Oct. 10, 1967 E. S. HODGES 3,345,981

CONING TOOL FOR CERVICAL SURGERY

Filed Jan. 29, 1965

Fig. 1.

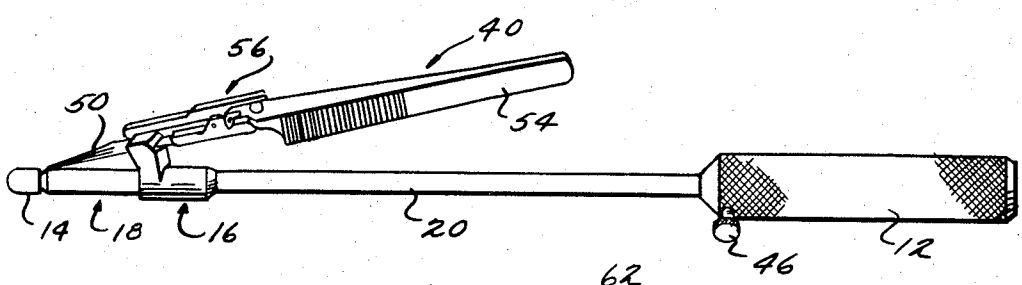


Fig. 2.

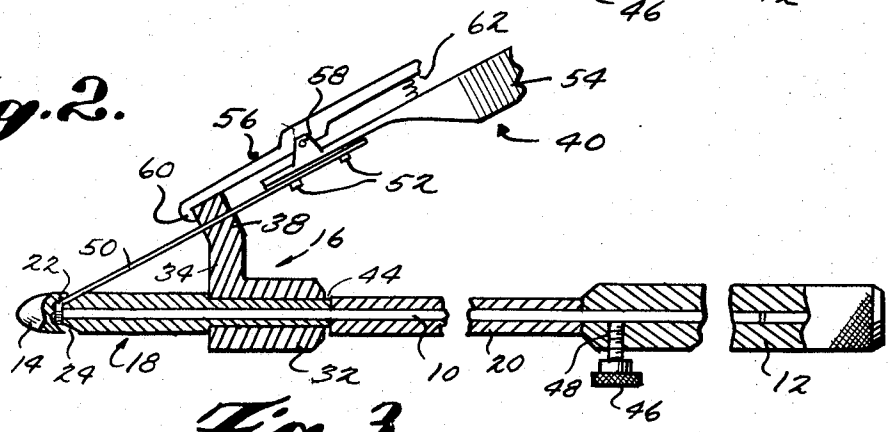


Fig. 3.

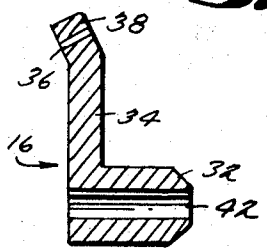


Fig. 4.

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CONING TOOL FOR CERVICAL SURGERY

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ABSTRACT OF THE DISCLOSURE

A medical instrument is provided for use in cold conization of a cervical os, and the instrument includes (1) a main body portion which can be held in one hand and placed into proper position for obtaining a tissue sample, and (2) a blade means carried in a guide means which can be rotated 360° about the longitudinal axis of the instrument so as to permit a removal of a continuous strip of tissue about the inner surface of a cervical os.

This invention relates to a surgical instrument for obtaining a tissue specimen from a body cavity, and more particularly the invention relates to an instrument for cold conization of the cervix.

The instrument of this invention is especially well adapted for removing a circumferential specimen of tissue from the cervical os for the purpose of diagnosis of and ultimate treatment of cancer of the cervix. As is well known in the medical arts, cancer of the cervix may be detected by examining tissue samples of the cervical epithelium, and it has become the accepted practice to take such samples in the physical examination of women of cancer age.

Various surgical instruments have been proposed for performing the cutting operation described above, but these instruments have had certain disadvantages in their limited cutting capabilities and in the difficulty of manipulating them in actual use.

The particular construction of the surgical instrument of this invention provides for the cutting blade to be mounted at a predetermined angle to the longitudinal axis of the instrument, and the instrument with its blade is then adapted for removing a strip of tissue from the internal circumference of a body cavity, such as from the cervical os of the uterus.

The mounting means for the cutting blade includes a blade guide which is rotatably mounted on the instrument and which maintains the blade in a fixed angular relationship to the instrument. At the same time, the blade guide permitts the blade to be rotated about the longitudinal axis of the instrument so that a 360° sampling of the epithelium may be removed from the cervix. With the construction of this invention the instrument may be inserted, and the sample taken, with greater manipulative ease then heretofore possible, and the cutting action of this instrument provides a better tissue sample for pathological evaluation.

It is a further feature of this invention that the blade guide of the instrument is easily interchangeable, whereby a variety of predetermined cutting angles may be provided on the same instrument. Thus, the same instrument may be used for removing greater or lesser amounts of tissue, or the instrument may be adapted to varying sizes and conditions of cervical cavities for obtaining the requisite amount of tissue for the usual diagnosis of cancer.

The blade is maintained in position by the blade guide associated with the instrument of this invention, but the blade is rotated about the longitudinal axis of the instrument by a blade holding means used in conjunction with this instrument. This blade holding means provides for the blade to be easily rotated about the circumference of the cervical os by a single operator while the instrument is being held in position by the same operator. Furthermore, the blade holding means is provided with a gripping device which may be used to grasp the anterior lip of the cervix while tissue is being removed from the cervical os. Prior to this invention, it has been necessary for an assistant to hold the cervix with separate clamping or gripping means while the operator removed tissue with a cutting instrument. With this invention, it is possible for a single operator to hold the cervix and to remove tissue with a single instrument.

The blade which is used in this instrument is replaceable and has a double cutting edge. This permits the cutting action to be effected in either direction of movement of the blade at the choice of the operator. Having a replaceable blade in the instrument allows the instrument to be adapted to varying cutting requirements by substituting different blades with different cutting characteristics. Furthermore, the blade may be easily discarded and replaced when dull, and the instrument may be continued in use.

In addition to advantages in construction and use which will be apparent from the above discussion, the present invention has the advantage of being assembled from a plurality of simple elements. These elements may be easily disassembled for sterilizing the instrument and for interchanging like elements of varying dimensions, so that the instrument may be fitted to a wide range of uses. Other advantages will appear from the accompanying drawings in which:

FIGURE 1 is a plan view of the surgical instrument together with the blade holding device used in conjunction with the instrument;

FIGURE 2 is a longitudinal section of the view shown in FIGURE 1;

FIGURE 3 is a section of an interchangeable blade guide for use with the instrument of FIGURES 1 and 2; and

FIGURE 4 is a perspective view of the instrument with the various elements exploded to more clearly illustrate their form and relationship.

Referring to the drawings, and more particularly to FIGURES 1, 2 and 4, the cold conization instrument has a stem **10** which may be of any suitable length and which includes a tip end and a handle end.

The handle end of the stem **10** may be provided with a removably mounted handle **12** and the tip end of the stem includes a tip **14** which is preferably formed integrally with the stem **10**. Intermediate the handle end and the tip end of the stem is a series of sleeve-like elements which are assembled on the stem **10** in a particular arrangement to be described. These elements include a blade guide **16** and spacer elements **18** and **20**. The instrument is assembled by starting with the elongated stem **10** with its integral tip **14** and by sliding the sleeve-like spacer element **18** onto the stem from the handle end of the stem. Then the blade guide **16** is added, together with the spacer element **20**, and lastly the handle **12** is secured to the end of the stem to hold the elements in their respective positions on the stem.

As discussed above, the tip **14** is preferably formed integrally with the stem **10**, but it may be formed separately and secured to the end of the stem in any suitable manner, as by threading it to the end of the stem. The tip **14** includes a shoulder **22** which is of a larger diameter than the stem **10**, but is smaller in diameter than the tip itself. This shoulder **22** acts as a spacer to maintain a space or a groove **24** between the tip **14** and the spacer element **18**.

The spacer element **18** is shown as having a central bore through its longitudinal axis, and this bore is of such a diameter that the stem may be snugly fitted through

the bore. The spacer element is fitted over and moved along the stem body until it abuts against the shoulder **22** of the tip **14**. The spacer element **18** also includes the tapered portion **25** which permits the blade **50** to be received into the groove **24**. As already described, the groove **24** is formed around the circumference of the tip when the spacer element **18** is abutted against the tip and its shoulder **22**. The blade tip is retained in this groove to maintain the blade in proper cutting position in cooperation with the blade guide **16**.

The spacer element **18** includes an enlarged portion **26** and a reduced diameter portion **28**. The enlarged portion **26** is of any suitable outside diameter and this will be the outside diameter of the main shaft of the instrument when assembled. The reduced diameter portion **28** is of such a diameter that it may receive and support the blade guide **16**. A shoulder **30** is formed on the element **18** where the reduced diameter portion **28** meets the enlarged portion **26**, and the blade guide **16** is abutted against this shoulder in the assembled instrument.

The blade guide **16** includes a sleeve-like base **32** and an elongate body member **34** extending laterally outwardly at right angles to the base, and the elongate body member **34** is secured to the base **32** by any suitable means. The elongate body member carries a slot **36** therethrough which is adapted to hold a cutting blade **50** in a fixed predetermined angular relationship to the longitudinal axis of the stem **10**. As shown in FIGURES 3 and 4, the slot **36** is formed completely through the elongate body member **34** at a terminal end **38** of the body member. The slot **36** is formed at a predetermined angle to the longitudinal axis of the stem **10** so that a cone will be described when the blade is rotatably guided around the axis of the stem. The slot is formed in alignment with the groove **24** in order that the point of the blade carried by the slot may be held in the groove **24** as shown in FIGURES 1 and 2. The depth of the blade guide **16** at the area of the slot is sufficient to permit the slot to hold the blade in a firm position. Thus, there will be no shifting of the blade when the instrument is in use.

The terminal end portion **38** may be coextensive with the longitudinal axis of the elongate body member **34**, but is shown as angling away from the axis of the body member **34**. The particular angular positioning of the terminal end portion **38** serves to cooperate with a preferred blade holder **40** in a manner that will be described in greater detail below.

The sleeve-like base **32** of the blade guide **16** includes a bore **42** through its longitudinal axis, and this bore **42** is of such a diameter as to fit for easy rotation around the portion **28** of the spacer element **18** when the two elements **16** and **18** are assembled. The length of the sleeve-like base **32** is shorter than the length of the portion **28** so that when the blade guide is mounted on the portion **28**, a space **44** is left between the blade guide and adjoining elements. In its assembled position, the blade guide **16** is abutted against the shoulder **30** of the spacer element **18**. In this mounted position, the blade guide **16** may be easily rotated about the longitudinal axis of the stem **10** because of the small space **44** and because of the particular selection of diameters of the bore **42** as related to the portion **28**.

The spacer element **20** is of any suitable length to complete the instrument up to the handle **12**. The spacer element **20** has a central longitudinal bore of the same diameter as that described for the spacer element **18**, and the outside diameter of the spacer **20** may be the same as the largest outside diameter of the spacer **18**. When the spacer element **20** is assembled onto the stem **10**, it will be seen that one end of the spacer element **20** abuts against the end of the portion **28** and thus the space **44** is formed between the spacer element **20** and the blade guide **16** as already mentioned.

Any suitable handle means may be provided for the handle end of the stem **10**. FIGURE 2 shows a preferred

form of handle **12** which is removably mounted on the stem **10** and which functions to hold the entire instrument assembly together. The handle **12** includes a central longitudinal bore of a suitable diameter for receiving the end of the stem **10**. The bore is sufficiently deep to permit the handle to tightly abut the end of spacer element **20**. A thumbscrew **46** is threaded in bore **48** of the handle to hold the handle in any given position on the end of stem **10**. The bore **48** is internally threaded to match external threads on the thumbscrew **46**, and thus the thumbscrew can be turned into the handle until it tightly engages the surface of the stem **10**.

From the above discussion, it can be seen that the assembled instrument provides a blade carrying and guiding device which is simple in construction and easily dismantled for sterilization or interchanging of elements. The entire device may be made of stainless steel or any other suitable material, and specific dimensions may be adjusted to fit varying needs.

It is of particular importance that the blade guide **16** may be easily interchanged in the instrument of this invention because various sizes of blade guides are used to provide varying cutting angles for a blade **50**. It will be seen by comparing the blade guides of FIGURES 2 and 3, that a longer body portion **34** for the blade guide provides a higher location of the slot **36** through the end portion **38**. Thus, in the FIGURE 3 blade guide a more obtuse angle is provided for the blade **50** in its relationship to the tip of the instrument. The longer blade guide is useful to permit a larger cone of tissue to be removed from a body cavity, and the interchangeability of blade guides adapts the instrument to a wider range of uses than heretofore possible. As an example of useful dimensions, the blade guides which may be made in accordance with this invention may vary in height from 1¼ inches to 2 inches, and such blade guides will provide cutting angles varying from 20° to 45° in proportion to the increasing length of blade guide.

The blade **50** is a double edge blade which is pointed at its tip, and it is preferably held by the holder **40** as shown in FIGURES 1 and 2. As seen in FIGURES 1 and 2, the the blade **50** may be in the configuration of a thin, flat blade, and cutting edges may be provided along the lateral edges of the blade in a well-known manner. Furthermore, the blade **50** is replaceable in the holder, and thus varying degrees of sharpness may be provided by interchanging blades in the holder.

The holder **40** is constructed to carry the blade in any conventional manner, such as by the fasteners **52** which fit through openings in the blade itself. The holder includes a handle **54**, and as shown in FIGURE 2, an extension of the handle portion includes the blade carrying means **52**. In addition, the blade holder includes lever means **56** pivotally mounted on the handle by a pin **58** which acts as a fulcrum for the lever. The lever means **56** includes a sharpened end point **60** which cooperates with the blade guide **16** and blade **50** to grip a portion of the cervix while tissue is being cut from the cervical os. The end of the lever means **56** which is opposite the gripping end **60** is attached to the holder handle **54** by a spring **62** or by any other suitable means. In this manner the lever means **56** includes a griping means **60** which may be actuated by lightly depressing the handle **54** of the holder. When the handle **54** is depressed the fulcrum point **58** is forced upwardly slightly and the spring **62** pulls the spring end of the gripping means down with the handle **54**. This action causes the gripping point **60** to raise upwardly away from the blade **50** and an opening or gap is thereby made between the point **60** and the blade. When the handle **54** of the holder is released, the gripping point **60** returns to a gripping position against the blade guide **16** and the opening between the point **60** and the blade becomes smaller. Thus, it is possible to grip tissue within the described opening with the point **60** and this is done to hold the cervix in a firm position while tissue is being

cut. The particular angle of the blade guide end portion **38** as related to the remainder of the elongate body portion of the blade guide **34** serves to cooperate with the gripping point **60**. The end portion **38** provides a flat head which is parallel to the main axis of the gripping means **56**, and the gripping point **60** is provided with a flat face which abuts against the point for better gripping action.

Having described the various elements and assembly of the surgical instrument of this invention, the use of the instrument will now be discussed. After selecting the proper size of blade guide, the instrument is assembled as described above. Then the blade is attached to the blade holder, and the blade is passed through the slot **36** of the blade guide **16** as shown in FIGURE 2. The tip of the blade is placed in the groove **24** at the tip of the instrument and is retained in the groove during the use of the instrument. It will be seen that the size of blade guide selected will determine the angle of the blade to the main axis of the instrument, and thus the size of cone described by the cutting action. The instrument is then inserted into the body cavity where tissue is to be removed. When used for cold conization of the cervix, the tip **14** of the instrument is inserted into the cervical os while the handle **12** is being held in one hand by the surgeon. With the instrument in place for operation, the handle **54** of the blade holder may be grasped by the other hand of the same operator preparatory to the cutting of tissue from the cervix. The handle **54** is depressed slightly toward the main instrument so as to open a space between the gripping point **60** and the blade **50**. Then the handle **54** is released and the gripping point grasps a portion of the anterior lip of the cervix. In this manner the cervix is maintained in a firm position while tissue is being cut from the cervical os. With the instrument in place and the gripping means holding the anterior lip of the cervix, the surgeon may now proceed to move the handle **54** of the blade holder about the longitudinal axis of the main instrument body while holding the handle **12** in a fixed position. Since the blade guide is rotatably mounted on the stem, the blade may be moved about a complete 360° circle, thus removing an entire conical circumference of tissue from the cervical os, if desired. It will be appreciated that the surgeon may release the gripping means periodically as the handle is being rotated about the circular path. The release of the gripping means is easily effected by depressing the handle **54** while it is being rotated. Also, downward pressure on the handle is periodically relieved, and the gripping means intermittently grasps a new portion of the cervix for each new location of the blade.

Using the procedure just described, a single operator may hold the entire instrument in place with his one hand while actuating the cutting blade with the other handle. Further, the same operator may actuate the gripping means for holding the cervix in the area that the cut is being made, and the entire operation may be accomplished with a single instrument. It is a further advantage that the use of a double edged cutting blade in the instrument permits rotative movement of the blade in either direction of the circular path so that the cutting action may be accomplished with either edge of the blade at the choice of the operator.

Although this instrument has been described in its preferred form and with the use of a preferred blade holding means, it is contemplated that variations may be made in the construction without departing from the scope of invention. For example, any suitable blade holding means may be used with this instrument, and it is possible to use a blade holder which does not include the gripping means described in the preferred embodiment. Also, it is contemplated that the blade guide means may take on a variety of configurations and may include means equivalent to the described slot for maintaining the blade at its predetermined angle. Furthermore, many structural changes are possible and are intended to be within the scope of

the present invention as set forth in the appended claims.

What is claimed is:

1. A surgical instrument for obtaining a circumferential specimen of tissue from a body cavity comprising:

a stem having a tip at its one end and a handle at its opposite end, said tip having a groove for receiving an end of a cutting blade;

a blade guide mounted on said stem at a fixed distance from the tip of the stem, and said blade guide having a body portion extending laterally from the stem said blade guide being mounted for rotation about the longitudinal axis of the stem;

a slot through the body portion of said blade guide for carrying a cutting blade, said slot being formed at a predetermined angle towards the longitudinal axis of the stem and in alignment with said groove in the tip of the stem; and

a cutting blade positioned in said slot of the blade guide, and extending from said slot to the tip of the stem, the end of said cutting blade being received and guided by said groove in the tip, whereby said cutting blade is held in the instrument at a predetermined angle to the stem of the instrument.

2. A surgical instrument as set forth in claim **1**, said groove being formed around the complete circumference of said tip portion, whereby the blade may be rotated 360° about the longitudinal axis of the stem while the end of said blade is being retained within said groove.

3. A surgical instrument for use with a cutting blade for obtaining a circumferential specimen of tissue from a body cavity comprising:

a stem having a tip portion at its one end and a handle portion at its opposite end, said tip portion having an annular groove for receiving the end of a cutting blade;

a blade guide mounted on said stem at a distance from the tip of the stem, leaving a space between said blade guide and said tip for forming said annular groove, said blade guide being mounted for rotation on said stem, whereby the blade guide and its blade may be rotated 360° about the longitudinal axis of the stem;

a slot in said blade guide for receiving the body of a cutting blade, said slot being positioned at a predetermined angle toward the longitudinal axis of the stem and in alignment with said groove in the tip of the stem, whereby a blade may be inserted through said slot with the end of the blade being received in the groove and with a cutting edge of said blade occupying the space between the blade guide slot and the tip of the stem at a predetermined angle to the stem.

4. A surgical instrument as set forth in claim **3** including gripping means carried by said instrument for holding the specimen of tissue while it is being cut and subsequently removed.

5. A surgical instrument for obtaining a circumferential specimen of tissue from a body cavity comprising:

a stem having a tip at its one end and a handle at its opposite end, said tip having a circumferential groove for retaining the tip of a cutting blade;

a blade guide rotatably mounted on said stem at a fixed distance from the tip of the stem, and said blade guide having a body portion extending laterally outwardly from the stem;

a slot through the body portion of said blade guide for carrying a cutting blade, said slot being formed at a predetermined angle toward the longitudinal axis of the stem and in alignment with said groove in the tip of the stem;

a cutting blade carried by a blade holder, said cutting blade being positioned in the slot of the blade guide and extending from the slot to the tip of the stem, the end of said cutting blade being retained and guided by said groove in the tip, whereby the cutting

blade is held in the instrument at a predetermined angle to the stem of the instrument; and

gripping means carried by said blade holder and mounted for cooperation with said blade guide and said blade, whereby said gripping means may be actuated to grasp a part of a body organ adjacent to the tissue being cut by the blade.

6. The surgical instrument as claimed in claim **5** wherein said gripping means is mounted on one end of a lever, said lever being fulcrumed on the blade holder and a second end of the lever being attached to the blade holder whereby movement of the holder in one direction will cause the lever to move about a fulcrum, carrying said gripping means in an opposite direction.

7. A surgical instrument for obtaining a circumferential specimen of tissue from a body cavity, said instrument being assembled from a plurality of elements and comprising:

an elongate stem having a tip at its one end and a handle portion at its opposite end, said tip including a groove around its circumference for receiving the end of a cutting blade;

a first spacer element mounted on said stem adjacent to the tip of the stem, and a second spacer element mounted adjacent to the handle portion of the stem;

a blade guide rotatably mounted on said stem intermediate said spacer elements and in abutting relationship to the spacer elements, said blade guide having an elongate body portion extending laterally outwardly from the stem;

a slot through the body portion of said blade guide for carrying a cutting blade, said slot being formed at a predetermined angle toward the longitudinal axis of the stem and in alignment with said groove in the tip of the stem whereby a cutting blade may be positioned through the slot with the end of the cutting blade retained in the groove of said tip;

a handle mounted on the handle portion of said stem adjacent to said second spacer element, said handle including means for fixing and releasing the handle onto the stem.

8. A surgical instrument for obtaining a circumferential specimen of tissue from a body cavity, said instrument being assembled from a plurality of elements and comprising:

an elongate stem having a tip at its one end and a handle portion at its opposite end, said tip including a groove around its circumference for receiving the end of a cutting blade;

a first spacer element mounted on said stem adjacent to the tip of the stem, and a second spacer element mounted adjacent to the handle portion of the stem;

a blade guide rotatably mounted on said stem intermediate said spacer elements and in abutting relationship to the spacer elements, said blade guide having an elongate body portion extending laterally outwardly from the stem;

a slot through the body portion of said blade guide, said slot being formed at a predetermined angle toward the longitudinal axis of the stem and in alignment with said groove in the tip of the stem; and

a cutting blade carried by a blade holder, said cutting blade being positioned in the slot of the blade guide and extending from the slot to the tip of the stem, the end of said cutting blade being held by said groove in the tip, whereby the cutting blade is held in the instrument at a predetermined angle to the stem of the instrument.

9. The surgical instrument as described in claim **8** where said blade holder further includes a gripping means mounted for cooperation with said blade guide and said blade, whereby the gripping means may be actuated to grasp a part of a body organ adjacent to the tissue being cut by the blade.

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