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(54) **TREATMENT TIP INCISION TEMPLATE**

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(52) **U.S. Cl.**

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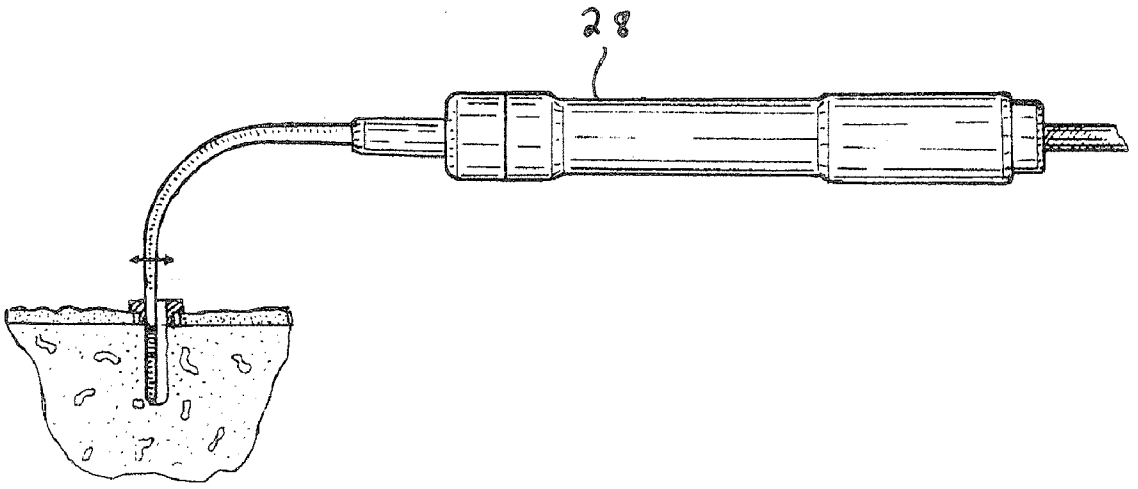
USPC ..... **606/13**; 606/1; 606/33; 606/169

(57) **ABSTRACT**

A shape and depth template for incisions with treatment tips, usable in treatments such as bone surgery, comprising a guiding body for a treatment tip provided with two mutually opposite end surfaces arranged at a preset distance and a lateral surface, one of the end surfaces being arrangeable at the treatment tip incision region and with a hole that of preset shape that passes there through from one end surface to the other.



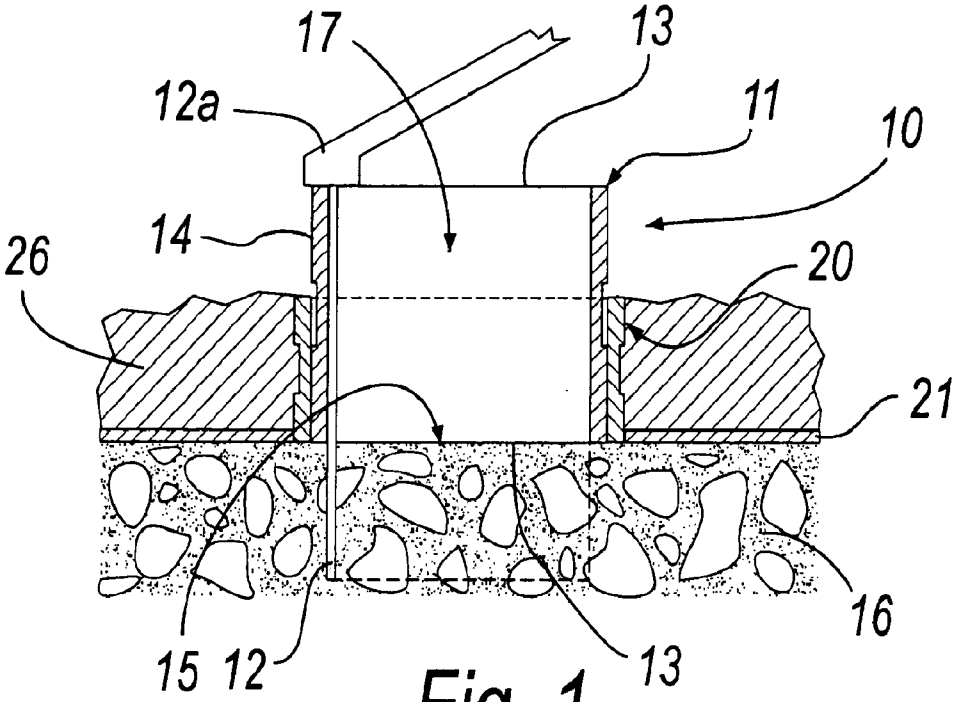



Fig. 1

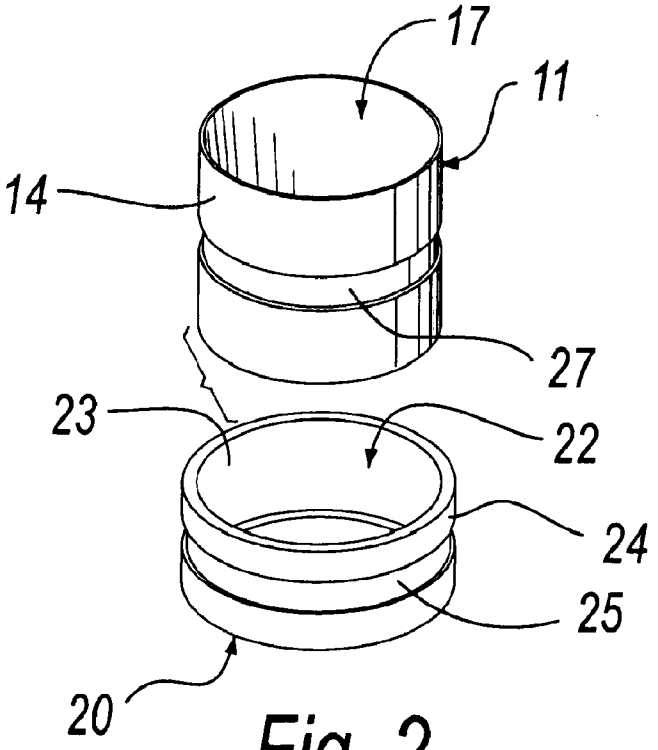



Fig. 2

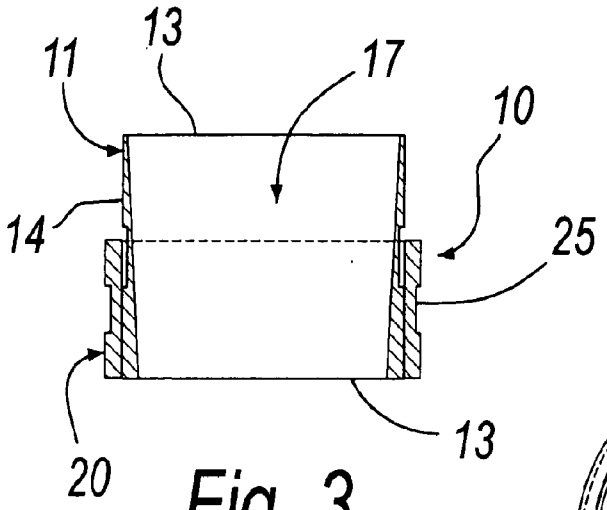



Fig. 3

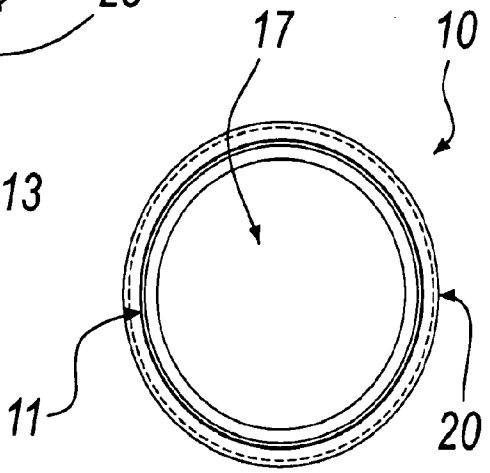



Fig. 4

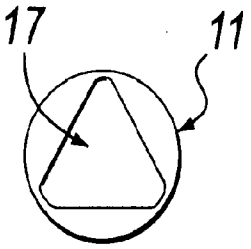



Fig. 5

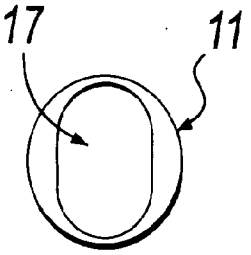



Fig. 6

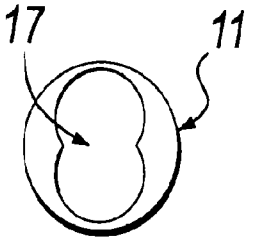



Fig. 7

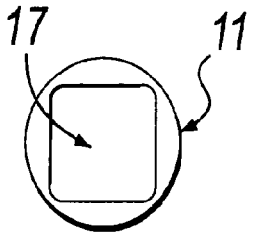



Fig. 8

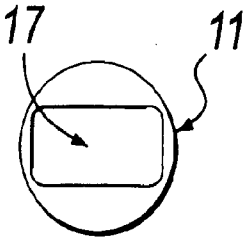



Fig. 9

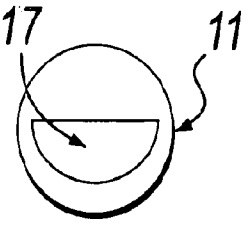



Fig. 10

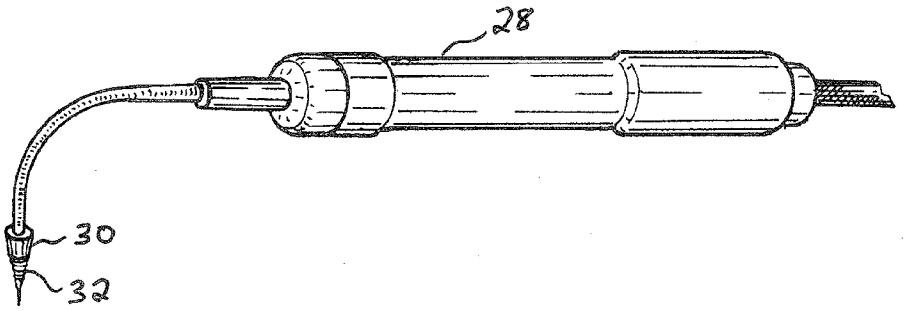



FIG.11

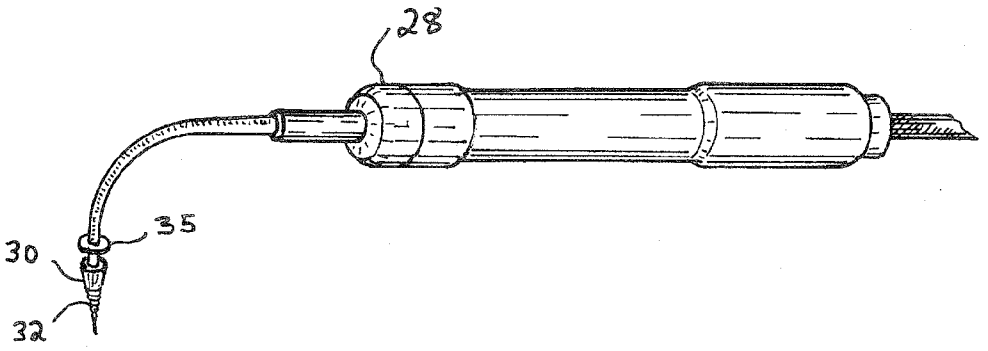



FIG.12

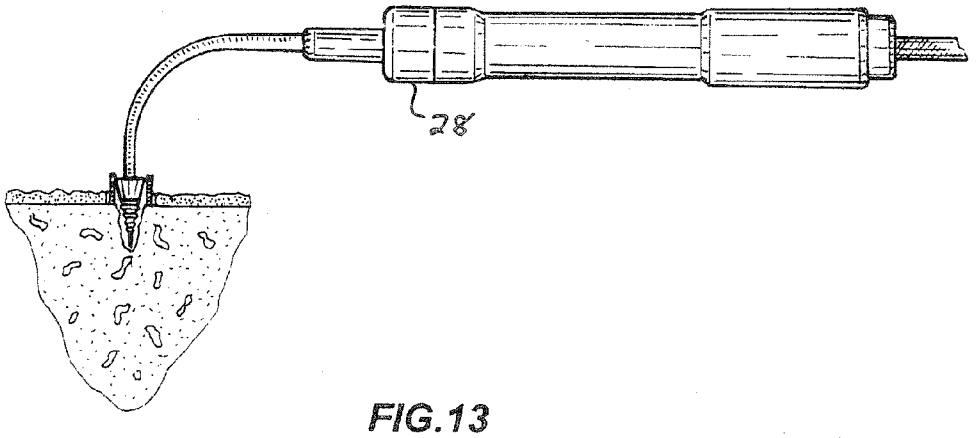



FIG.13

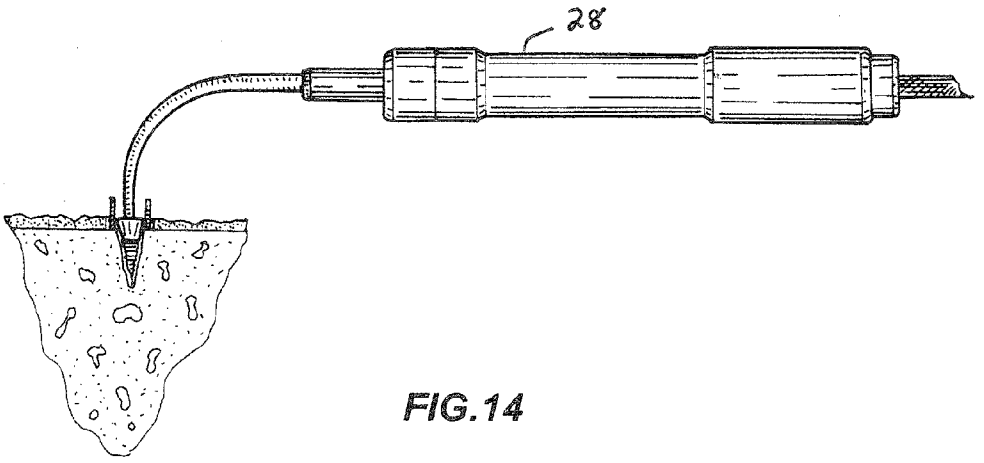



FIG.14

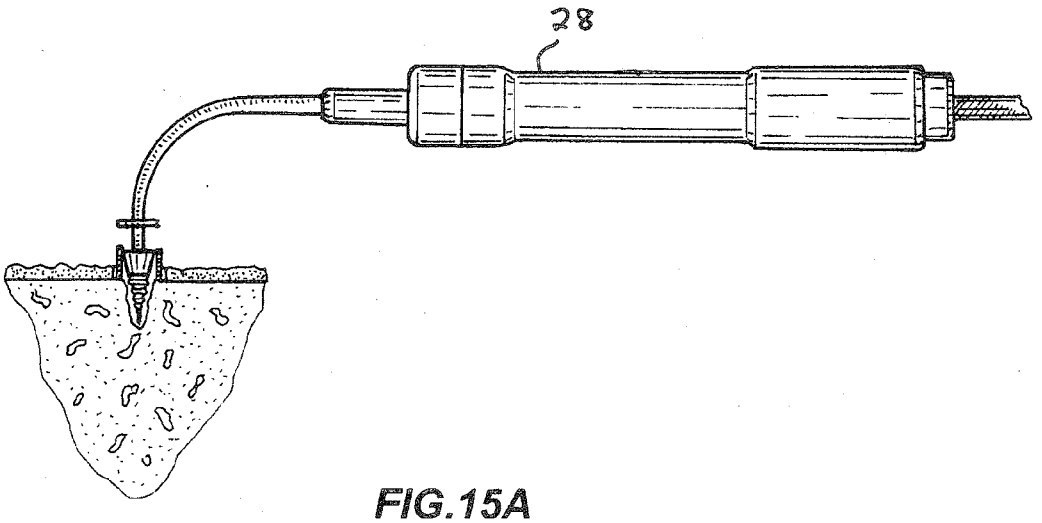



FIG.15A

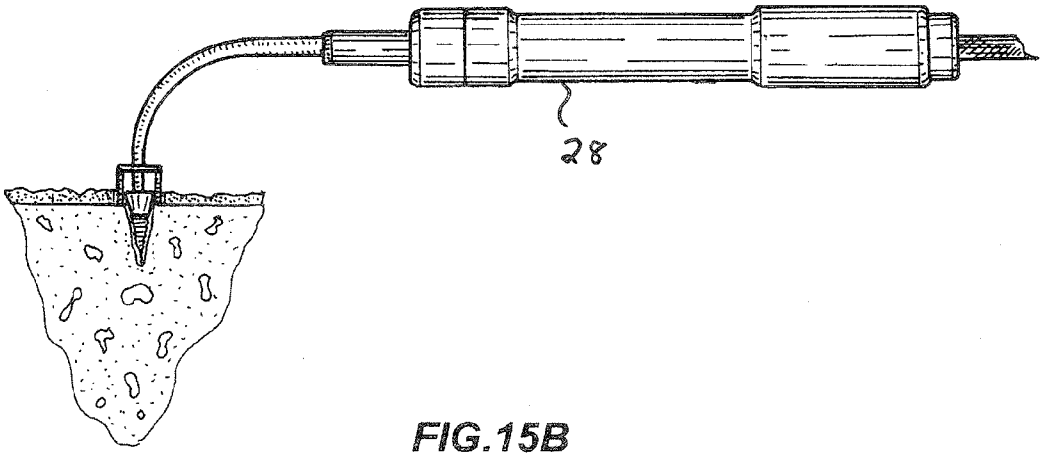



FIG.15B

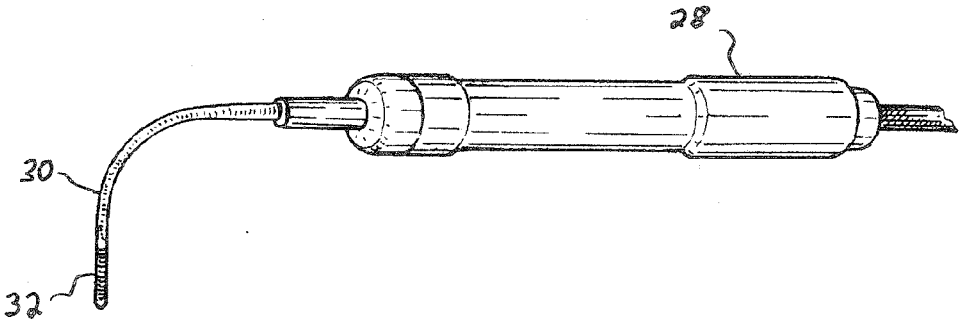



FIG.16

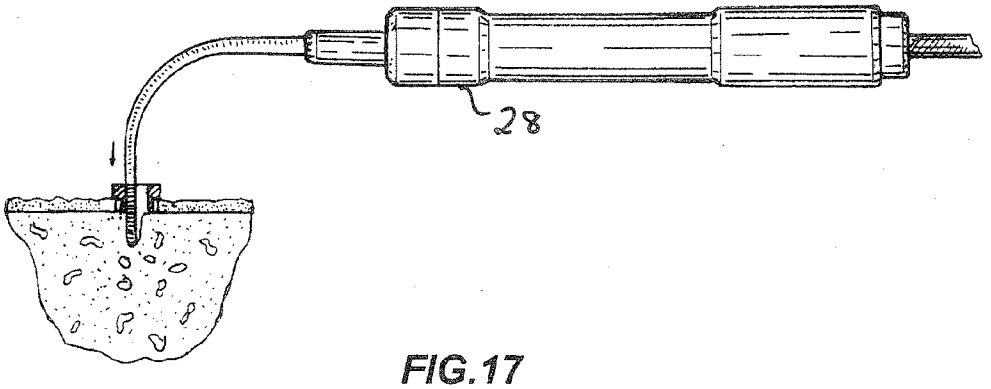



FIG.17

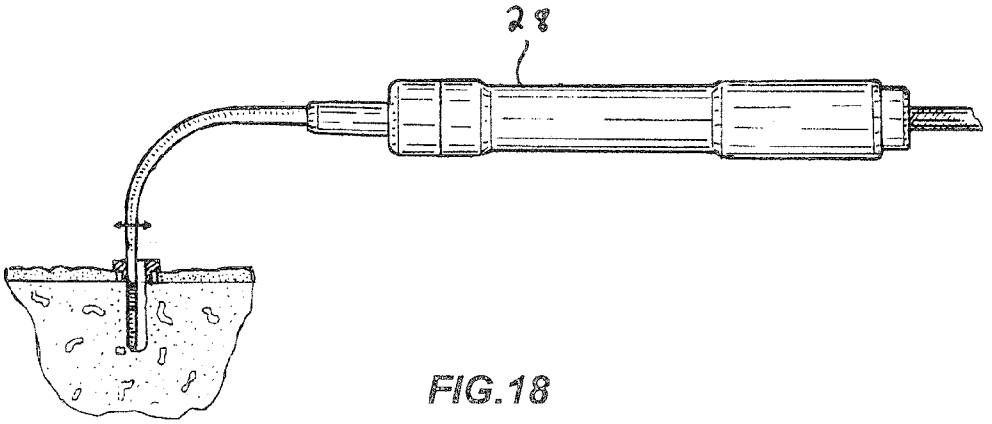



FIG.18

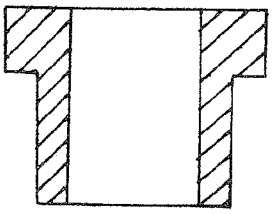


FIG.19A

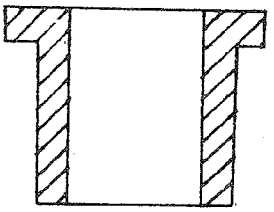


FIG.19B

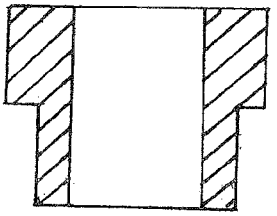


FIG.19C

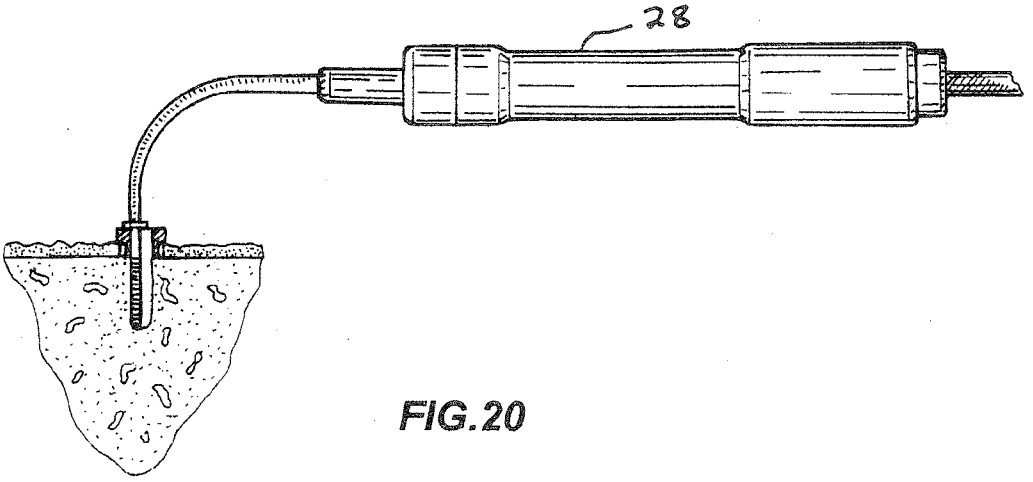



FIG.20

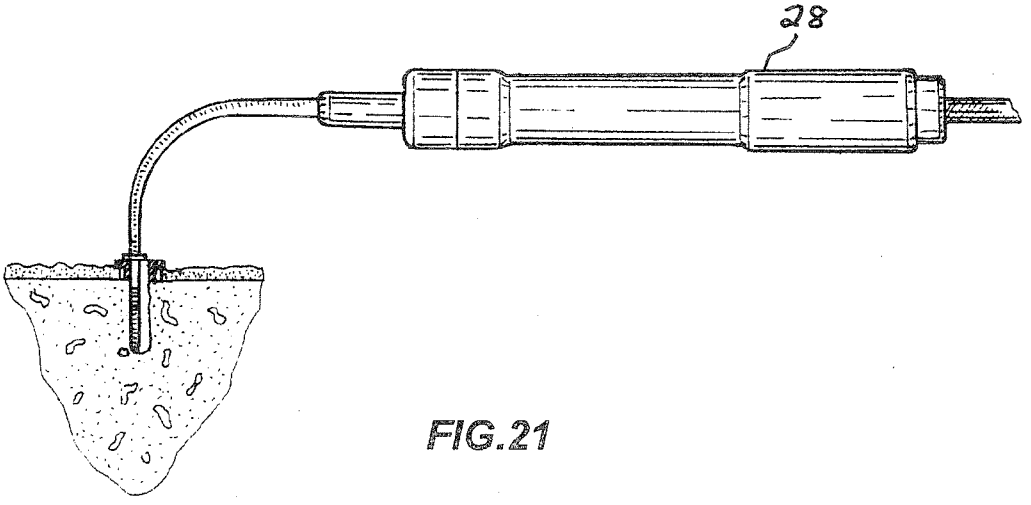



FIG.21

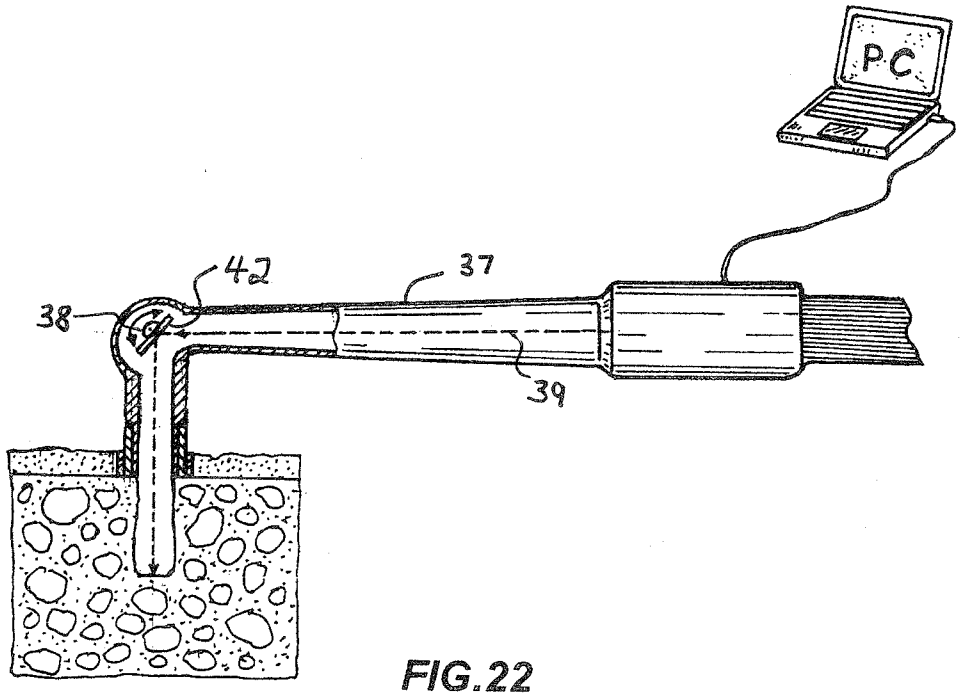



FIG.22

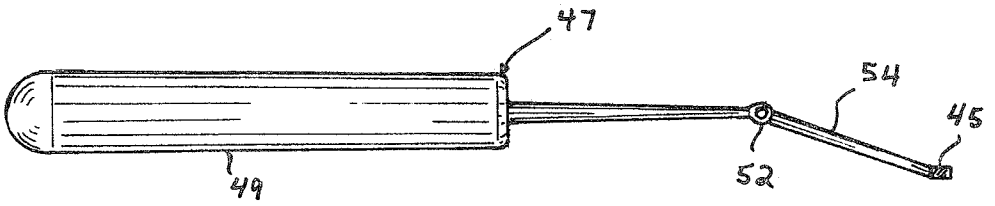



FIG.23

# TREATMENT TIP INCISION TEMPLATE

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application is a continuation of U.S. patent application Ser. No. 12/569,898 (Att. Docket BE8245CIP), filed Sep. 29, 2009 and entitled TREATMENT TIP INCISION TEMPLATE, which is a continuation-in-part of U.S. patent application Ser. No. 10/843,476 (Att. Docket BE8245P) filed May 12, 2004 and entitled LASER TIP INCISION TEMPLATE FOR BONE SURGERY, now U.S. Pat. No. 7,615,047, which claims foreign priority to Italian Pat. App. PD2003A000102, filed May 15, 2003, the entire contents of all which are hereby incorporated by reference.

## BACKGROUND OF THE INVENTION

**[0002]** 1. Field of the Invention

**[0003]** The present invention relates to a shape and depth template for medical treatment (e.g., dosing, disrupting, ablating and/or cutting) applications such as the performance of cuts or incisions with treatment (e.g., laser) tips, particularly usable on tissue and, more particularly, usable in the context of exemplary applications such as hard tissue (e.g., bone) surgery.

**[0004]** The invention can be used particularly but not exclusively for providing osteotomy sites for dental implants.

**[0005]** The invention can also be applied in the execution of bone biopsies, the removal of calibrated bone samples for the most disparate uses in orthopedics, et cetera.

**[0006]** 2. Description of Related Art

**[0007]** Until recently, the use of treatment-devices (e.g., lasers) in surgery was limited to the cutting of substantially soft tissues, since it was not possible to calibrate the power of, for instance, the laser for harder tissues.

**[0008]** Generally, if these devices (e.g., lasers) were applied to hard-tissue (e.g., bone) portions, they would burn said portions, with consequent death of the component cells.

**[0009]** Recently, new developments in medical treatment (e.g., laser) technologies have allowed devices such as lasers to perform incisions in bone tissues without burning them.

**[0010]** Scalpels with a laser tip are used for these incisions; the laser tips that are used can be different from one another. For example, the laser light of a laser tip can be conveyed by means of optical fibers, waveguide systems, or mirror systems; the laser of said scalpels may also be of the hydrokinetic type.

## SUMMARY OF THE INVENTION

**[0011]** One aim of the present invention is to provide a shape and depth reference during the incision of biological tissues by means of treatment (e.g., laser) tips.

**[0012]** Within this aim, an object of the present invention is to provide a shape and depth template for incisions with treatment tips that is particularly usable in treatment applications such as bone surgery.

**[0013]** Another object of the present invention is to provide a shape and depth template for incisions with treatment tips, particularly usable in treatment applications such as bone surgery, that allows easy operation on the part of the surgeon.

**[0014]** A further object of the present invention is to provide a shape and depth template for treatments (e.g., incisions) with treatment tips, particularly usable, for instance, in bone surgery, that can in some examples allow for osteotomy sites of extreme precision, which comply with the physiology of the affected region.

**[0015]** A still further object of the present invention is to provide a shape and depth template for incisions with treatment tips, particularly usable, for instance, in bone surgery, that can in some instances allow for a certain elasticity in choosing the shapes and dimensions of the sites to be provided.

**[0016]** Another object of the present invention is to provide a shape and depth template for incisions with treatment tips, particularly usable, for instance, in bone surgery, that according to certain examples can be produced with known systems and technologies.

**[0017]** This aim and these and other objects that will become more apparent hereinafter are achieved by a shape and depth template for incisions with treatment tips that is particularly usable in treatment applications such as bone surgery, characterized in certain implementations as comprising a guiding body for a treatment tip that is delimited by two mutually opposite end surfaces arranged at a preset distance and by a lateral surface, one of said end surfaces being designed to be arranged at the region where incision with the treatment tip is to be performed, said guiding body having a hole that has a preset shape and passes through it from one end surface to the other.

**[0018]** While the apparatus and method has or will be described for the sake of grammatical fluidity with functional explanatons, it is to be expressly understood that the claims, unless indicated otherwise, are not to be construed as limited in any way by the construction of "means" or "steps" limitations, but are to be accorded the full scope of the meaning and equivalents of the definition provided by the claims under the judicial doctrine of equivalents.

**[0019]** Any feature or combination of features described or referenced herein are included within the scope of the present invention provided that the features included in any such combination are not mutually inconsistent as will be apparent from the context, this specification, and the knowledge of one skilled in the art. In addition, any feature or combination of features described or referenced may be specifically excluded from any embodiment of the present invention. For purposes of summarizing the present invention, certain aspects, advantages and novel features of the present invention are described or referenced. Of course, it is to be understood that not necessarily all such aspects, advantages or features will be embodied in any particular implementation of the present invention. Additional advantages and aspects of the present invention are apparent in the following detailed description and claims that follow.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0020]** Further characteristics and advantages of the present invention will become more apparent from the following detailed description of preferred but not exclusive embodiments thereof, illustrated by way of non-limiting examples in the accompanying drawings, wherein:

**[0021]** FIG. **1** is a sectional front view of a template according to the invention, applied to a gingival bone, illustrating a treatment scalpel during incision;

**[0022]** FIG. **2** is an exploded perspective view of a template according to the invention;

**[0023]** FIG. **3** is a sectional front view of a template according to the invention in an alternative embodiment with respect to the shape of FIG. **1**;

**[0024]** FIG. **4** is a plan view of the template of FIG. **3**;

**[0025]** FIGS. **5-10** are six plan views of a corresponding number of alternative embodiments of the template according to the invention;

**[0026]** FIG. **11** is a schematical view of a first embodiment of a sonic or ultrasonic tip having a conical or tapered shape for the use with the templates according to the present invention;

**[0027]** FIG. **12** is a schematical view of a second embodiment of a sonic or ultrasonic tip having a conical or tapered shape, with a stop area, for the use with the templates according to the present invention;

**[0028]** FIGS. **13** and **14** are schematical views of bone ablating steps using the first embodiment of a sonic or ultrasonic tip of FIG. **11**;

**[0029]** FIGS. **15**A and **15**B are schematical views of different bone ablating steps using the second embodiment of a sonic or ultrasonic tip of FIG. **12**;

**[0030]** FIGS. **16-18** are schematic views of another set of steps for boring or ablating bone with another embodiment of a sonic or ultrasonic tip having a cylindrical shape, and suitable for being used with the jackets/templates according to the present invention;

**[0031]** FIGS. **19**A-**19**C are sectional views of different embodiments of jackets/templates for the control and metering of the height/depth of the boring or ablating bone steps according to the present invention;

**[0032]** FIG. **20** is a schematical view of a sonic or ultrasonic cylindrical tip using an embodiment of a template of FIGS. **19**A-**19**C;

**[0033]** FIG. **21** is a schematical view of another sonic or ultrasonic cylindrical tip using another embodiment of a template of FIGS. **19**A-**19**C;

**[0034]** FIG. **22** is a schematical view of a boring or ablating bone step with an embodiment of a laser microscanner for the use with the templates according to the present invention; and

**[0035]** FIG. **23** is a schematical view of a template hand holder tool according to the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0036]** Embodiments of the invention are now described and illustrated in the accompanying drawings, instances of which are to be interpreted to be to scale in some implementations while in other implementations, for each instance, not. In certain aspects, use of like or the same reference designators in the drawings and description refers to the same, similar or analogous components and/or elements, while according to other implementations the same use should not. According to certain implementations, use of directional terms, such as, top, bottom, left, right, up, down, over, above, below, beneath, rear, and front, are to be construed literally, while in other implementations the same use should not. The present invention may be practiced in conjunction with various techniques that are conventionally used in the art, and only so much of the commonly practiced process steps are included herein as are necessary to provide an understanding of the present invention. The present invention has applicability in the field of medical devices and processes in general. For illustrative purposes, however, the following description pertains to treatment devices and related methods of use.

**[0037]** With reference to the figures, a shape and depth template for incisions with treatment tips according to an exemplary embodiment is designated in the illustrated example by the reference numeral **10**. As embodied herein, templates of the invention can have medical treatment (e.g., dosing, disrupting, ablating and/or cutting) applications such as the performance of cuts or incisions with treatment (e.g., laser) tips. They can be particularly usable on tissue and, more particularly, can be usable in the context of exemplary applications such as in hard tissue (e.g., bone) surgery, according to certain features of the invention.

**[0038]** The template **10** is exemplified comprising a guiding body **11** for a treatment tip (of preset length), designated by the reference numeral **12** in FIG. **1**. The treatment tip may be configured to emit one or more of in no order of preference, electromagnetic (e.g., laser) energy, abrasive particles (e.g., silica, aluminum oxide, or a baking soda mixture propelled by compressed air) and/or acoustic energy (e.g., vibrations, such as sonic, supersonic and/or ultrasonic emissions, sound energy that may have a frequency greater than 20 kHz, high-intensity focused or applied forms of the preceding, and/or other acoustic means and equivalents thereof).

**[0039]** Exemplary acoustic energy emitting (e.g., sonic cutting/ablating) treatment tips can comprise and/or utilize, in whole or in part, in any combination with any other technology disclosed or referenced herein, to the extent compatible or modifiable to be compatible and/or not mutually exclusive, that of (a) micro-vibrating sonic movement of air-driven handpieces (e.g., by Sonicflex kayo); and (b) sonosurgery bonetips "sonic" instruments made by Komet (e.g., by Gebr. Basseler D E, provided in any of 3 shapes for operation within the mouth as formed with very thin incision sections (0.2 mm), all of which is incorporated herein by reference. (See Agabiti, Ivo "ERE (Edentulous Ridge Expansion) technique in two stages," Apr. 23, 2009, published at http://en.zerodonto.com/2009/04/sonosurgery-komet-sonic-tips.html or http://tinyurl.com/y9o81kd.) Further information incorporated herein by reference for the same purposes is (c) pages 11 et. seq, beginning with "Sonosurgery® SFS," of Innovazioni 2009 IT, published at http://www.komet.it/fileadmin/images/innovations/Innovazioni_09_IT_GB.pdf or http://tinyuyl.com/ybj31ds.

**[0040]** Furthermore, as shown in FIGS. **11** and **12** any of such acoustic energy emitting treatment tips can comprise and/or utilize, as (d), a conical, oval and/or tapered sonic or ultrasonic tip (e.g., for the making of non-cylindrical bores). Each of the tips coupled to an instrument **28** can comprise, for instance, a smooth surface **30**, which may, in some implementations, facilitate a slidable/movable fit within the guiding body **11** of the template **10**, and may further comprise a working surface **32** for emitting energy and/or otherwise affecting/facilitating, for example, boring. In certain embodiments, the working surface **32** may comprise an abrasive surface. The embodiment of FIG. **12** comprises a stop area **35**, for facilitating treatments which may require or benefit from, for example, a limited or predetermined depth.

**[0041]** FIGS. **13** and **14** depict a first sequence of operation, using, for example, the configuration of FIG. **11**, and FIGS. **15**A and **15**B depict a second sequence of operation, using, for example, the configuration of FIG. **12**.

**[0042]** Emissions can in certain implementations be accomplished under control or by aid of (e) a circuit such as a microprocessor. The microprocessor can be programmed to vary the timings, powers, distributions, and/or other charac-

teristics of the emissions, in accordance with desired cuts or treatments to be achieved. Additionally, such parameters my be varied/controlled in accordance with the surface being treated/disrupted (for example, particular type or condition of bone and/or soft tissue). In any of the disclosed or referenced embodiments, as well as additional embodiments as would be apparent in view of this disclosure, a surface-profile imager/generator can be implemented to provide a computer generated model of a surface being scanned, as or at least partly analogous to that disclosed in U.S. Pat. No. 5,588,428. A visible beam, for example, may be used to collect profile information of the target to be treated. Emissions from the treatment tip can be scanned accordingly, with for example the amount and/or properties of the emissions being varied in accordance with different areas and/or desired treatments to be imparted.

**[0043]** In the disclosed or referenced embodiments, as well as additional embodiments as would be apparent in view of this disclosure, actual emitting orifices (e.g., waveguides such as optical fiber) can be scanned using a motor assembly. Other embodiments can also or alternatively comprise scanning using reflectors and/or focusing optics, as known in the art. U.S. Pat. No. 5,624,434, and patents and references cited therein, disclose apparatuses which scan using dynamically controlled deflectors, the contents of which are expressly incorporated herein by reference. In other embodiments, similar technology may be incorporated in (f) hand-held pieces, wherein a few or substantially all of the parts therein are fixed and/or do not move, and/or wherein the handpiece is moved, also or instead.

**[0044]** The guiding body **11** is formed by two mutually opposite end surfaces **13**, which are arranged at a standardized preset distance from each other, as will become better apparent hereinafter, and by a lateral surface **14**.

**[0045]** One of the end surfaces **13** is to be arranged at a region **15** where incision with the treatment tip **12** is to be performed.

**[0046]** For example, FIG. **1** illustrates a gingival bone **16** to which the template **10** according to the invention, useful for providing an osteotomy site for dental implants, is applied.

**[0047]** In this embodiment, the lateral surface **14** of the guiding body **11** has a substantially cylindrical shape.

**[0048]** The guiding body **11** has a hole **17** that has a preset shape and passes through it from one end surface to the other.

**[0049]** In this embodiment, the hole **17**, which is coaxial to the cylindrical extension of the entire guiding body **11**, has a circular cross-section.

**[0050]** In other embodiments, shown in FIGS. **5-10**, the hole **17** has a cross-section that is respectively triangular, elliptical, figure-of-eight (two-lobe), square, rectangular, semicircular, in all of which any corners are radiused.

**[0051]** The hole **17** further has, depending on the type of use, a straight wall shape (see FIG. **1**), or a shape that tapers from the outside toward said incision region (which corresponds to the bone to be cut or ablated), as shown in FIGS. **3** and **4**; in this last case, the hole **17** having a circular cross-section has a substantially conical shape, preferably a straight conical shape.

**[0052]** The template **10** also comprises a jacket **20** that acts as a reference for the guiding body **11** and is designed to be rigidly fixed, by way of a supporting structure **21**, at the incision region **15**.

**[0053]** The jacket **20** has a through hole **22** that is formed by an internal surface **23** that is shaped complementarily to the lateral surface **14** of the guiding body **11** and is therefore cylindrical.

**[0054]** In particular, in this embodiment the jacket **20** has an outer surface **24** that has a substantially cylindrical shape.

**[0055]** Advantageously, on the outer surface **24** of the jacket **20** there is a first annular groove **25** to allow the jacket **20** to grip a supporting matrix **26** provided on the supporting structure **21** arranged in the incision region **15**.

**[0056]** A second annular groove **27** is formed at an outer region of the lateral surface **14** of the guiding body **11** to allow to grip the supporting matrix if the guiding body **11** is applied without the jacket **20**, as explained hereinafter.

**[0057]** The use of the template is as follows.

**[0058]** Consider for example the case of the execution of an osteotomy site for the insertion of a dental implant.

**[0059]** After determining the position in which the site is to be provided on the alveolar bone of the patient, an impression tray of the dental arch is performed.

**[0060]** The supporting structure **21** for the template **20** is provided by using the spatial references of said impression tray; said template is therefore positioned in the correct location for providing the site.

**[0061]** A matrix of resin **26** is arranged on the supporting structure **21** and stably locks the template **20** in position.

**[0062]** In particular, the jacket **20** is embedded in the matrix **26**.

**[0063]** The guiding body **11** is inserted in the hole of the jacket so as to rest one end surface of the guiding body on the surface, or tissue, or hard tissue such as bone, to be treated (e.g., cut or ablated).

**[0064]** At this point, the treatment tip **12**, which protrudes from the treatment head **12** of a treatment scalpel, is inserted in the hole **17**.

**[0065]** The treatment tip **12** must follow the internal surface of the hole **17** so as to provide the contour of the site.

**[0066]** The depth of the site is ensured by the fact that the height of the guiding body **11** is known and so is the length of the treatment tip; at the most, the treatment head can rest against the edge of the guiding body, thus ensuring the chosen depth of incision.

**[0067]** For this reason, guiding bodies having different heights and optional internal tapers are provided according to a series of predefined sizes.

**[0068]** For example, it is possible to provide templates in which, depending on the length of the guiding body, a particular inclination of the internal surface of the hole **17** is associated; moreover, the treatment tip may also be adjusted in order to assume certain preset lengths, thus increasing the adjustment of the incision depth.

**[0069]** Having a through hole with an internal taper on the guiding body allows to provide conical sites.

**[0070]** The various shapes of the hole of the guiding body cited above (which can be tapered or rit allow to provide sites of an appropriate shape.

**[0071]** For example, the figure-of-eight shape is typical of the implantation of a molar, the triangular shape is typical of a canine, the ellipsoidal shape is typical of a premolar, and so forth; in this manner, it is possible to provide sites that comply with the original anatomy of the affected region.

**[0072]** It is extremely advantageous to use a jacket that is fixed in the matrix and a removable guiding body; in this manner one has great flexibility in choosing the sizes for

providing the site. One can for example decide to use at the last minute, before the operation, a guiding body that is different from the preset one, since it is believed to be more suitable after visual assessment "in the field;" in this manner, one avoids having to remake the supporting structure.

**[0073]** Moreover, it is possible to recover the guiding body once the operation has been completed and to discard only the jacket embedded in the matrix of the supporting structure, said jacket being associable with all the models of various sizes of the guiding body.

**[0074]** The use of said template may be the most disparate, from the above described provision of osteotomy sites for dental implants to the calibrated removal of tissue (e.g., hard tissue such as bone) portions in various parts of the body for the most disparate reasons, biopsies, removal of material to be used in other regions, et cetera.

**[0075]** In practice it has been found that the invention thus described achieves the intended aim and objects; in particular, the present invention provides a shape and depth template for incisions with treatment tips, particularly usable, for example, in bone surgery thereby allowing for osteotomy sites and bone samples having precise shapes and dimensions.

**[0076]** As shown in FIGS. **13** and **14**, the treatment tip is a supersonic tip according to the embodiment of FIG. **11**, the tip being suitable to cooperate with the templates of the present invention for the making of bores and/or ablating bones. The figures show the different operating steps, starting from the drilling of a central bore in the bone and subsequently by removing with an ablating operation the bone material following the template shape.

**[0077]** On the other hand, and as shown in FIGS. **15**A and **15**B, the treatment tip may be a supersonic tip according to the embodiment of FIG. **12**, the tip being suitable to cooperate with the templates of the present invention for the sake of making bores and/or ablating bones. The figures show the different operating steps, starting from the ablating of a central bore in the bone and subsequently by removing with an ablating operation the bone material following the template shape, by abutting the tip sides onto the jacket.

**[0078]** FIGS. **16-18** elucidate a set of steps for boring or ablating bone with another embodiment of a sonic or ultrasonic tip having one or more of, for example but not by way of limitation, a cylindrical, non-tapered, or oval shape, and suitable for being used with the jackets/templates according to the present invention. As shown in FIG. **16**, the treatment tip may be a supersonic tip suitable to cooperate with the templates of the present invention for the sake of making bores and/or ablating bones. According to the illustrated version of this embodiment, the tip can comprise a straight cylindrical shape with a working (e.g., abrasive and/or emitting) surface **32** and a non-working surface **30**. The non-working surface can, but need not necessarily be, smooth, due, for instance, to its relatively small diameter as compared to the diameter of the hole **17** of the guiding body **11** of the template **10**. The figures show a number of operating steps, starting from the drilling of a central bore in the bone and continuing to removing with an ablating operation the bone material following the template shape. According to the illustrated version of this embodiment, the tip can comprise a relatively small diameter as compared to the diameter of the hole **17** of the guiding body **11** of the template **10**, whereby, for instance, the tip can (e.g., in an exemplary but not limiting application) penetrate and be advanced into the tissue (e.g., bone) bone without it even touching the guiding body **11**. For instance, according to a few but not all implementations the tip need not snugly fit within the hole, thus providing, for example, a degree of flexibility or maneuverability to the process. In various implementations, however, such as that depicted in FIG. **18**, the inner surface of the guiding body **11** can still (e.g., at the user's option) be used as a guide or template by way of, for example, movement of the tip in a direction transverse (c.f., arrow in FIG. **18**) to the direction of insertion (c.f., arrow in FIG. **17**) so that, for example, contact is made and/or a longitudinal length of the tip rests against the inner surface of the guiding body **11**. For instance, in an implementation comprising, as an example, a working surface **32** having an abrasive characteristic, the tip may be advanced distally through the guiding body **11** until the working surface **32** is no longer within the hole **17** (c.f., FIG. **18**), at which time a user may maneuver the smooth surface **30** into contact (e.g., sliding engagement) with the inner surface of the guiding body **11**.

**[0079]** As shown in FIGS. **19**A-**19**C, there are provided according to the present invention different shapes and/or different depths (e.g., different shoulder heights) of the jackets/templates for the treatment tip. According to the present invention, and as shown in FIGS. **20** and **21**, a supersonic tip suitable to cooperate with the jackets/templates shown in FIGS. **19**A-**19**C of the present invention may realize the making of bores and/or ablating bones by controlling the depth of the former. The figures show different operating steps, starting from a drilling of a central bore in the bone and followed by removing with an ablating operation the bone material following the template shape with a controlled depth by final abutment of the treatment tip onto the jacket/template edge specifically chosen in a depth value.

**[0080]** With reference to FIG. **22**, a scanning/ablating and/or boring implementation **37** may be provided to include, for example, a microscanner **38**, whereby according to a typical but not limiting embodiment a cutting laser **39** can be driven through or under partial or full control of the microscanner **38**. For instance, an electromagnetically controlled mirror **42** can be positioned on the template whereby the scanning/ablating cutting operation is obtained without a fiber laser tool (e.g., fiber optic) needing to be inserted into the tissue.

**[0081]** As shown in FIG. **23**, according to the present invention each of the templates **45** may be held via a holding tool **47** which incorporates a handpiece **49** having a projecting part where a joint connection **52** is provided and where a holding rod **54** is connected thereto. The holding rod **54** foresees facilitates) connecting projections for the secure connection of one or more predetermined templates at the distal end thereof.

**[0082]** The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

**[0083]** In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

**[0084]** Although the disclosure herein refers to certain illustrated embodiments, it is to be understood that these embodiments have been presented by way of example rather than limitation. Corresponding or related structure and methods specifically contemplated, disclosed and claimed herein as part of this invention, to the extent not mutually inconsis-

tent as will be apparent from the context, this specification, and the knowledge of one skilled in the art, including, modifications thereto, which may be, in whole or in part, (i) operable and/or constructed with, (ii) modified by one skilled in the art to be operable and/or constructed with, and/or (iii) implemented/made/used with or in combination with, any parts of the present invention according to this disclosure, include: (I) any one or more parts of the above disclosed or referenced structure and methods and/or (II) subject matter of any one or more of the following claims and parts thereof, in any permutation and/or combination. The intent accompanying this disclosure is to have such embodiments construed in conjunction with the knowledge of one skilled in the art to cover all modifications, variations, combinations, permutations, omissions, substitutions, alternatives, and equivalents of the embodiments, to the extent not mutually exclusive, as may fall within the spirit and scope of the invention as limited only by the appended claims.

What is claimed is:

**1**. A medical implement receiving energy from an instrument in order to effectuate a treatment application onto a region of a body, the medical implement comprising:

a longitudinal structure having a proximal portion and a distal portion and being arranged for coupling to the instrument at the proximal portion;

a treatment tip which is disposed at the distal portion and which is configured to emit treatment energy for effectuating the treatment application, the treatment tip comprising a tapered working surface able to emit the treatment energy onto the region in order to effectuate the treatment application;

a smooth surface adapted to facilitate a slidable fit of the medical implement within a template; and

a stop area adapted to facilitate limiting to a predetermined depth the treatment application.

**2**. The medical implement as set forth in claim **1**, the treatment tip being configured to emit one or more of electromagnetic energy, abrasive particles propelled by compressed fluid, and acoustic energy in the form of sonic, supersonic or ultrasonic emissions.

**3**. The medical implement as set forth in claim **1**, wherein the treatment tip comprises a maximum cross-sectional dimension which is less than a maximum cross-sectional dimension of the stop area.

**4**. The medical implement as set forth in claim **1**, wherein the stop area is formed on the treatment tip in a vicinity of the smooth surface and the treatment tip comprises one or more of a conical, oval or tapered sonic or ultrasonic tip.

**5**. The medical implement as set forth in claim **1**, wherein the treatment application comprises dosing, disrupting, ablating, boring, incising or cutting hard tissue with one or more of sonic, supersonic and ultrasonic energy.

**6**. The medical implement as set forth in claim **1**, wherein one or more of the longitudinal structure and the treatment tip comprises a waveguide for delivering treatment energy suitable for boring or ablating bone.

**7**. The medical implement as set forth in claim **1**, wherein the stop area is adapted to abut with the template in order to facilitate limiting of the treatment application to a predetermined depth within the region.

**8**. The medical implement as set forth in claim **1**, wherein the template comprises a jacket and a guiding body.

**9**. The medical implement as set forth in claim **8**, wherein:

the instrument is a handpiece; and

the stop area abuts with the jacket.

**10**. The medical implement as set forth in claim **8**, wherein the jacket has a through hole that is formed by an internal surface shaped complementarily to a lateral surface of the guiding body.

**11**. The medical implement as set forth in claim **10**, the jacket comprising a first end surface and a mutually opposite second end surface surrounding a tissue contact end, whereby the jacket forms a reference for the guiding body.

**12**. The medical implement as set forth in claim **11**, the first and second end surfaces being arranged at a preset distance separated by the lateral surface and being formed with a preset shape providing a contour to guide and be followed by the treatment tip, with one of the end surfaces being arranged so as to rest on the region where the treatment application is to be performed.

**13**. The medical implement as set forth in claim **1**, wherein the treatment energy is emitted via control by one or more of a circuit, a microprocessor, a microscanner comprising an electromagnetically controlled mirror positioned above and coupled to the template, and a surface-profile imager configured to provide a computer generated model of a surface to be scanned via a beam that enables collecting profile information of the region.

**14**. An assembly suitable for performing a treatment application on a region of a body, the assembly comprising:

a template adapted to be coupled to rest on the region; and

a medical implement operable to receive energy from an instrument and to effectuate the treatment application, the medical implement including a longitudinal structure having a proximal portion arranged for coupling to the instrument and an opposing distal portion having a treatment tip configured to emit treatment energy for performance of the treatment application, and further including (a) a working surface able to emit the treatment energy onto the region for performance of the treatment application, (b) a surface able to facilitate a slidable fit of the medical implement within the template, and (c) a stop area adapted to facilitate limiting of the treatment application to a predetermined depth within the body.

**15**. The assembly as set forth in claim **14**, wherein the working surface is tapered.

**16**. The assembly as set forth in claim **14**, further comprising a microscanner able to scan emissions from the treatment tip with a power, timing, amount and distribution of the emissions being variable in accordance with one or more of different areas and desired treatment applications to be performed.

**17**. The assembly as set forth in claim **14**, the template comprising a hole with a cross-sectional shape of one or more of triangular, elliptical, oval, figure-of-eight (two-lobe), square, rectangular and semicircular, and further with corners that are radiused.

**18**. A tool for holding the template of claim **14**, comprising an elongate handpiece with a first end and a second end opposing the first end, a longitudinal projection having a diameter smaller than a diameter of the handpiece and having a proximal vicinity coupled to the second end, a joint connection disposed at a distal vicinity of the longitudinal projection, and a holding rod connected to the joint connection, the holding rod comprising connecting projections for securely connecting with one or more templates at the distal vicinity.

**19**. A microscanner system for performing a treatment application on a region of a body, comprising:

a template arranged for coupling onto the region where the treatment application is to be performed;

a longitudinal structure having a proximal portion coupled to an instrument and a distal portion coupled to the template, the longitudinal structure being adapted to receive treatment energy from the instrument and to emit the treatment energy toward the region to cause performance of the treatment application;

an electromagnetically controllable mirror positioned between the proximal and distal portions of the longitudinal structure; and

a circuit coupled and configured to control the mirror, whereby the treatment energy is dynamically scanned via movement of the mirror to advance the treatment energy over the region.

**20**. The microscanner system as set forth in claim **19**, wherein the mirror is positioned above and coupled to the template and the treatment energy is emitted via control by a microprocessor, the microscanner being enabled to scan and ablate or cut the region without insertion of a fiber optic into the body.

**21**. The microscanner system as set forth in claim **19**, in which the treatment application comprises lasing of the region with the circuit comprising a microprocessor configured to control the microscanner to scan laser energy over the region whereby the microscarmer is operated via direction of the microprocessor to scan the treatment energy over the body to accomplish boring or ablating of the region.

**22**. The microscanner system as set forth in claim **19**, further comprising a surface-profile imager configured to provide a computer generated model of a surface to be scanned, the imager being adapted to project and collect a beam and to collect profile information of the region.

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