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(54) **DEBRIDEMENT HAND TOOL**

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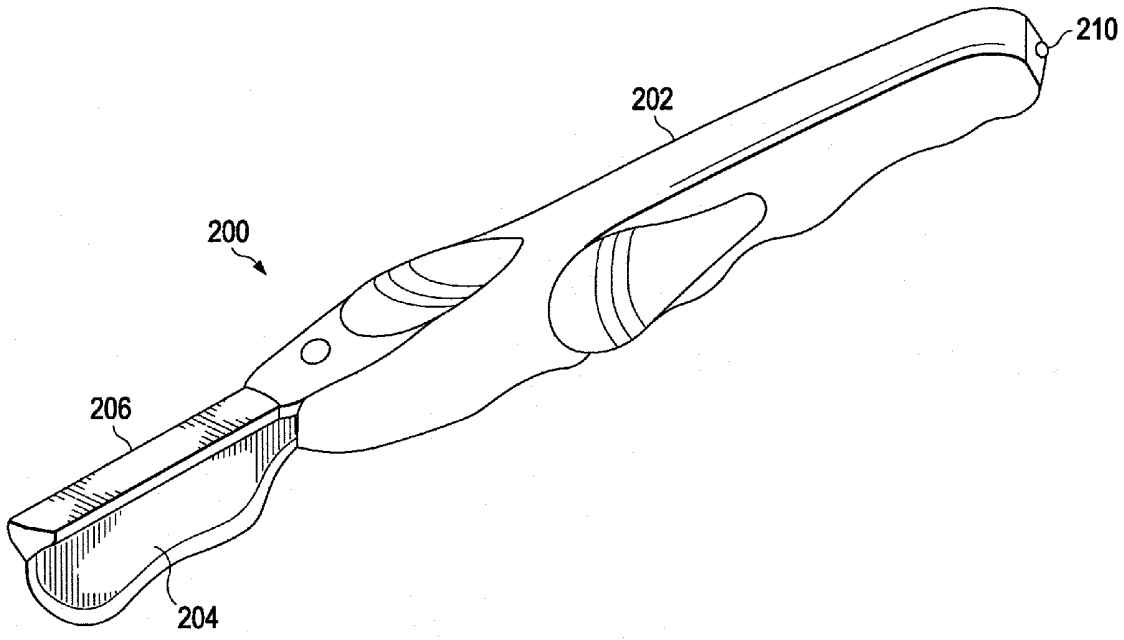
(52) **U.S. Cl.** ..... **606/169**

(57) **ABSTRACT**

The disclosed embodiments include tools for aiding a user in debriding necrotic tissue. For example, in one embodiment, a debridement tool is disclosed that includes a housing having an interior space. A motor and a power source are disposed within the interior space of the housing. The power source is operable to provide power to the motor. A blade is coupled to a first end of the housing. The blade is operable to vibrate when the motor is powered. The debridement tool further includes a lighting element disposed within the housing and beneath a cutting edge of the blade. The lighting element is operable to illuminate the tissue site. In some embodiments, the lighting element operates at a particular wavelength that assists in distinguishing between necrotic tissue and healthy tissue.



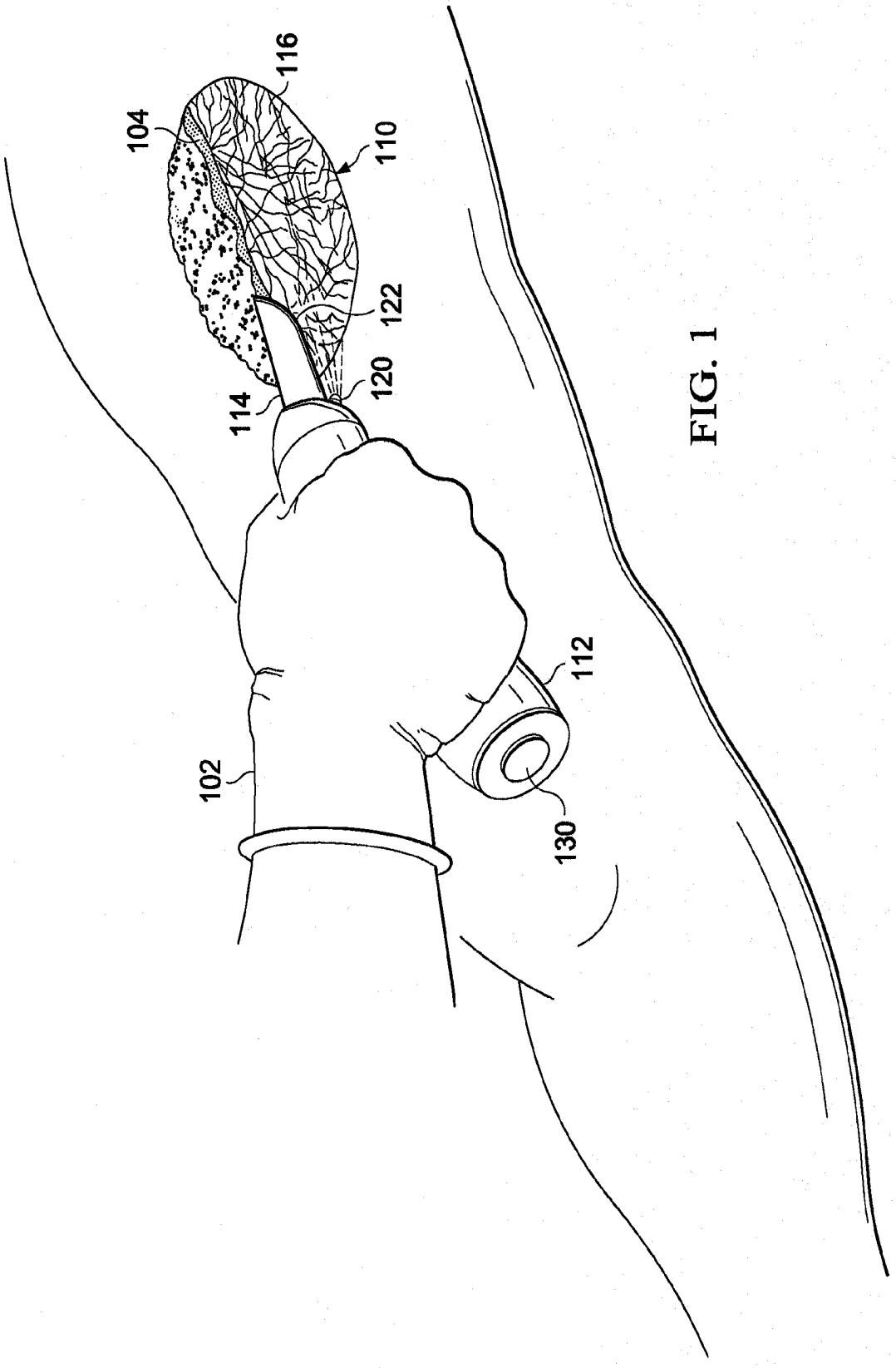



FIG. 1

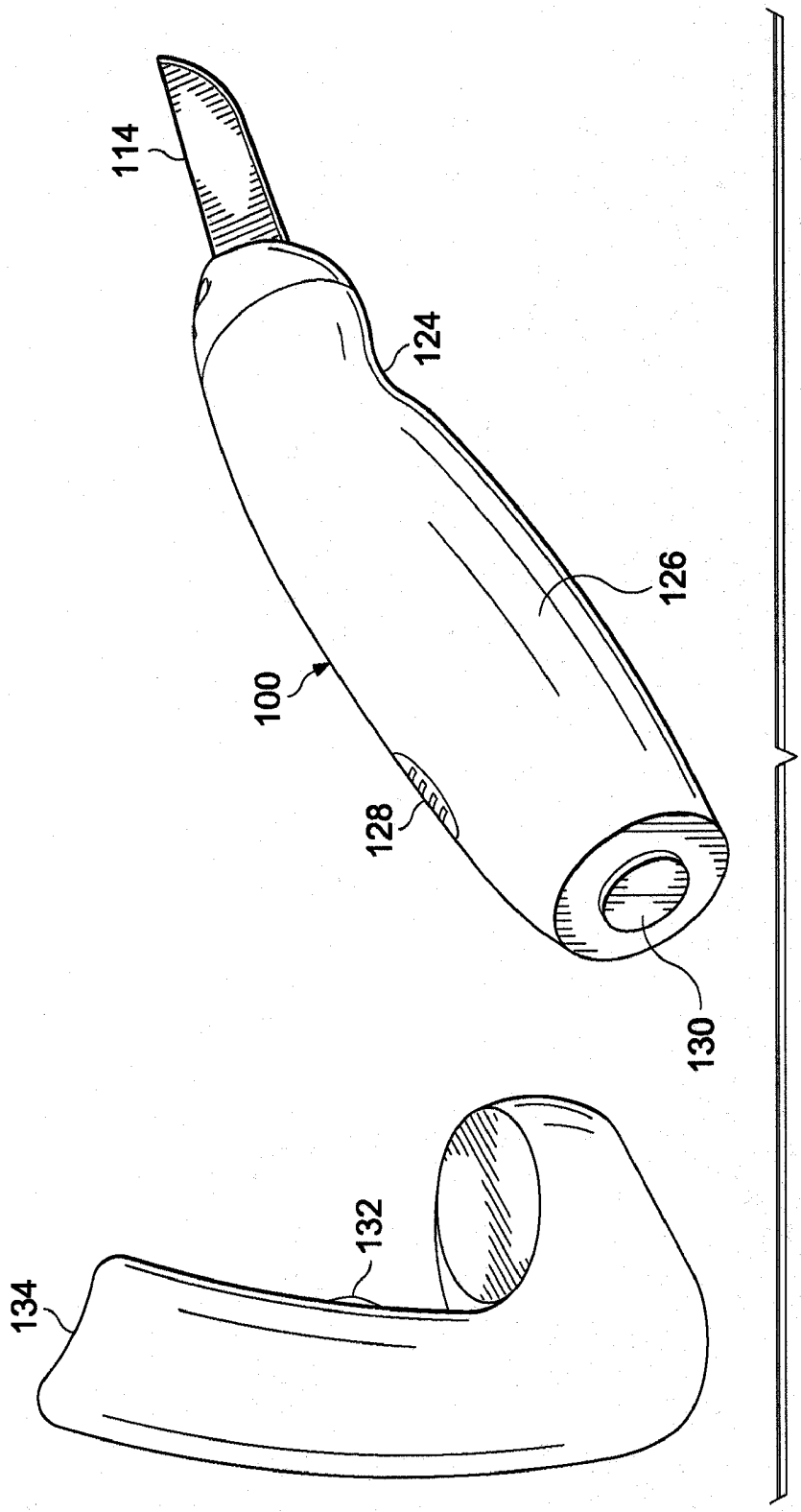



FIG. 2

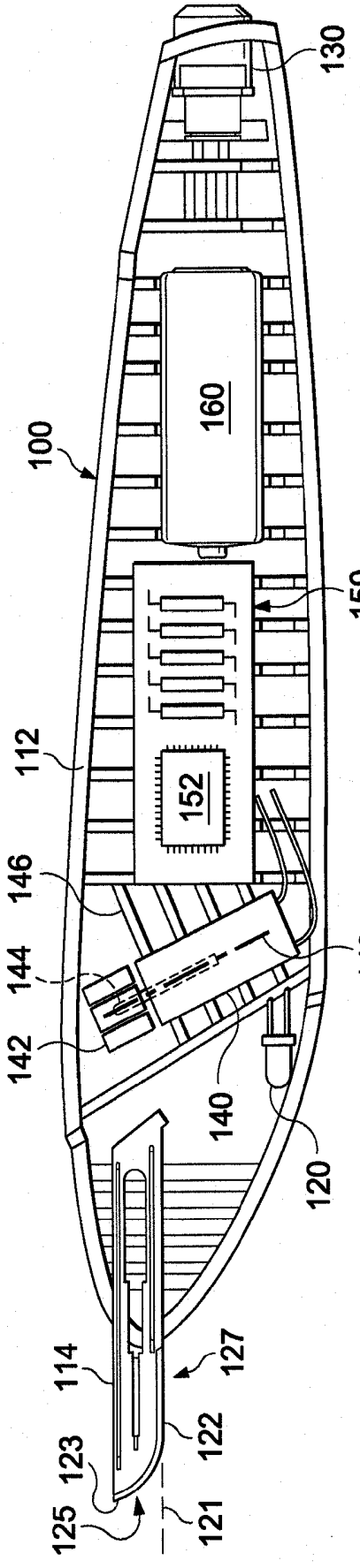

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FIG. 3

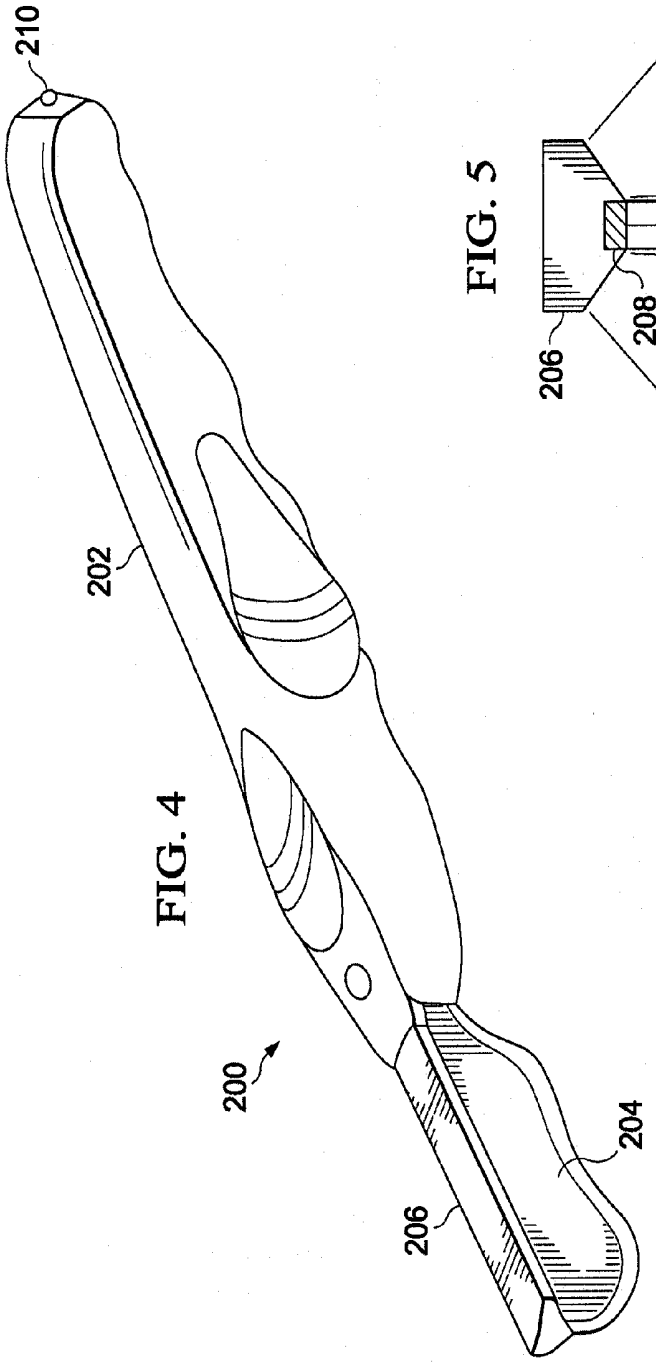


FIG. 4

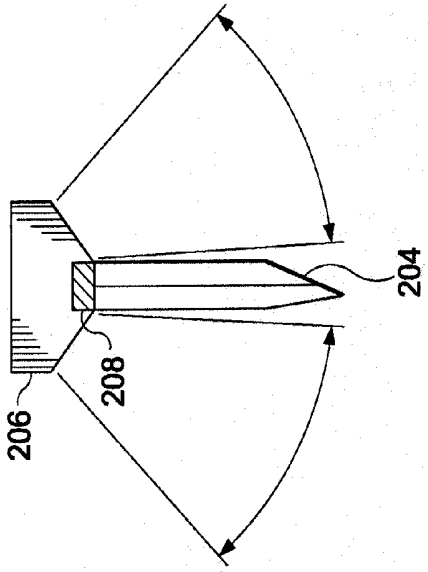


FIG. 5

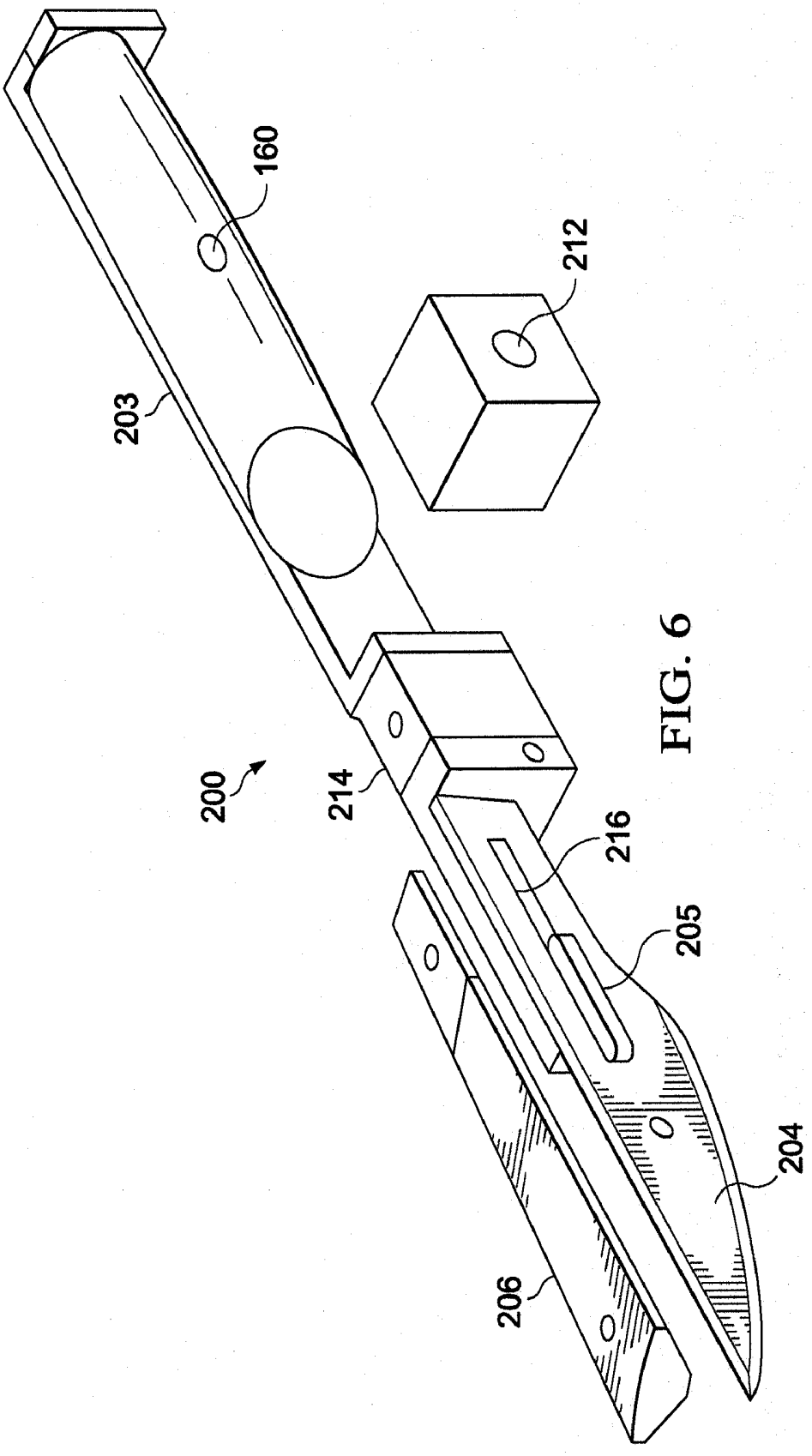


FIG. 6

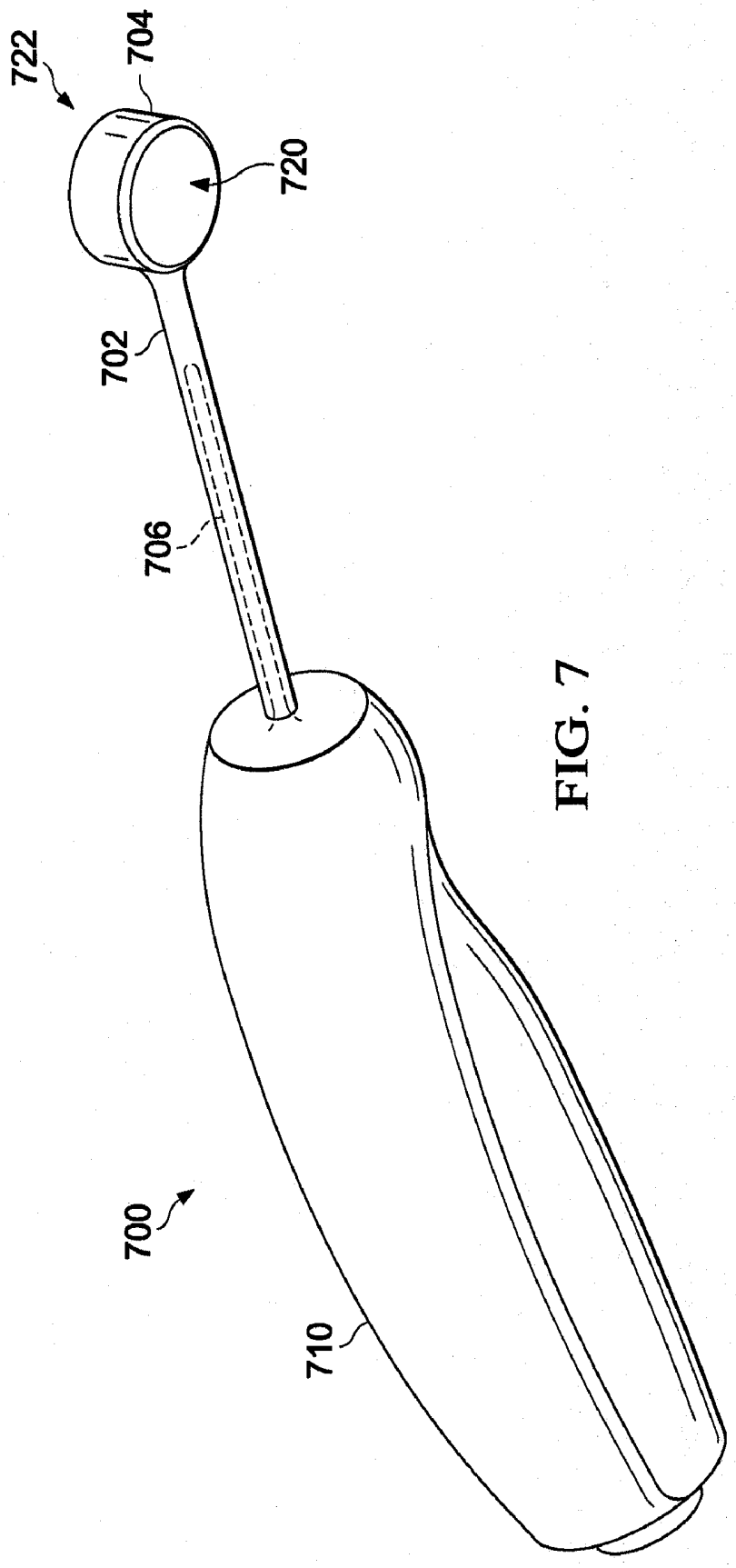


FIG. 7

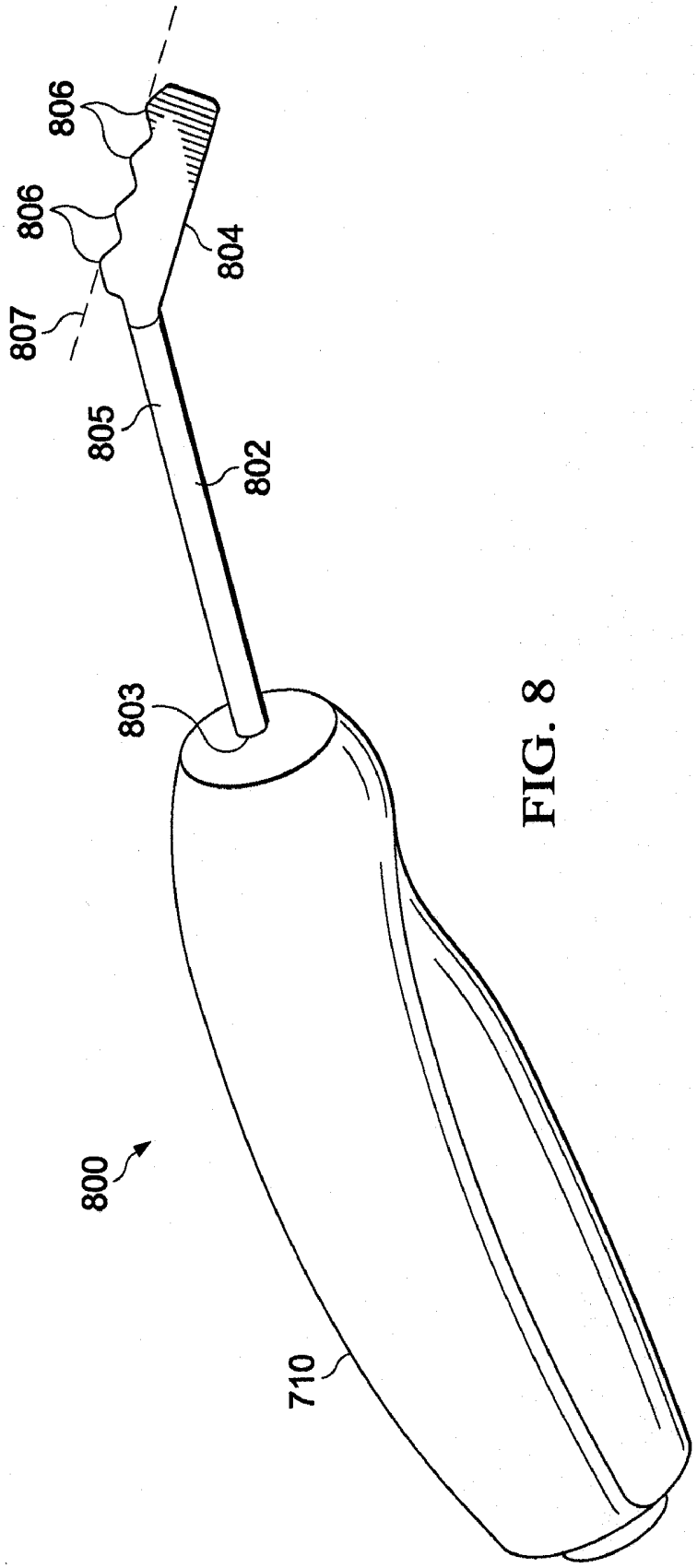


FIG. 8

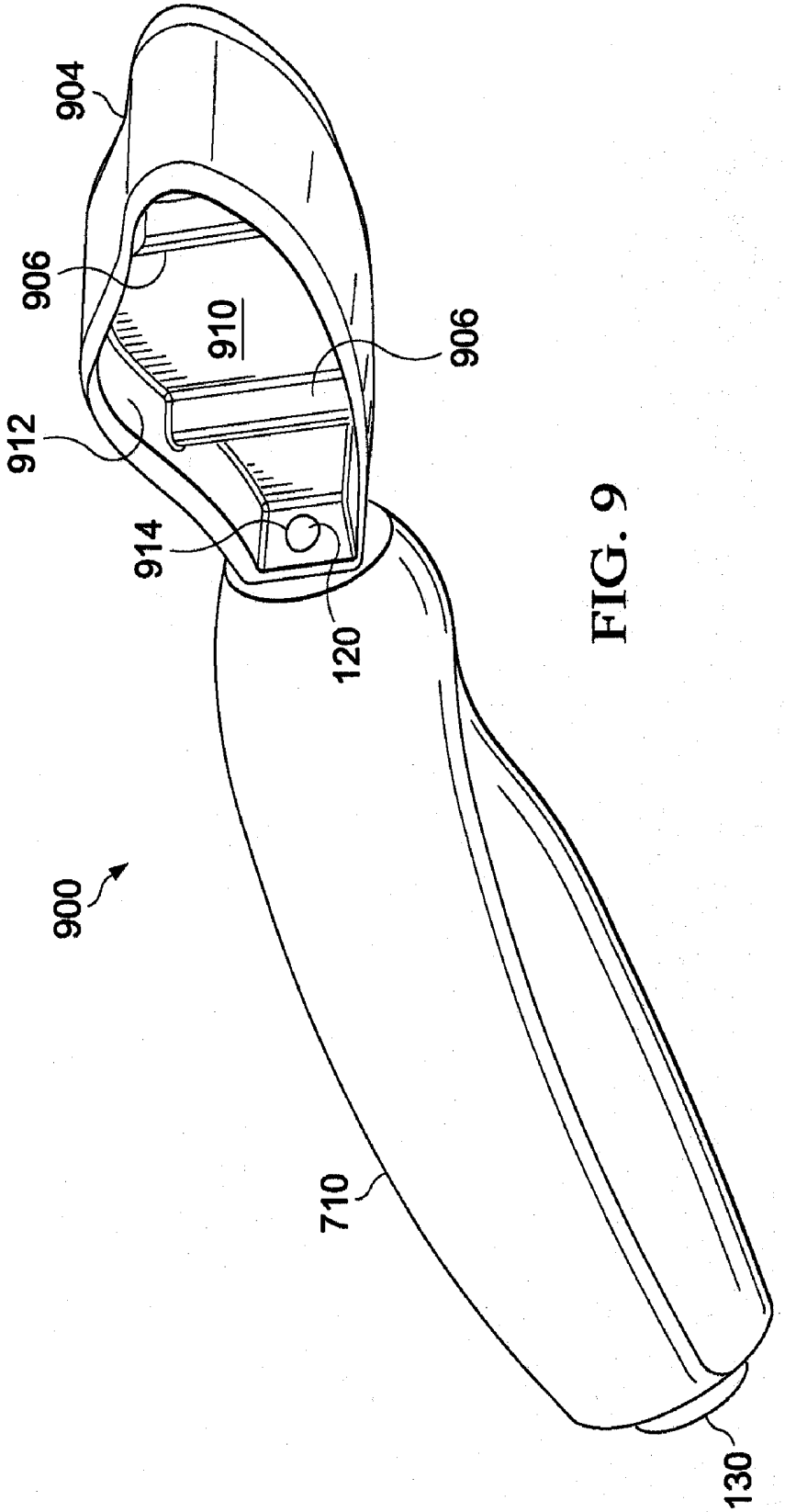


FIG. 9

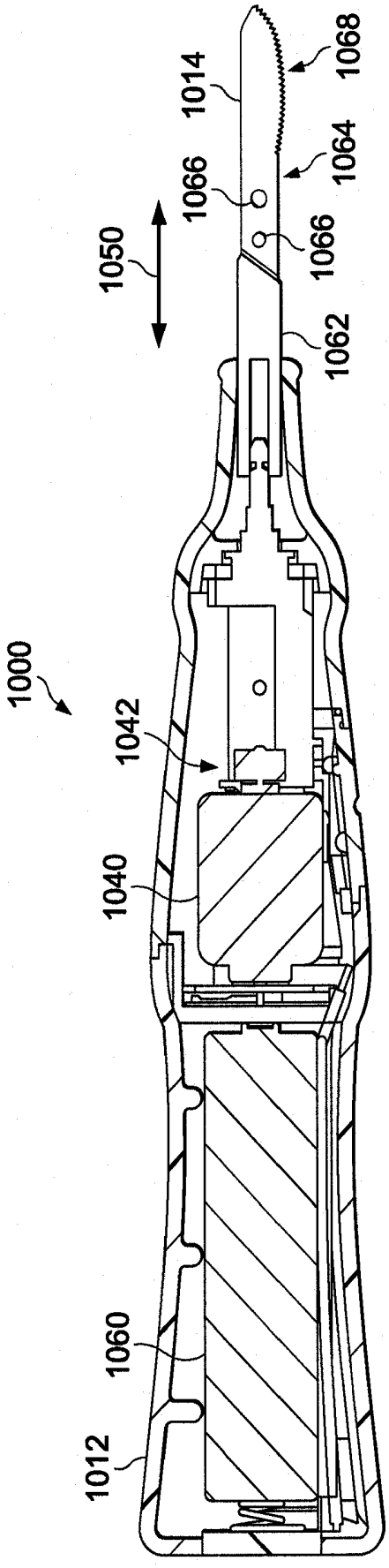


FIG. 10

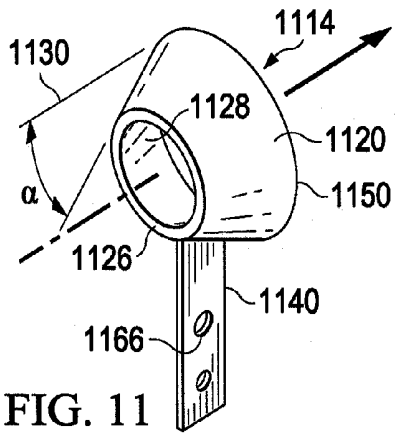


FIG. 11

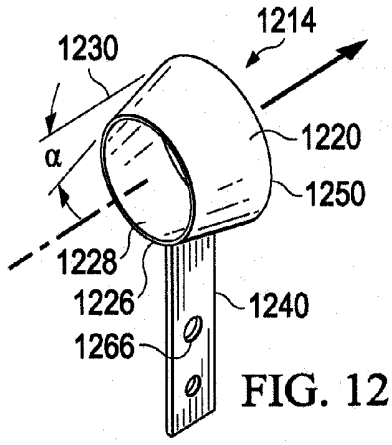


FIG. 12

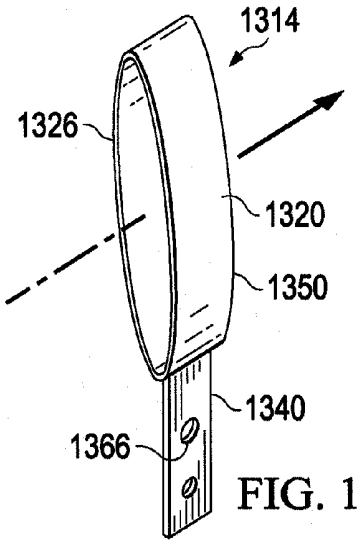


FIG. 13

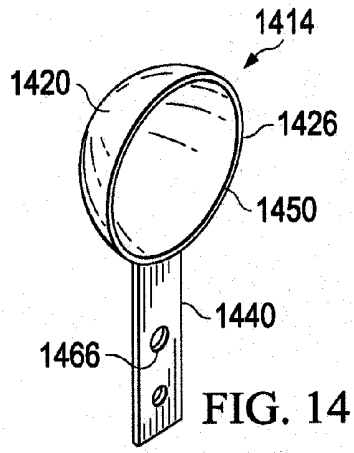


FIG. 14

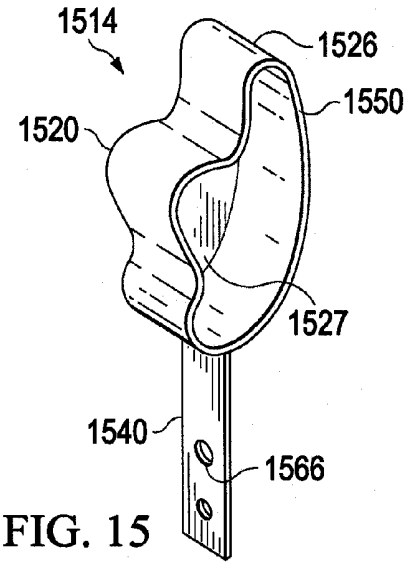


FIG. 15

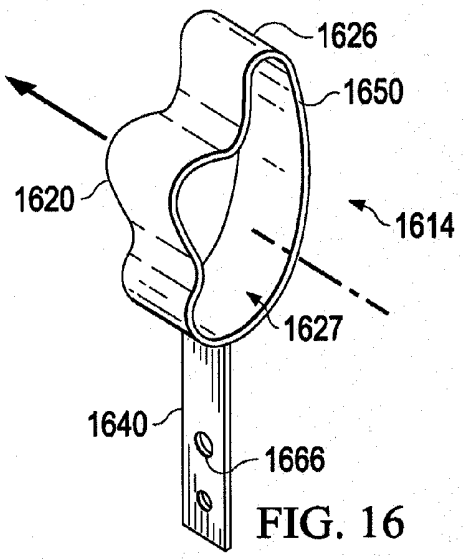


FIG. 16

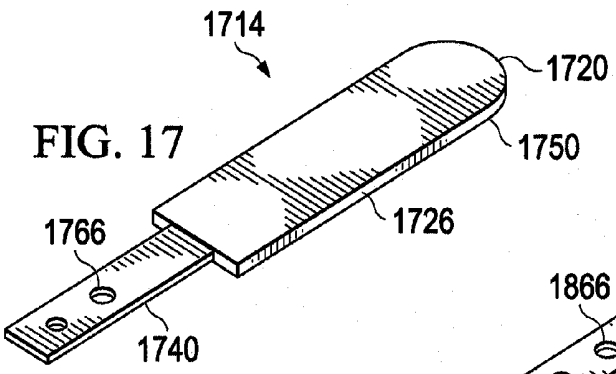


FIG. 17

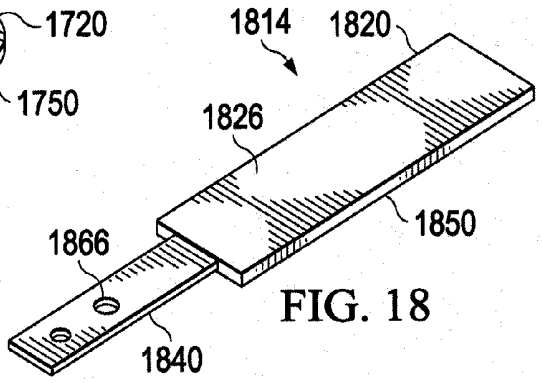


FIG. 18

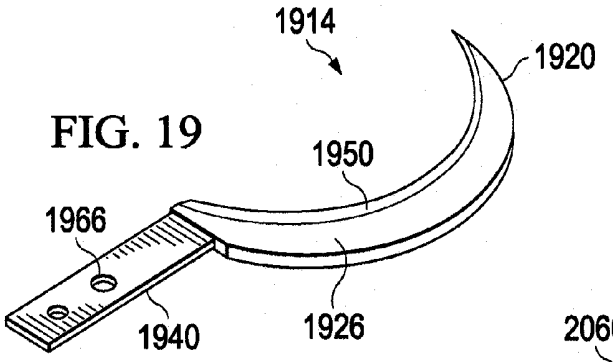


FIG. 19

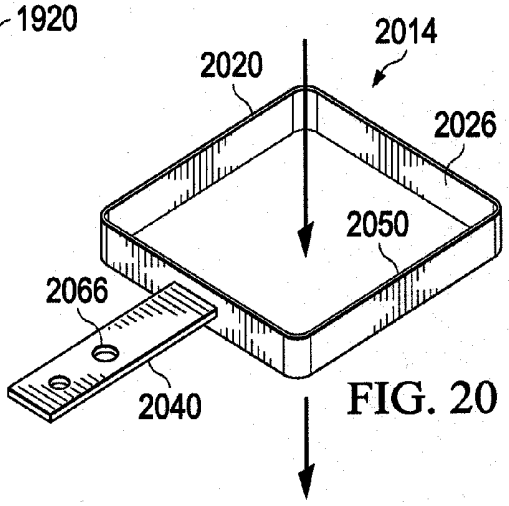


FIG. 20

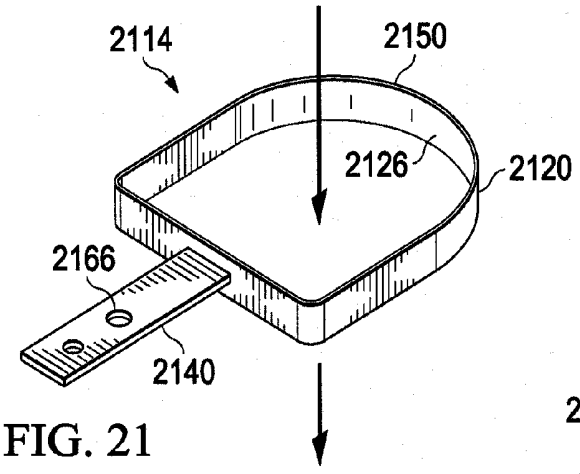


FIG. 21

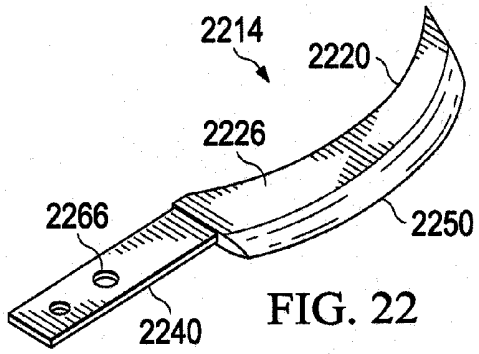


FIG. 22

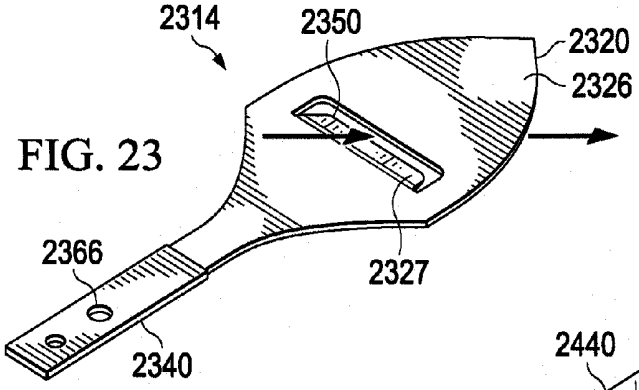


FIG. 23

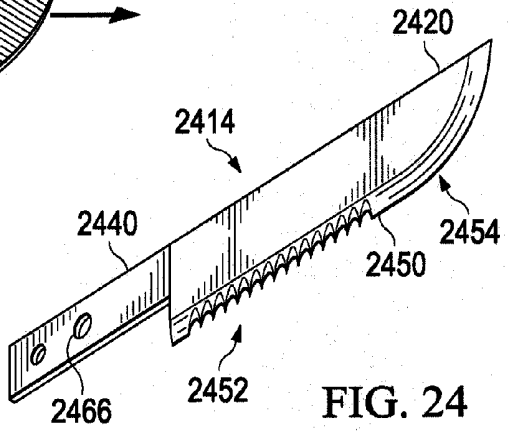


FIG. 24

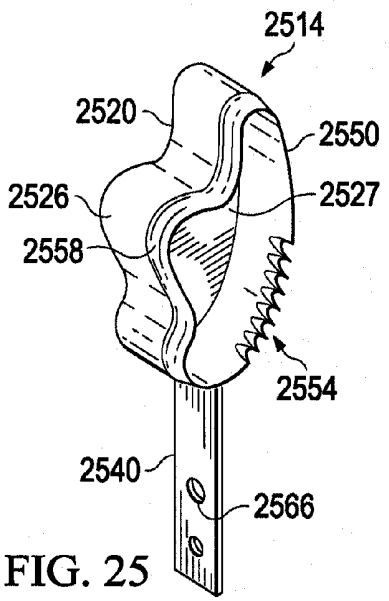


FIG. 25

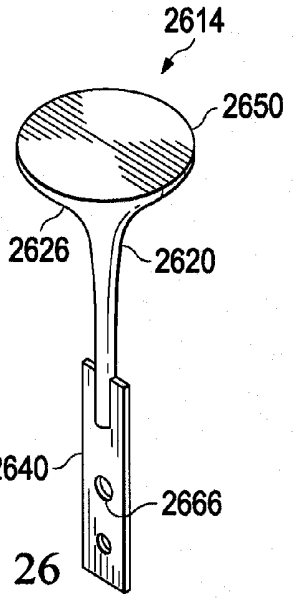


FIG. 26

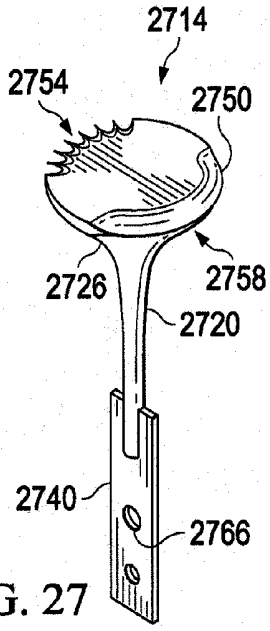


FIG. 27

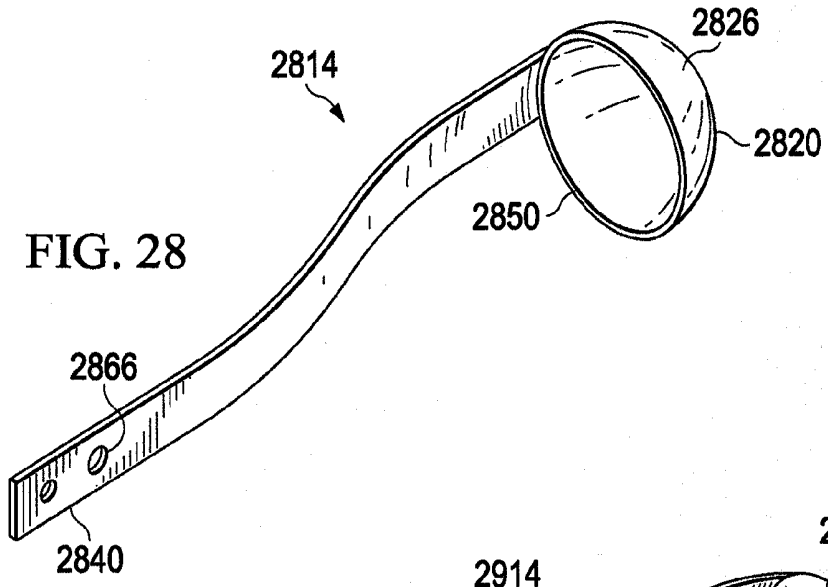


FIG. 28

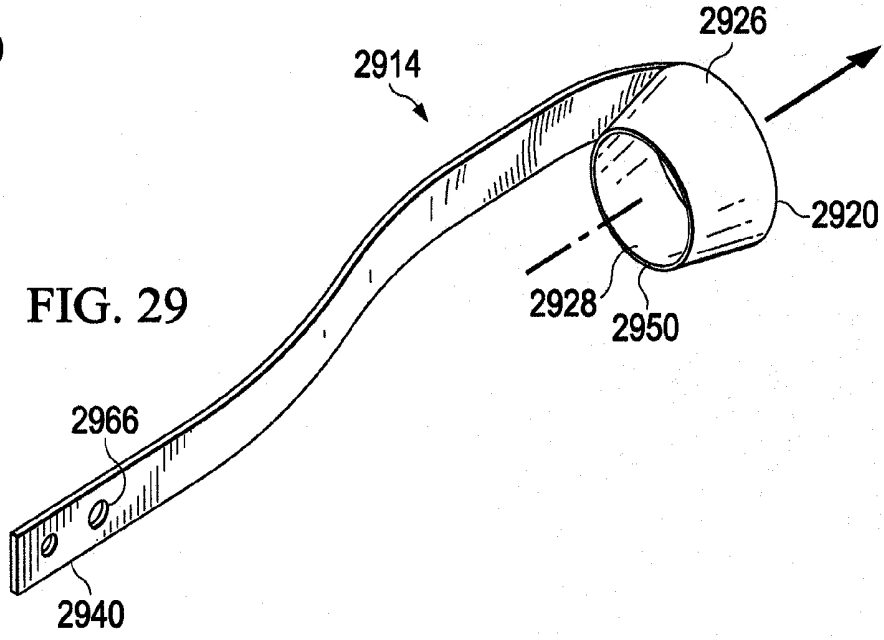


FIG. 29

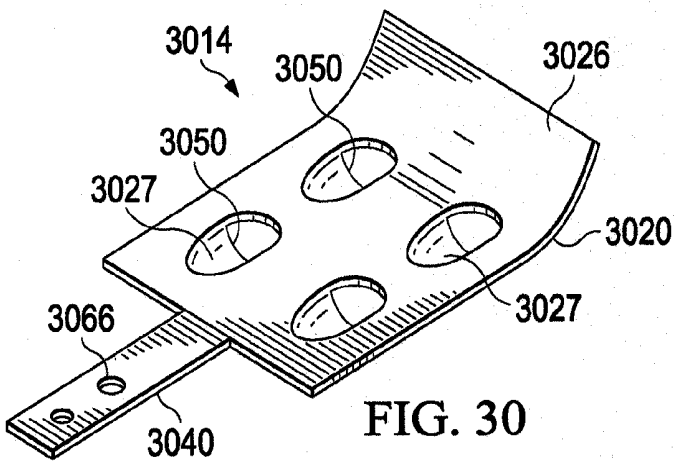


FIG. 30

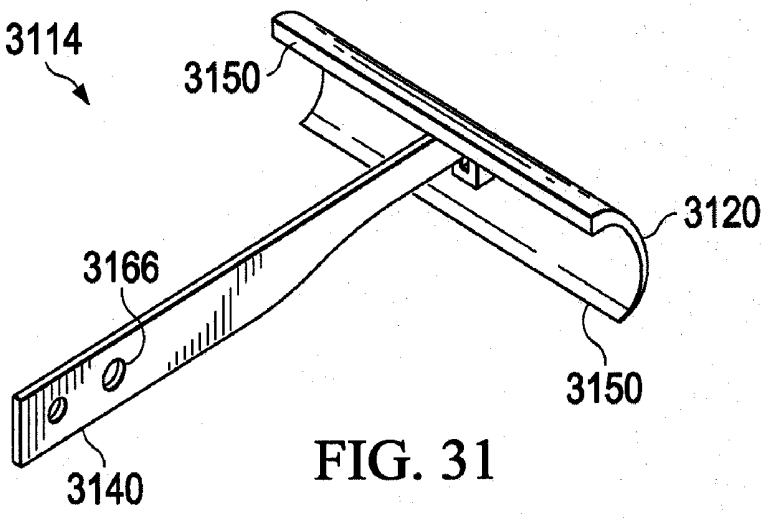
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FIG. 31

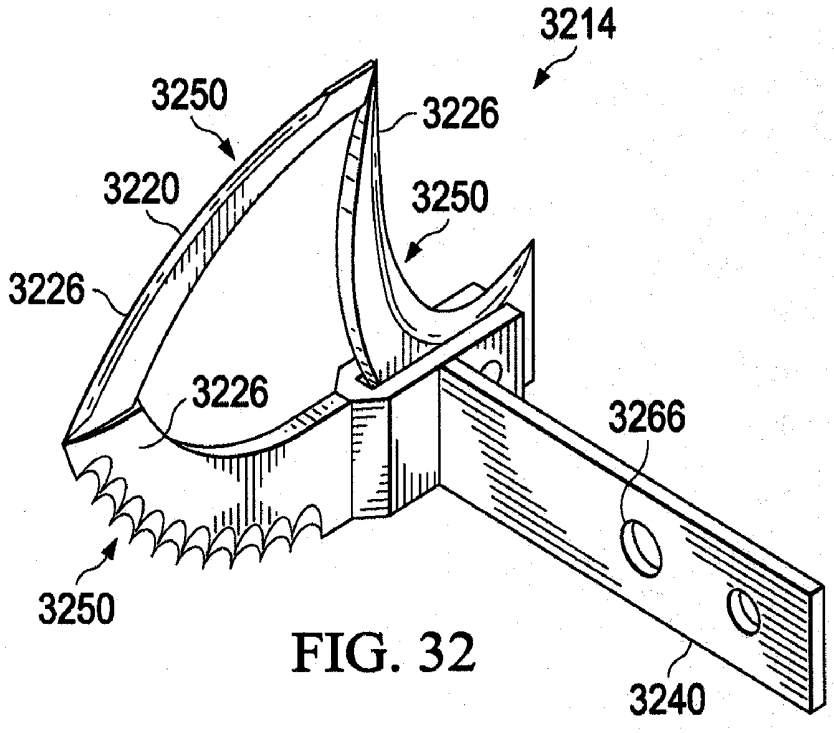
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FIG. 32

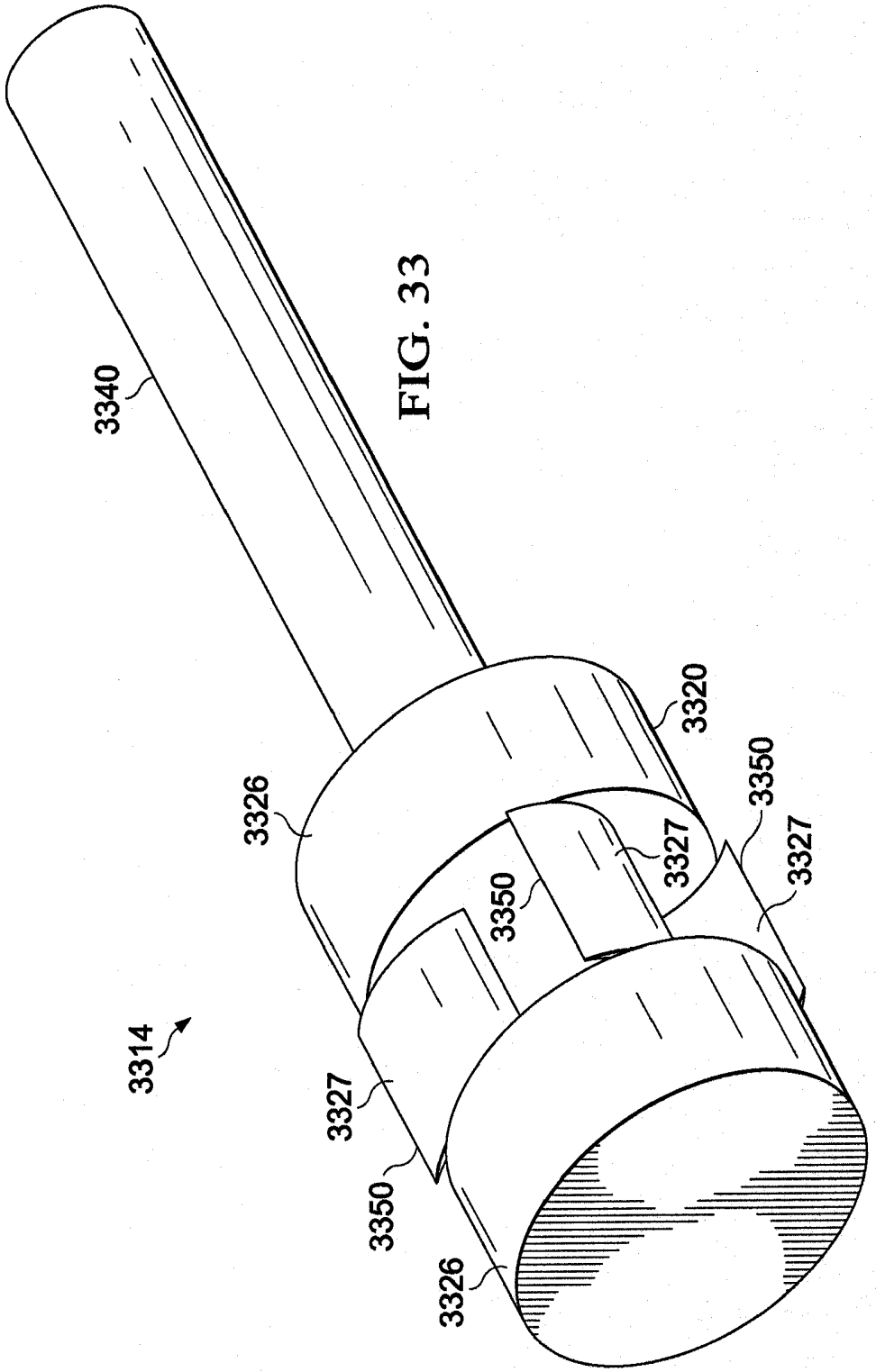


FIG. 33

# DEBRIDEMENT HAND TOOL

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims the benefit of U.S. Provisional Application No. 61/405,577, filed Oct. 21, 2010, which is hereby incorporated by reference.

## BACKGROUND OF THE INVENTION

**[0002]** Debridement refers to the removal of dead, damaged, or infected tissue to improve the healing potential of the remaining healthy tissue. Several factors make proper debridement difficult such as poor lighting, difficult wound locations, immobile patients, environmental constraints, and the use of improper debridement tools. In addition, the action of cutting away the debrided eschar is especially difficult for outside of a hospital or controlled medical environment because the blade, often a traditional pointed blade, may cut into healthy tissue and cause extensive bleeding. Therefore, this fear may cause some users to debride "lightly". This can often lead to infections due to eschar remaining in the wound after cleaning and redressing.

## SUMMARY

**[0003]** The disclosed embodiments provide solutions to problems associated with existing debridement tools. For example, in one embodiment, a debridement tool for debriding tissue from a tissue site is presented. The debridement tool includes a housing having an interior space. A motor and a power source are disposed within the interior space of the housing. The power source is operable to provide power to the motor. A blade is coupled to a first end of the housing. The blade is operable to vibrate when the motor is powered. The debridement tool further includes a lighting element disposed within the housing and beneath a debridement edge of the blade. The lighting element is operable to illuminate the tissue site. In some embodiments, the lighting element operates at a particular wavelength that assists a user in distinguishing between necrotic tissue and healthy tissue.

**[0004]** The disclosed embodiments also provide several types of blades that may be used to debride necrotic tissue. For instance, in one embodiment, a curette-style blade for use with a debridement tool is disclosed. The curette-style blade includes an extension member having a first end and a second end, an attachment member for coupling the first end of the blade to the debridement tool, and a circular debridement member attached to the second end of the extension member. The circular debridement member is operable to debride necrotic tissue from a tissue site.

**[0005]** In another embodiment, a ribbon-style blade for use with a debridement tool is disclosed. The ribbon-style blade includes an elongated member forming a shape with an interior space, one or more support structures located within the interior space and connected to an interior perimeter of the elongated member for supporting the shape of the elongated member, and an attachment member for coupling the blade to the debridement tool. The elongated member is operable to assist a user in debridement of necrotic tissue.

**[0006]** Other objects, features, and advantages of the illustrative embodiments will become apparent with reference to the drawings and detailed description that follow.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0007]** FIG. **1** illustrates a debridement tool operated by a user to debride necrotic tissue at a tissue site in accordance with one embodiment;

**[0008]** FIG. **2** illustrates a perspective view of a debridement tool in accordance with one embodiment;

**[0009]** FIG. **3** illustrates the interior components of a debridement tool in accordance with one embodiment;

**[0010]** FIG. **4** illustrates a perspective view of a debridement tool in accordance with another embodiment;

**[0011]** FIG. **5** illustrates a front perspective view of the debridement tool of FIG. **4**;

**[0012]** FIG. **6** illustrates components of the debridement tool of FIG. **4** in accordance with one embodiment;

**[0013]** FIG. **7** illustrates a debridement blade that may be used with a debridement tool in accordance with one embodiment;

**[0014]** FIG. **8** illustrates another debridement blade that may be used with a debridement tool in accordance with the disclosed embodiments;

**[0015]** FIG. **9** illustrates yet another debridement blade that may be used with a debridement tool in accordance with the disclosed embodiments;

**[0016]** FIG. **10** illustrates a debridement according to an illustrative embodiment; and

**[0017]** FIGS. **11-33** illustrate multiple embodiments of debridement blades or tips configured to remove tissue and configured to be used with a debridement tool.

## DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

**[0018]** In the following detailed description of several illustrative embodiments, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is understood that other embodiments may be utilized and that logical structural, mechanical, electrical, and chemical changes may be made without departing from the spirit or scope of the invention. To avoid detail not necessary to enable those skilled in the art to practice the embodiments described herein, the description may omit certain information known to those skilled in the art. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the illustrative embodiments are defined only by the appended claims.

**[0019]** The terms "debride", "debriding", and "debridement" as used herein refers to the removal of necrotic tissue to improve the healing potential of the remaining healthy tissue. The term "necrotic tissue" as used herein refers to dead, damaged, or infected tissue. Although debridement of necrotic tissue may sometimes require an incision or cut be made, the disclosed embodiments may also be used to debride necrotic tissue without requiring that any incisions be made. The term "tissue site" as used herein refers to a wound or defect located on or within any tissue, including but not limited to, bone tissue, adipose tissue, muscle tissue, neural tissue, dermal tissue, vascular tissue, connective tissue, car-

tilage, tendons, or ligaments. Finally, the term "blade" as referenced herein refers to a component of the debridement tool that comes in contact with necrotic tissue and is capable of being used for debriding necrotic tissue from a tissue site. The term "blade" does not imply or infer that the blade is necessarily sharp or capable of cutting.

**[0020]** FIGS. **1-3** are related to one embodiment of a debridement tool **100** for debriding necrotic tissue. Beginning with FIG. **1**, a perspective view of a user **102** using the debridement tool **100** to debride the necrotic tissue **104** at a tissue site **110** is presented. The debridement tool **100** comprises a housing **112**. The housing **112** serves as a handle, as shown in FIG. **1**, for enabling the user **102** to grip and use the debridement tool **100**. The user **102** may be a caregiver, such as a nurse or doctor, or may be a patient performing the debridement procedure on him or herself. In one embodiment, the debridement tool **100** is designed specifically for use in a home-care environment where optimal lighting and conditions are not present.

**[0021]** Referring to FIG. **2**, in certain embodiments, the housing **112** may be manufactured to provide an ergonomically shaped handle so as to provide the user **102** with a comfortable grip when using the debridement tool **100**. The housing **112** may be made of any material, such as plastic or metal. The housing **112** may be formed by an injection molding process or any other suitable technique. In one embodiment, the housing **112** may be formed as a single unit having an interior space for housing components of the debridement tool **100**. Alternatively, the housing **112** may be formed by coupling together two or more separate pieces. The interior of the housing **112** may also include support mounts, brackets, and/or other attachment means for coupling one or more of the internal components of the debridement tool **100** to the housing **112**.

**[0022]** A blade **114**, as illustrated in FIGS. **1-3**, is attached to or operably restrained by the housing **112** and is used to remove necrotic tissue **104** from the tissue site **110**. In some embodiments, the blade **114** may be operably retracted into the housing **112** and extended as needed. The blade **114** may be made of plastic, metal, or any other suitable material. The blade **114** may have smooth, rough, or serrated edges, and may be dull, semi-dull, or sharp. In addition, the blade **114** may consist of various shapes, sizes, and lengths. Selection of a particular type of design of the blade **114** may be based on the type, size, and shape of the tissue site being treated. For example, if the tissue site **110** is a small surface wound which does not require an incision be made for removing the necrotic tissue **104**, the blade **114** may be a small, dull flat blade operable to scrape the necrotic tissue **104** away from the tissue site **110** without harming any of the healthy tissue **116** located adjacent the necrotic tissue **104**. In some embodiments, the blade **114** may be a regular scalpel blade as illustrated in FIG. **3**. Still, in other embodiments, as will be further described, the blade **114** may be a curette-type attachment or a rake shaped blade for removing/scraping the necrotic tissue **104** from the tissue site **110**. The blade **114** may be manufactured using an injection molding process or any other suitable method. For example, in certain embodiments, the blade **114** may be a ceramic or plastic injection molded blade.

**[0023]** The debridement tool **100** may also include a light **120** for illuminating the tissue site **110** to aid in debridement of the necrotic tissue **104**. The light **120** may be any type of light including a fluorescent light, an incandescent bulb, or light emitting diodes (LEDs). In one embodiment, the light **120** is strategically placed within the housing **112** such that light **120** provides full illumination of the tissue site **110** without casting any shadows onto the tissue site **110**. For example, in one embodiment, the light **120** may be placed below a debridement plane **121** (represented by a line in FIG. **3**) associated with a debridement edge **122** of the blade **114**. In FIG. **3**, the debridement plane **121** is perpendicular to the plane of illustration of the figure. The placement of the light **120** beneath the debridement plane **121** allows the light **120** to be between the debridement edge **122** and the tissue being debrided. This positioning helps prevent shadows being cast by the light **120** and provides improved illumination of the tissue. While blade **114** includes a cutting tip **123** and a tip portion **125** of the debridement edge **122** does not follow the debridement plane **121**, the debridement edge **122** illustrated in the embodiment of FIG. **3** also includes substantially linear portion **127**, and it is upon this portion of the debridement edge **122** that the debridement plane **121** is defined. In other embodiments, a curved edge that does not include linear portions may be provided, making it difficult to definitively identify a debridement plane similar to that illustrated in FIG. **3**. In these embodiments, the debridement plane may be defined as corresponding to the average tangential slope associated with the curved cutting edge. Alternatively, instead of the light being positioned beneath the cutting plane or between the cutting plane and the tissue being debrided, the light may be positioned such that the light does not cast a shadow caused by the blade when the blade is positioned in contact with the tissue or above the tissue just prior to contact.

**[0024]** In addition, in certain embodiments, the light **120** may operate at a specific wavelength for aiding the user **102** in distinguishing between the necrotic tissue **104** and the healthy tissue **116** at the tissue site **110**. For example, in one embodiment, the light **120** may operate at a red to near infrared wavelength region, such as, but not limited to, about 500 nm to about 700 nm. In another embodiment, the light may operate at a wavelength of about 500 nm to about 660 nm. In still another embodiment, the wavelength may be about 700 nm. Oxyhemoglobin in the blood stream is capable of absorbing the light at these particular wavelengths, and thus, illuminating the blood vessels within the healthy tissue **116** for distinguishing between the healthy tissue **116** and the necrotic tissue **104**. This aids the user **102** in debriding only the necrotic tissue **104** and from inadvertently cutting into the healthy tissue **116**.

**[0025]** While the light **120** may be useful to performing debridement operations, all of the embodiments described herein may be used either with or without a light or other illumination source.

**[0026]** Referring still to FIG. **2**, in one embodiment, the debridement tool **100** may include a comfortable grip shape **124**, a non-slip material or surface **126**, and a recharging contact element **128**. As stated above, the debridement tool **100** may be ergonomically shaped to provide the user **102** with a comfortable grip so as to aid in debridement of the necrotic tissue **104**. The comfortable grip shape **124** may vary in design and may include additional recesses or grooves. In certain embodiments, the comfortable grip shape **124** may be designed specifically for a left hand user or for a right hand user. In addition, the debridement tool **100** may be manufactured in various sizes to accommodate different hand sizes.

**[0027]** The non-slip material or surface **126** prevents slippage of the debridement tool **100** during debridement. For example, the non-slip material or surface **126** may be a rub-

bery-type material that is wrapped around the housing **112** of the debridement tool **100** for providing a non-slip surface. In addition, the non-slip material or surface **126** may be rough or may include raised ridges or bumps to further prevent slippage of the debridement tool **100**. The non-slip material or surface **126** may further include non-slip elements that adhere especially well to latex or rubber gloves to reduce slippage from users that utilize gloves during debridement.

**[0028]** In certain embodiments, the housing **112** contains an internal power source **160**, as shown in FIG. **3**. The power source **160** may be any type of electrical storage device capable of supplying power to the components of the debridement tool **100**. For example, the power source **160** may be, but is not limited to, an alkaline battery, a lithium battery, or a lithium-ion battery.

**[0029]** The recharging contact element **128** enables recharging of the power source **160** within the debridement tool **100**. The recharging contact element **128** is electrically coupled to the power source **160** and provides electrons for recharging the power source **160** when in contact with an electrical contact element **132** of a recharging base station **134**. The recharging base station **134** is capable of being coupled to an electrical outlet for receiving electricity. The recharging base station **134** may also be used to store the debridement tool **100** when not in use.

**[0030]** Alternatively, the debridement tool **100** may use other recharging techniques for recharging the power source **160** including, but not limited to, inductive coupling or using a recharging port that is operable to receive a plug for recharging the power source **160**. Inductive coupling uses magnetic fields that are generated as current moves through a wire. For example, a coil inside the recharging base station **134** creates a magnetic field when current flows through the coil. When the debridement tool **100** is placed on the recharging base station **134**, the magnetic field induces a current in another coil within the debridement tool **100**, not shown, for recharging the power source **160**.

**[0031]** Additionally, in some embodiments, the debridement tool **100** may use a frequency energy receiver **152** coupled to the power source **160** for recharging the power source **160** wirelessly from a remote distance. The frequency energy receiver **152** enables the debridement tool **100** to be recharged by receiving electricity through electromagnetic waves. A wireless energy transmitter, not shown, resonates at the same frequency as the frequency energy receiver **152**, and generates the electromagnetic waves. The frequency energy receiver **152** enables the debridement tool **100** to be recharged at a distance of a few meters away from the wireless energy transmitter. In some embodiments, the frequency energy receiver **152** may be integrated with a circuit board **150**, as schematically illustrated in FIG. **3**. Alternatively, the frequency energy receiver **152** may be a separate component of the debridement tool **100**.

**[0032]** Referring to FIG. **3**, the circuit board **150** is electrically coupled to the power source **160**. The circuit board **150** may include a conductive layer operable to carry power to various components of the debridement tool **100**. In one embodiment, the circuit board **150** is coupled to a motor **140**, the light **120**, and a switch **130** for controlling one or more operations of the debridement tool **100**. In another embodiment, the circuit board **150** may be coupled to a blade trigger (not shown) that is operable to detect the position of the blade **204**. For example, if the blade trigger detects that the blade is in an extended position, the circuit board **150** may automatically turn on the motor **140**, and if the blade trigger detects that the blade is in a retracted position, the circuit board **150** may automatically turn off the motor **140**. Similarly, in some embodiments, the debridement tool **100** may include a blade retraction mechanism (not shown) that automatically retracts the blade **114** if the circuit board **150** detects that the motor **140** is powered off, and may automatically extend the blade **114** if the circuit board **150** detects that the motor **140** is powered on.

**[0033]** The switch **130** is used to toggle the motor **140** between an on and off state. In some embodiments, the switch may also activate the light **120**. The switch **130** may be a push button switch, a sliding switch, a flip switch, a knob, or any other mechanism for starting and stopping the motor **140**. The switch **130** may be placed at any convenient location on the debridement tool **100** such as at the end of the housing **112** (as shown in FIGS. **2** and **3**). In another embodiment, not shown, the switch **130** may be placed closer to the blade **114** for enabling a user to easily switch the motor on and off using his/her thumb.

**[0034]** In the depicted embodiment, the motor **140** includes an offset mass **142** that is rotated about an axis **143** associated with a shaft **144**. As referenced herein, the term "offset" means that the offset mass **142** is not centrally placed/rotated about the axis **143**, is manufactured such that an uneven weight is dispersed about the area of the offset mass **142** (e.g., a first portion of the offset mass **142** weighs more than a second portion of the offset mass **142**), or is manufactured with some combination of these characteristics. The rotation of the offset mass **142** about the axis **143** causes vibrations due to the weight imbalance of the offset mass **142**. In certain embodiments, the speed at which the offset mass **142** rotates about the axis **143** may be variably controlled to generate a desired level of vibrations. For example, the switch **130** may be a knob that may be gradually adjusted to increase or decrease the level of vibration. In one embodiment, the motor **140** is angled towards the blade **114** for transferring the generated vibrations to the blade **114** for vibrating the blade **114**. The size of the motor **140**, the offset mass **142**, and the blade **114** may vary in different embodiments to provide an optimum level of vibration. The distance between the motor **140** and the blade **114** may also be adjusted to provide the optimum level of vibration. Additionally, the housing **112** may include one or more motor-support mounts **146** for reducing vibrations in undesired planes and for causing the blade **114** to vibrate in a desired plane.

**[0035]** In the embodiment illustrated in FIG. **3**, the axis **143** is angled relative to the debridement plane **121** previously described, which results in the rotation of the offset mass **142** generating a first force component substantially parallel to the debridement plane **121** and along a length of the blade **114**, a second force component substantially parallel to the debridement plane **121** and substantially transverse to the length of the blade **114**, and a third force component substantially perpendicular to the debridement plane **121**. These force components assist a user in moving the blade as the user debrides tissue. The rotation of the offset mass **142** results in the oscillation of each force component, which further aids in the debridement of tissue.

**[0036]** In another embodiment, or in any of the embodiments described herein, a motor may be used with to provide a reciprocating motion to the blade or other debridement tip.

**[0037]** Referring now to FIGS. **4-6**, a debridement tool **200** is presented in accordance with another embodiment. FIG. **4**

illustrates a perspective view of the exterior of the debridement tool **200**. The debridement tool **200** includes a handle **202**, a blade **204**, and a lighting element **206**. The handle **202** may be made of any material including metal, plastic, rubber, or a combination thereof. In a preferred embodiment, the handle **202** is shaped to provide a comfortable grip, and includes a non-slip contact surface. In some embodiments, the debridement tool **200** may include a power plug port **210** for receiving power via an electrical outlet. The power plug port **210** may also be used to recharge an internal power source.

**[0038]** The blade **204** may be any type of blade as described above with regard to the blade **114**. For example, the blade **204** may be made of plastic or metal, and may be dull, semi-dull, or sharp. The edge of the blade **204** may be smooth or rough, straight or curved, and may include indentations for enabling easier grasping and debridement of the necrotic tissue **104**.

**[0039]** In the depicted embodiment, the lighting element **206** is positioned above the blade **204** for illuminating the tissue site **110**. The lighting element **206** may include a recessed groove **208**, as shown in FIG. **5**, in which the blade **204** resides. The recessed groove **208** is slightly larger than the blade **204** for enabling the blade **204** to vibrate along the axis or width of the groove **208**. The lighting element **206** may be operable to illuminate the tissue site **110** on both sides of the blade **204** as illustrated in FIG. **5**. By illuminating on both sides of the blade **204**, the lighting element **206** is able to illuminate tissue without a shadow being cast by the blade **204**. As stated previously, in some embodiments, the lighting element **206** may operate at a specific wavelength for aiding the user **102** in distinguishing between the necrotic tissue **104** and the healthy tissue **116** at the tissue site **110**. In one embodiment, the lighting element **206** is fixed to the handle **202** to prevent or reduce the lighting element **206** from vibrating during debridement. Although the depicted lighting element **206** is triangular in form, the lighting element **206** is not limited to any particular shape, size, or length. The housing of the lighting element **206** may be may be made of plastic, metal, or any other suitable material.

**[0040]** FIG. **6** illustrates components of the debridement tool **200** in accordance with one embodiment. In this embodiment, the debridement tool **200** includes a handle housing **203**. The handle housing **203** provides a support structure for coupling the separate components of the debridement tool **200**, such as, the power source **160**, an electronic controller unit **212**, a motor **214**, the lighting element **206**, and the blade **204**. Although the depicted embodiment illustrates a particular arrangement of the components on the handle housing **203**, the components may be arranged differently in other embodiments. The handle housing **203** may be made of any suitable material including plastic or metal. In some embodiments, the handle housing **203** may include internal circuitry or wiring for electrically coupling the components of the debridement tool **200**.

**[0041]** In certain embodiments, the handle housing **203** may include a blade mount **205** for coupling the blade **204** to the handle housing **203**. For example, the blade mount **205** may be a flange that is operable to engage an aperture **216** of the blade **204**. In certain embodiments, the blade **204** may be slidingly received on the blade mount **205** such that the blade **204** may reciprocate along the axis of the blade mount **205** due to the vibrations generated by the motor **214**. The reciprocating action of blade **204** may aid the user **102** in debriding the necrotic tissue **104**. Alternatively, in some embodiments, the blade **204** may be locked or securely fastened to the blade mount **205** to prevent or reduce any reciprocating action to reduce the likelihood of accidentally cutting into the healthy tissue **116** at the tissue site **110**.

**[0042]** In the depicted embodiment, the power source **160** is coupled to the handle housing **203** near the end of the handle housing **203**. In one embodiment, the power source **160** may be a recharged via the power plug port **210** or by using any other recharging techniques such as, but not limited to, the recharging techniques described above. Alternatively, the power source **160** may be a replaceable power source such as an alkaline or lithium ion battery.

**[0043]** In one embodiment, the electronic controller unit **212** may include circuitry for controlling operations of the motor **214** and the lighting element **206**. For example, the electronic controller unit **212** may be coupled to a switch (not depicted) for initiating and stopping the motor **214**. In certain embodiments, the electronic controller unit **212** may also house a coil for enabling the power source **160** to be recharged using inductive coupling.

**[0044]** The motor **214** is positioned adjacent the blade **204** along the handle housing **203**. The motor **214** generates vibrations that are transferred to the blade **204** for vibrating the blade **204**. In some embodiments, the motor is a piezoelectric motor. A piezoelectric motor is a motor that operates by using materials (notably crystals and certain ceramics) to generate vibrations in response to receiving electricity. Alternatively, in some embodiments, the motor **214** may be an ultrasonic motor/transducer, or a sonic or subsonic motor or transducer. An ultrasonic motor is a type of electric motor powered by the ultrasonic vibration of a component, the stator, placed against another component, a rotor or a slider depending on a particular embodiment. The motor **214** may additionally use resonance to amplify the vibration of the stator in contact with the rotor.

**[0045]** Referring now to FIGS. **7-9**, various debridement tips/blades that may be used with the disclosed embodiments for debriding necrotic tissue are presented. Beginning with FIG. **7**, a debridement blade **700** that may be used with a debridement tool **710** is presented in accordance with one embodiment. The debridement tool **710** may be one of the disclosed embodiments or may be a generic debridement tool. The debridement blade **700** may be metallic, non-metallic, or partially metallic. In the depicted embodiment, the debridement blade **700** includes an extension member **702**, a circular debridement member **704**, and an attachment member **706** for coupling the extension member **702** of the blade to the debridement tool **710**.

**[0046]** In some embodiments, the extension member **702** may be pliable for enabling the user **102** to bend and shape the extension member **702** as desired for aiding in debridement. In addition, the length and thickness of the extension member **702** may vary in different embodiments.

**[0047]** In one embodiment, the attachment member **706** may be a cavity within the extension member **702** that is operable to couple with a coupling member (not depicted) of the debridement tool **710**. The cavity may include threading incorporated along at least a portion of an internal wall for coupling with the coupling member of the debridement tool **710**. In an alternative embodiment, the attachment member **706** may include attachment clips (not depicted) operable to couple with a coupling member of the debridement tool. For example, the attachment clips on the extension member **702**

may be inserted into an aperture of the debridement tool **710** and locked in place for attaching the debridement blade **700** to the debridement tool **710**. Still, in another embodiment, the attachment member **706** may be a male coupling member (not depicted) containing threading for coupling with a female coupling member (not depicted) of the debridement tool **710** (i.e., the debridement blade **700** is twisted onto the debridement tool **710**).

**[0048]** The circular debridement member **704** is used to debride necrotic tissue from a tissue site. In one embodiment, the circular debridement member **704** is operable to vibrate due to vibrations generated by the debridement tool **710** to assist a user in debridement. In some embodiments, the circular debridement member **704** is a curette style tip. For instance, the circular debridement member **704** may include an open cavity **720** that is backed by a wall **722** to form a cup-like structure. Alternatively, the circular debridement member **704** may not include the wall **722**, but may instead by open to form a ring-like structure. If a cup-like structure is employed, the cup may be cylindrical or domed shaped. The thickness and circumference of the circular debridement member **704** may vary depending on a particular embodiment. For example, the circular debridement member **704** may include a larger circumference or thickness for larger areas of debridement. In certain embodiments, the circular debridement member **704** may include a sharp edge for aiding in debridement of the necrotic tissue **104**. Although a circular debridement member is depicted, the circular debridement member **704** is not limited to any particular shape. For example, the circular debridement member **704** may be oval, triangular, diamond, square, rectangular, or any other shape.

**[0049]** FIG. **8** illustrates another debridement blade **800** that may be used with the debridement tool **710** in accordance with the disclosed embodiments. In the depicted embodiment, the debridement blade **800** includes an extension member **802** having a first end **803** and a second end **805**. The debridement blade **800** also includes a debridement member **804** attached to the second end **805** of the extension member.

**[0050]** The extension arm **802** is similar to the extension member **702** as described above with regard to FIG. **7**. The extension arm **802** includes an attachment member (not depicted) for coupling the first end **802** of the debridement blade **800** to the debridement tool **710**. Alternatively, the extension arm **802** may be connected to or received by the debridement tool **710** without use of a separate attachment member. The attachment member may be the same or similar to that of the attachment member **706** as described above with regard to FIG. **7** or may be any other suitable coupling means. The extension arm **802** may vary in size and length, and may be made of any suitable material.

**[0051]** The debridement member **804** is used to debride necrotic tissue. The debridement member **804** may be metallic, non-metallic (e.g., plastic), or a combination thereof. In one embodiment, the debridement member **804** includes a plurality of ridges **806** that are operable to assist a user in debridement of the necrotic tissue. For example, the plurality of ridges **806** may enable better grasping of necrotic tissue and/or may enable a user to reach into lower areas of a tissue site. In one embodiment, the debridement member **804** is operable to vibrate due to vibrations generated by the debridement tool **710** to assist the user in debridement of necrotic tissue. In some embodiments, the debridement member **804** is coupled to the second end **805** of the extension member **802** such that an angle exists between a debridement plane **807** of the debridement member **804** and a longitudinal axis of the extension member **802**. In other words, when angled, the longitudinal axis of the extension member **802** is not parallel to the debridement plane **807**. Further, in some embodiments, the debridement member **804** may be adjusted as desired by a user to any particular angle (including parallel) or may be rotatable about the second end **805** of the extension arm **802**. Although the depicted embodiment illustrates the second end **805** of the extension arm **802** coupled to one side of the debridement member **804**, in some embodiments, the second end **805** of the extension arm **802** may be attached substantially central to the debridement member **804** (i.e., similar to a rake configuration) or to multiple locations of the debridement member **804**. In alternative embodiments the debridement member **804** may include a triangular debridement member (not depicted) that is oriented such that a base of the triangular debridement member is used for debridement of necrotic tissue (i.e., similar to a hoe configuration) or oriented such that a tip of the triangular debridement member is used for debridement of necrotic tissue (i.e., an upside down triangle).

**[0052]** FIG. **9** illustrates yet another debridement blade or tip **900** that may be used with the debridement tool **710** in accordance with the disclosed embodiments. The debridement tip **900** is a ribbon-style scraper that comprises an elongated member **904** that forms a shape with an interior space **910**. The elongated member **904** is operable to assist a user in debridement of necrotic tissue. For instance, in some embodiments, the elongated member **904** vibrates in response to vibrations generated by the debridement tool **710** in aiding a user in debridement of necrotic tissue.

**[0053]** The elongated member **904** may be made of plastic, rubber, or a composite of any suitable material. Additionally, in certain embodiments, the elongated member **904** may be shaped as desired by a user for providing a greater assortment of angles for enabling the user to debride necrotic tissue at varying tissue sites.

**[0054]** In some embodiments, the debridement tip **900** may include one or more support structures **906** located within the interior space **910** and connected to an interior perimeter **912** of the elongated member **904** for supporting the shape of the elongated member **904**. The support structures **906** provide support and prevent the elongated member **904** from collapsing during debridement. The support structures **906** may be rigid or semi-rigid and be made of any suitable material.

**[0055]** The debridement tip **900** may be coupled to the debridement tool **710** via an attachment member (not depicted). The attachment member may be attachment clips or a male coupling similar to the attachment member **706** as described above with regard to FIG. **7**. Alternatively, in some embodiments, the debridement tip **900** may be manufactured as an integral part of the debridement tool **710**. In addition, in some embodiments, the debridement tip **900** may include an aperture **914** for enabling the light **120** to illuminate a tissue site and for aiding a user in distinguishing between necrotic tissue and healthy tissue.

**[0056]** Referring to FIG. **10**, a debridement tool **1000** having features similar in some respects to debridement tool **100** is illustrated. Debridement tool **1000** includes a housing **1012** that serves as a handle to allow a user to grip and use the debridement tool **1000**. A blade or tip **1014** is received by the housing **1012** and is used to remove necrotic tissue from a tissue site. In some embodiments, the blade **1014** may be operably retracted into the housing **1012** and extended as

needed. The blade **1014** may be made of plastic, metal, or any other suitable material. The blade **1014** may have smooth, rough, or serrated edges, and may be dull, semi-dull, or sharp. In addition, the blade **1014** may consist of various shapes, sizes, and lengths. Selection of a particular type of design of the blade **1014** may be based on the type, size, and shape of the tissue site being treated. For example, if the tissue site is a small surface wound which does not require an incision be made for removing the necrotic tissue, the blade **1014** may be a small, dull flat blade operable to scrape the necrotic tissue away from the tissue site without harming any of the healthy tissue located adjacent the necrotic tissue. In some embodiments, the blade **1014** may be a regular scalpel blade. In other embodiments, the blade may be shaped differently, including any of the blades or tips described with reference to FIGS. **11-33**.

**[0057]** In certain embodiments, the housing **1012** contains an internal power source **1060**, as shown in FIG. **10**. The power source **1060** may be any type of electrical storage device capable of supplying power to the components of the debridement tool **1000**. For example, the power source **1060** may be, but is not limited to, an alkaline battery, a lithium battery, or a lithium-ion battery. If a battery is used, the battery may employ any suitable charging system to recharge the battery.

**[0058]** The power source **1060** is electrically coupled to a motor **1040** to provide power to the motor **1040**. In one embodiment, the motor **1040** is operably coupled to a reciprocating drive train **1042** that may include one or more shafts, gears, or cam. The reciprocating drive train **1042** is capable of imparting reciprocal motion represented by arrows **1050** to a head member **1062**. The head member **1062** is coupled to the blade **1014** such that the reciprocating motion of the head member **1062** during operation of the debridement tool **1000** is imparted to the blade **1014**. The blade **1014** may include an attachment portion **1064** with a plurality of apertures **1066** or tabs to permit removable coupling to the head member **1062**. The blade further includes a debridement portion **1068** with the edges or other components necessary to perform debridement operations.

**[0059]** Referring to FIGS. **11** and **12**, debridement blades or tips **1114**, **1214** are curette-shaped and each includes a debridement portion **1120**, **1220** coupled to an attachment portion **1140**, **1240**. The debridement portions **1120**, **1220** each include a ring-shaped wall **1126**, **1226** with at least an inner frusto-conical surface **1128**, **1228**. In the embodiment illustrated in FIGS. **11** and **12**, the outer surface of the ring-shaped wall **1126**, **1226** is also frusto-conical. Angle, $\alpha$, may represent the angle of either the inner surface **1128**, **1228** or the outer surface relative to a line **1130** normal to the expected debridement plane, and the angle may in various embodiments be between zero and ninety degrees. A debridement edge **1150**, **1250** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1150**, **1250** is capable of removing tissue during debridement operations. The attachment portion of the **1140**, **1240** may include a plurality of apertures **1166**, **1266** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0060]** Referring to FIG. **13**, a debridement blade or tip **1314** is eyelet-shaped and includes a debridement portion **1320** coupled to an attachment portion **1340**. The debridement portion **1320** includes a substantially elliptical wall **1326**. A debridement edge **1350** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1350** is capable of removing tissue during debridement operations. The attachment portion of the **1340** may include a plurality of apertures **1366** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0061]** Referring to FIG. **14**, a debridement blade or tip **1414** is semi-hemispherical in shape and includes a debridement portion **1420** coupled to an attachment portion **1440**. The debridement portion **1420** includes a semi-hemispherical wall **1426**. A debridement edge **1450** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1450** is capable of removing tissue during debridement operations. The attachment portion of the **1440** may include a plurality of apertures **1466** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0062]** Referring to FIG. **15**, a debridement blade or tip **1514** is flame-shaped and includes a debridement portion **1520** coupled to an attachment portion **1540**. The debridement portion **1520** includes a flame-shaped wall **1526** coupled to a rear wall **1527**. A debridement edge **1550** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1550** is capable of removing tissue during debridement operations. The attachment portion of the **1540** may include a plurality of apertures **1566** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0063]** Referring to FIG. **16**, a debridement blade or tip **1614** is flame-shaped and includes a debridement portion **1620** coupled to an attachment portion **1640**. The debridement portion **1620** includes a flame-shaped wall **1626** surrounding an inner passage **1627**. A debridement edge **1650** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1650** is capable of removing tissue during debridement operations. The attachment portion of the **1640** may include a plurality of apertures **1666** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0064]** Referring to FIG. **17**, a debridement blade or tip **1714** includes a rounded spatula shape with a debridement portion **1720** coupled to an attachment portion **1740**. The debridement portion **1720** includes a substantially planar wall **1726**. A debridement edge **1750** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1750** is capable of removing tissue during debridement operations. The attachment portion of the **1740** may include a plurality of apertures **1766** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0065]** Referring to FIG. **18**, a debridement blade or tip **1814** includes a squared, spatula shape with a debridement portion **1820** coupled to an attachment portion **1840**. The debridement portion **1820** includes a substantially planar wall **1826**. A debridement edge **1850** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1850** is capable of removing tissue during debridement operations. The attachment portion of the **1840** may include a plurality of apertures **1866** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0066]** Referring to FIG. **19**, a debridement blade or tip **1914** is sickle-shaped and includes a debridement portion **1920** coupled to an attachment portion **1940**. The debride-

ment portion **1920** includes a sickle-shaped wall **1926**. A debridement edge **1950** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **1950** is capable of removing tissue during debridement operations. The attachment portion of the **1940** may include a plurality of apertures **1966** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0067]** Referring to FIG. **20**, a debridement blade or tip **2014** is square-shaped and includes a debridement portion **2020** coupled to an attachment portion **2040**. The debridement portion **2020** includes a square-shaped wall **2026**. A debridement edge **2050** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **2050** is capable of removing tissue during debridement operations. The attachment portion of the **2040** may include a plurality of apertures **2066** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0068]** Referring to FIG. **21**, a debridement blade or tip **2114** is square-shaped and includes a debridement portion **2120** coupled to an attachment portion **2140**. The debridement portion **2120** includes a square-shaped wall **2126** that includes a pair of rounded corners. A debridement edge **2150** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **2150** is capable of removing tissue during debridement operations. The attachment portion of the **2140** may include a plurality of apertures **2166** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0069]** Referring to FIG. **22**, a debridement blade or tip **2214** is tanto-shaped and includes a debridement portion **2220** coupled to an attachment portion **2240**. The debridement portion **2220** includes a tanto-shaped wall **2226**. A debridement edge **2250** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **2250** is capable of removing tissue during debridement operations. The attachment portion of the **2240** may include a plurality of apertures **2266** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0070]** Referring to FIG. **23**, a debridement blade or tip **2314** is spade-shaped and includes a debridement portion **2320** coupled to an attachment portion **2340**. The debridement portion **2320** includes a spade-shaped wall **2326** and includes a debridement element **2327** that is angled relative to the wall **2326**. A debridement edge **2350** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **2350** is capable of removing tissue during debridement operations. The attachment portion of the **2340** may include a plurality of apertures **2366** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0071]** Referring to FIG. **24**, a debridement blade or tip **2414** includes a debridement portion **2420** coupled to an attachment portion **2440**. The debridement portion **2420** includes a debridement edge **2450** that includes both a linear region **2452** and a curved region **2454**. The debridement edge **2450** in the linear region **2452** is serrated. The curved region **2454** is non-serrated, but sharpened. It should be noted that the linear and curved regions each may include any combination of sharp, dull, smooth, rough, or serrated edges. The debridement edge **2450** is capable of removing tissue during debridement operations. The attachment portion of the **2440** may include a plurality of apertures **2466** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0072]** Referring to FIG. **25**, a debridement blade or tip **2514** is flame-shaped and includes a debridement portion **2520** coupled to an attachment portion **2540**. The debridement portion **2520** includes a flame-shaped wall **2526** coupled to a rear wall **2527**. A debridement edge **2550** is provided that in FIG. **25** includes a coarsely serrated region **2554** and a sharpened region **2558**. The debridement edge **2550** is capable of removing tissue during debridement operations. The attachment portion of the **2540** may include a plurality of apertures **2566** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0073]** Referring to FIG. **26**, a debridement blade or tip **2614** is valve-shaped and includes a debridement portion **2620** coupled to an attachment portion **2640**. The debridement portion **2620** includes a valve-shaped member **2626**. A debridement edge **2650** is provided that may be sharp or non-sharpened (i.e. dull). The debridement edge **2650** is capable of removing tissue during debridement operations. The attachment portion of the **2640** may include a plurality of apertures **2666** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0074]** Referring to FIG. **27**, a debridement blade or tip **2714** is valve-shaped and includes a debridement portion **2720** coupled to an attachment portion **2740**. The debridement portion **2720** includes a valve-shaped member **2726**. A debridement edge **2750** is provided that includes a coarsely serrated region **2754** and a sharpened region **2758**. The debridement edge **2750** is capable of removing tissue during debridement operations. The attachment portion of the **2740** may include a plurality of apertures **2766** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0075]** Referring to FIG. **28**, a debridement blade or tip **2814** is semi-hemispherical in shape and includes a debridement portion **2820** coupled to an attachment portion **2840**. The attachment portion **2840** includes an angled region that allows the debridement portion **2820** to be oriented differently than the debridement portion **1420** of FIG. **14**. In FIG. **28**, the debridement portion **2820** is oriented with its opening directed toward the debridement tool. The debridement portion **2820** includes a semi-hemispherical wall **2826**. A debridement edge **2850** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **2850** is capable of removing tissue during debridement operations. The attachment portion of the **2840** may include a plurality of apertures **2866** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0076]** Referring to FIG. **29**, a debridement blade or tip **2914** is curette-shaped and includes a debridement portion **2920** coupled to an attachment portion **2940**. The attachment portion **2940** includes an angled region that allows the debridement portion **2920** to be oriented differently than the debridement portion **1120** of FIG. **11**. In FIG. **29**, the debridement portion **2920** is oriented with its opening directed toward the debridement tool. The debridement portion **2920** includes a ring-shaped wall **2926** with at least an inner frusto-conical surface **2928** similar to the debridement portion **1120** of FIG. **11**. A debridement edge **2950** is provided that may be sharp,

dull, smooth, rough, or serrated. The debridement edge **2950** is capable of removing tissue during debridement operations. The attachment portion of the **2940** may include a plurality of apertures **2966** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0077]** Referring to FIG. **30**, a debridement blade or tip **3014** is sled-shaped and includes a debridement portion **3020** coupled to an attachment portion **3040**. The debridement portion **3020** includes a rectangular, sled-shaped wall **3026** and includes a plurality of debridement elements **3027** that protrude beneath the wall **3026**. A debridement edge **3050** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **3050** is capable of removing tissue during debridement operations. The attachment portion of the **3040** may include a plurality of apertures **3066** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0078]** Referring to FIG. **31**, a debridement blade or tip **3114** is plow-shaped and includes a debridement portion **3120** coupled to an attachment portion **3140**. The debridement portion **3120** includes a rectangular, plow-shaped member **3126**. At least one debridement edge **3150** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **3150** is capable of removing tissue during debridement operations. The attachment portion of the **3140** may include a plurality of apertures **3166** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0079]** Referring to FIG. **32**, a debridement blade or tip **3214** includes a debridement portion **3220** coupled to an attachment portion **3240**. The debridement portion **3220** includes a plurality of curved members **3226**. At least one debridement edge **3250** is provided that may be sharp, dull, smooth, rough, or serrated. The debridement edge **3250** is capable of removing tissue during debridement operations. The attachment portion of the **3240** may include a plurality of apertures **3266** or tabs to permit removable coupling to the head member **1062** (see FIG. **10**) or other debridement tools described herein.

**[0080]** Referring to FIG. **33**, a debridement blade or tip **3314** is cylindrically-shaped and includes a debridement portion **3320** coupled to an attachment portion **3340**. The debridement portion **3320** includes a pair of cylindrically-shaped walls **3326** between which are located a plurality of debridement elements **3327** that radially protrude beyond the cylindrically-shaped walls **3326**. A debridement edge **3350** is provided on each debridement element **3327** that may be sharp, dull, smooth, rough, or serrated. The debridement edge **3350** is capable of removing tissue during debridement operations. The attachment portion of the **3340** of FIG. **33** is preferably a shaft that is configured to be rotated by a motor or other motion-imparting device. As the shaft is rotated, the debridement elements **3327** also rotate thereby allowing efficient removal of tissue. The presence of the cylindrically-shaped walls **3326** provides safe operation by limiting the depth to which the debridement elements **3327** may remove tissue. In other words, the debridement elements **3327** are only capable of removing tissue to a depth equal to the distance that the debridement elements **3327** extend beyond the walls **3326**. This distance is preferably adjustable to allow adjustability in the depth of tissue removal.

**[0081]** Accordingly, based on the above disclosure, it should be apparent from the foregoing that an invention having significant advantages has been provided for aiding a user in debriding necrotic tissue. While the depicted embodiments illustrate certain shapes and design configurations, the disclosed embodiments are not intended to be limited to any particular design, and are susceptible to various changes and modifications without departing from the spirit thereof.

**1**. A debridement tool for debriding tissue from a tissue site, the debridement tool comprising:
- a housing having an interior space;
- a motor disposed within the interior space of the housing;
- a power source disposed within the interior space of the housing operable to provide power to the motor;
- a blade coupled to a first end of the housing, the blade operable to vibrate when the motor is powered on; and
- a lighting element disposed within the housing and beneath a debridement edge of the blade, the lighting element operable to illuminate the tissue site.

**2**. The debridement tool of claim **1**, further comprising a switch for powering the motor on and off.

**3**. The debridement tool of claim **2**, wherein the switch is located at a second end of the housing, the second end being opposite the first end.

**4**. The debridement tool of claim **1**, wherein the power source is a rechargeable power source operable to be recharged while remaining in the housing.

**5**. The debridement tool of claim **1**, wherein the power source is a rechargeable power source operable to be recharged using inductive coupling.

**6-9**. (canceled)

**10**. The debridement tool of claim **1**, wherein the motor is a piezoelectric motor.

**11**. The debridement tool of claim **1**, wherein the motor is an ultrasonic motor.

**12**. The debridement tool of claim **1**, wherein the motor includes an offset mass rotating about an axis causing the blade to vibrate.

**13**. The debridement tool of claim **12**, wherein the axis is angled relative to a debridement plane of the blade such that the rotation of the offset mass generates a first force component substantially parallel to the debridement plane and along the length of the blade, a second force component substantially parallel to the debridement plane and substantially transverse to the length of the blade, and a third force component substantially perpendicular to the debridement plane.

**14**. The debridement tool of claim **13**, further comprising one or more mounts within the housing for reducing the vibration in undesired planes caused by the rotation of the offset mass.

**15**. The debridement tool of claim **1**, wherein the blade is unsharpened.

**16**. The debridement tool of claim **1**, wherein the vibration of the blade assist in debridement of the tissue.

**17**. The debridement tool of claim **1**, wherein the blade is a metal scalpel blade.

**18**. (canceled)

**19**. The debridement tool of claim **1**, wherein the blade is an injection molded plastic blade.

**20**. The debridement tool of claim **1**, wherein the blade is an injection molded ceramic blade.

**21**. The debridement tool of claim **1**, wherein the blade vibrates at ultrasonic frequencies.

**22**. The debridement tool of claim **1**, wherein the blade is retractable.

**23**. The debridement tool of claim **22**, further comprising a blade trigger, the blade trigger causing the motor to power off when the blade is retracted, and causing the motor to power on when the blade is extended.

**24**. The debridement tool of claim **1**, wherein the shape of the blade is dependent on the tissue site being treated.

**25**. The debridement tool of claim **1**, wherein the lighting element is operable to identify tissue with blood flow.

**26**. The debridement tool of claim **1**, wherein the lighting element is operable to identify necrotic tissue.

**27**. The debridement tool of claim **1**, wherein the lighting element operates at a specific wavelength for identifying tissue with blood flow.

**28**. The debridement tool of claim **27**, wherein the specific wavelength is at a red to near infra-red region.

**29**. The debridement tool of claim **1**, further comprising electrical circuitry electrically coupled to the motor, the power source, and the lighting element for controlling operations of the debridement tool.

**30-68**. (canceled)

**69**. A debridement tool for debriding tissue from a tissue site, the debridement tool comprising:

a housing having an interior space;

a motor disposed within the interior space of the housing, wherein the motor includes an offset mass rotating about an axis for generating vibrations;

a power source disposed within the interior space of the housing operable to provide power to the motor;

a blade coupled to a first end of the housing along a first plane, the motor located a distance and angled within the housing so as to transfer the vibrations along the first plane for vibrating the blade along the first plane for assisting a user in debridement of necrotic tissue; and

a lighting element disposed within the housing beneath a debridement edge of the blade, wherein the lighting element operates at a wavelength operable to assist a user in distinguishing between necrotic tissue and healthy tissue.

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| 专利名称(译) | 清创手工具 | | |
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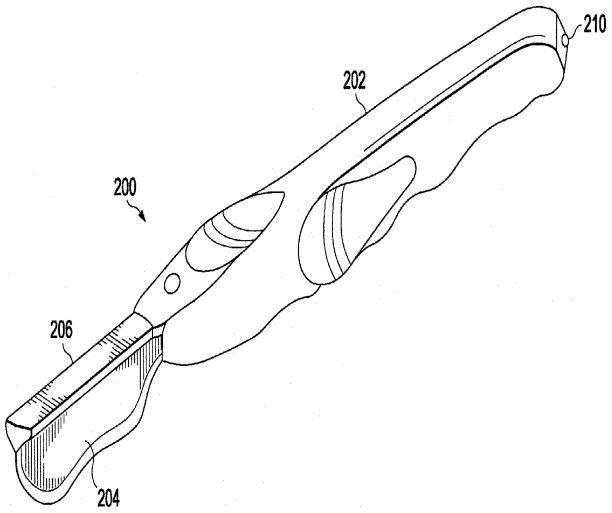
摘要(译)

所公开的实施例包括用于帮助使用者清除坏死组织的工具。例如，在一个实施例中，公开了一种清创术工具，其包括具有内部空间的壳体。电动机和电源设置在壳体的内部空间内。电源可操作以向电动机提供电力。叶片连接到壳体的第一端。当马达通电时，刀片可操作以振动。清创术工具还包括照明元件，该照明元件设置在壳体内并位于刀片的切割边缘下方。照明元件可操作以照亮组织部位。在一些实施例中，发光元件以特定波长操作，其有助于区分坏死组织和健康组织。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