Nov. 3, 1964 L. F. HAMILTON 3,155,094

HEMOSTATIC INSTRUMENT

Filed Nov. 27, 1961

Fig. 1

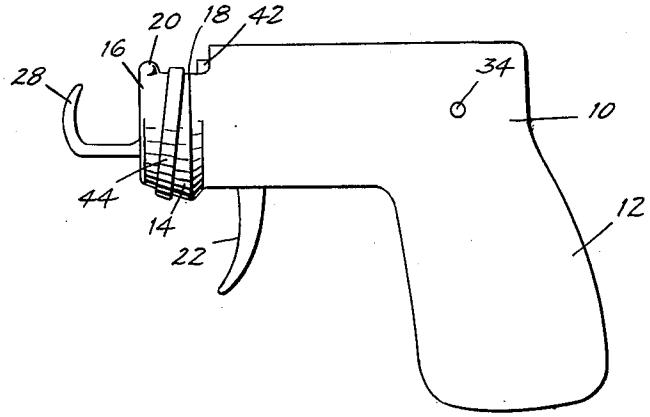
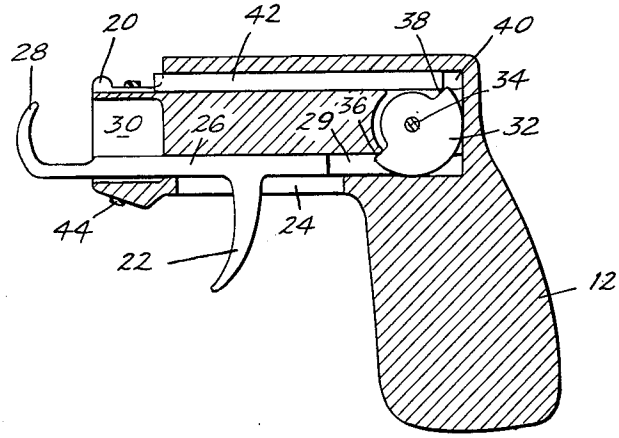


Fig. 3



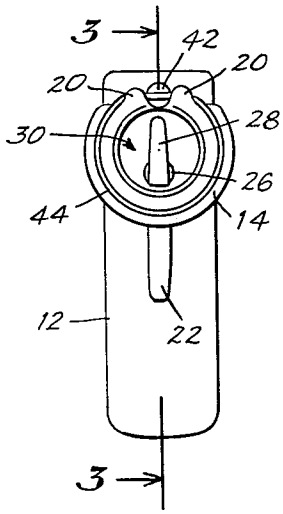


Fig. 2

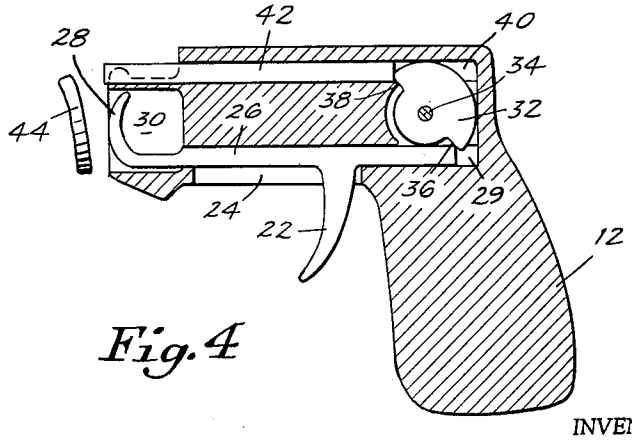


Fig. 4

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HEMOSTATIC INSTRUMENT

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This invention relates to hemostatic instruments and more particularly relates to a simple hemostatic instrument for tying the umbilical cord of newborn babies.

Various clamping devices have been suggested for checking the flow of blood in the umbilical cord but no prior known type has been found to be completely satisfactory. This is due primarily to the difficulty experienced in making a proper tie. If the tie in the cord is too tight or too loose, bleeding will occur. Also, prior known clamping devices have required an excessive amount of time to adjust and, therefore, needlessly diverted the attention of the obstetrician away from the mother or baby.

Accordingly, this invention has for its object to provide a simple, inexpensive and highly efficient clamping device for tying umbilical cords following child delivery.

Another object of this invention is to provide a clamping instrument that will reduce the time involved in tying the umbilical cord.

Yet another object of this invention is to provide a clamping instrument that uses the relatively gentle action of an elastic band for clamping the umbilical cord.

A further object of this invention is to provide a clamping instrument that may be subjected to the necessary cleaning, sterilizing and handling without accidentally releasing the elastic band.

A still further object of this invention is to provide a clamping instrument which is built and operated along the lines of a pistol, thereby making its use extremely easy.

These and further objects and advantages of the invention will become more apparent upon reference to the following description and claims and the appended drawings wherein:

FIGURE 1 is a side elevation view of the pistol-shaped hemostatic instrument constructed in accordance with this invention;

FIGURE 2 is an end view of the instrument;

FIGURE 3 is a cross-sectional view taken along lines 3—3 of FIGURE 2 showing the instrument in its loaded condition; and

FIGURE 4 is a view of the instrument shown in FIGURE 3 after it has been discharged.

The same reference numerals denote the same parts throughout the several views of the drawings.

With reference to the figures of the drawings, the hemostatic instrument of this invention has an overall shape which closely resembles that of a small pistol and consists of a cylindrical-shaped barrel **10** having a pistol grip **12** secured to one end. The barrel of the instrument has a substantially conical shaped end surface **14** which tapers toward an opening **16** in the end of the cylinder. This tapered end surface has an indentation **18** cut along its top surface. This indentation thus forms a lip or ridge **20** whose function will be more fully explained hereinafter.

A trigger **22** is slidably mounted through a slot **24** in the bottom of the cylinder **10**, as more clearly seen in FIGURES 3 and 4. This trigger **22** is connected to or formed as an integral part of a slide rod **26** which is positioned in a longitudinal bore or passage **29** located within the cylinder **10**. The slide rod **26** is tapered toward one end and terminates in a hook **28**. This hook **28** is normally extended outside the cylinder **10** as shown in FIGURE 3. However, when the trigger is pulled against the grip **12**, the hook **28** will be drawn into a cavity **30** located at the open end of the cylinder as more clearly seen in FIGURE 4.

A lever or bell crank arrangement **32**, which has a generally circular configuration, is pivotally mounted within the cylinder **10** by a pivot pin **34**. Two notches **36** and **38** are cut into the lever and are positioned so as to extend into the longitudinal bores **29** and **40**. A plunger or push rod **42** is slidably mounted within the bore **40**. When the trigger is pulled, as is shown in FIGURE 4, the slip rod **26** moves along the bore **29** until its end engages the notch **36** of the lever **32**. The upper notch **38**, which extends into the longitudinal bore **40**, is positioned so that it will be in engagement with one end of the plunger **42**.

Located around the tapered end **14** of the cylinder **10** is an elastic band **44** which may be, for example, an ordinary type rubber band. This band is held in place and prevented from slipping off the tapered end surface by the ridge **20** formed by the indentation **18**. This ridge arrangement prevents the band from accidentally slipping off the instrument, thus allowing the instrument to be "loaded" (by placing the band **44** around the tapered end **14**) prior to its being used.

Sometime prior to the time when the instrument is to be used, the band **44** is placed on the tapered end **14** as shown in FIGURES 1–3 with the hook **28** in its extended position. The instrument is then subjected to a sterilizing step such as boiling with the band positioned in place. The instrument is then removed from the sterilizer and ready for use.

In use, the slack umbilical cord is hooked by the hook **28** at the desired length from the umbilicus. The trigger **22** is then pulled, thereby drawing the umbilical cord through the open end **16** into the cavity **30** within the cylinder **10**. At this point, the cord is kinked and the end of rod **26** has just made engagement with the notch **36** of the lever **32**. The trigger is then pulled a little more forcefully, thereby causing the lever **32** to pivot or rotate about pin **34**, thereby pushing the rod **42** along the bore **40** into engagement with the band **44**.

As the trigger is pulled further, the rod **42** pushes the band **44** over the ridge or lip **20**, thereby allowing the band to slip off the tapered cylinder. The band is now located around and is clamping the umbilical cord in its crimped or kinked condition.

The trigger is then released and the hook extended so that the hook may be removed from the loop formed in the umbilical cord. With the instrument removed, the distal portion of the cord may be clamped and cut.

From the above, it may be seen that the cord will never be touched by the obstetrician's potentially contaminated hands. Due to the particular shape and operation of the instrument and its similarity to a pistol, any of the obstetrician's assistants who are familiar with the operation of a pistol may perform the clamping of the cord, thereby allowing the obstetrician to direct his full attention to the mother and child. The time required to perform this clamping operation is also greatly reduced over that normally required to perform any other type of tie, which is important, but not nearly so much so as the effective hemostatis without cord damage which is afforded by the elastic band.

It will be apparent from the foregoing that the device of this invention is low in cost, rugged in construction and assures a positive clamping action. The use of an elastic band will not cut the fragile umbilical cord, yet it will effectively afford enough constrictive action to stop any bleeding. The operation of the instrument is simple and requires only one hand, thus leaving the other hand of the operator free.

The invention may be embodied in other specific forms

without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A hemostatic instrument comprising a housing having a tapered end, gripping means mounted on the other end of said housing, an elastic band, means for holding said elastic band upon said tapered end, a hook slidably located within said housing and normally positioned outside said tapered end of said housing, a push rod slideably mounted in said housing, and means for simultaneously drawing said hook into said housing and moving said push rod out of said housing to push said elastic band from said tapered end.

2. A hemostatic instrument for tying umbilical cords comprising a cylindrical-shaped housing having a tapered end, a cavity located within said tapered end, grip means located on the other end of said housing, a slip rod slidably positioned within said housing, said slip rod terminating at one end in a hook, said hook normally being positioned outside said tapered end of said housing, trigger means connected to said slip rod for moving said hook into said cavity, elastic band means mounted on said tapered end of said housing, a push rod in said housing for releasing said band means when said trigger is operated, and lever means coupling said slip rod to said push rod whereby movement of said slip rod imparts a moving force through said lever means to said push rod.

3. A hemostatic instrument for tying umbilical cords according to claim 2 wherein said tapered end is provided with a ridge for preventing said band means from prematurely being released.

4. A hemostatic instrument for tying umbilical cords comprising a cylindrical-shaped housing having a tapered end and a bore, a ridge located on said tapered end, a cavity located within said tapered end, a pistol grip mounted on said other end of said housing, a longitudinally movable slip rod slidably positioned within a bore in said housing, said slip rod being tapered at one end and terminating in a hook, said hook normally being positioned outside said tapered end of said housing, a trigger connected to said slip rod through a slot in said housing for moving said hook into said cavity, an elastic band mounted on said tapered end and held in place by said ridge, a longitudinally movable push rod mounted in a bore in said housing for engaging against said elastic band, and means interconnecting said slip rod and said push rod so that movement of said trigger will move said hook into said cavity as said push rod moves out of said bore to release said elastic band from said tapered end.

5. A hemostatic instrument for tying umbilical cords according to claim 4 wherein said last named means is a lever, said lever being pivotally mounted in said housing with one end thereof arranged to engage said slip rod and the other end thereof arranged to engage said push rod.

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