Aug. 11, 1959 H. W. SEIGER 2,898,906

BIOPSY INSTRUMENT

Filed March 21, 1957

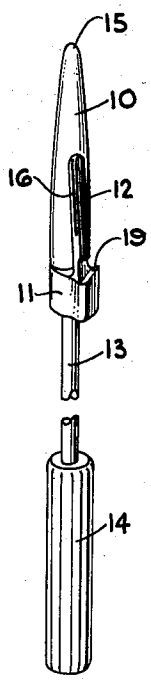

FIG. 1

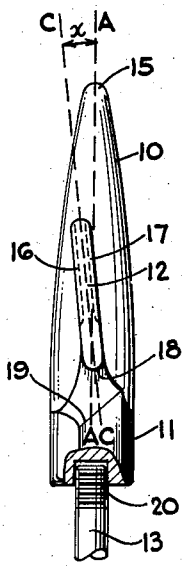

FIG. 2

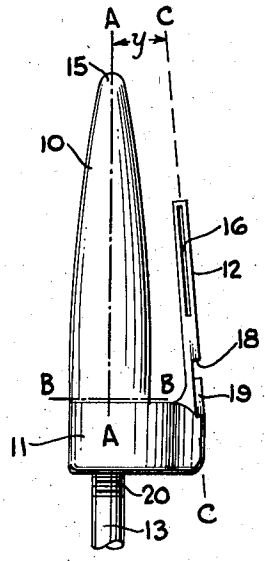

FIG. 3

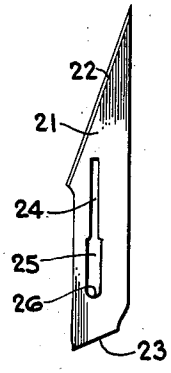

FIG. 4

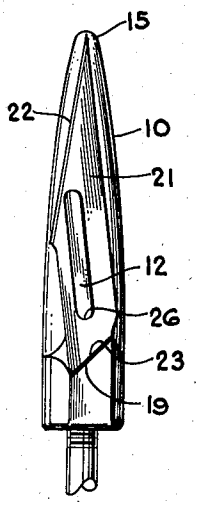

FIG. 5

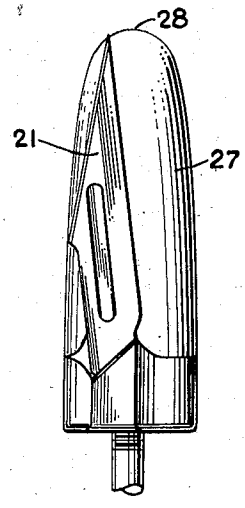

FIG. 6

INVENTOR.
HARRY WRIGHT SEIGER
BY *Elliott & Pastoriza*
ATTORNEYS

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BIOPSY INSTRUMENT

Harry Wright Seiger, Santa Monica, Calif.

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3 Claims. (Cl. 128—2)

This invention relates to surgical instruments and more particularly to an improved instrument for cold conization of the cervix.

Conization of the uterine cervix has heretofore been accomplished by fusiform or triangular type electrodes in which an electrically energized hot wire is employed for cutting and removing portions of the infected area. While this procedure also provides a section of tissue for biopsy, such tissue is usually so coagulated as a result of the burning process that proper pathological evaluation is seldom obtainable. Other instruments used for this purpose require dilation beforehand which usually macerates and tears the mucosa and deeper tissues. Consequently, any microscopic pictures taken of such tissues are distorted. Further, such instruments may macerate a possible malignancy, which, if present, will cause the malignancy or cancer to spread. Also, after dilation the muscular coat lacks tonicity for some time which tends to greater subsequent bleeding.

In my co-pending application, Serial Number 596,516 filed July 9, 1956, now Patent Number 2,827,039, and entitled Surgical Instrument, there is disclosed a novel combination of guiding head and cutting blade holder enabling a neat incision to be effected about the cervical os providing a tubular shaped tissue section that is not coagulated or macerated and of such character that proper pathological evaluation of the tissue may be made. The present invention is a continuation-in-part of this above mentioned co-pending application and constitutes a similar instrument having improved features for accomplishing a cold conization of the cervix.

Accordingly, it is a primary object of the present invention to provide an improved surgical instrument for conization of the uterine cervix which overcomes the problems of coagulation and dilation characteristic of the electrode and other type instruments employed heretofore.

More particularly, it is an object to provide an instrument of the above type employing a sharp disposable blade which may be readily removed and replaced and which is commonly available in hospital surgeries.

Still another object is to provide a surgical instrument which will enable the removal of a sufficiently thick section of tissue to determine a carcinoma in-situ, or to determine whether the lesion is invasive.

Another important object is to provide an improved surgical instrument for conization of the uterine cervix having a uniquely designed guiding head co-operating with the cutting edge of a blade in such a manner that the thickness of a section of cervical tissue to be removed is under the control of the surgeon and in which the guiding head itself is provided in at least three distinct sizes, any one of which may be used with the same type blade.

These and many other objects and advantages of the present invention are attained, briefly, by providing a guiding head portion in the shape of a narrow elongated semi-ellipsoid merging into a base portion at one end and terminating in a smoothly rounded apex at its other end. Secured to the base portion is a blade holder adapted to

receive a small cutting blade which is commonly available in hospital surgeries and secure the same in a desired spaced relationship with respect to the major axis of the guiding head. The base portion itself is secured to the end of an elongated shaft, the other end of which terminates in a handle to provide an instrument which may be properly positioned with no dilation. To this end, a given sized guiding head is initially selected in accordance with the size of the cervical os. Preferably, the axis of the cutting blade is inclined slightly with respect to the major axis of the guiding head when viewed in each of two planes at right angles to each other, the direction of inclination being such that the actual cutting operation is performed by axially rotating the instrument in a counterclockwise direction to completely circumscribe the cervical os. The smoothly surfaced contours of the guiding head are such as to guide the cutting action of the blade to enable the desired coning of the cervix to be accomplished.

A better understanding of the invention will be had by referring to the accompanying drawings illustrating a preferred embodiment thereof, and in which:

Figure 1 is a perspective view of the surgical instrument prior to the securement of a cutting blade thereto;

Figure 2 is an enlarged elevational view of the head and blade holding portions of the instrument as seen in one plane;

Figure 3 is another elevational view similar to Figure 2 but showing the head and blade holding portion in a plane at right angles to the plane of Figure 2;

Figure 4 is a view of one type of commonly available cutting blade employed with the instrument of Figures 1 through 3;

Figure 5 is a view similar to Figure 2 illustrating the cutting blade in position on the instrument; and,

Figure 6 is a view similar to Figure 5 illustrating the cutting blade mounted on a larger sized guiding head.

Referring to Figure 1, the surgical instrument is shown as comprising a head **10** having a tapered, conical shape preferably integrally formed with a base **11**. The base **11** also serves to support a blade holder **12** in spaced relationship with respect to the head **10**. An elongated shaft **13** is threadedly secured to the underside of the base **11** and extends axially in alignment with the major axis of the head **10** terminating in its far end in a handle **14**.

In Figures 2 and 3, the details of the head **10** and blade holder **12** are illustrated wherein it will be noted that the head **10** itself is somewhat in the form of a semi-ellipsoid merging into the base portion **11** at its lower end and terminating in a rounded apex **15** at its upper end. While the expresssion semi-ellipsoid substantially defines the shape of the head and will be used hereafter for convenience, it may also be considered as made up of a cylindrical portion adjacent the base merging into a conical portion along the main body and terminating in a hemispherical portion. The important feature is that it be symmetrical with respect to the vertical axis and have no sharp edges, corners, or points. The major axis of this semi-ellipsoid is indicated in Figure 3 at A—A and the minor axis, at B—B. The semi-ellipsoid is defined by a plane passing through the minor axis B—B and normal to the major axis A—A.

The blade holder itself comprises an elongated element provided with grooves **16** and **17** along opposite side edges. The axis C—C of this elongated element is inclined at a slight angle x to the left of the major axis A—A as viewed in the plane of the drawing in Figure 2. This same axis C—C of the elongated element, when viewed in a plane at right angles to that of Figure 2 such as shown in Figure 3, is also inclined towards the axis A—A at a slight angle y. The elongated element itself terminates at its lower end in a rounded undercut portion **18** adapted to co-operate with an inclined ledge portion **19** on the por-

tion of the base 11 from which the blade holding element 12 extends.

With the inclination of the blade holding axis slightly to the left of the major axis A—A of the head 10, the instrument is designed for axial rotation in a counter clockwise direction when viewed from the handle end. It is, therefore, desirable that the threaded connection of the shaft 13 to the base 11 be lefthanded as schematically indicated by the threads 20 such that when the instrument is used and rotated axially in a counter clockwise direction, there will be no possibility of the shaft unthreading from the base.

Referring now to Figure 4, the disposable cutting blade employed with the instrument illustrated in Figures 1 to 3 is shown as comprising a flat body portion 21 having a sharp cutting edge 22 and a bottom inclined base 23. The blade body 21 includes a centrally disposed elongated slot 24 merging into an enlarged portion 25 terminating in a rounded end 26. The width of the slot 24 is dimensioned to equal the width of the blade holding element 12 between the bottom portions of the respective grooves 16 and 17 while the enlarged portion 25 of the slot is dimensioned to correspond to the overall width of the holding element 12. Thus, the blade may be readily inserted onto the blade holder 12 by simply passing the upper portion of the elongated element 12 into the enlarged portion 25 of the slot and sliding down the narrow portion of the slot edges in the respective grooves 16 and 17. The lower end of the enlarged slot 25 as indicated at 26 is adapted to fit under the undercut portion 18 of the element 12 and the inclined base 23 to seat on the inclined ledge 19 of the blade holding structure.

In Figure 5, the blade 21 is illustrated in position on the blade holder 12 and it will be noted that as a result of the slight axial inclination of the blade holder 12 to the left, the cutting edge 22 of the blade forms a desired relationship with respect to the lateral surface of the guiding head 10 for co-operation therewith when the instrument is rotated during a coning operation.

At least three different sized guiding heads, and more if desired, are provided and designed in accordance with the principles of the invention. Figure 6, for example, illustrates a relatively large head 27 which may be used with the same blade 21. The head size selected will ordinarily be determimned by the size of the external os within which the head is to be positioned. In this respect, the tip 15 of the head 10 shown in Figure 5 or the tip 28 of the head 27 shown in Figure 6 should fit the cervical opening fairly snugly.

In using the instrument of the present invention for performing a cold conization of the uterine cervix, the cervix is usually grasped with three single-toothed tenacula, the right side of the anterior lip being held by the surgeon while the left side of the anterior lip and middle of the posterior lip is held by an assistant or nurse. The tip of the head 15 or 29 of the instrument is then inserted into the cervical os and forced deeper into the canal. At this time the cutting blade penetrates the tissue lateral to the cervical os until the cutting edge is fully utilized. Then with short in and out strokes and simultaneous rotation of the handle in a counter clockwise direction the cervical os is completely circumscribed. The thickness of the tissue section to be removed may be controlled by the size of head used and by the degree of lateral pressure with which the guiding head is urged radially against the inside of the os. During this cutting operation, the head 10 serves to guide and support the cutting blade in a desired spaced position with respect to the portion of the os upon which the head rests whereby a tubular tissue cut of desired thickness for subsequent pathological examination may be achieved. After the cutting operation has been completed, the wound is treated in a conventional manner.

The tubular shaped core obtained by means of the improved instrument is also slightly conical in shape as a result of the inclined angle y of the blade. This core is not coagulated or macerated and is of such a character that effective pathological evaluation of the tissues thereof may be made.

It will be evident, referring once again to Figures 2 and 3 that because of the semi-ellipsoidal shape of the head, which is completely symmetrical with respect to the major axis A—A, an absolutely smooth and rounded guiding surface is provided so that no portion of the inner circumferential areas of the cervical os are subject to sharp edges or corners and any maceration of such areas is avoided.

Not only does this preferred semi-ellipsoidal shape of the guiding head result in the above noted advantage, but also dilation is avoided and the extremely smooth guiding surface enables proper manipulation of the blade cutting edge.

Minor modifications of the instrument falling within the scope and spirit of the present invention will occur to those skilled in the art. The present invention is, therefore, not to be thought of as limited strictly to the particular instrument shown and described for illustrative purposes.

What is claimed is:

1. A surgical instrument comprising: a head substantially in the shape of a narrow, elongated semi-ellipsoid defined by dividing an ellipsoid by a plane including the minor axis and normal to the major axis of said ellipsoid; said head merging into a base portion at a point corresponding to the position of said plane; an elongated blade holding element secured to said base portion extending in spaced relationship with respect to said major axis and terminating short of the free end of said head for holding a cutting blade in predetermined relationship to said head, said elongated blade holding element being inclined at an acute angle with respect to said major axis when viewed in a first plane including said major axis and also inclined at an acute angle to said major axis when viewed in a plane at right angles to said first plane, said blade holding element having grooves in opposite sides thereof; and said cutting blade having an elongated central slot the opposite edges of which are respectively receivable in said grooves, whereby the semi-ellipsoidal surface of said head provides a guide and support for said blade during a surgical operation.

2. An instrument according to claim 1, including: a handle; a shaft having one end secured to said handle; thread means on the other end of said shaft, said head having a threaded bore adapted to receive said other end of said shaft to secure the major axis of said head in substantial co-axial alignment with the longitudinal axis of said shaft.

3. An instrument according to claim 2, in which the axis of said elongated blade holding element is inclined to the left of the major axis of said head when viewed in said first plane, and said thread means and threaded bore are left handed whereby cutting operations are effected by rotating said instrument axially in a counter clockwise direction as viewed from said handle.

References Cited in the file of this patent

UNITED STATES PATENTS

2,729,210 Spencer ---------- Jan. 3, 1956