or surface **38** from permanently sticking to surface **40** when strip **34** is arranged in roll **42**. In some embodiments, surface **40** is sprayed or coated with an agent comprising wax to prevent the material having adhesion and/or adherent properties and/or surface **38** from permanently sticking to surface **40** when strip **34** is arranged in roll **42**. In some embodiments, at least one of surface **38** and surface **40** comprises an antimicrobial substance that can neutralize or destroy microbes.

[0030] Stethoscope **44** includes a diaphragm **46** and an opposite head **48**. Each cover **32** is sized and configured to removably cover diaphragm **46** and head **48** simultaneously by form-fitting surface **38** with outer surfaces of diaphragm **46** and head **48**, as shown in FIG. **5**. In particular, surface **38** may be positioned to engage an outer surface of diaphragm **46**. Cover **32** may then be folded over diaphragm **46** such that surface **38** engages an outer surface of head **48**. Cover **32** may then be crimped about head **48** to protect head **48** from microbes released from a patient during examination by a medical practitioner. The configuration of covers **32** allows covers **32** to be quickly and easily applied to head **48** and diaphragm **46** of stethoscope **44** prior to examination of a patient. It should be appreciated that covers **32** are acoustically transmissive such that covers **32** do not change the acoustics of stethoscope **44**. That is, covers **32** do not interfere with the function(s) of stethoscope **44**.

[0031] Covers **32** are disposable. That is, covers **32** are each configured for one-time use with a single patient such that a medical practitioner engages stethoscope **44** with a first cover **32** in the manner described above prior to examining a first patient patient. After examination is complete, the first cover **32** may be removed from stethoscope **44** and discarded. The medical practitioner may engage stethoscope **44** with a second cover **32** in the manner described above before examining a second patient. This configuration reduces and/or prevents contamination from the first patient to the second patient. In some embodiments, covers **32** have the shape of a circle, rectangle, octagon, trapezoid, triangle, square or other polygon that is greater than the size of head **48**. In one embodiment, covers **32** are 10 cm×14 cm rectangles. It is envisioned that the size of covers **32** can vary depending on the size of stethoscope **44**. In some embodiments, the thickness of covers **32** is in the range of from about 0.01 mm to about 0.8 mm. In some embodiments, covers **32** have a thickness in the range of from about 0.1 mm to about 0.4 mm.

[0032] System **30** includes a housing **50** comprising an antimicrobial material, such as, for example, a silver-based antimicrobial material, a copper-based antimicrobial material, chlorhexidene gluconate, benzalkonium chloride, a monoquaternary and/or polyquaternary ammonium salt-based antimicrobial material, a biguanide-based antimicrobial such as polyhexamethylene biguanide, triclosan, zinc pyrithione, an isothiazolinone-based antimicrobial, a 10,10'-oxybisphenoxarsine-based antimicrobial, a peptide-based antimicrobial, a natural antimicrobial such as hops extract, honey, a chitosan-based antimicrobial, and combinations thereof. Housing **50** is configured for mounting on a vertical surface such as, for example, a wall of a room, or a horizontal surface, such as, for example, a top surface of a desk or bench. In some embodiments, system **30** includes a bracket that mounts directly to the vertical surface and/or the horizontal surface. Housing **50** engages the bracket to fix housing **50** relative to the vertical surface and/or horizontal surface.

[0033] Housing **50** includes an inner surface **52** defining a cavity **54** configured for disposal of roll **42**, as shown in FIG. **7**. Roll **42** is disposed in cavity **54** such that a first end surface **56** of the strip extends through an opening **58** in a first end **60** of housing **50**. Opening **58** has a height that is greater than the thickness of covers **32** and less than a height of roll **42** such that covers **32** may be moved in and out of cavity **54** through opening **58** while roll **42** is prevented from moving through opening **58**. In some embodiments, roll **42** may be inserted into cavity **54** through a door **62** positioned at a second end **64** of housing **50**. In some embodiments, door **62** is pivotable about a hinge **66** to move door **62** between an open orientation shown in FIG. **6** and a closed orientation shown in FIG. **7**. As shown in FIG. **9**, housing **50** includes three hinges **66** that are uniformly spaced apart from one another. It is envisioned that housing **50** may include one or a plurality of hinges **66**. In some embodiments, door **62** has a height that is greater than the height of roll **42** such that roll **42** can be inserted into cavity **54** when door **62** is in the open orientation. In some embodiments, door **62** has a height that is less than the height of roll **42** such that roll **42** must be compressed to insert roll **42** into cavity **54** through an opening created by door **62**.

[0034] In some embodiments, the antimicrobial material is sprayed or coated on surface **52**. In some embodiments, one or more walls that form housing **50** are impregnated with the antimicrobial material. In some embodiments, the antimicrobial material forms surface **52**. That is, the antimicrobial material is integrally formed with housing **50** to control the bacterial level present on and around roll **42**. In some embodiments, cavity **54** includes an antimicrobial ultraviolet light source disposed therein configured to emit ultraviolet light on roll **42** to control the bacterial level present on and around roll **42**. In some embodiments, the antimicrobial ultraviolet light source is mounted to an outer surface of housing **50** such that

the antimicrobial ultraviolet light source can emit ultraviolet light on each cover **32** as each cover **32** is dispensed from housing **50**. This configuration allows covers **32** to be treated with ultraviolet light immediately prior to use.

[0035] In some embodiments, strip **34** is wound about a cylindrical spool **68**. Housing **50** includes side surfaces **70** extending between ends **60**, **64**. Surfaces **70**, **70** each include an aperture configured for disposal of spool **68**. The apertures in surfaces **70**, **70** are aligned with one another and extend perpendicular to an axis defined by housing **50**. The apertures in surfaces **70**, **70** are positioned such that roll **42** is spaced apart from surface **52** when spool **68** is inserted into the apertures in surfaces **70**, **70**, as shown in FIG. **7**. That is, while a cover **32** positioned adjacent opening **58** having a linear or planar configuration engages surface **52**, the covers **32** that form roll **42** having an arcuate configuration do not. This configuration allows roll **42** to rotate within cavity **54** without creating friction by engaging surface **52**.

[0036] Housing **50** has a width defined by the distance between surfaces **70**, **70**. In some embodiments, spool **68** has a length defined by the distance between opposite end surfaces that is greater than the width of housing **50** such that the end surfaces of spool **68** extend through the apertures in surfaces **70**, **70**, as shown in FIGS. **8** and **9**. In some embodiments, a second end **72** of strip **34** is fixed to spool **68**. This configuration allows roll **42** to unwind into strip **34** when spool **68** is rotated in a first direction, such as, for example, clockwise, and/or strip **34** to wind into roll **42** when spool **68** is rotated in a second direction, such as, for example, counterclockwise. That is, spool **68** may be rotated in the first direction to advance end surface **56** through opening **58**. Spool **68** may be further rotated in the first direction until one cover **32** is positioned outside of cavity **54**. In some embodiments, rotating spool **68** three hundred and sixty degrees advances one cover **32** through opening **58**.

[0037] In some embodiments, rotation of spool **68** may be automated by a device such as, for example, an actuator. It is envisioned that the actuator may be external of or internal to housing **50**. That is, the actuator may be positioned inside or outside of cavity **54**. In some embodiments, the actuator is configured to rotate spool **68** such that one cover **32** advances through opening **58** and then stop rotating spool **68**. In some embodiments, the actuator begins to rotate spool **68** in response to a sound such as, for example, a signal or voice command. This configuration allows housing **50** to dispense a single cover **32** without the medical practitioner using his or her hands.

[0038] In assembly, operation and use, a medical practitioner can advance one cover **32** through opening **58** in housing **50** by rotating spool **68** in a first direction either manually or via the actuator. Alternatively, the medical practitioner can advance the cover **32** through opening **58** by grabbing surface **56** and pulling strip **34**. The medical practitioner may then remove the cover **32** from strip **34** by tearing perforations **36** between the cover **32** and an adjacent cover **32**. The medical practitioner then aligns diaphragm **46** of stethoscope **44** with surface **38** and gently presses diaphragm **46** onto surface **38** such that surface **38** adheres to diaphragm **46** to form a substantially air-tight seal with diaphragm **46**. The medical practitioner can then engage head **48** with cover **32** such that surface **38** adheres to head **48** to form a substantially air-tight seal with head **48**. Cover **32** may then be crimped about head **48**. That is, edges or corners of cover **32** are bunched up about head and crimped such that cover **32** forms an air tight seal about head **48**. In some embodiments, edges of cover **32** are wrapped around head **48** prior to crimping cover **32** about head **48**. In some embodiments, the cover **32** remains engaged with strip **34** while the cover **32** is positioned to engage stethoscope **44**. That is, the cover **32** may be removed from strip **34** after the cover **32** engages stethoscope **44**. It is envisioned that cover **32** may remain engaged to stethoscope **44** during examination of a patient. Following the examination, the medical practitioner may remove cover **32** from stethoscope **44** prior to examining another patient to prevent contamination from the first patient to the second patient. To remove cover **32**, the medical practitioner can simply pull cover **32** from stethoscope **44** and discard the same. A second cover **32** may be dispensed from housing **50** and engaged with stethoscope in the manner described above prior to examining the next patient.

[0039] In one embodiment, system **30** includes a stethoscope comprising a head having an outer surface. A first strip includes a first surface. A plurality of spaced-apart instrument covers are removably disposed on the first surface. The instrument covers each include a first portion that removably engages the first surface and an opposite second portion configured to removably cover the outer surface of the head of the stethoscope. A second strip includes a second surface that removably engages the second portions of the instrument covers. A housing comprises an antimicrobial material and is configured for mounting on a vertical surface. The housing includes an inner surface defining a cavity. The first strip includes a first amount of a first material having adhesive properties disposed between the first surface and the instrument covers and the second strip includes a second amount of a second material having adhesive properties disposed between the second surface and the instrument covers. The first amount is greater than the second amount. In some embodiments the first and second materials are the same material. In some embodiments, the first and second materials are different materials having different adhesive properties. The first and second strips are arranged in a rolled configuration, with the instrument covers being positioned between the first and second strips. The roll is disposed in the cavity of the housing such that first ends of the first and second strips extend through an opening in the housing. The first end of the first strip engages a first roller and the first end of the second strip engages a second roller. Rotating the first and second rollers simultaneously in a first direction causes the first and second strips to translate axially in a second direction. The first and second rollers are spaced apart from one another such that the second portions sequentially disengage the second surface as the first and second strips translate axially in the second direction. In some embodiments, simultaneous rotation of the first and second rollers is automated.

[0040] It will be understood that various modifications may be made to the embodiments disclosed herein. Therefore, the above description should not be construed as limiting, but merely as exemplification of the various embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto. The embodiments above can also be modified so that some features of one embodiment are used with the features of another embodiment. One skilled in the art may find variations of these embodiments, which, nevertheless, fall within the spirit of the present disclosure, whose scope is defined by the claims set forth below.

What is claimed is:

1. A dispensing system comprising a plurality of instrument covers defining an elongated strip, the strip comprising a first surface and an opposite second surface, the first surface comprising a material having adhesion properties, the strip being arranged in a roll such that the material contacts the second surface to maintain the strip in the roll.

2. A dispensing system according to claim **1**, wherein the strip comprises one or more of polyvinyl chloride, polyvinylidene chloride, low density polyethylene, linear low density polyethylene, polyisobutene, poly[ethylene-vinylacetate] copolymer, lightweight aluminum foil, cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber, latex, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether, latex-free material and a tackifier.

3. A dispensing system according to claim **1**, wherein the instrument covers are separated from one another by a series of perforations configured to tear off individual portions.

4. A dispensing system according to claim **1**, wherein:

each of the instrument covers is configured to cover a head portion of a stethoscope including a diaphragm portion and a surface opposite the diaphragm portion so as to shield the diaphragm and opposite surface from the transfer of microbes from a patient.

5. A dispensing system according to claim **4**, the instrument covers are constructed from a form fitting material configured to removably form fit around the diaphragm and the surface opposite the diaphragm of the stethoscope when arranged about the head of the stethoscope.

6. A dispensing system according to claim **1**, wherein each of the instrument cover is acoustically transmissive and substantially impermeable to microorganisms and fluids.

7. A dispensing system according to claim **1**, wherein at least one of the material, the first surface and the second surface comprises an antimicrobial substance that can neutralize or destroy microbes.

8. A dispensing system according to claim **1**, wherein the second surface has non-stick properties.

9. A dispensing system according to claim **1**, wherein the second surface is glossy.

10. A dispensing system according to claim **1**, wherein the second surface is coated with a powder to prevent the material from permanently adhering to the second surface.

11. A dispensing system according to claim **1**, further comprising a housing comprising an antimicrobial material, the housing being configured for mounting on a vertical surface or a horizontal surface, the housing including an inner surface defining a cavity configured to accept and house the roll so that a first end of the strip extends through an outer surface of the housing.

12. A dispensing system according to claim **11**, wherein the antimicrobial material comprises silver.

13. A dispensing system according to claim **11**, wherein the housing comprises an antimicrobial ultraviolet light source.

14. A dispensing system according to claim **1**, wherein the dispenser is disposable.

15. A dispensing system according to claim **1**, wherein the material comprises one or more of an antimicrobial material and an antiseptic material.

16. A method for dispensing instrument covers comprising:

providing an elongated strip defining a plurality of instrument covers separated from one another by a series of perforations, the strip comprising a first surface and an opposite second surface, the first surface comprising a material having adhesion properties, the strip being arranged in a roll such that the material contacts the second surface to maintain the strip in the roll;

providing a housing configured for mounting on a vertical surface or a horizontal surface, the housing including an inner surface defining a cavity;

disposing the roll within the cavity such that a first end of the strip is aligned with an opening in the housing;

rotating the roll in a first direction about a transverse axis such that the first end of the strip translates axially through the opening;

providing a stethoscope comprising a diaphragm and an opposite head;

breaking off the instrument cover that engages the stethoscope from the strip; and

engaging the first surface with the diaphragm and the head.

17. A method according to claim **16**, wherein each of the instrument covers is configured to cover a head portion of a stethoscope including a diaphragm portion and a surface opposite the diaphragm portion so as to shield the diaphragm and opposite surface from the transfer of microbes from a patient.

18. A method according to claim **16**, wherein each of the instrument covers is acoustically transmissive and substantially impermeable to microorganisms and fluids.

19. A method according to claim **16**, wherein the vertical surface is a wall of a room and the horizontal surface is an upper surface of a desk or bench.

20. A dispensing system comprising:

a plurality of instrument covers defining an elongated strip, the instrument covers being acoustically transmissive and substantially impermeable to microorganisms and fluids, the instrument covers being separated from one another by a series of perforations, the strip comprising a first surface and an opposite second surface having non-stick properties, the first surface comprising a material having adhesion properties, the strip being arranged in a roll such that the material contacts the second surface to maintain the strip in the roll;

a housing comprising an antimicrobial material, the housing being configured for mounting on a vertical surface or a horizontal surface, the housing including an inner surface defining a cavity having an antimicrobial ultraviolet light source and the roll disposed therein such that a first end of the strip extends through an opening in the housing; and

a stethoscope including a diaphragm and an opposite head, each of the instrument covers being sized and configured to removably cover the diaphragm and the head simultaneously by form-fitting a respective first surface with outer surfaces of the diaphragm and the head,

wherein the strip comprises one or more of polyvinyl chloride, polyvinylidene chloride, low density polyethylene, linear low density polyethylene, polyisobutene, poly [ethylene-vinylacetate] copolymer, lightweight aluminum foil, cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber, latex, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether, latex-free material and a tackifier,

wherein the material comprises one or more of a cellophane, vinyl, acetate, polyethylene acrylic, butyl rubber,

ethylene-vinyl acetate, natural rubber, a nitrile, silicone rubber, a styrene block copolymer, a vinyl ether and a tackifier, and

wherein at least one of the material, the first surface and the second surface comprises an antimicrobial substance that can neutralize or destroy microbes.

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