

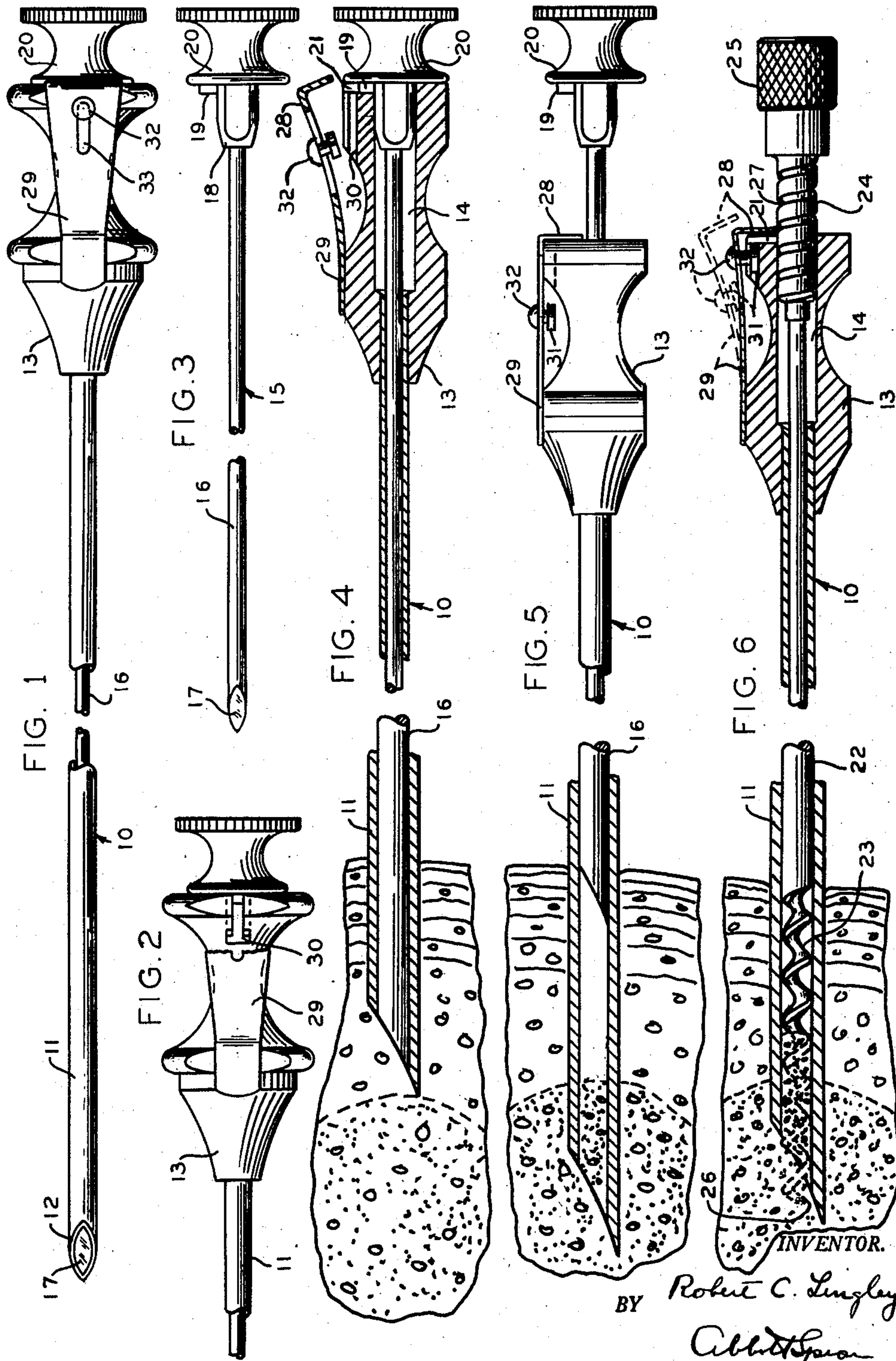
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BIOPSY DEVICE

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BIOPSY DEVICE

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The present invention relates to biopsy instruments and to the parts thereof.

For a biopsy, it is necessary to secure enough tissue from the suspected area to meet the requirements of the examination. Where that area is located at a depth, it is often difficult to secure tissue from it, at least in adequate supply, and the principal objective of this invention is to furnish an instrument enabling tissue, whether hard or soft, to be effectively sampled even at substantial depths.

This generally stated objective is attained, in accordance with the invention, with a biopsy instrument comprising a needle consisting of a cannula having one end adapted for entry into the tissue and a hub attached to its other end. A member is slidable and rotatable in the needle and has a tissue cutting portion at one end in the form of a helix and a portion at its other end which has a screw feed part detachably engageable with a complementary part on the needle hub.

With such a device, when the needle is advanced into tissue in the suspected area independently of its member, it receives and partially severs a mass of tissue. With the screw feed parts engaged, the member is then rotated to advance positively its helical cutting portion into the contained mass to the desired extent to cut it into a spirally disposed specimen of such small cross sectional dimensions that rupture proximate the extremity of the helical cutting portion is ensured when the needle and member are withdrawn as a unit. It is thus assured that the retained specimen will furnish an adequate supply of tissue for biopsy purposes.

In the accompanying drawings, there is shown an illustrative embodiment of the invention from which these and other of its objectives, novel features, and advantages will be readily appreciated.

In the drawings:

Fig. 1 is a view of a biopsy instrument, showing, in plan view, the screw feed part with which the needle is provided and with an obturator in place,

Fig. 2 is a fragmentary view thereof with said part partly broken away,

Fig. 3 is a view of the obturator,

Fig. 4 is a longitudinal section of the needle inserted in tissue with the obturator blocking the cannula bore,

Fig. 5 is a similar view with the needle advanced relative to the obturator to receive within it tissue from a suspected area, and

Fig. 6 illustrates the advance of a helical cutting member in accordance with the invention into the contained mass of tissue.

At 10, there is generally indicated a needle, shown as having its cannula 11 beveled at one end as at 12 to provide a tissue piercing point and having at its other end a hub 13 provided with a bore 14 with which the bore of the cannula 11 is in axial communication.

A generally indicated obturator 15, see Fig. 3, has its stem 16 dimensioned to be a close fit in the cannula 11 but to be slidable and rotatable with respect thereto.

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The obturator is conventional and is of sufficient length so that its beveled end 17 will lie flush with the cannula point 12 when its hub 18 is entrant of the hub bore 14 and the rib 19 on its finger grip 20 is within the seat 21 in the free end of the hub 13.

The needle 10 and obturator 15, as thus far described, are conventional, and where tissue at a depth is to be sampled, they are inserted as a unit into the tissue with the obturator preventing the needle from receiving other tissue within it. The needle 10 is then advanced into the suspected area to receive within it a plug or mass of tissue that must be severed. Usually before such advance, a tissue retaining member, generally indicated at 22, is inserted into the needle 10 in substitution of the obturator 15.

In order that such received tissue will remain in the needle 10 as it is withdrawn, the tissue retaining member 22 is shown as having a helical portion 23 at one end and a portion 24 at its other end dimensioned to enter the hub bore 14 and including a finger grip 25. The helical cutting portion 23 is shown as a spiral dimensioned to be a close fit in the needle 10 and as having its free extremity in the form of a transversely disposed cutting edge 26.

As illustrative of complementary screw feed parts by which the tissue retaining member 22 may be positively advanced to a determined extent, the portion 24 of the tissue retaining member 22 is shown as having threads 27 and these may be engaged by the part 28 with which the resilient arm 29, attached to the hub 13, is provided and which normally holds said screw feed parts disengaged. When, however, the arm 29 is manually depressed to effect the engagement of the parts, the tissue retaining member 22 may be rotated to positively advance its cutting portion 23 relative to the needle 10 into the mass of contained tissue to cut that mass into a spirally disposed specimen of cross sectional dimension that will rupture readily adjacent the extremity of the helical cutting portion when the device is withdrawn. In practice, the pitch of the threads 27 is the same as that of the helical cutting portion 23.

In order that the parts may be detachably locked together, the hub 13 is shown as having a longitudinally disposed T-shaped channel 30 adapted to receive the head 31 of a slide 32 carried by the arm 29 in a slot 33.

From the foregoing, it will be apparent that biopsy devices, in accordance with the invention, are well adapted to meet the important requirements of ensuring the positive removal of a specimen tissue, either hard or soft, from suspected internal areas, that will prove adequate for examination purposes.

What I therefore claim and desire to secure by Letters Patent is:

1. A biopsy device comprising a needle including a hub and cannula having one end pointed for entry into tissue and the other end attached to said hub, and a member slidable and rotatable in said cannula and hub and including a helical cutting portion at one end and a second portion at the other end, said hub and said second portion including complementary, disengageable, screw feed parts, said needle and said member being movable relative to one another so that either may be first advanced into tissue and the other then advanced with respect thereto, said screw feed parts, when engaged, ensuring that on rotation of said member, its advance is positive, the combined action of the advancement of said needle and member being that of effecting the cutting of a mass of tissue into a spiral specimen whose cross sectional dimension ensures rupture of the retained specimen proximate to the extremity of the helical cutting portion when said device is withdrawn.

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2. A biopsy device comprising a needle including a hub and cannula having one end pointed for entry into tissue and the other end attached to said hub, and a member slidable and rotatable in said cannula and hub and including a helical cutting portion at one end and a second portion at the other end, said hub and said second portion including complemental, disengageable, screw feed parts, said needle, when advanced into tissue independently of said needle and said member being movable relative to one another so that either may be first advanced into tissue and the other then advanced with respect thereto, said screw feed parts, when engaged, ensuring that on rotation of said member, its advance is positive, the combined action of the advancement of said needle and member being that of effecting the cutting of a mass of tissue into a spiral specimen whose cross sectional dimension ensures rupture of the retained specimen proximate to the extremity of the helical cutting portion when said device is withdrawn, the pitch of the helical cutting portion being the same as that established by said screw feed parts.

3. A biopsy device comprising a needle including a hub and a cannula having one end pointed for entry into tissue and the other end attached to said hub and a member slidable and rotatable in said cannula and hub and including a helical cutting portion at one end and a second portion at the other end, said hub and said second portion including complemental screw feed parts, the screw feed part carried by said hub including a resilient supporting arm normally holding it from an operative position with respect to the screw feed part of the member, said needle and said member being movable relative to one another so that either may be first advanced into tissue and the other then advanced with respect thereto, said screw feed parts, when engaged, ensuring that on rotation of said member, its advance is positive, the combined action of the advancement of said needle and member being that of effecting the cutting of a mass of tissue into a spirally disposed specimen whose cross sectional dimensions ensure rupture of the retained specimen proximate to the extremity of the helical cutting portion when said device is withdrawn.

4. A biopsy device comprising a needle including a hub and a cannula having one end pointed for entry into tissue and the other end attached to said hub and a member slidable and rotatable in said cannula and hub and including a helical cutting portion at one end and a second portion at the other end, said hub and said second portion including complemental screw feed parts, the screw feed part carried by said hub including a resilient supporting arm normally holding it from an operative position with respect to the screw feed part of the member and means on said hub engageable with said arm to lock said hub part in said operative position, said needle and said member being movable relative to one another so that either may be first advanced into tissue and the other then advanced with respect thereto, said screw feed parts, when engaged, ensuring that on rotation of said member, its advance is positive, the combined action of the advancement of said needle and member being that of effecting the cutting of a mass of tissue into a spirally disposed specimen whose cross sectional dimensions ensure rupture of the retained specimen proximate the end of the retained helical cutting portion when said device is withdrawn.

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5. A biopsy device comprising a needle including a hub and a cannula having one end pointed for entry into tissue and the other end attached to said hub and a member slidable and rotatable in said cannula and hub and including a helical cutting portion at one end and a threaded portion at the other end, a thread engaging part carried by said hub for movement into and out of engagement with the said threaded portion to establish a connection, said needle and said member being movable relative to one another so that either may be first advanced into tissue and the other then advanced with respect thereto, said screw feed parts, when engaged, ensuring that on rotation of said member, its advance is positive, the combined action of the advancement of said needle and member being that of effecting the cutting of a mass of tissue into a spirally disposed specimen whose cross sectional dimensions ensure rupture of the retained specimen proximate the end of the cutting portion when said device is withdrawn.

6. A biopsy needle for use with a tissue severing member provided at one end with one part of a screw feed, said needle comprising a cannula having one end for entry into tissue and a hub on the other end of said cannula, said hub and said cannula slidably and rotatably receiving said member, and a complemental screw feed part carried by said hub for engagement with the member part thereof.

7. A biopsy needle for use with a tissue severing member provided at one end with a threaded portion, said needle comprising a cannula having one end for entry into tissue, and a hub on the other end of said cannula, said hub and said cannula slidably and rotatably receiving said member, a resilient arm on said hub, and a part carried by said arm for engagement with said threaded portion.

8. A biopsy needle for use with a tissue severing member provided at one end with a threaded portion, said needle comprising a cannula having one end for entry into tissue and a hub on the other end of said cannula, said hub and said cannula slidably and rotatably receiving said member, a resilient arm on said hub, and a part carried by said arm for engagement with said threaded portion and means for detachably locking said arm in engagement.

9. A tissue severing member to be slidably and rotatably received within a biopsy needle whose hub has a screw feed part, said member including at one end a helical tissue entering portion and at the other end a complemental screw feed part.

10. A tissue severing member to be slidably and rotatably received within a biopsy needle whose hub has a screw feed part, said member including at one end a helical tissue entering portion and at the other end a threaded part.

11. A tissue severing member to be slidably and rotatably received within a biopsy needle whose hub has a screw feed part, said member including at one end a helix whose free end has a transverse cutting edge and the other end has a complemental screw feed part.

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