United States Patent

Bronstein

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[54] CIRCUMCISION CLAMP

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[52] **U.S. Cl.** .....**128/325,** 128/346, 24/20 TT, 24/264

[51] **Int. Cl.** **A61b 17/12,** A61b 17/08, A44b 21/00

[58] **Field of Search**.....24/20 TT, 264; 128/305, 325, 128/346

[56] **References Cited**

UNITED STATES PATENTS

2,695,616	11/1954	Hansell	128/346
2,747,576	5/1956	Bronstein	128/346
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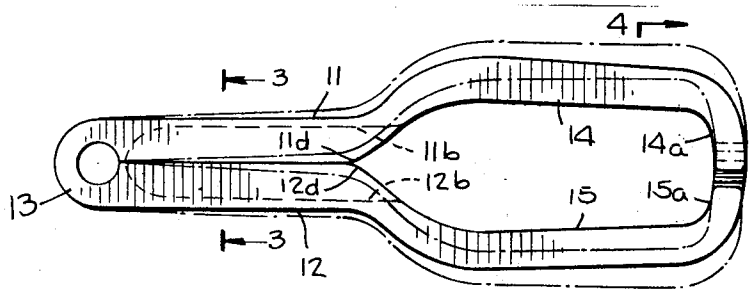
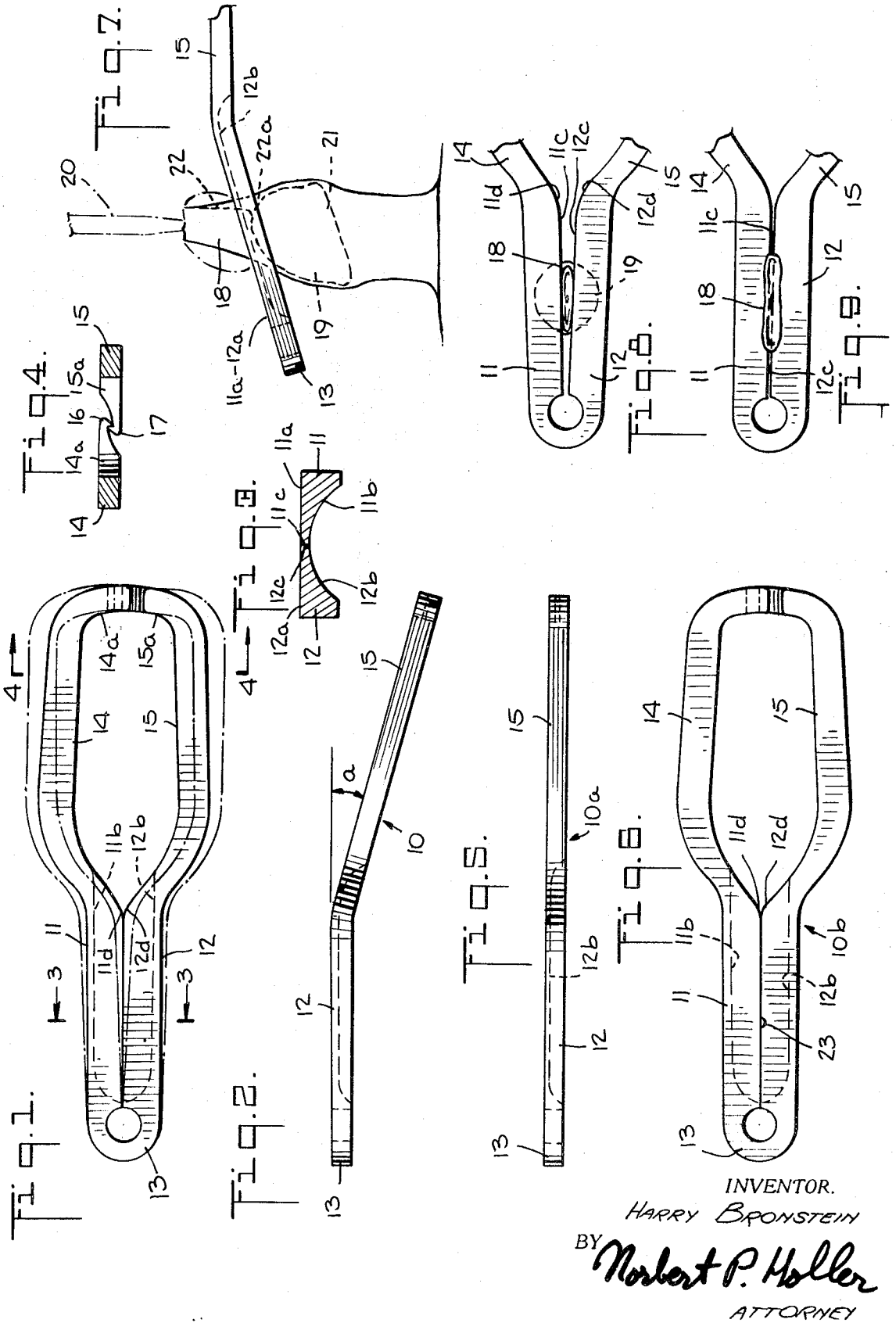
[57] **ABSTRACT**

Circumcision clamps of the "dorso-ventral" type, which are characterized by pairs of mating elongated jaws for clamping the prepuce or foreskin and which are positioned transversely of the glans penis in the dorsal-ventral direction when used in a circumcision operation, are disclosed. The clamps are one-piece structures which can be made in either reusable or disposable form. The two jaws of each such clamp are interconnected at one end by a solid hinge integral therewith which normally biases them into their open state, and at their other ends have respective preferably laterally offset arms integral therewith and extending generally longitudinally therefrom for a sufficient distance to provide the leverage required to enable the jaws to be pressed together into their closed state against the force of the hinge and with sufficient force to crush and produce at least almost complete hemostasis in a prepuce clamped between the jaws. At their free ends, the arms are provided with interengageable hooks or ratchet elements to enable the respective jaws to be locked in their closed position. In the use of such a clamp, the plane of the jaws should be oriented oblique to the axis of the penis, in conformity with the physical shape of the glans, to enable a greater amount of the prepuce and mucosa to be cut off dorsally of the glans than ventrally thereof and to avoid cutting unnecessarily into the frenulum. To make the operator cognizant of this requirement and to facilitate such use, the clamp is preferably made with the plane of the jaws oriented oblique to the plane of the arms.

This abstract is not to be taken either as a complete exposition or as a limitation of the present invention, however, the full nature and extent of the invention being discernible only by reference to and from the entire disclosure.

8 Claims, 9 Drawing Figures





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CIRCUMCISION CLAMP

This invention relates to the art of circumcision of male human beings, and in particular to improvements in circumcision clamps for use in connection therewith.

In carrying out a circumcision operation, it is common practice, after the preliminary probing operation to loosen the mucosa and smegma from the surface of the glans penis has been completed, first to thread or draw the prepuce and adherent mucosa covering the glans into and through an open circumcision clamp, then to close the clamp with sufficient force to effect a complete or an almost complete hemostasis (the latter condition must be initially present in circumcisions performed in accordance with ritualistic Hebraic rites which require blood to flow at the time the prepuce is cut), and finally to cut off the portion of the prepuce and mucosa protruding through the clamp at the side of the latter facing away from the glans. The clamp is subsequently opened and removed, permitting the remaining skin to be retracted behind the glans. A circumcision is, of course, a relatively simple operation, but when performed by inexperienced or careless operators can be dangerous and result in damage to the glans penis either during or after the circumcision, which could lead to impairment of the physiological and biological functions of the organ and, particularly where the circumcision is being performed upon an infant, may even result in the infant's death.

In my prior U. S. Pat. No. 2,747,576, I have heretofore disclosed and claimed a class of circumcision clamps which may be referred to as the "dorso-ventral" type, so called because for clamping the prepuce mated jaws are used which, during a circumcision operation, are positioned to extend transversely to the glans penis in the dorsal-ventral direction. Although such clamps have proved to be a valuable aid in enhancing the safety of circumcision operations, they are nevertheless multi-element structures which are expensive to produce and, in common with all other types of clamps, require a great deal of skill to ensure the proper use thereof.

In addition, persons performing circumcisions have heretofore generally concentrated only on the immediate problem of cutting off the tip of the prepuce, without paying sufficient attention to the physical shape of the glans penis. As a result, circumcisions are customarily made by cutting "straight across," i.e. with the cutting plane essentially perpendicular to the axis of the penis. The glans, however, is characterized by an oblique orientation of the corona thereof to the axis of the penis, which makes the dorsal portion of the glans to be uncovered substantially greater than the ventral portion.

This has created two main problems. Thus where the "straight across" cut is made far enough along the prepuce (in from the extremity thereof) to ensure removal of the proper amount of skin dorsally of the glans, far too much of the ventral skin which does not cover the glans is also cut off, leaving the stem of the penis denuded and unsightly. Moreover, because of the excessive ventral cut, the base of the frenulum is also cut into and frequently completely severed. This invariably causes severe bleeding at the time due to the difficulty of ligating the capillaries which constitute the majority of the blood vessels in the frenulum, and subsequently has an adverse effect on the biological function of the organ during coitus.

On the other hand, where the cut is made only a short distance in along the prepuce in order to avoid cutting off the base of the frenulum, too little skin is removed dorsally of the glans, with the result that the cervix of the glans is not uncovered and does not become accessible for the removal of accumulated smegma therefrom. Removal of smegma is extremely important, however, since medical research has statistically established that smegma is carcinogenic as well as conducive to the occurrence of infections, inflammations and other diseases of the penis. By virtue of the insufficient dorsal cut, therefore, the primary purpose of the circumcision operation, i.e. the removal of smegma, is effectively nullified.

The principal object of the present invention, therefore, is to provide a novel and improved dorso-ventral circumcision

clamp construction which will enable circumcision operations to be carried out properly, easily and safely.

Another object of the present invention is the provision of such novel and improved circumcision clamps which are considerably easier as well as more economical to manufacture than any heretofore known circumcision clamp, can be made in either reusable or disposable form, and can be manipulated and operated with one hand.

It is also an object of the present invention to provide novel and improved circumcision clamps and methods as aforesaid which facilitate the removal of the proper amount of prepuce and mucosa during a circumcision operation, i.e. an amount which is greater dorsally of the glans penis than ventrally thereof in conformity with the physical shape of the glans, without risk of injury to the glans or the frenulum.

Generally speaking, the objectives of the present invention are attained by a one-piece circumcision clamp construction comprising a pair of rigid, coplanar, mating jaws which are integrally hinged to one another at one end so as normally to be urged apart somewhat by the hinge, only sufficiently, however, to enable the prepuce to be threaded into the bite of the jaws but not the glans. At their other ends, the clamp jaws are integral with a pair of rigid arms which are preferably laterally outwardly offset relative to the respective jaws in opposite senses to enable the operator to press the jaws together with the leverage required to close them against the biasing force of the hinge and with sufficient force to crush and produce at least almost complete hemostasis in the clamped prepuce. The arms are provided at their free ends with interengageable hook or ratchet elements for holding the arms in the jaw-closing position while hemostasis is achieved in the prepuce located between the jaws. Both jaws are flat on their top surface to define the cutting plane and are complementarily arcuately inwardly beveled or recessed in their bottom surface to accommodate the end of the glans penis. The jaw portion of the clamp construction is preferably oriented in a plane oblique to the plane of the arm portion to facilitate positioning of the jaws at the proper angle to the glans during a circumcision operation. Such clamps can be easily produced by standard manufacturing techniques either to be reusable, in which case they will preferably be made of stainless steel or the like, or to be disposable after a single use, in which case for purposes of minimum cost of production they will preferably be made of synthetic thermoplastic or thermosetting resinous materials such as nylon, polyethylene, polypropylene, and the like suitably processed to have sufficient hardness or strength characteristics to be able not only to exert the required clamping pressure but also to withstand autoclaving, for purposes of sterilization, at temperatures of about 300° F. or more. Both the resinous or plastic material and any reinforcing filler used therein must, of course, be non-toxic or characterized by levels of toxicity sufficiently low to render them acceptable for surgical procedures on human beings.

The foregoing and other objects, characteristics and advantages of the present invention will be more clearly understood from the following detailed description thereof when read in conjunction with the accompanying drawing, in which:

FIG. 1 is a top plan view of a circumcision clamp according to one aspect of the present invention;

FIG. 2 is a side elevational view of the clamp shown in FIG. 1;

FIGS. 3 and 4 are sectional views taken, respectively, along the lines 3—3 and 4—4 in FIG. 1;

FIG. 5 is a side elevational view, similar to FIG. 2, of a circumcision clamp constructed in accordance with another aspect of the present invention;

FIG. 6 is a top plan view, similar to FIG. 1, of a circumcision clamp constructed in accordance with yet another aspect of the present invention;

FIG. 7 is a fragmentary side elevational view illustrating the use of the circumcision clamp shown in FIGS. 1 and 2; and

FIGS. 8 and 9 are fragmentary top plan views of the clamp in different stages of the operation illustrated in FIG. 7.

Referring now by the drawing in greater detail, in the various figures of which like parts are designated by like reference numerals, the circumcision clamp **10** (FIGS. **1** and **2**) according to one aspect of the present invention is a one-piece construction which can be manufactured by standard manufacturing techniques and comprises a pair of rigid, coplanar jaws **11** and **12** connected to one another at one end by an integral, solid flexible hinge portion **13** normally biasing them into the open state thereof illustrated in phantom outline in FIG. **1**. At their other ends, the jaws are integral with respective rigid arms **14** and **15** which extend generally longitudinally of the jaws and are laterally outwardly offset relative thereto. The arms **14** and **15**, by means of which the jaws can be pressed into their closed state, illustrated in solid lines in FIG. **1**, against the biasing force of the hinge **13**, are turned inwardly toward one another at their free ends and there are provided with respective interengageable hook or ratchet elements **16** and **17** (FIG. **4**)BY means of which they can be locked in the jaw-closing position. It will be apparent that the offsetting of the arms relative to the jaws enhances the leverage required for the clamping function. The plane of the jaws **11** and **12** in the clamp **10** is oriented oblique to the plane of the arms **14** and **15** (FIG. **2**), the angle *a* between these planes being ordinarily between about 15° and 25° (although it may be somewhat greater or smaller if desired) in conformity with the physical shape of the glans penis.

The jaws **11** and **12** are flat on their top surfaces **11***a* and **12***a* (FIG. **3**), and on their bottom surfaces are provided with complementarily arcuately inwardly beveled or recessed portions **11***b* and **12***b*, the jaws **11** and **12** thus having mated facing inner edges **11***c* and **12***c* (see also FIGS. **8** and **9**), preferably on the order of about **1** or **2** mm. wide, defining the prepuce-engaging surfaces of the clamp. As will become clear as the description proceeds, the flat surface **11***a*–**12***a* of the jaw portion of the clamp defines the cutting plane, while the concave surface **11***b*–**12***b* defines the recess accommodating the tip of the glans penis during the circumcision.

In operation, when a circumcision is to be performed, the hooks or ratchet elements **16** and **17** are first disengaged from each other, permitting the clamp **10** to open and separate the jaws **11** and **12**, as shown in phantom in FIG. **1**, to the extent of about 4 or 5 mm. at their ends connected to the arms **14** and **15**, i.e. just far enough (FIG. **8**) to enable the portion of the foreskin or prepuce **18** intended to be removed, but not the glans penis **19**, to pass between the edges **11***c* and **12***c*. Preliminary to the application of the clamp, of course, the mucosa adhering to the glans penis between the latter and the prepuce is loosened, and the smegma in the cervix of the glans is broken free and removed, by the use of a suitable probe (not shown). The prepuce **18** is then drawn by means of one or more hemostats **20** (only one is shown in phantom outline in FIG. **7**) into and through the space between the open jaws **11** and **12** (FIG. **8**), the clamp being held so that the recess **11***b*–**12***b* faces the glans and that the jaw portion is oriented substantially parallel to the corona **21** of the glans. The reason for the obliquity of the jaw portion of the clamp will now be apparent; thus, by its very presence, the bend in the clamp will make the person performing the circumcision cognizant of the fact that he must hold and apply the clamp in such a manner that both the clamping line and the cutting plane will follow the line of, i.e. be oriented substantially parallel to, the corona of the glans, to ensure that the jaws will clamp the prepuce further in from the orifice extremity thereof on the dorsal side (the left in FIG. **7**) than on the ventral side (the right in FIG. **7**). It will be understood that the glans cannot be drawn into the opening of the jaws **11** and **12** by virtue of the limited spreading thereof, whereby the possibility of damage to the glans is effectively avoided. Moreover, the ends of the jaws **11** and **12** merging into the arms **14** and **15** are rounded off, as shown at **11**d and **12***d* (FIGS. **1** and **8**), to prevent injury to the prepuce while it is being threaded or drawn into the jaw opening.

The arms **14** and **15** are then pressed together until the hooks or ratchet elements engage, locking the jaws in the closed position and producing hemostasis in the portion of the prepuce **18** clamped between the edges **11***c* and **12***c* (FIG. **9**). As clearly shown, the cutting plane **11***a*–**12***a* thus intersects the prepuce further in from the end thereof on the dorsal side than on the ventral side (FIG. **7**), and although the outermost portion of the frenulum **22** is also clamped between the edges **11***c* and **12***c*, the cutting plane remains clear of the base of the frenulum. Again, it will be seen that since the beveled surface portions **11**b and **12***b* are adapted to fit over the glans penis **19** (FIG. **7**), the glans cannot be damaged in this operation. In the clamped condition, the prepuce spreads out somewhat over the clamping region of the jaws, as shown.

After the clamp has been closed in the orientation described and all (or all but a small part) of the blood flow to the prepuce has ceased, the portion of the prepuce projecting beyond the clamp is cut off by guiding the knife (not shown) along the flat surface **11***a*–**12***a* (FIG. **7**). It will be seen that the clamp orientation now ensures that, with the glans being larger dorsally than ventrally, more dorsal than ventral skin will be cut off and that, although some of the outermost end region of the frenulum **22** will inevitably also be severed, the base **22***a* of the frenulum will remain unaffected and undamaged. The severe bleeding which would occur upon the base of the frenulum being cut is avoided, and the frenulum will, therefore, retain its ability subsequently to perform its biological function in improving the sex act during ejaculation. Moreover, since only a small amount of ventral skin is cut off, the stem of the penis will not be denuded and rendered unsightly. The clamp is retained in place for a further short time interval after the cutting operation until complete stoppage of circulation to the severed edge of the remaining portion of the prepuce has taken place. Thereafter, the clamp is removed and the usual post-operative measures are taken, which need not here be set forth.

The objectives of the present invention may also be attained by slightly modified versions of the clamp **10**. Thus, the clamp **10***a* shown in FIG. **5** differs from the first described embodiment only in that the jaw portion and the arm portion are disposed in the same plane, i.e. the clamp is straight and not angled as shown in FIG. **2**. In the use of the clamp **10***a*, therefore, the person performing the circumcision will have to exercise care in applying the clamp to make certain that the cutting plane defined by the jaws **11** and **12** substantially follows or parallels the corona of the glans. The clamp **10**b shown in FIG. **6**, on the other hand, may be either angled as shown in FIG. **2** or straight as shown in FIG. **5** and differs from the other embodiments only in that a small round-edged recess or notch **23**, about 1 mm deep and about **2** mm wide as measured along the jaws, is provided in the clamping or prepuce-engaging region of one of the jaw clamping edges, for example in the edge **12***c* of the jaw **12**. The presence of such a recess will be positive assurance of the attainment of less than complete hemostasis, i.e. of the fact that some blood will flow in the prepuce during the circumcision operation. Since, as previously mentioned, this condition must be present in Hebraic ritualistic circumcisions, the clamp **10**b would be particularly well suited for use in circumcisions of that type.

It will be clear to those skilled in the art that by virtue of the one-piece construction, the clamps according to any of the various embodiments of the present invention lend themselves readily to manipulation with one hand, i.e. they can be both opened and closed with one hand, enabling persons performing circumcisions to apply the clamps without at the same time having to release the hemostats **20**. Moreover, by virtue of the one-piece construction, these clamps can be economically produced, inasmuch as the need for making several parts and then assembling the same into the final product is entirely eliminated. It is this aspect of the invention, in fact, which now for the first time has made it economically feasible to produce disposable circumcision clamps, even though disposability in various types of surgical and medical instruments has long

been recognized as desirable if for no other reason than the elimination of cross- infection.

It will be understood that the foregoing description of preferred embodiments of the present invention is for purposes of illustration only, and that the various structural and operational features herein disclosed are susceptible to a number of modifications and changes none of which entails any departure from the spirit and scope of the present invention as defined in the hereto appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A "dorsal-ventral" circumcision clamp, comprising a one-piece structure providing a pair of coplanar, rigid, elongated, mating jaws having respective opposed facing smooth-surfaced edges about 1 to 2 mm. wide adapted to receive and clamp a prepuce inserted therebetween, a solid flexible hinge integral with and interconnecting said jaws at one end of the latter, said hinge biasing said jaws angularly away from one another into an open state thereof to an extent sufficient to permit only the prepuce but not the glans penis to pass therebetween respective arms integral with and connected to said jaws at the other ends thereof, said arms extending generally longitudinally of said jaws for a sufficient distance from said other ends of said jaws for providing the leverage required to enable said jaws to be pressed toward one another into a closed state against the force of said hinge and with sufficient force to crush and produce at least almost complete hemostasis in a prepuce when clamped between said jaws, and interengageable latching elements at the free ends of said arms for releasably securing said jaws in their closed and clamping state, said jaws being further provided with complementary flat top surfaces to define the cutting plane when said jaws are in the closed state, and with respective complementarily arcuately inwardly beveled bottom surfaces to define a concave recess adapted to accommodate the glans penis.

2. A circumcision clamp according to claim 1, said structure having the plane of the jaw portion thereof oriented oblique to the plane of the arm portion thereof, the degree of obliquity corresponding to the physical shape of the glans penis and serving as an indication to a person performing a circumcision to orient the cutting plane so as to follow the line of the corona of the glans penis.

3. A circumcision clamp according to claim 1, said structure having the portion thereof portion of said structure including said arms coplanar with the portion thereof.

4. A circumcision clamp according to claim 1, said arms being laterally outwardly offset relative to their respective jaws.

5. A circumcision clamp according to claim 1, one of said jaws being provided in said edge thereof with a small smooth-surfaced recess approximately medially of the clamping region of said edge to assure incomplete hemostasis upon clamping of a prepuce between said jaws.

6. A circumcision clamp according to claim 5, said recess being about 1 mm deep and about 2 mm wide as measured along said edge of said one jaw.

7. A circumcision clamp according to claim 1, said structure being made of stainless steel.

8. A circumcision clamp according to claim 1, said structure being made of synthetic thermoplastic or thermosetting resinous materials and having zero or acceptably low levels of human toxicity and hardness or strength characteristics sufficient to enable the required clamping pressures to be exerted by said jaws and to enable said structure to withstand autoclaving at temperatures of at least about 300° F. without becoming softened or warped.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,678,935 Dated July 25, 1972

Inventor(s) Harry Bronstein

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 1, "by" should read --to--. Column 5, line 22, a comma should follow the word "therebetween". Column 6, lines 2-3 should read --having the portion thereof including said jaws coplanar with the portion of said structure including said arms.---.

Signed and sealed this 26th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents