

[54] DIGITAL AMNIOTOME

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[51] Int. Cl. A61b 17/42
[58] Field of Search 128/361, 303 R, 305,
128/314, 329, 330, 333, 215, 253, 307, 304;
30/298

[56]

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[57]

ABSTRACT

The digital amniotome described herein is a split-ring like device adapted to be placed on a finger for rupturing the amniotic membrane during obstetrical procedures. The ring-like device has a recessed portion which is normally positioned to be located at the pad of the fingertip and has a sharp tipped element thereon. Immediately contiguous to the recessed portion is a guard portion which extends out beyond the recessed portion to prevent the sharp tipped element from contacting the amniotic membrane. When pressure is applied to the guard portion, which is resilient, it retracts thereby exposing the sharp tipped element such that it is able to rupture the membrane.

5 Claims, 7 Drawing Figures

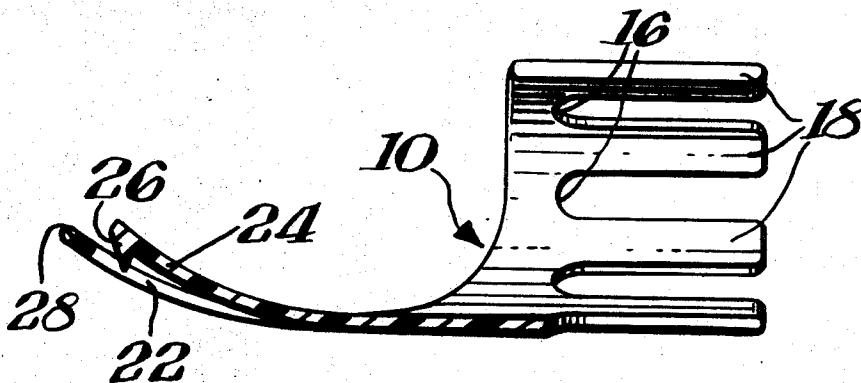


Fig. 2.

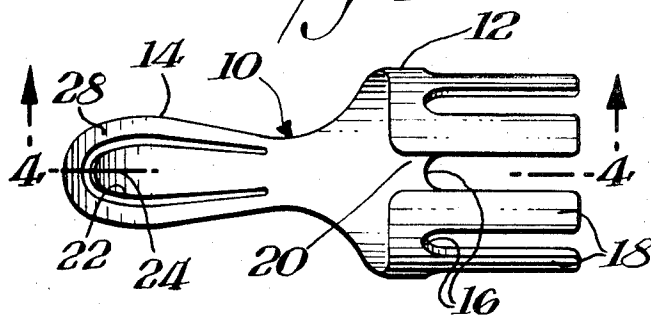


Fig. 5.

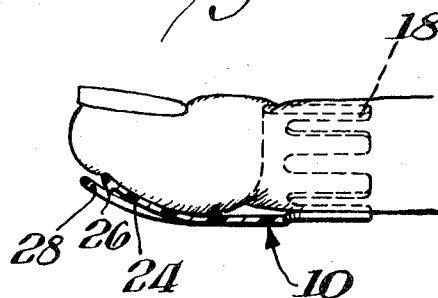


Fig. 1.

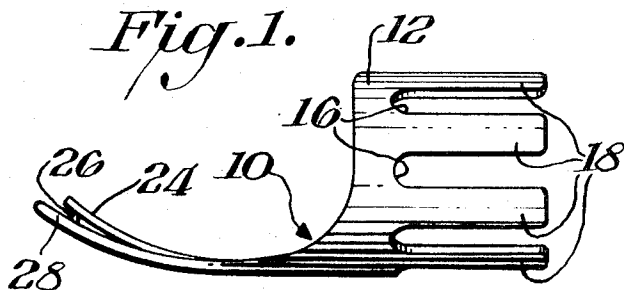


Fig. 6.

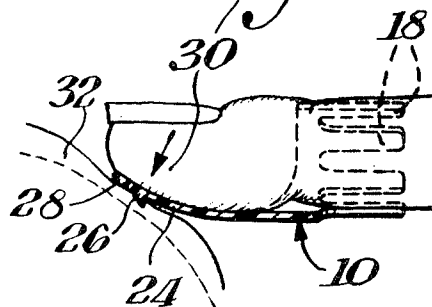


Fig. 3.



Fig. 4.

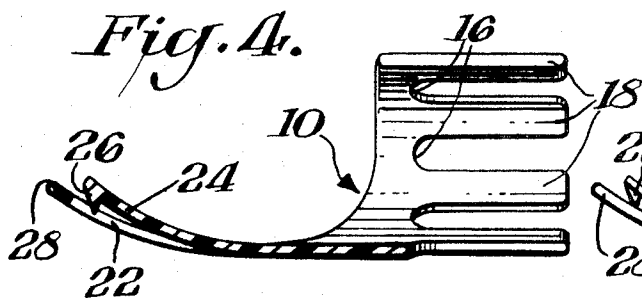
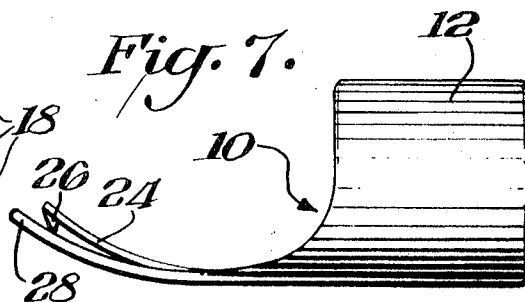


Fig. 7.



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DIGITAL AMNIOTOME

BACKGROUND OF THE INVENTION

This invention relates to a digital amniotome, and, more particularly, to a digital amniotome adapted to be actuated by the application of pressure thereto.

It is often desirable and/or necessary, for the purpose of hastening labor in a pregnant woman who is at term, to rupture the amniotic membrane. Various devices have been designed over the years for this purpose. One of the more commonly used devices is a stainless steel member having a finger loop at one end and a sharpened hook at the other. Other devices have included surgical gloves having a protruding sharpened point positioned on one of the fingers. Still other devices have included finger carried members having a sharp point on one end and plastic rods having a sharpened hook-like device on one end.

Although the hook-like devices have some advantages over the spear shaped or trocar-pointed devices because there is less change of injuring the fetus or traumatizing the patient's cervix or vaginal wall, their mere appearance tends to frighten many patients. This is particularly true of the older stainless steel instruments that are available. Furthermore, the sterilization problems encountered with many of the instruments are difficult and with the increasing labor costs quite undesirable.

It is, therefore, an object of this invention to obviate many of the disadvantages of the prior art amniotic sac rupturing devices.

There has been described in an earlier filed application filed by Jean R. Poirier entitled "Digital Amniotome" Ser. No. 110,505 filed Jan. 28, 1971 now U.S. Pat. No. 3,687,139 issued Aug. 29, 1972 and assigned to the same assignee as this application. A digital amniotome which operates by movement of the end finger phalanx to cause a hook-like device to protrude from a sheath in a finger carried member. While this device has proven quite satisfactory it does tend, because it must be constructed to be relatively stiff to enhance the fingertip movement, to decrease the obstetrician's ability to "feel" his way during the procedure. With the loss of the sense of feel it is sometimes difficult for the obstetrician to properly operate the device and effect the rupturing of the membrane. Further some users encounter some difficulty in flexing the fingertip as is required.

Accordingly, another object of this invention is to provide an improved device for rupturing the amniotic sac during obstetric procedures which device does not inhibit the user's sense of feel.

Another object of this invention is to provide an improved disposable device that is easily and quickly used for rupturing the amniotic membrane during obstetrical procedures.

BRIEF DESCRIPTION OF THE INVENTION

In a preferred embodiment of this invention, a finger carried obstetrical device is adapted to rupture the amniotic membrane during obstetrical procedures. This device is operated merely by applying it to the membrane and pressing to cause a normally guarded sharp tipped or hook-like element to be exposed and permit the rupture. The device itself is a finger carried member adapted to grip the finger. The member has a recessed portion adapted to engage the end portion of the

finger. A sharp tipped element is secured on the recessed portion. The finger carried member also has a guard portion contiguous to the recessed portion which is adapted to normally extend radially of the finger beyond the recessed portion so as to guard or provide a sheath for the hook-like portion. At least one of the portions is resilient such that any relative pressure between the guard portion and the recessed portion exposes the sharp tipped element to effect the rupture.

Preferably, the finger carried member is in the form of a split ring-like section which is fluted on its rear edge to form fingers which extend rearwardly along the user's finger to more firmly secure the device to the finger and prevent movement thereof.

DESCRIPTION OF THE DRAWINGS

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention, itself, however, both as to its organization and method of operation as well as additional objects and advantages thereof, will be best understood from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a side elevation view of a digital amniotome constructed in accordance with one embodiment of this invention;

FIG. 2 is a top plan view of the digital amniotome illustrated in FIG. 1;

FIG. 3 is a bottom plan view of the digital amniotome illustrated in FIG. 1;

FIG. 4 is a cross-sectional view of the digital amniotome illustrated in FIG. 1 taken along the section line 4-4;

FIG. 5 is a pictorial view of the digital amniotome in cross-section in position on the operator's finger prior to use;

FIG. 6 is an illustration of the digital amniotome of this invention being operated to puncture the amniotic membrane, the digital amniotome being illustrated in longitudinal cross-section; and

FIG. 7 is a pictorial view of an alternative embodiment of a digital amniotome constructed in accordance with an alternative embodiment of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

There is illustrated in FIGS. 1 through 4 one embodiment of the invention in which there is seen a finger carried member 10 which has a split ring portion 12 and a longitudinally extended portion 14. The finger member 10 preferably is integral and may be formed of rubber latex, or any suitable plastic such as polyamid sold under the trade name NYLON, polytetrafluoroethylene sold under the trademark TEFLON, impact modified polystyrene, or perhaps most preferably, a polypropylene plastic may be used. Typically the member is formed by molding. Preferably the material forming the member 10 is somewhat resilient such that some slight bending or flexure is permitted, to facilitate the utilization of the device as will become apparent from the following description. Portions of the member 10 may be rigid. The member 10 should be of sufficient length such that the split ring portion can fit over the second phalanx of the user's finger (usually the middle finger is used for this purpose) with the elongated portion 14 extending to the general vicinity of the first pha-

lanx or finger tip. Actually the user can adjust the position to his liking.

The back end of the split ring portion is axially fluted as at 16 for the purpose of forming axially and rearwardly (along the finger) extending fingers 18. Furthermore, the circular portion of the ring section 12, which is split as at 20 to permit it to be expanded to fit varying size fingers, is of a decreasing longitudinal width as the split region 20 is approached. This decreasing width in the longitudinal direction functions to force the fingers 18 inwardly as the circular split portion is opened thereby to improve the grip of the device on the user's finger.

The elongated portion 14 is curved axially inward as it extends forward (with respect to the user's finger) and has a removed section or cut 22 in the general form of an elongated tear drop to form an inner recessed portion 24 on which there is secured a radially extending sharp pointed or hook-like element 26 (FIG. 3 and 4) such that when the hook-like element is permitted to come in contact with the amniotic membrane it facilitates the membrane's rupture.

Immediately contiguous to and surrounding the recessed portion 24 is a guard portion or loop 28 which is radially of the user's finger more outwardly positioned than the recessed portion 24 such that the guard loop 28 tends to sheath and prevent the hook 26 from extending out beyond the guard loop 28. The hook 26 therefore is prevented from acting until guard loop 28 is depressed and thereby exposes the hook. The cross-sectional area and configurations of the recessed portion 24 and the guard loop 28 may be varied to vary their relative resiliences.

The normal position of the digital amniotome on the user's finger is seen most clearly in FIG. 5 with the finger tip 30 in contact with the recessed portion 24 such that the hook 26 is recessed relative to the guard loop 28 which is somewhat removed from the finger tip 30. The fingers 18 are gripping the user's finger, preferably in the region of the second finger phalanx, although the member may be constructed to fit on the finger tip if desired, by shortening its over all length. The second phalanx is preferred since the knuckle between the first and second phalanxes aids in preventing the axial movement of the digital amniotome along the user's finger.

To use the digital amniotome to rupture the amniotic membrane of a pregnant woman in labor, the doctor or other operator places the amniotome 10 on his finger as illustrated in FIG. 5 and inserts the amniotome into the vagina (not shown) and the opening of the cervix (not shown) until the recessed portion and guard loop 28 are immediately adjacent the exposed region of the amniotic membrane 32. At the entrance to the cervix, the doctor then by merely pressing the finger tip 30 against the amniotic membrane 32 causes the guard loop 28 to retract thereby exposing the sharp tip of the hook-like element 26. With this accomplished the doctor merely need draw his finger across the membrane to snag it and thereby cause the rupture with little chance of injury to the fetus illustrated by the dashed line 32 or to the walls of the vagina or cervix. This accomplished, he merely releases the finger and the guard loop again snaps back to its original position protecting or guarding the hook 26 and withdraws his finger from the vagina again with little or no danger of traumatizing the walls of either the cervix or the vagina. Being made

of plastic it is quite convenient to merely dispose of the amniotome without further ado. No sterilization and reuse are required.

In an alternative usage of the invention, once the finger tip is in position with the guard loop in contact with the amniotic membrane, the doctor merely need place his hand upon the pregnant woman's stomach and apply pressure. This causes the amniotic membrane to bulge outwardly against the guard loop depressing the same such that the tip is exposed and the amniotic membrane is then easily ruptured as described herein before.

In the preferred embodiment of this invention both the recessed portion 24 and the guard loop 28 are resilient although either may be made rigid as desired. If the guard loop is made rigid, finger tip motion is required to extend and expose the hook 26. If both are resilient or even if only the guard portion is resilient, the guard loop will retract and expose the hook 26 which is the preferred method of utilization. No flexing of the finger tip is required as when the guard loop is rigid. As noted hereinbefore some persons encounter difficulty in flexing the finger tip.

In an alternative embodiment of the invention as seen in FIG. 7 the split ring section may be constructed to be of solid form with no extending fingers 18. While this embodiment is not quite as desirable as the earlier embodiment described herein, it is somewhat cheaper to construct and is often preferred by some doctors particularly by those having relatively large fingers where the additional gripping power of the fingers 18 is not required.

In some cases it is preferable to construct the member 10 such that it is "radio opaque", i.e., it may be detected using x-rays and the like. This can aid in the recovery of the member in the improbable likelihood that it somehow becomes dislodged from the user's finger and cannot be immediately located by probing. This may be accomplished by introducing radio opaque particles in the plastic prior to molding.

While an integral construction is preferred for economy reasons, any part or parts of the amniotome may be separately constructed as desired and secured to the remainder of the member as by a suitable adhesive.

There is thus seen to have been described herein an improved digital amniotome which is relatively simply used without the requirement for flexing the finger. The amniotome described is simple and economical to construct and provides a readily used sheathing mechanism that tends to prevent traumatizing the vagina or cervix of the woman.

It is obvious that many embodiments may be made of this inventive concept, and that many modifications may be made in the embodiments hereinbefore described. Therefore, it is to be understood that all descriptive material herein is to be interpreted merely as illustrative, exemplary, and not in a limited sense. It is intended that various modifications which might readily suggest themselves to those skilled in the art be covered by the following claims as far as the prior art permits.

What is claimed is:

1. A gynecological device adapted to be placed on a finger for rupturing the amniotic membrane during obstetrical procedures, said device comprising:
a finger carried member having a ring-like portion adapted to grip said finger,

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said member having an elongated recessed portion adapted to be engaged by the end portion of said finger,

said recessed portion having a sharp tipped element secured thereto to facilitate the rupture of said membrane,

said member also having an elongated generally U-shaped raised guard portion contiguous to and surrounding said recessed portion adapted normally to protrude radially of said finger beyond said recessed portion, thereby to guard said sharp tipped element,

said recessed portion and said raised portion each being resilient whereby the relative pressure between said finger tip and said membrane exposes said sharp tipped element to permit the rupture of

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the amniotic membrane.

2. A device according to claim 1 wherein said recessed portion and said guard portion have different degrees of resiliency.

3. A device according to claim 1 wherein said guard portion is more easily depressed than said recessed portion.

4. A device according to claim 1 wherein said device is integrally formed.

5. A device according to claim 1 wherein said finger carried member is a resilient single split-ring section, adapted to fit over different sized fingers, and the axial length of said ring section increases as a function of the circumferential distance from the split portion thereof.

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