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MORGAN

(54) **PRECONFIGURED ULTRASOUND CONDUCTIVE MEDIUM**

(71) Applicant: **G. Chad MORGAN**, Chattanooga, TN (US)

(72) Inventor: **G. Chad MORGAN**, Chattanooga, TN (US)

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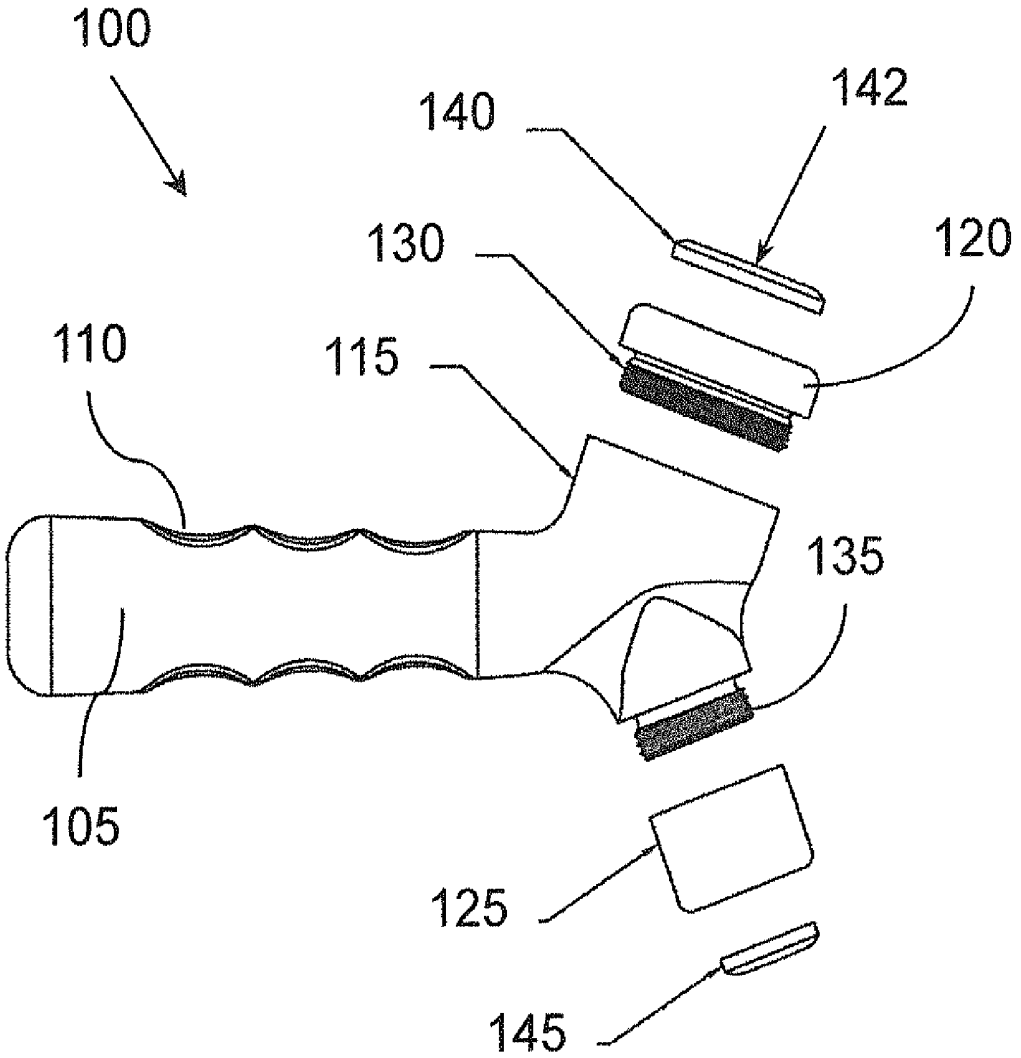
(57) **ABSTRACT**

Embodiments associated with ultrasound conductive medium are described. In one embodiment, an ultrasound conductive medium is formed into a preconfigured shape that is a structure configured to attach over a head of an ultrasound device.



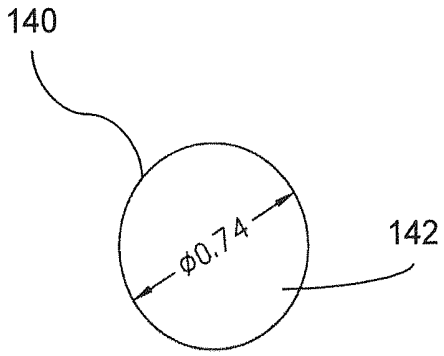


FIG. 1A
Top View

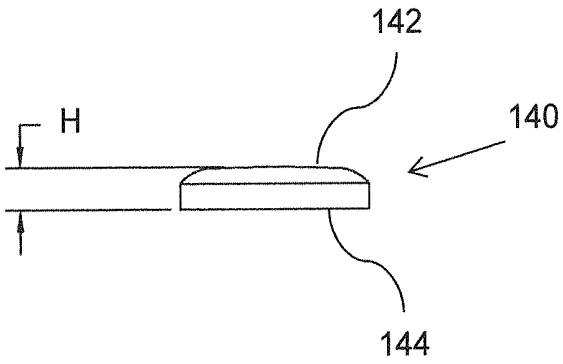


FIG. 1B
Side View

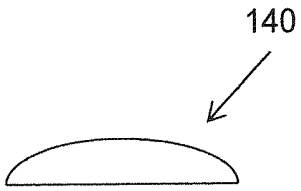


FIG. 1C
Side View

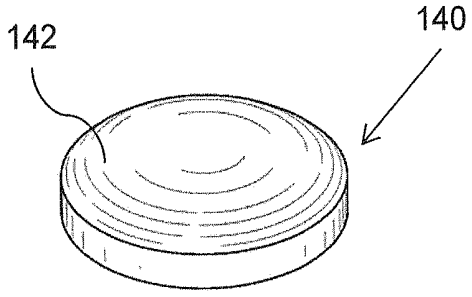


FIG. 1D
3-D View

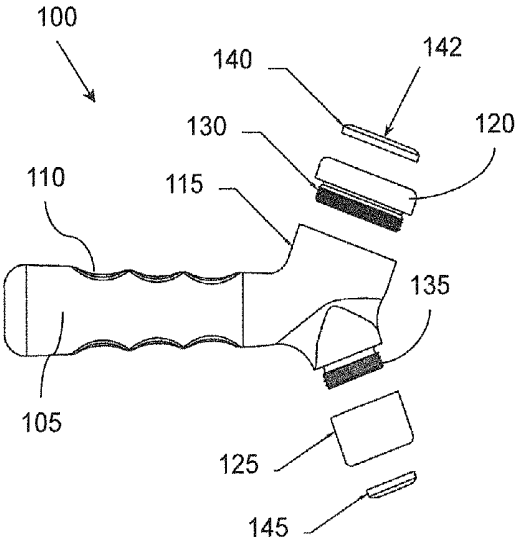

100
140
142
130
120
110
115
135
105
125
145

FIG. 2A

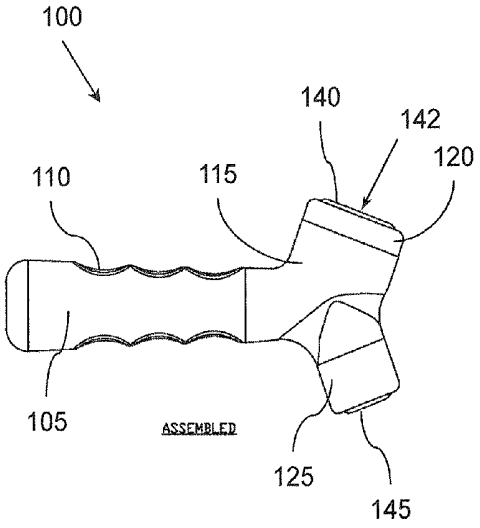

100
140
142
120
110
115
105
ASSEMBLED
125
145

FIG. 2B

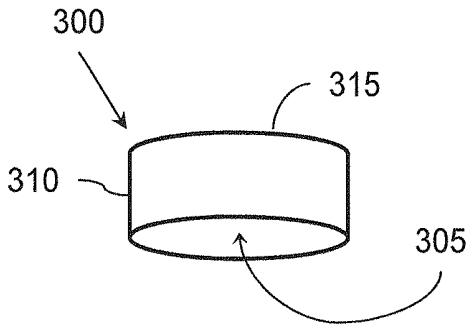


FIG. 3A

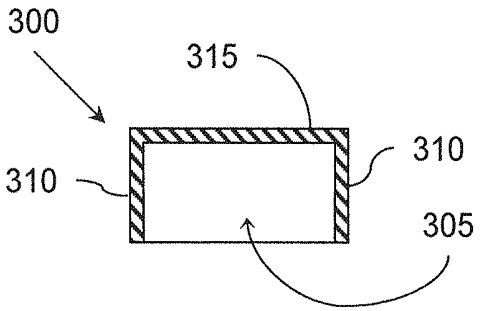


FIG. 3B

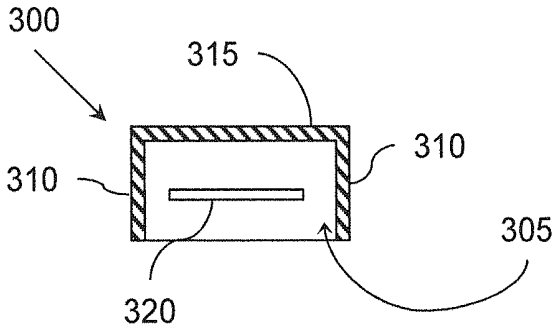


FIG. 3C

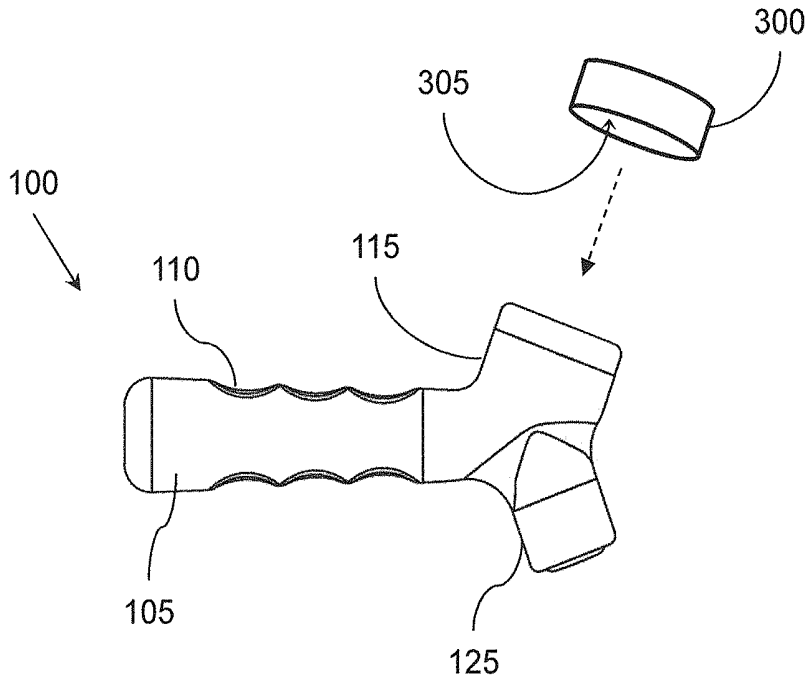


FIG. 4A

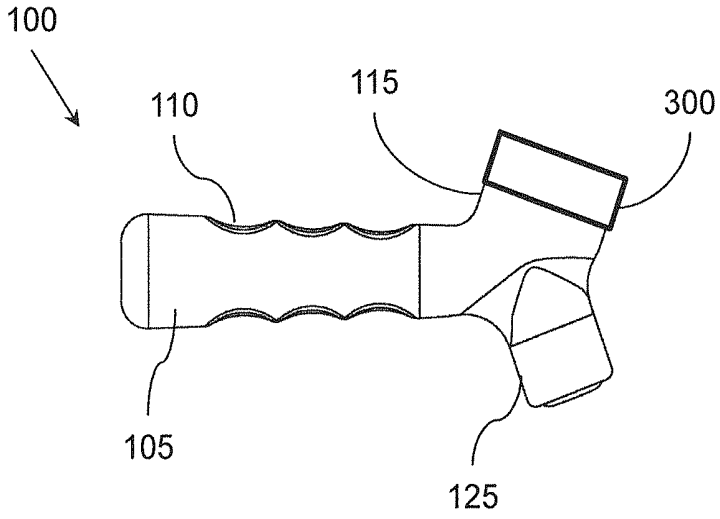


FIG. 4B

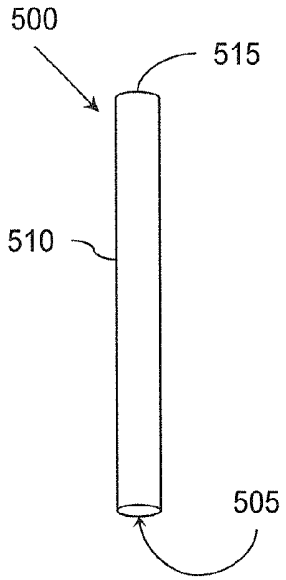


FIG. 5

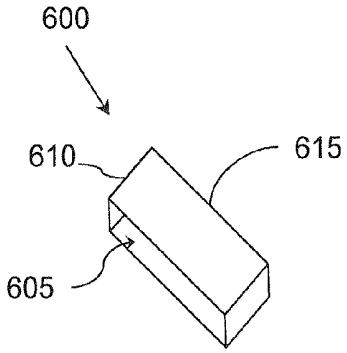


FIG. 6

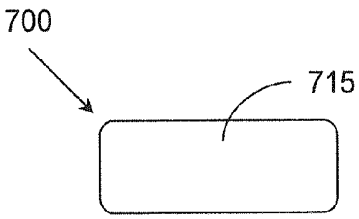


FIG. 7

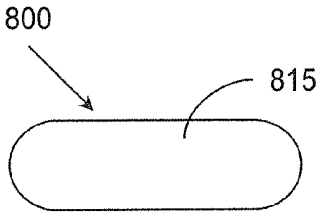


FIG. 8

PRECONFIGURED ULTRASOUND CONDUCTIVE MEDIUM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This patent disclosure claims the benefit of U.S. Provisional Patent application Ser. No. 61/765,392 entitled "Preconfigured gel with infused drug for ultrasound" filed on Feb. 15, 2013, and U.S. Provisional Patent Application Ser. No. 61/765,376 entitled "Preconfigured gel for ultrasound" filed on Feb. 15, 2013, and U.S. Provisional Patent Application Ser. No. 61/919,233 entitled "Gel with locking element and gel adaptor" filed on Dec. 20, 2013, which are all hereby wholly incorporated by reference in their entirety.

BACKGROUND

[0002] Ultrasound devices operate with frequencies from 0 to 200 mHz up to several gigahertz and are used in many different fields. In the medical field, ultrasound can be used for therapeutic procedures and imaging of internal structures. For example, ultrasound can be applied to a patient's skin to stimulate the tissue beneath the skin's surface using very high frequency sound waves.

[0003] Ultrasound is applied using a device that includes a transducer or applicator that is put in contact with a patient's skin. A random amount of liquid gel is dispensed on the patient's skin to cover the area and on all surfaces of the device's head. The gel functions to couple the device with the skin, to reduce friction, and to assist transmission of the ultrasonic waves. The gel is squeezed out of a bottle and spread over the patient's skin. Since the gel is a fluid, it is difficult to contain within a desired area of the skin and the thickness of the gel cannot be controlled. Lack of a consistent and desired thickness of the gel can lead to a less than optimal ultrasound application. Gel that is too thin or too thick can affect the quality of images produced by the device, therapeutic values, and/or efficacy. Furthermore, when the ultrasound procedure is completed, the patient is required to clean up and wipe off the gel from the patient's skin. Typically, the gel is not completely removed and the cleaning process is uncomfortable.

SUMMARY

[0004] In one embodiment of the disclosure, an ultrasound conductive medium is disclosed that is formed into a preconfigured shape that is a cap-like structure configured to attach over a head of an ultrasound device. In another embodiment, the ultrasound conductive medium is in a solidified state that maintains the preconfigured shape. In another embodiment, the ultrasound conductive medium is formed from a gel.

[0005] In another embodiment, the cap-like structure includes flexible side walls that define an internal cavity. In another embodiment, the flexible side walls include one or more protrusions formed within the internal cavity, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto. In another embodiment, the one or more internal protrusions are oriented and configured to mate with or abut against corresponding notches or edges in the head of the ultrasound device. In another embodiment, the cap-like structure includes sidewalls and an interface surface, wherein the interface surface has a predetermined thickness of the ultrasound conductive medium to provide a consistent amount of ultrasound conductive medium between the ultrasound device and a patient.

[0006] In another embodiment of the disclosure, an ultrasound conductive medium is disclosed that is molded into a solid form having a shape defined to cover and enclose a head of an ultrasound device. In another embodiment, the ultrasound conductive medium includes one or more sidewalls that define an internal cavity for receiving the head of the ultrasound device. In another embodiment, the one or more sidewalls include one or more protrusions, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto.

[0007] In another aspect, the solid form of the ultrasound conductive medium includes a predetermined thickness of ultrasound conductive medium to provide a consistent and controlled amount of the ultrasound conductive medium between a transducer of the ultrasound device and a patient. In another embodiment, the shape is a cap-like structure that includes flexible sidewalls for attaching to the head of the ultrasound device. In another embodiment, the shape is a tube shape that includes elongated sidewalls that define an internal cavity, wherein the internal cavity is configured to receive a long and narrow ultrasound probe.

[0008] In another embodiment, the cap-like structure ultrasound conductive medium includes sidewalls and an interface surface, wherein the interface surface has a predetermined thickness of the ultrasound conductive medium to provide a consistent amount of ultrasound conductive medium between the ultrasound device and a patient. In another embodiment, the ultrasound conductive medium comprises an ultrasound gel.

[0009] In another embodiment, the flexible side walls include one or more protrusions formed within the internal cavity, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto.

[0010] In another embodiment of the disclosure, an ultrasound device is disclosed that includes at least a handle connected to a head, wherein the head contains an ultrasound transducer; and an ultrasound conductive medium having a solidified shape, wherein the solidified shape is attach to and over the head of the ultrasound device. The ultrasound conductive medium is configured to provide an interface surface and coupling medium between the ultrasound transducer and an ultrasound target.

[0011] In another embodiment, the solidified shape is a cap-like structure comprising one or more flexible sidewalls that define an internal cavity for receiving the head of the ultrasound device. The ultrasound conductive medium is attached to move with the head when the ultrasound device is moved. In another embodiment, the one or more sidewalls includes one or more protrusions.

[0012] In another embodiment, the solidified shape comprises solidified gel and the ultrasound conductive medium is removable from the head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate various systems, methods, and other embodiments of the disclosure. It will be appreciated that the illustrated element boundaries (e.g., boxes, or other shapes) in the figures represent one embodiment of the boundaries. In some embodi-

ments one element may be designed as multiple elements or that multiple elements may be designed as one element. In some embodiments, an element shown as an internal component of another element may be implemented as an external component and vice versa. Furthermore, elements may not be drawn to scale.

[0014] FIGS. **1**A and **1**B illustrate one embodiment of a preconfigured gel from a top view and side view, respectively.

[0015] FIG. **1**C illustrates another embodiment of the preconfigured gel from a side view.

[0016] FIG. **1**D illustrates a 3-dimensional image of the preconfigured gel from FIG. **1**B.

[0017] FIG. **2**A illustrates one embodiment of an ultrasound device shown with components unassembled.

[0018] FIG. **2**B illustrates the ultrasound device of FIG. **2**A in an assembled view.

[0019] FIG. **3**A illustrates one embodiment of an ultrasound conductive medium configured in a cap-like structure.

[0020] FIG. **3**B illustrates the ultrasound conductive medium in FIG. **3**A in cross-section.

[0021] FIG. **3**C illustrates another embodiment of the ultrasound conductive medium of FIGS. **3**A and **3**B including an internal protrusion.

[0022] FIGS. **4**A and **4**B illustrates the ultrasound conductive medium of FIG. **3**A being attached to a head of an ultrasound device to cover the head.

[0023] FIG. **5** illustrates another embodiment of an ultrasound conductive medium that is preconfigured with extended sidewalls.

[0024] FIG. **6** illustrates another embodiment of an ultrasound conductive medium that is preconfigured as a rectangular cap.

[0025] FIG. **7** illustrates a top surface view of another embodiment of an ultrasound conductive medium that is preconfigured as a rectangular cap with rounded corners.

[0026] FIG. **8** illustrates a top surface view of another embodiment of an ultrasound conductive medium that is preconfigured with a generally oval shape.

DETAILED DESCRIPTION

[0027] Embodiments of preconfigured gel are disclosed herein that are used for ultrasound devices. In one embodiment, ultrasound gel is preconfigured into a predefined shape (herein also referred to as a "gel shot", which is an individual piece of gel). In general, gel refers to an ultrasound conductive medium. As will be described with reference to FIGS. **1-2**, the predefined shape is made to correspond to a recessed cavity of an ultrasound device in which the preconfigured gel is inserted. In one embodiment, the preconfigured gel is infused with a drug to be delivered during an ultrasound procedure (e.g., transdermal delivery). In one embodiment, the drug is Lidocaine or other anesthetic. In another embodiment, as will be described with reference to FIGS. **3-8**, gel is preconfigured into a defined shape to cover the head of an ultrasound device (herein also referred to as a "gel cover" or "gel cap").

[0028] In one embodiment, the preconfigured gel (gel shot or gel cover) is formed from an aqueous material that functions as a conductive medium and coupling medium for ultrasound energy. The aqueous material is for example a liquid or jelly-like substance/composition that is molded into a desired shape and processed to retain its shape as a solid form (e.g., via curing, heating, cooling, or other process). For example, the gel composition is processed to solidify the gel to a desired extent so that its shape is set. In different embodiments, the preconfigured gel can be solidified to different degrees or ranges as desired such as being a soft and flexible object, being a rigid object, or any state in between (e.g., semi-rigid and/or flexible structure).

[0029] In one embodiment, the gel shot or gel cover is formed to retain its shape and have memory. Once the shape is set, which has predetermined amount of gel, the preconfigured gel provides a consistent amount and thickness of gel for an ultrasound procedure. The gel shot or gel cover is formed in advance so that it is ready for use with an ultrasound device and provides a premeasured and consistent amount of gel. After being used in an ultrasound procedure, the preconfigured gel is removed from the ultrasound device and replaced with a new piece of preconfigured gel. Of course, the same piece of gel may be used for multiple procedures since it is attached to the ultrasound device and can be moved. However, there may be issues with sterility from multiple uses that may not be desired.

[0030] With reference to FIGS. **1**A and **1**B, one embodiment of preconfigured gel **140** is illustrated, which is in a solidified state. FIG. **1**A shows a top view of the gel **140** and FIG. **1**B shows a side view. FIG. **1**C illustrates a side view of another embodiment of the gel **140** with a different shape. FIG. **1**D illustrates a 3-dimensional image of the preconfigured gel **140** where the gel **140** represents the shape of FIGS. **1**A and **1**B. Of course, other shapes can be formed.

[0031] In one embodiment, the preconfigured gel **140** is formed with a circular top surface **142** and bottom surface **144** and has a general configuration of a disk/pad. This shape would correspond to a head of ultrasound device that is generally round. The preconfigured gel **140** includes a thickness or height H. In one embodiment, the height H of the gel **140** is about 0.15 inches and the diameter is about 0.74 inches. In another embodiment, the diameter may be about 1.17 inches for use with ultrasound devices that have a larger circular head. Of course, other dimensions may be implemented.

[0032] The shape and size of the preconfigured gel **140** may be defined to correspond to a gel receiving cavity of an ultrasound device in which the gel **140** is to function with. Of course, the gel **140** may be implemented in other shapes and sizes (e.g., 3-dimensional oval or polygon, other shapes with curved sides, flat sides, rectangular shape, and so on to correspond to the shape of an ultrasound head). The top surface **142** may be flat (see FIG. **1**B) or curved (see FIG. **1**C) in order to provide good contact with an ultrasound target (e.g., a patient's skin). In other embodiments, the preconfigured gel **140** may be formed with irregular shapes such as having the top surface **142** that is larger than the bottom surface **144** (e.g., mushroom shape). In other embodiments, the gel cover may be formed in various shapes and sizes to conform to an applicable head of an ultrasound device (see FIGS. **3-8**).

[0033] In one embodiment, the preconfigured gel is formed or molded into a desired shape. This may involve using molds. Multiple molds can be used to create multiple pieces of the preconfigured gel at a time. For example, a tray of patterned shapes can be used where the gel composition in a liquid form is inserted into each shape. The gel composition is then processed to solidify the gel to a desired extent so that its shape is set (e.g., the composition holds its shape, does not flow, or does not take the shape of its container when placed in the container). Of course, other processes may be used to create the preconfigured gel or cover such as injection mold-

ing, 3-D printing, and so on. In one embodiment, the molding process also applies to the gel cover embodiments of FIGS. **3-8**.

Ultrasound Device Embodiment

[0034] With reference to FIGS. **2**A and **2**B, in one embodiment, an ultrasound device **100** described herein includes a diaphragm configured with a recessed cavity for receiving and containing the preconfigured gel **140**. In another embodiment, the diaphragm is configured as a replaceable head for an ultrasound device where the diaphragm includes an ultrasound transducer (e.g., piezoelectric crystal) and a cavity for containing the preconfigured gel **140**.

[0035] FIG. **2**A illustrates the ultrasound device **100** in a partially unassembled state and FIG. **2**B shows the device **100** in an assembled state. The device **100** is configured as a hand-held device including an elongated handle **105** that may include one or more finger grips **110** (e.g., indentations, ridges, and so on). The handle **105** is connected to a head **115** that includes one or more sides that connect to a diaphragm. In the illustrated embodiment, the head **115** includes two sides where the first side includes diaphragm **120** that includes a transducer and the second side includes diaphragm **125** and a transducer (e.g., the device **100** includes two ultrasound heads). Of course, other types of ultrasound devices or probes may be used with the preconfigured gel described herein. Thus the embodiment of FIGS. **2**A-**2**B are not intended to be limiting.

[0036] In one embodiment, diaphragm **120** is configured with a connector **130** that is threaded to insert and connect with a corresponding threaded socket in the head **115**. Similarly, the second side of the head **115** may include a connector **135** that is threaded for connecting with a threaded socket within the diaphragm **125**. In another embodiment, the connectors **130** and **135** may be configured as a quick-connect/disconnect device so that the diaphragms **120** and **125** can be connected by pushing and snapping into place or disconnected by pulling off with a small amount of force. Thus, in one embodiment, the diaphragms **120** or **125** are configured as replaceable components. In another embodiment, the head **115** and diaphragm **125** may be integral with each other (e.g., one piece, formed together).

[0037] With reference to diaphragm **120**, the diaphragm includes a recessed cavity/receptacle that is configured to receive and contain a conductive medium **140** used during an ultrasound scan. In one embodiment, the conductive medium **140** is a portion of gel (e.g., gel shot, gel pad) that is preconfigured to fit into the cavity and the top surface **142** is exposed, as seen in FIG. **2**B where gel **140** is inserted into the diaphragm **120**. Likewise, diaphragm **125** includes a cavity to receive a conductive medium **145** when used during a scan.

Preconfiqured Gel Cover/Cap Embodiment

[0038] In another embodiment, with reference to FIGS. **3**A and **3**B, an adaptor **300** for an ultrasound device is disclosed. The adaptor **300** includes an ultrasound conductive medium configured to operate with a flat or generally flat surface of an ultrasound head (e.g., a head without a gel cavity in the head/diaphragm). FIG. **3**A shows one embodiment of a perspective view of the adaptor **300** and FIG. **3**B shows a cross-section view of FIG. **3**A. In one embodiment, the adaptor **300** is piece of preconfigured ultrasound gel that is formed and shaped as a gel cover **300**. The gel cover **300** is configured to be attachable like a cap over the head of an ultrasound device (e.g., a cap, sleeve, or other covering type shape).

[0039] As previously stated, the gel cover **300** is created from a liquid or gel-like composition of an ultrasound conductive medium and formed into a preconfigured shape and solidified. In various embodiments, the preconfigured gel can be solidified to different degrees or ranges as desired such as being a soft and flexible object, being a rigid object, or any state in between (e.g., semi-rigid and/or flexible structure). In one embodiment shown in FIG. **3**A, the gel cover **300** is formed as a generally circular shaped cap that is configured to attach to a generally circular shaped ultrasound head/probe. Of course, other shapes can be formed based on the shape and configuration of an ultrasound head to be used with the preconfigured gel. For example, each type of ultrasound head may have a customized version of the gel cover **300** made for the device.

[0040] With reference to FIGS. **3**A and **3**B, in one example, the gel cover **300** is configured with an internal cavity **305** to receive the ultrasound head/diaphragm. The gel cover **300** includes one or more sidewalls **310** that define the internal cavity **305** via an opening (e.g., a missing wall, no bottom surface). The sidewalls **310** are configured to surround and attach to the head/diaphragm of an ultrasound device. In one embodiment, side wall **310** is a continuous circular wall that extends out from a closed top surface **315** of the cover **300**. The sidewalls **310** may be generally straight and/or curved as they extend out from the top surface **315**.

[0041] The top surface **315** functions as the interface surface and coupling medium between the ultrasound transducer and an ultrasound target (e.g., a patient) once the ultrasound device is inserted into the cavity **305**. The thickness of the closed top surface **315** is predetermined and is a measured amount of gel based on the size and shape of the gel cover **300**. The predetermined thickness of the top surface **315** and the solid form of the gel cover **300** provides a consistent and controlled amount of gel (e.g., coupling agent/medium) between the ultrasound transducer and the patient. Thus dispensing inconsistent and unknown amounts of liquid gel during an ultrasound procedure is eliminated.

[0042] In general, the gel cover **300** is a reverse configuration as shown in FIG. **2**A. Instead of the gel **140** inserting into the cavity of the diaphragm **120**, here the diaphragm/head is inserted into the gel cover **300**. For example, this is shown in FIGS. **4**A and **4**B where the gel cover **300** is being attached to head **115** in which is at least one ultrasound transducer (FIG. **4**A). FIG. **4**B shows the gel cover **300** attached to the head **115** (e.g., top of head **115** is inserted into cavity of gel cover **300**). The gel cover **300** is preconfigured into a solid form having a shape defined to cover and enclose the head of an ultrasound device. The gel cover **300** is removable and replaceable with other gel covers.

[0043] In one embodiment, the gel cover **300** may be a configured similar to a shower-cap design (e.g., cap-like structure) with flexible side walls that can move and stretch to surround, cover, and/or enclose the diaphragm/head of a device. In one embodiment, the gel cover **300** is held in place on the head by at least surface tension, friction from the sidewall(s) **310**, and/or the squeezing force from the flexible sidewall(s) **310** against the head. When a scan is complete, the gel cover **300** is simply pulled off and another gel cover can be attached for a subsequent scan. Of course, the gel cover **300** may be used for multiple scans since the cover **300** is attached to the ultrasound device and moves with the device. However,

multiple uses of the gel cover **300** may cause issues of sterility that may not be desired. In one embodiment, gel covers may be individually packaged to ensure that each cover **300** is sterile for each use, or a group of gel covers **300** may be packaged together.

[0044] In another embodiment with reference to FIG. **3**C, the internal surface of the sidewalls **310** may include one or more lips, rings, ribs, edges or other internal protrusions **320**. The internal protrusion **320** is configured to lock and/or assist in securing the gel cover **300** onto the head of the ultrasound device. For example, the internal protrusions are oriented and configured to mate with or abut against corresponding receiving notches or edges in the head of the ultrasound device for which the gel cover **300** is made. One or more internal protrusions **320** can be configured within the gel cover **300**. A protrusion may be continuously around the internal surface like a ring, vertical and/or horizontal ribs (where horizontal is parallel to the top surface **315** as shown by protrusion **320**), or other combination of protrusions. Other sizes and shapes of the protrusion(s) **320** may also be formed to function as a locking element that assists to secure the gel cover **300** to an ultrasound head.

[0045] In another embodiment, the sidewalls **310** are configured to fit around the head/diaphragm (e.g., see FIGS. **3**B and **4**B, generally a U-shaped cross-section) so that when the ultrasound head is inserted into the cavity **305**, the gel cover **300** is attached to the device (see FIG. **4**B). Thus when the ultrasound device **100** is moved by an operator, the gel cover **300** is moved/pushed along with the device **100** to slide along a patient to provide a consistent and controlled amount of coupling agent-conductive medium/gel between the ultrasound transducer and the patient, which is provided by the interface top surface **315**. Thus as stated previously, squirting and spreading random amounts of liquid gel on a patient is eliminated.

[0046] In other embodiments, the gel cover can be formed in other shapes and configurations. For example, with reference to FIG. **5**, a gel cover **500** is illustrated as a tube-like structure where sidewalls **510** are elongated and much longer than the sidewalls **310** shown in FIG. **3**A. Gel cover **500** is configured to fit a long and narrow ultrasound probe (e.g., stick-like probe). The sidewall(s) **510** defines an internal cavity **505** where the internal cavity **505** is configured to receive a long and narrow ultrasound probe. The gel cover **510** also includes a closed top surface **515** that functions as an interface surface for the ultrasound.

[0047] Of course, other shapes can be implemented based on the shape of the ultrasound device. For example, FIG. **6** shows one embodiment of a rectangular shaped gel cap **600** that includes a cavity **605** defined by four sidewalls **610** and a closed top surface **615**. FIG. **7** shows another embodiment of a gel cover **700** from a top surface view where the top closed surface **715** is generally rectangular but with rounded corners. FIG. **8** shows another embodiment of a gel cover **800** from a top surface view where the top closed surface **815** is generally oval in shape. In general, the gel cover can be formed to correspond to a particular shape of an ultrasound head so that each type of head can operate with a custom shaped gel cover.

[0048] Definitions

[0049] The following includes definitions of selected terms employed herein. The definitions include various examples and/or forms of components that fall within the scope of a term and that may be used for implementation. The examples are not intended to be limiting. Both singular and plural forms of terms may be within the definitions.

[0050] The term "conductive medium" is used to refer to a substance that is used during an ultrasound procedure that assists in coupling the ultrasound device/probe head or applicator tip to a subject/target (e.g., the skin of a patient or other surface) and conducts ultrasound energy. Typically, the conductive medium is ultrasound gel but other substances can be used such as shampoo, hairstyling gel, hand lotion, hand sanitizer, liquid dishwashing detergent, olive oil (or other oil based substances), or other substance with a composition that is appropriate to function with an ultrasound device. Many substances can form gels when a suitable thickener or gelling agent is added to their formula to change the viscosity. These substances are preconfigured into a solidified state as an individual piece of conductive medium as explained previously (e.g., solidified state may be any state in which the gel holds its shape and does not flow). References to the term "gel" is intended to refer to any of these conductive media that is appropriate for an ultrasound procedure.

[0051] References to "one embodiment", "an embodiment", "one example", "an example", and so on, indicate that the embodiment(s) or example(s) so described may include a particular feature, structure, characteristic, property, element, or limitation, but that not every embodiment or example necessarily includes that particular feature, structure, characteristic, property, element or limitation. Furthermore, repeated use of the phrase "in one embodiment" does not necessarily refer to the same embodiment, though it may.

[0052] While example systems, methods, and so on have been illustrated by describing examples, and while the examples have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope of the appended claims to such detail. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the systems, methods, and so on described herein. Therefore, the disclosure is not limited to the specific details, the representative apparatus, and illustrative examples shown and described. Thus, this disclosure is intended to embrace alterations, modifications, and variations that fall within the scope of the appended claims.

[0053] To the extent that the term "includes" or "including" is employed in the detailed description or the claims, it is intended to be inclusive in a manner similar to the term "comprising" as that term is interpreted when employed as a transitional word in a claim.

[0054] To the extent that the term "or" is used in the detailed description or claims (e.g., A or B) it is intended to mean "A or B or both". When the applicants intend to indicate "only A or B but not both" then the phrase "only A or B but not both" will be used. Thus, use of the term "or" herein is the inclusive, and not the exclusive use. See, Bryan A. Garner, A Dictionary of Modern Legal Usage 624 (2d. Ed. 1995).

What is claimed is:

1. An ultrasound conductive medium formed into a preconfigured shape that is a cap-like structure configured to attach over a head of an ultrasound device.

2. The ultrasound conductive medium of claim **1**, wherein the ultrasound conductive medium is in a solidified state that maintains the preconfigured shape.

3. The ultrasound conductive medium of claim **1**, wherein the ultrasound conductive medium is formed from a gel.

4. The ultrasound conductive medium of claim 1, wherein the cap-like structure includes flexible side walls that define an internal cavity.

5. The ultrasound conductive medium of claim 4, wherein the flexible side walls include one or more protrusions formed within the internal cavity, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto.

6. The ultrasound conductive medium of claim 5, wherein the one or more internal protrusions are oriented and configured to mate with or abut against corresponding notches or edges in the head of the ultrasound device.

7. The ultrasound conductive medium of claim 1, wherein the cap-like structure includes sidewalls and an interface surface, wherein the interface surface has a predetermined thickness of the ultrasound conductive medium to provide a consistent amount of ultrasound conductive medium between the ultrasound device and a patient.

8. An ultrasound conductive medium molded into a solid form having a shape defined to cover and enclose a head of an ultrasound device.

9. The ultrasound conductive medium of claim 8, wherein the ultrasound conductive medium includes one or more sidewalls that define an internal cavity for receiving the head of the ultrasound device.

10. The ultrasound conductive medium of claim 9, wherein the one or more sidewalls include one or more protrusions, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto.

11. The ultrasound conductive medium of claim 8, wherein the solid form includes a predetermined thickness of ultrasound conductive medium to provide a consistent and controlled amount of the ultrasound conductive medium between a transducer of the ultrasound device and a patient.

12. The ultrasound conductive medium of claim 8, wherein the shape is a cap-like structure that includes flexible sidewalls for attaching to the head of the ultrasound device.

13. The ultrasound conductive medium of claim 8, wherein the shape is a tube shape that includes elongated sidewalls that define an internal cavity, wherein the internal cavity is configured to receive a long and narrow ultrasound probe.

14. The ultrasound conductive medium of claim 8, wherein the cap-like structure includes sidewalls and an interface surface, wherein the interface surface has a predetermined thickness of the ultrasound conductive medium to provide a consistent amount of ultrasound conductive medium between the ultrasound device and a patient.

15. The ultrasound conductive medium of claim 8, wherein the ultrasound conductive medium comprises an ultrasound gel.

16. The ultrasound conductive medium of claim 8, wherein the flexible side walls include one or more protrusions formed within the internal cavity, wherein the one or more protrusions are configured to assist in securing the ultrasound conductive medium to the head of the ultrasound device once attached thereto.

17. An ultrasound device, comprising:

at least a handle connected to a head, wherein the head contains an ultrasound transducer; and

an ultrasound conductive medium having a solidified shape, wherein the solidified shape is attach to and covers the head of the ultrasound device;

wherein the ultrasound conductive medium is configured to provide an interface surface and coupling medium between the ultrasound transducer and an ultrasound target.

18. The ultrasound device of claim 17, wherein the solidified shape is a cap-like structure comprising one or more flexible sidewalls that define an internal cavity for receiving the head of the ultrasound device, wherein the ultrasound conductive medium is attached to move with the head when the ultrasound device is moved.

19. The ultrasound device of claim 18, wherein the one or more sidewalls includes one or more protrusions.

20. The adaptor of claim 17, wherein the solidified shape comprises solidified gel and wherein the ultrasound conductive medium is removable from the head.

* * * * *

专利名称(译)	预配置的超声导电介质		
公开(公告)号	US20140257108A1	公开(公告)日	2014-09-11
申请号	US14/181130	申请日	2014-02-14
[标]申请(专利权)人(译)	MORGAN摹CHAD		
申请(专利权)人(译)	MORGAN，G CHAD		
当前申请(专利权)人(译)	NAIMCO INC.		
[标]发明人	MORGAN G CHAD		
发明人	MORGAN, G. CHAD		
IPC分类号	A61B8/00		
CPC分类号	A61B8/4281 A61N7/00 A61B2017/2253 A61B8/4455 A61N2007/0078		
优先权	61/765392 2013-02-15 US 61/919233 2013-12-20 US 61/765376 2013-02-15 US		
外部链接	Espacenet USPTO		

摘要(译)

描述了与超声导电介质相关的实施例。在一个实施例中，超声导电介质形成为预先配置的形状，该预先配置的形状是被配置为附接在超声装置的头部上的结构。