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(54) **SURGICAL SPECIMEN MARKING MECHANISM**

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A61B 90/00 (2016.01)

(52) **U.S. Cl.**
CPC ***A61B 90/39*** (2016.02); *A61B 2090/3937* (2016.02); *A61B 2090/3987* (2016.02); *A61B 2090/3991* (2016.02)

(58) **Field of Classification Search**
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See application file for complete search history.

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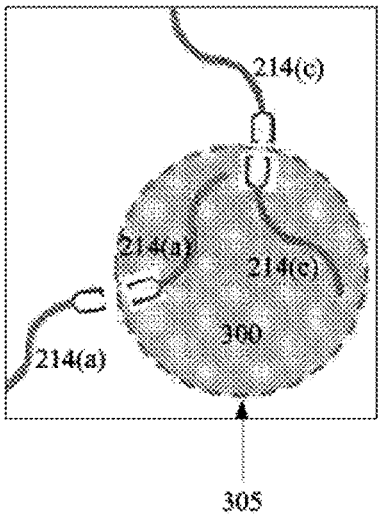
(57) **ABSTRACT**

According to one embodiment, an apparatus is disclosed. The apparatus includes an endoscopic clip placement tool and one or more marking clips attached to a specimen mass by the clip placement tool to mark a margin and orientation of the specimen mass.

12 Claims, 3 Drawing Sheets



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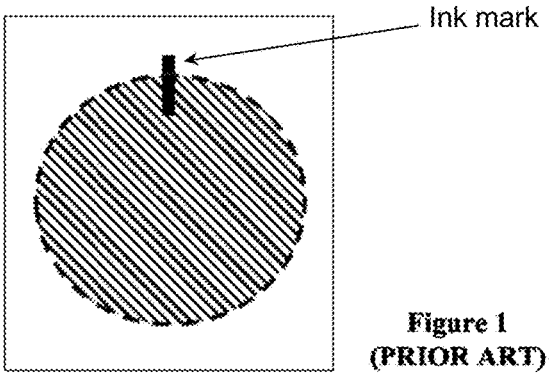

Figure 1
(PRIOR ART)

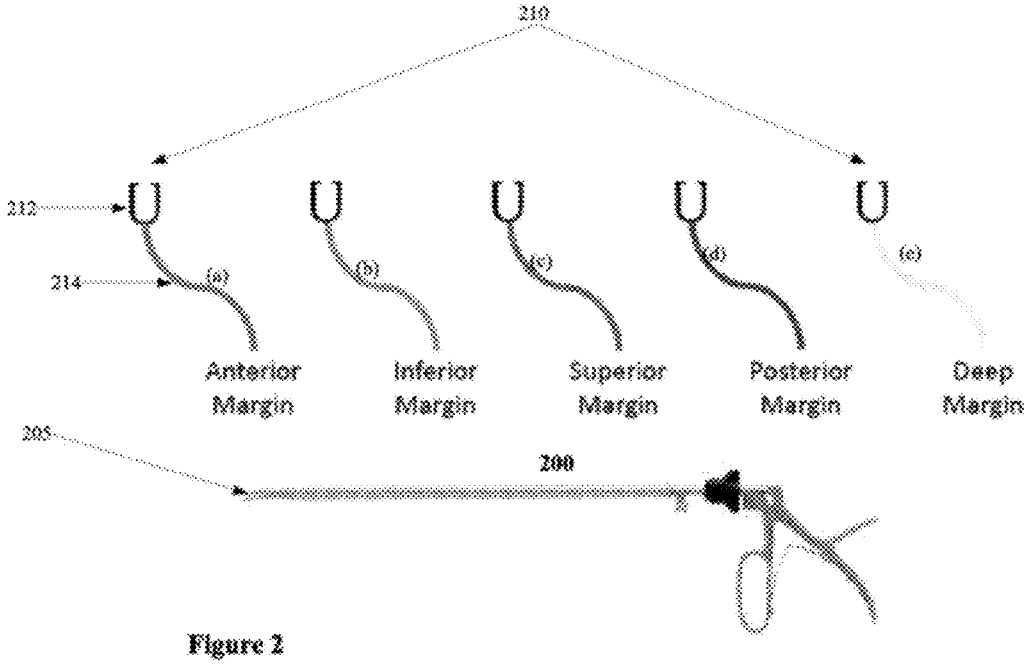

Figure 2

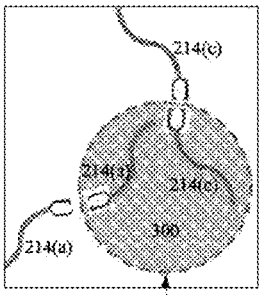

Figure 3A

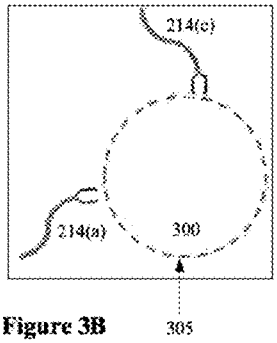

Figure 3B

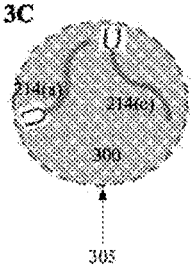

Figure 3C

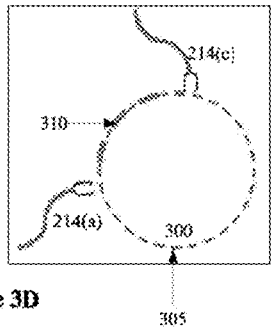

Figure 3D

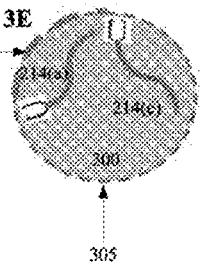

Figure 3E

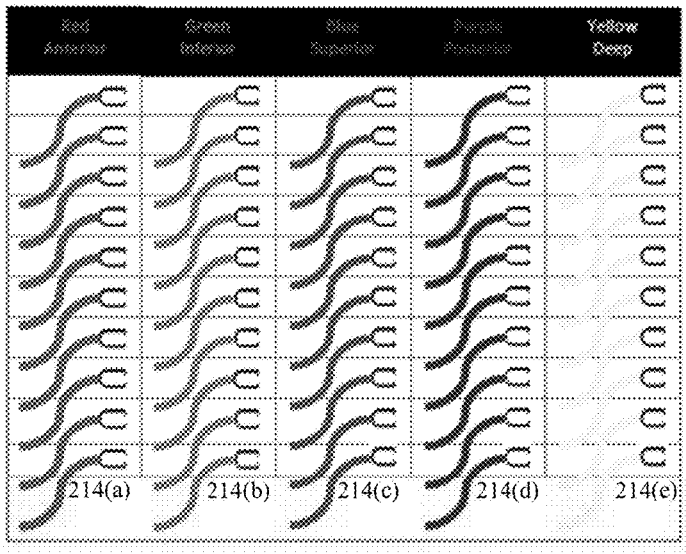

Figure 4

SURGICAL SPECIMEN MARKING MECHANISM

This is a non-provisional application based on provisional application Ser. No. 62/162,035 filed on May 15, 2015 and claims priority thereof.

FIELD OF THE INVENTION

The present invention relates to medical devices, more particularly, surgical specimen margin orientation marking.

BACKGROUND

Surgical specimen margin orientation marking for endoscopic, robotic, laparoscopic, or other surgery types where body tissue is removed, is critical for pathological diagnosis, tumor excision and other margin marking. One example of surgical specimen margin orientation marking may be featured in an endoscopic excision of a tumor. In such an example, the tumor is removed and forwarded to a pathologist for evaluation by frozen or permanent section. The pathologist subsequently performs an analysis to identify malignancy at one or more margins. A surgeon may then direct additional tissue to be excised, the orientation of which is critical for proper and accurate excision.

The current technique for surgical specimen margin orientation marking involves ink marking after a specimen has been removed from a body. FIG. **1** illustrates one embodiment of a conventional marking technique in which a specimen mass is marked with a dotted line to differentiate from surrounding tissues identifies an excised mass. In such a technique an ink mark may be placed at "12:00 o'clock" position on the mass.

However, this approach is inaccurate and subject to error if the orientation of the specimen is changed (e.g., dropped, manipulated, etc.). For example, it may be difficult to find the ink marks and compare to those on the removed mass. Further, the surgeon, staff, or pathologist examining the mass may mistakenly manipulate the removed mass, or there may be miscommunication between surgeons and pathologists related to orientation. An alternative approach that may be implemented includes placement of a reference suture in the specimen at the 12:00 O'clock position. However, this approach is equally subject to error.

Accordingly, an improved surgical specimen margin orientation marking mechanism is desired.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood more fully from the detailed description given below and from the accompanying drawings of various embodiments of the invention. The drawings, however, should not be taken to limit the invention to the specific embodiments, but are for explanation and understanding only.

FIG. **1** illustrates a conventional surgical specimen margin orientation marking system;

FIG. **2** illustrates one embodiment of a surgical specimen margin orientation marking mechanism;

FIGS. **3**A-**3**E illustrate embodiments of a mass identified by marking clips; and

FIG. **4** illustrates one embodiment of a package of marking clips.

DETAILED DESCRIPTION

A surgical specimen margin orientation marking mechanism is described. Reference in the specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment.

In the following description, numerous details are set forth. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring the present invention.

FIG. **2** illustrates one embodiment of a surgical specimen margin orientation marking mechanism **200**. Mechanism **200** includes an endoscopic clip placement tool **205** and marking clips **210**. In one embodiment, each marking clip **210** includes a clip **212** and a color-coded suture **214** attached at a closed end of clip **212**. In such an embodiment, clips **212** are titanium ligature clips, while the sutures are comprised of silk. However other embodiments may feature clips and sutures made of different materials, and having different shapes and weights.

According to one embodiment, the color-coded sutures **214**(*a*)-**214**(*e*) are implemented to indicated a location. In such an embodiment, **214**(*a*) includes a red suture indicating an anterior location. Similarly, **214**(*b*), **214**(*c*), **214**(*d*) and **214**(*e*) include green, blue, purple and yellow sutures, respectively, that represent inferior, superior, posterior and deep locations, respectively. However, other embodiments may feature various other color-coding schemes.

In one embodiment, a surgeon will place two marking clips **210** for specimen marking. In such an embodiment, one marking clip **210** is placed on a mass, while the second marking clip **210** is placed in the surrounding tissue. Subsequently, a cut is made in between the two. The result is a mirror image marking of the two pieces.

Color coded sutures **214** are attached to the clips having colors designating the anterior, inferior, superior, posterior, and deep margins, as discussed above. FIGS. **3**A-**3**E illustrate embodiments of a mass identified by marking clips **210**. As shown in FIG. **3**A, a mass **300** to be excised is identified by dotted line **305** to differentiate from surrounding tissues.

Color-coded sutures **214** devices are placed on the margins to identify orientation. For instance, clips **210** are shown having pairs of sutures **214**(*a*) and **214**(*c*). Note that only two types of suture **214** clips have been shown for ease of viewing. FIG. **3**B shows clips **210** having sutures **214**(*a*) and **214**(*b*) attached to tissue above mass **300** for orientation following excision of mass **300**, while FIG. **3**C shows clips **210** having sutures **214**(*a*) and **214**(*b*) attached to mass **300** for orientation following excision.

According to one embodiment, marking mechanism **200** enables accurate communication between a pathologist and a surgeon, assuming a positive or close margin determined by the pathologist. FIG. **3**D shows additional tissue **310** requiring excision that can be more accurately addressed, and FIG. **3**E shows a positive or close margin identified by the pathologist.

In a further embodiment, the surgeon may implement the clip **210**/suture **214** combination as an effective tool for manipulating tissues, which is more efficient than attaching a handle to an otherwise slippery surface. FIG. **4** illustrates one embodiment of a package of marking clips. As shown in FIG. **4**, a package may include 25-pair/50-unit cassette of clips **210** having the various sutures **214** for endoscopic procedures.

Whereas many alterations and modifications of the present invention will no doubt become apparent to a person of ordinary skill in the art after having read the foregoing description, it is to be understood that any particular embodiment shown and described by way of illustration is in no way intended to be considered limiting. Therefore, references to details of various embodiments are not intended to limit the scope of the claims, which in themselves recite only those features regarded as the invention.

What is claimed is:

1. An apparatus comprising:

an endoscopic clip placement tool;

a first marking clip adapted to be attached with the clip placement tool to a first area associated with a specimen mass, the specimen mass having an outer margin that defines the shape of the specimen mass;

a second marking clip adapted to be attached to a second area associated with tissue surrounding the specimen mass and outside the margin; and

wherein the first area and the second area are located on direct opposite sides of the margin, such that the first marking clip and the second marking clip identify the orientation of the specimen mass relative to the tissue surrounding the specimen mass.

2. The apparatus of claim **1**, wherein the first marking clip and the second marking clip comprise:

a closed end; and

a suture attached to the closed end.

3. The apparatus of claim **2**, wherein a suture color of the first marking clip and a suture color of the second marking clip are identical.

4. The apparatus of claim **3**, further comprising:

a third marking clip adapted to be attached to a third area associated with the specimen mass;

a fourth marking clip adapted to be attached to a fourth area associated with the surrounding tissue;

wherein the third marking clip and the fourth marking clip comprise:

a closed end; and

a suture attached to the closed end;

wherein the suture color of the first marking clip and the suture color of the second marking clip is a first color;

wherein a suture color of the third marking clip and a suture color of the fourth marking clip is a second color that is different from the first color; and

wherein the first marking clip and the second marking clip identify a first position of the margin and the third marking clip and the fourth marking clip identify a second position of the margin.

5. The apparatus of claim **4**, wherein the first position is associated with an anterior area of the margin, an inferior area of the margin, a superior area of the margin, a posterior area of the margin, or a deep area of the margin; and

wherein the second position is associates with an anterior area of the margin, an inferior area of the margin, a superior area of the margin, a posterior area of the margin, or a deep area of the margin, but which is different from the area of the margin associated with the first portion.

6. The apparatus of claim **1**, wherein the first marking clip is configured to manipulate the mass specimen.

7. The apparatus of claim **1**, wherein the first marking clip and the second marking clip are not interconnected.

8. A marking system comprising:

a first marking clip adapted to be attached to a first location of a specimen mass, the outer boundary of which is defined by an outer margin;

a second marking clip that is distinct from the first marking clip that is adapted to attach to a second location associated with tissue surrounding the specimen mass, and

wherein the first location and the second location are located on direct opposite sides of the margin, which orients the specimen mass relative to the surrounding tissue.

9. The marking system of claim **8**, wherein the first marking clip and second marking clip comprise a closed end with an identifier extending therefrom.

10. The marking system of claim **9**, wherein the identifier has a color that corresponds to a location of the first marking clip along the margin, and wherein the color is different if the location is associated with an anterior area of the margin, an inferior area of the margin, a superior area of the margin, a posterior area of the margin, or a deep area of the margin.

11. The marking system of claim **10**, wherein the color associated with the anterior area is red, the color associated with the inferior area is green, the color associated with the superior area is blue, and the color associated with the posterior location is purple.

12. The marking system of claim **8**, wherein the first marking clip is configured to manipulate the mass specimen.

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