

April 4, 1961

H. W. SEIGER
HOLDER FOR TENACULA

2,977,958

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3 Sheets-Sheet 1

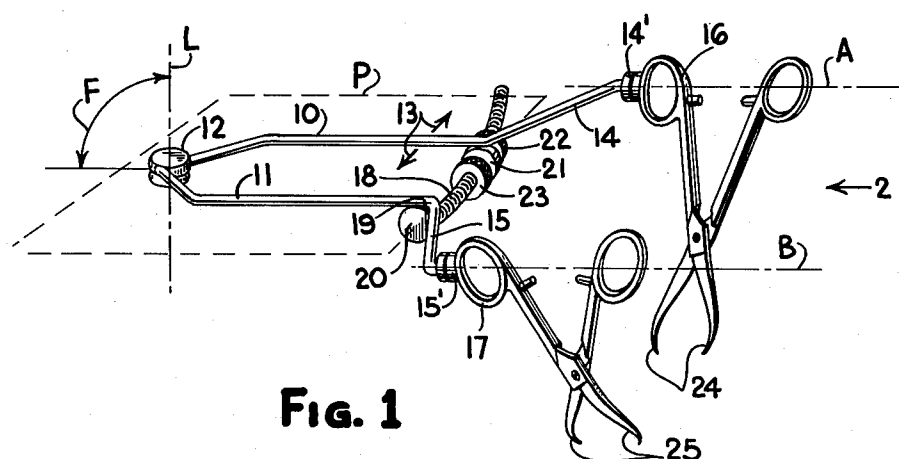


FIG. 1

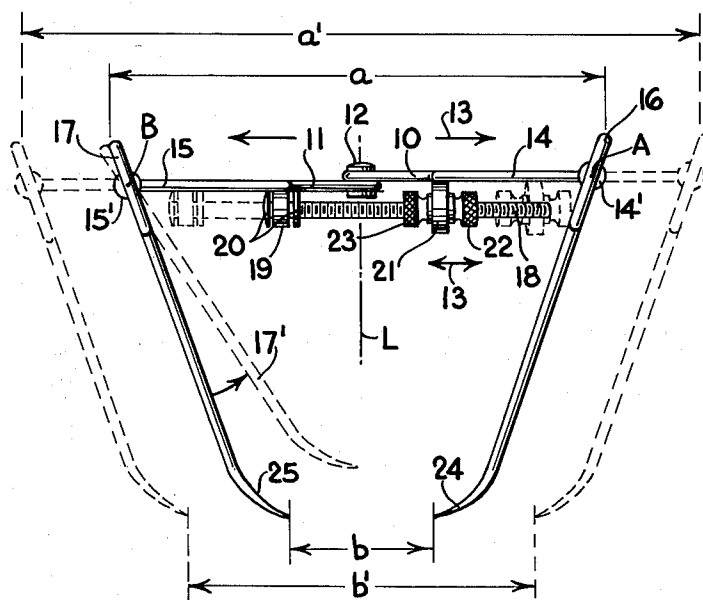


FIG. 2

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

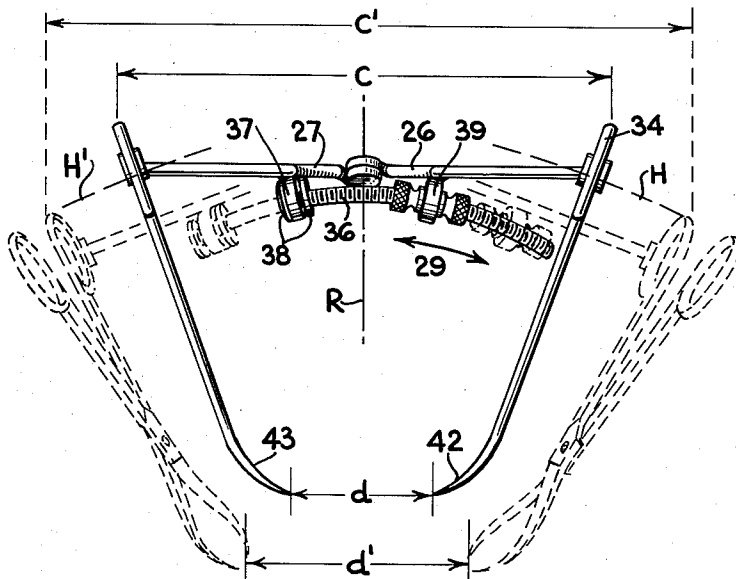
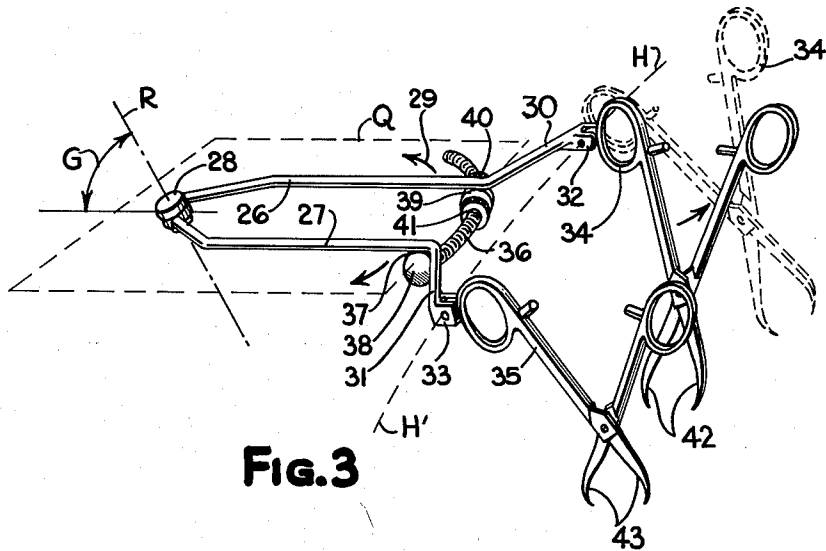
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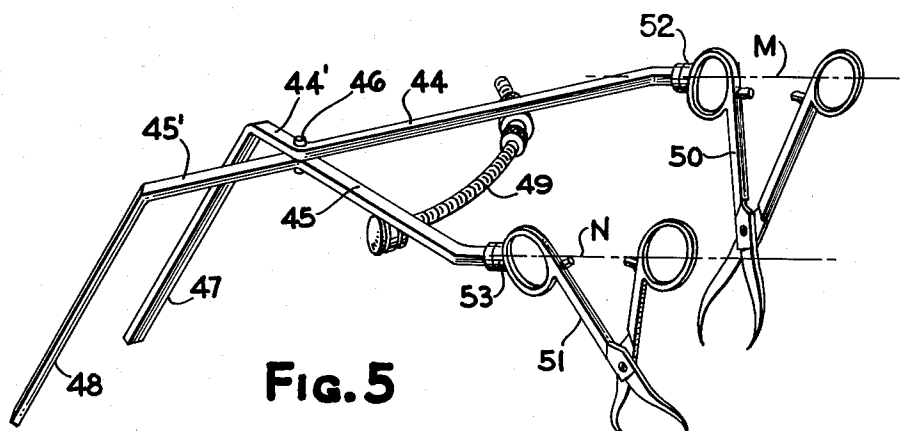


FIG. 5

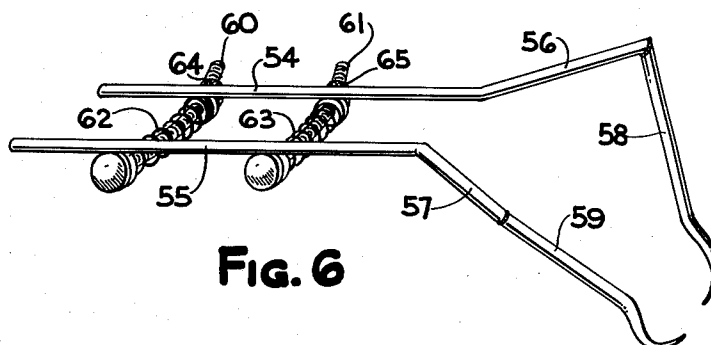


FIG. 6

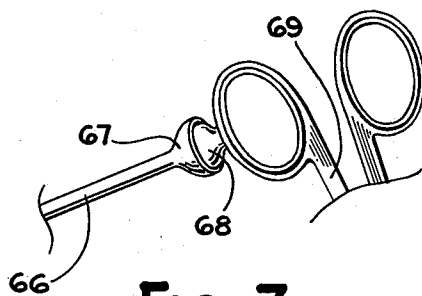


FIG. 7

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

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2,977,958

HOLDER FOR TENACULA

Harry Wright Seiger, 520 Arizona Ave.,
Santa Monica, Calif.

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2 Claims. (Cl. 128—346)

This invention relates broadly to surgical instruments and more particularly to a holding device for securing at least two tenacula in a predetermined orientation with respect to each other to enable manipulation of the tenacula simultaneously with one hand.

Many types of surgical operations require the use of tenacula for holding tissue or organs in a convenient position during the surgery. For example, in cold coning of the cervix, two or three single pronged tenacula are circumferentially imbedded in the cervix about the cervical os and the cervix itself pulled outwardly and sufficiently stretched to enable the surgeon to effect the cold coning. For an operation of this type, the manipulation of the tenacula requires the presence of the surgeon and one nurse or assistant.

Bearing the above in mind, it is a primary object of the present invention to provide a mechanical holding device which will enable the manipulation of more than one tenacula by the use of only one hand whereby the surgeon himself may properly stretch and position the cervix or other tissue or organ upon which surgery is to take place and the need for one nurse or assistant is eliminated.

More particularly, it is an object to provide a holding device of the above type which will properly orient and position two or more single pronged tenacula at a desired relative spatial position with respect to each other to facilitate a cold coning or other operation in the uterine cervical region.

Still another object is to provide a holding device for tenacula which will enable each of the tenacula to be relatively free for imbedding in the tissue to be held and yet which will also permit the simultaneous manipulation of the tenacula with one hand.

Another object is to provide a holder for tenacula which may be adjusted and secured in different positions so that the tenacula may be accommodated to different sized organs and for different types of operations. For example, in tubal insufflation, one tenaculum will frequently tear through the tissue or hold the cervix at an undesirable angle whereas two or more tenacula will retain their hold on the cervix and at the same time hold the cervix in line with the insufflating cannula.

These and many other objects and advantages of this invention are attained, briefly, by providing a pair of holding arms coupled together at first adjacent ends and terminating at their other ends in diverging portions connected to suitable tenacula. The coupling means at the first pair of adjacent ends may comprise a pivot pin for pivotally connecting the arms for movement about an axis normal to a plane including the arms. In a second embodiment, the axis of the pivot pin is inclined at an acute angle to the plane of the arms to provide a slightly different effect when the tenacula are pivoted with respect to each other.

A securing means in the form of a threaded member is spaced from the coupling means at the first ends of the

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adjacent arms and extends transversely of the arms to secure them at any predetermined position apart. The tenacula themselves may comprise simple hooks or single pronged scissor types. They may be secured to the ends of the diverging portions of the arms either directly or through a suitable coupling such as a pivoting arrangement for rotative movement about an axis transverse to the first pivot axis at the first adjacent ends of the arms. By this arrangement, the tenacula may be easily manipulated for initial insertion or imbedding in the tissue.

Further modifications of the invention contemplate the substitution of universal joints for certain of the pivot pins as well as novel gripping means and additional adjusting means.

A better understanding of the various embodiments of the invention will be had by referring to the accompanying drawings in which:

Figure 1 is an overall perspective view of a first embodiment of the invention;

Figure 2 is a front view taken in the direction of the arrow 2 of Figure 1;

Figure 3 is an overall perspective view of a second embodiment of the invention;

Figure 4 is a front view of the embodiment illustrated in Figure 3;

Figure 5 is a perspective view of a modified handle structure;

Figure 6 is a perspective view of still another embodiment; and,

Figure 7 is a fragmentary view of a modified type of coupling means.

Referring to Figure 1, there is illustrated in perspective a first embodiment of the invention comprising a pair of holding arms 10 and 11 secured together at a first pair of adjacent ends as by a pivot pin 12. In the embodiment of Figure 1, the axis of the pivot pin and thus the axis of rotation of the arms 10 and 11 with respect to each other is indicated at L and is preferably substantially normal to the plane P of the two arms 10 and 11. Thus, the axis L forms an angle F which is substantially ninety degrees so that pivotal movement of the arms 10 and 11 with respect to each other will take place in the plane P as indicated by the arrows 13.

As shown, the arms 10 and 11 extend into diverging portions 14 and 15 in turn terminating in rotating joints 14' and 15' connected to tenacula 16 and 17. The axes of rotation of the joints 14' and 15' are indicated at A and B. A securing means in the form of a threaded member 18 spaced from the pivot pin 12 extends transversely between the arms 10 and 11 and is preferably secured to one of the arms as at 19 by means of fixed flanges 20. The threaded member 18 extends through an opening 21 in the other arm 10 and is arranged to be secured in set positions by tightening nuts 22 and 23 threaded on the member 18.

As best seen in Figure 2, the arrangement is such that by pivoting the arms 10 and 11 away from each other in the plane P, the two tenacula 16 and 17 will be positioned further apart so that the tenaculum points 24 and 25 are spaced further apart. In the embodiment of Figures 1 and 2 wherein the pivotal axis L is substantially normal to the plane of the arms P, the movement of the tenacula 16 and 17 further apart, as indicated by the dotted lines in Figure 2, changes the spacing between the handle portions, "a"—"a" by substantially the same amount as the change in spacing "b"—"b" of the tenacula points 24 and 25. By rotating one or both of the tenacula about their respective axes A and B as at the joints 14' and 15', the points may be spaced closer together. This latter movement is indicated in dotted lines 17' for the tenaculum 17.

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In certain types of operations, it may be desirable to effect a greater spacing between the handles of the tenacula than between the tenaculum points, thus leaving more room for a surgeon to operate between the handles. To this end, the holding device may take the form of the modified version illustrated in Figures 3 and 4.

Referring first to Figure 3, the tenacula holder comprises holding arms 26 and 27 having first adjacent ends coupled together as by a pivot pin 28. In this embodiment, the axis R of the pivot pin 28 forms an acute angle G with the plane Q of the holding arms 26 and 27. As a consequence of this inclination of the axis with respect to the plane Q, the holding arms will follow arcuate paths having components in both the horizontal plane Q and a vertical plane as indicated by the arrows 29. The free ends of the holding arms 26 and 27 merge into diverging portions 30 and 31 and terminate in second and third coupling means 32 and 33 in turn secured to the tenacula 34 and 35. In the embodiment of Figure 3, the coupling means 32 and 33 may take the form of pivot pins coupling the tenacula to the diverging ends of the portions 30 and 31 for rotative movement about individual axes H and H' transverse to the first axis R for the pivot pin 28 and forming acute angles to the plane Q. With this construction and the tenacula pivoted downwardly to the position illustrated in solid lines in Figure 3, the prongs or points of the tenacula converge towards each other.

As a consequence of the acute angle of the axis R with the plane Q in the embodiment in Figures 3 and 4, the securing means between the arms in the form of the threaded member 36 is arcuate in shape, the radius of curvature of the arc extending towards and being normal to the axis R. As shown, this threaded member 36 is secured at 37 by enlarged flanges 38 to the arm 27. The member itself passes transversely through an opening 39 in the other arm 26 and is securable in any desired position as by tightening nuts 40 and 41.

Referring now to Figure 4, it will be noted that because of the inclination of the first axis R, swinging the arms 26 and 27 further apart from the solid line to the dotted line position results in a greater opening or separation distance between the handle portions of the tenacula than between the pronged portions 42 and 43. Thus, if the distance between the handles when in the solid line position is "c" and when in the dotted line position "c'", and similarly if the distance between the points 42 and 43 is "d" when in the solid line position and "d'" when in the dotted line position, the difference in the lengths "d'" and "d" is less than the difference in the lengths "c'" and "c". Accordingly, an improved adjustment may be effected providing more room as compared to the embodiments of Figures 1 and 2 between the handles of the tenacula for the surgeon to operate in for a given change in the separation distance of the tenacula points.

In Figure 5, there is shown still another embodiment of the holder wherein the holding arms 44 and 45 have portions 44' and 45' bent at almost right angles and a single pivot 46 passing therethrough. The bent portions respectively terminate in downwardly extending handles 47 and 48. A screw guide 49 and suitable tightening nuts are provided to vary the spacing between the arms 44 and 45 as in the previous embodiments. Tenacula 50 and 51 are secured to the far ends of the arms through suitable rotating joints 52 and 53. These joints permit rotation of the tenacula about axes M and N, respectively.

The downwardly depending handle portions 47 and 48 provide a "pistol" grip for the holder and facilitate somewhat the varying of the distance between the tenacula when the tightening nuts on the screw 49 are loosened. Thus, pressing of the handles 47 and 48 together will tend to cause the arms 44 and 45 to swing further apart and

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conversely, separation of the handles 47 and 48 will bring the arms 44 and 45 together.

In Figure 6, a pair of holding arms 54 and 55 are shown extending into diverging portions 56 and 57 rigidly secured to single hooks 58 and 59. While it is possible to secure the diverging portions 56 and 57 directly to tenacula of the type illustrated in the previous embodiments, single hooks as shown in Figure 6 can be substituted. Rather than a pivoting means, the desired orientation of the arms is achieved by providing two guide screws 60 and 61. In this embodiment compression springs 62 and 63 about the screws bias the arms apart so that only single end tightening nuts 64 and 65 are necessary. It will be evident in Figure 6 that by independently adjusting the tightening nuts associated with the screws 60 and 61, a desired position in between the single hook points can be achieved.

Referring now to Figure 7, there is illustrated an alternative type of coupling means which by way of example is shown between one end of one of the diverging portions and the handle of the tenaculum. Thus, if 66 represents a portion of one of the arms, this may terminate in a ball receiving socket 67 receiving a ball 68 rigidly secured to the handle of the tenaculum 69. By use of such a universal joint, the tenaculum may be easily manipulated for initial imbedding or insertion in tissue and the chance of inadvertently unhooking or dislodging the tenaculum is decreased as a consequence of its freedom of movement. Nevertheless, a desired pulling force on the tenaculum may be applied through the medium of the universal joint. The coupling of the other end portion of the other arm to the corresponding tenaculum may also be effected by a universal joint. Further, a universal joint may be substituted for the pivot pin for securing of the adjacent ends of the arms 26 and 27 together in Figure 3 or the arms 10 and 11 in the embodiment of Figure 1.

In employing any one of the holding devices illustrated in Figures 1, 3, and 5 for manipulating tenacula during an operation, the tenacula themselves are first adjusted by varying the position of the tightening nuts on the threaded member. The tenaculum prongs are then imbedded or punched into the tissue and locked in a conventional manner. This portion of the operation is simplified by employing pivot pins at the couplings 32 and 33 in the embodiment of Figure 3 since each tenaculum is free to rotate as indicated by the dotted lines for the tenaculum 34 in Figure 3. Alternatively, if a universal joint, as illustrated in Figure 7, is used the insertion of the tenaculum may be even more simplified.

After each tenaculum is properly inserted and locked, the surgeon may grasp the holding arms 26 and 27 with one hand and perform the required operation with the other. Because both the tenacula and the surgical instrument are under control of the surgeon, the operation is greatly facilitated. For example, the doctor need not give orders to a nurse as to the manner of holding the tenacula as the operation progresses, but rather he can automatically manipulate the tissue himself with one hand while operating with the other. This is an important advantage in that it eliminates possible misunderstandings or delays between the doctor and nurse or assistant.

From the foregoing description, it will be evident that the present invention provides a very useful and adaptable holder for surgical operations. While only a few basic embodiments of the invention have been set forth, it will be evident to those skilled in the art that many variations can be effected without departing from the scope and spirit of the invention. The tenacula holder is, therefore, not to be thought of as limited to the specific embodiments set forth for illustrative purposes.

What is claimed is:

1. A holder for tenacula comprising, in combination: 75 a pair of holding arms; a first pivot means connecting

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adjacent end portions of said arms for pivoting movement about a first axis at an acute angle to the plane including said arms; second and third pivot means at the other ends of said arms pivotally mounting said tenacula for pivoting movement about second and third axes forming acute angles with said plane respectively; and securing means spaced from said first pivot means and connected between said arms for securing said arms in a predetermined position with respect to each other, said second and third axes extending transversely to said first axis whereby said tenacula may be individually pivoted into a position in which their respective points converge towards each other and whereby said arms may be swung apart about said first axis thereby separating said handles a greater distance than said points as a consequence of the acute angle formed by said first axis with said plane of said arms.

2. A holder for tenacula comprising, in combination: a pair of holding arms; a first pivot means connecting adjacent end portions of said arms for pivoting movement about a first axis at an angle to the plane including said arms, said end portions including bent portions turning into downwardly depending portions to define a gripping handle; second and third pivot means at the other ends of said arms pivotally mounting said tenacula for pivot-

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ing movement about second and third axes, respectively; and securing means spaced from said first pivot means and connected between said arms for securing said arms in a predetermined position with respect to each other, said second and third axes extending transversely to said first axis whereby said tenacula may be individually pivoted into a position in which their respective points converge towards each other.

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