INTRAUTERINE CONTRACEPTIVE DEVICES

A COMPILATION OF DEVICES

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INTRAUTERINE CONTRACEPTIVE DEVICES

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Introduction

This compilation of IUD's is intended to provide the reader with an idea of the diversity of existing devices. We have provided information on manufacturers, materials, and patents, but our information is incomplete; further information is needed. In addition, the collection of devices herein is not exhaustive. Hopefully, this compilation can be updated and enlarged subsequently. It is meant to be a working reference book for those interested in IUD design or use. To that end, we would appreciate and welcome additional information that may be available. Most of the information contained in this compilation has been extracted from an "IUD Information Handbook" (See Appendix 2) prepared for The Pathfinder Fund.

We have not included any relevant performance data for the devices. Extensive detailed clinical test data are available in the reports from the Cooperative Statistical Program of Dr. Tietze of The Population Council and in the many reports from the International IUD Programme of Dr. Bernard of The Pathfinder Fund.

The report is divided into three major portions: Considerations for Design of Intrauterine Devices, Photographs of Devices and, Patent Drawings of Devices. In presenting the photographs and drawings we hope to give the reader an idea of the fantastic variety of devices that have been conceived. Also presented is some information on IUD Inserters in Appendix 1. A bibliography on IUD's is also given.

The bibliography also does not pretend to be complete, but does provide a source for those who wish to acquire more information.

For references prior to 1965, the reader is referred to publications of the two international meetings on IUDs held in New York, the first in 1962 and the second in 1964.

CONSIDERATIONS FOR DESIGN OF INTRAUTERINE DEVICES

There are many factors to consider in design of an intrauterine device (IUD). The current variety of intrauterine devices attest to the fact that the method of action is not known, indeed if there is only one method of action. However, clinical experience with IUD's has provided a body of information which may yield insight into the problems associated with design.

An "ideal" intrauterine device should:

a) prevent pregnancy;
b) be continuously retained;
c) be non-toxic to the wearer;
d) produce no symptoms to the wearer;
e) be inexpensive for mass production and distribution;
f) be easy to apply or remove even by non-medical personnel;
g) be non-reactive to sterilization by heat or chemicals;
h) fit the structure which is to contain it.

Knowledge of the organ, the uterus, which will contain it, is fundamental.

ANATOMY

Among women and within the same person, the uterus may be of variable size and shape. Anatomy texts describe the "normal" uterus as a pear-shaped organ, having an average length of approximately 3 inches (7.5 cm), an average breadth of approximately 2 inches (5 cm), and a thickness of 1¼ inches (3 cm). This is an oversimplification and does not adequately describe the different clinical "normal" situations such as:

a) the never pregnant uterus of the young teen-ager;
b) the never pregnant uterus of the adult;
c) the uterus which has carried 1-4 pregnancies to term and is now more than 6 months since the last delivery;
d) the uterus which has carried 1-4 pregnancies to term and is now less than 6 months since the last delivery;
e) the uterus which has carried more than 4 pregnancies to term and is now more than 6 months since the last delivery;
f) the uterus which has carried more than 4 pregnancies to term and is now less than 6 months since the last delivery;
g) the uterus after an abortion of less than 24 weeks gestation and is now more than 3 months after the abortion;
h) the uterus after an abortion of less than 24 weeks gestation and is now less than 3 months after the abortion;
i) the uterus at time of menstruation, or after menstruation, before ovulation, at ovulation, and after ovulation but prior to menstruation.

Properly, then, upon examination of an individual, the "normal" palpable uterus must be considered in relation to an individual's age, parity, current menstrual cycle, or most recent termination of pregnancy. The normal uterus is to be contrasted with the abnormal uterus which may involve a disease process (such as fibroid tumors) or congenital defects. Early in embryonic development, lateral paired structures fuse in the mid-line to form the uterus. Abnormalities result from failure of proper fusion. Because of disease and congenital defects, no intrauterine device can be useful for 100% of women.

SHAPE AND ANGLES

Anatomically, the uterus is usually described as being composed of a body (corpus) and a cervix. The longitudinal axis of the cervix has an angle of about 110 degrees with the longitudinal axis of the corpus (corporocervical angle) in the average "normal" uterus (never pregnant or not recently pregnant). With the uterus in "normal" position in the pelvis, the longitudinal axis of the cervix usually makes about a 90 degree angle with the longitudinal axis of the vagina. Although this is an average, normal relationship, many different angles may be found. Assuming a rather fixed 90 degree angle of the longitudinal axis of the cervix with the longitudinal axis of the vagina, the corpus may have a smaller, even an acute, angle in a forward direction over the bladder (anteflexion), or backward such that the upper portion of the corpus (fundus) rests against the rectum (retroflexion). Thus the corpus of the uterus may assume a position between accentuated anteflexion and severe retroflexion.

The longitudinal axis of the cervix may retain a fixed angle with the longitudinal axis of the corpus, and the entire uterus may pivot about a transverse axis through the junction of the cervix and corpus so that the longitudinal axis of the cervix may describe an arc of more than 180 degrees, whereas in the "normal" position the face of the cervix rests against the posterior wall of the vagina; at the other extreme, it contacts the anterior wall of the vagina. The process is termed anteversion-retroversion. Rather than pure flexion or version, usually various combinations are found which change the angle relationships between the longitudinal axes of the vagina, cervix, and corpus. Furthermore, these relationships may not be constant within an individual and may vary from time to time depending upon physiologic states (e.g., full bladder) and position of the individual (e.g., supine). Disease states, such as tumor masses, or adhesions following inflammation (either bacterial or chemical), or congential defects also may modify these angular relationships.

Unless an operator has a knowledge of the normal anatomical relationships, and of those that may occur as normal variants and/or abnormal states of disease, complications may occur, such as perforation with placement of the IUD into the peritoneal cavity.

UTERINE INTERIOR

Knowledge of the interior of the uterus is of equal importance to that of size, shape and angular relationships. The uterus has several different kinds of tissue. The surface of the corpus is covered by a glistening layer of tissue (visceral peritoneum) which is similar to visceral peritoneum elsewhere in the peritoneal cavity. Adjacent to the surface covering is a mass of specialized, smooth muscle (myometrium) through which course a system of blood vessels, entering the uterus from the lateral margins. The tissue (endometrium) which lines the interior of the uterus and which forms a potential cavity is multi-layered and complex.

ENDOMETRIUM

The endometrium is an extraordinarily delicate, three-dimensional tissue through which course from myometrium to surface small blood vessels and glands (see diagram). The endometrium lines the interior of the uterus, producing only a potential cavity. The surfaces are apposed and separated by a thin layer of fluid which probably originates mostly from the glands. Only those particles of microscopic size, such as sperm, are permitted to enter the interior of the uterus through the cervical canal without disrupting the endometrium. The blood vessels that course through the endometrium have very little supportive elements in their walls and often consist of only a lining (endothelium). Since the tissue is three-dimensional, and since there is no cavity, damage to the endometrium by gouging results by insertion of a firm object into the interior of the uterus, no matter how carefully this is done. Obviously, blood vessels, glands and endometrial cells are disrupted. Thus after each insertion there must be a time for recovery and repair. Those devices with greater volume and greater movement through the endometrium during insertion produce the most damage. The thickness of the endometrium has rather tremendous variations among women and within the same individual during the menstrual cycle. Whether or not a device lies fully within the endometrium or rests against the myometrium will depend party upon the thickness of the endometrium and the height of the IUD.

Furthermore, the blood vessels deep in the endometrium are of larger caliber, narrowing and forming a capillary network as they approach the surface. Consequently, disruption of vessels at the base of the endometrium will often result in greater loss of blood.

CERVIX

Generally, there is a narrowing (internal os) at the junction of the cervix and corpus. This constriction, coupled with the corporocervical angle, are important factors in IUD design since this area must be negotiated easily by a delivery system for placement of the IUD into the interior of the uterus.

UTERINE FORCES

In addition to the anatomical structures and relationships, a knowledge of uterine forces is important. Although most of the published articles deal with the contractile forces associated with labor, there are a few studies describing the contractile forces of the non-pregnant uterus with and without an intrauterine device. Although variable force wave patterns have been reported, depending upon the methods used for investigation, the conclusions which may be drawn are as follows:

1) The contractile forces of greatest magnitude occur at or just prior to the onset of the menstrual flow.
2) Contractions during the proliferative phase of the cycle which is directly under the influence of estrogens are greater than those during the secretory phase of the cycle which follows ovulation.

3) The contractile forces in nulliparous women are greater in magnitude following insertion of an IUD than in multiparous women when compared with the magnitude of the forces measured at the onset of the menstrual period without the presence of an IUD.

The contractile forces are expulsive in nature and usually have their origin in the upper portion of the uterus (fundus) or in the area of the cornua, where the tube passes through the uterine wall. The contractile forces appear to expel the uterine contents and, at the same time, dilate the internal os as the contracting fibers shorten. The magnitude of the force decreases as the propagation of the wave progresses from the fundus to the level of the internal os. Such waves of contraction have elements of, but are not true peristalsis.

(myometrial)
Uterine/forces may exert pressure against an IUD which may then produce pressure against the myometrium and lead to spontaneous perforation. More frequently, though, the forces simply move the IUD, causing shearing of endometrial structures.

USUAL COMPLICATIONS OF CURRENT IUD'S

a) Pregnancy.
b) Spontaneous expulsion.
c) Medical removal for pain or bleeding.
d) Translocation (perforation) (migration).
e) Local inflammatory reaction.

Each of the complications can be related to the design of the IUD, the carrier by which it is introduced into the interior of the uterus, and the insertion technique itself which must acknowledge the skill of the operator.

PREGNANCY

The complication of unwanted pregnancy appears to be related to:

a) the surface area of the device;
b) the amount of local reaction that the device may stimulate within the endometrium;
c) the presence of specific metals attached to, or of chemicals included with, a device.

Surface area may not be important if a device provokes a reaction in the endometrium sufficient to have a contraceptive or contra-implantation effect. Some plastics may induce such a reaction, or a more mild reaction may be produced by the use of metals, such as copper. Hormones may be added to alter the endometrium.

SPONTANEOUS EXPULSION

Spontaneous expulsion appears to be related to:

a) size of device;
b) softness of material;
c) presence of an appendage in the lower uterine segment or in the cervical canal;

d) the design of the device itself as to thether it may be
   (1) "fundal-seeking" or
   (2) have appendages that may prevent or reduce expulsion, or
   (3) degree of rigidity.

REMOVALS

The removals for pain and/or bleeding are related to:

a) the volume of the device;
b) the number of points which can produce a shearing action on the vessels that course through the endometrium;
c) the size of vessels that may be ruptured;
d) the presence of inflammation;
e) abnormal uterine interior (e.g., presence of polyps or submucus fibroids);
f) distension of the uterine interior;
g) chemical reaction to the device itself;
h) unknown causes such as surface electric charge alterations of cells, pH changes, etc.

Cramping may be due to the excess pressure against the myometrium. Exactly how such pressures are converted into a sensation of pain is not known. However, even small amounts of pressure in the interior of the uterus set up extensive cramping in the nulligravidous woman and may be unbearable. Cramping may persist for 48 hours or longer, forcing the operator to remove the device.

TRANSLOCATION

Translocation (perforation or migration) may occur. This may result from:

a) misdiagnosis of the relationship of the corpus to the cervix with either anterior or posterior wall perforation at the time of insertion;
b) excessive pressure against the wall of the uterus causing pressure atrophy and migration;
c) perforation through a weak spot in the myometrium, for example, the former placental site or at the site of a congenital defect.

Rather stiff plastic devices with little "memory" may be extended to fit a linear narrow tube for insertion. After such deformation of a device, forcing it into a confined space, the interior of the uterus, provides ample opportunity for perforation.

INFLAMMATION

Substances inserted into the interior of the uterus may invoke an inflammatory response, with or without concomitant introduction of bacteria. The vaginal lumen is a contaminated area and passage of an inserter through the cervical canal is nearly improbable without the simultaneous introduction of bacteria from the surface of the cervix or from the external portion of the cervical canal. Frequently such introduction of bacteria produces only a transient inflammatory response. However, it is infection, and one response to infection is an increase in the local blood supply by the proliferation and/or dilation of blood vessels. Accompanying the vascularity is an increase in the number of polymorphonuclear leucocytes, plasma cells, and other inflammatory cells. Movement of the IUD within such an endometrium may then lead to easier and greater disruption of the blood vessels. The shearing of glands, vessels and cells may also evoke a response by the body to clear the debris. Uterine bleeding and clinical signs and symptoms of infection may occur, with or without pain.

Even without the simultaneous introduction of bacteria to provoke inflammation, the IUD's may induce an inflammatory response to chemicals in the plastics or to attached metals or both.

THEORIES OF ACTION

How IUD's prevent pregnancy is not known. Several theories have been postulated.

a) Pressures against the walls of the interior of the uterus may stimulate increased motility, either in the tube or the uterus or both. This would either provide for expulsion of sperm, or hasten the transport of the fertilized ovum down the tube, placing it in the interior of the uterus before the endometrium has developed sufficiently to accept it; or induce expulsion of a developing zygote from the interior of the uterus through the expulsive forces of the increased uterine motility.

b) Local inflammatory response may produce a hostile environment, unfavorable for the ascending sperm or for the nourishment and implantation of the developing zygote.

c) Create variations in hormone production which would alter end organ response, in the case the tube, endometrium and cervical glands.

d) Other modes of action not adequately investigated.

Although the theories related to tubal and uterine motility and the alterations in the hormone production response are in question, little doubt remains concerning the effect that inflammation of the endometrium may have on contraception and implantation. Metallic ions may invoke a local inflammatory response or may alter a specific enzyme system which is essential for further development of the embryo within the interior of the uterus. The latter remains under investigation.

PATHOLOGY

The possibilities that varieties of pathology can exist should not be neglected. For example, fibroid tumors are fairly common in women over the age of 30, especially in members of the black race. Chronic disease states, such as chronic inflammation of the endometrium, may be significant in many areas of the world.

MATERIALS

Devices have been made of either plastic or metal or combinations of these. Primary consideration in selecting a material is its ability to be compatible with living tissue, especially the endometrium. Since the materials must be sterilized prior to insertion, they should not react with to chemicals or the heat of sterilization. Other characteristics which are laudable are lightness of weight, good "memory", no surface charge so as to produce static electricity and pick up lint materials, deformation under limited stress, radio-opaqueness, cheap, easy to produce, availability in most areas of the world, non-adsorbent. No single material has all of these qualities. Consequently, combinations of plastic and metals may be necessary.

SHAPE AND SIZES OF DEVICES

No device should have a fixed, closed loop. Experience in the past has shown that such devices when partially or totally lodged within the peritoneal cavity may have herniation of the bowel through the closed loop with subsequent bowel strangulation. Consequently, the U.S. Food and Drug Administration properly has excluded such devices as a recommendation.

A second consideration of shape and size is the ability of a device to fit the interior of uteri of variable size, which may vary from the large dimension seen immediately postpartum to that of the small nulligravid uterus. Perhaps a single device to encompass the entire range of nulligravid, postpartum, and multiparous uteri may be impractical. However, a single device to fit all situations would be desirable.

A third characteristic should be one that does not apply against the myometrium pressure which will result in migration of the device into the peritoneal cavity. Devices which have leading edges or ends that are in contact with the myometrium are more likely to migrate.

Another design factor to consider is the number of parts or edges to the device. Since the device is lodged within the endometrium, any movement by each edge has the potential of producing a shearing stress against the vessels and cells. Consequently, the fewer such places for shearing stress, the better.

Other things to consider in the design of the shape and size are:

a) total volume, which should be kept as small as possible;
b) moldability or flexibility, so that the device can be easily inserted or easily removed through the internal os and yet expand to a maximum of surface area;
c) identification of a device such as by means of strings or appendages which are visible at the external os of the cervix;
d) flexibility in all planes.

Finally, a design should be considered which will permit the device to be placed into a carrier for easy placement into the interior of the uterus by trained,non-medical personnel. Likewise, the design should allow for easy removal without instrumentation.

DELIVERY SYSTEM

A system must take into account that trained, but not necessarily highly skilled, non-medical personnel will be a part of the system. Consequently, an inserter should be able to:

a) easily contain the IUD in a relatively small volume or cross-sectional area of the inserter;
b) be flexible enough or shaped so as to negotiate the corporo-cervical angle in all women without dilation of the cervical canal;
c) be made of material that can be adequately sterilized, particularly under rather primitive conditions;or
d) that can be prepackaged cheaply;
e) that is inexpensive;
f) that is easily manufactured;
g) that will not require a complex process for sterilization, or to load and insert for non-medical people.

One other consideration in development of an inserter is the need for a longer, special type which may be used to insert an IUD immediately, or within a few days, after delivery of the fetus and placenta.

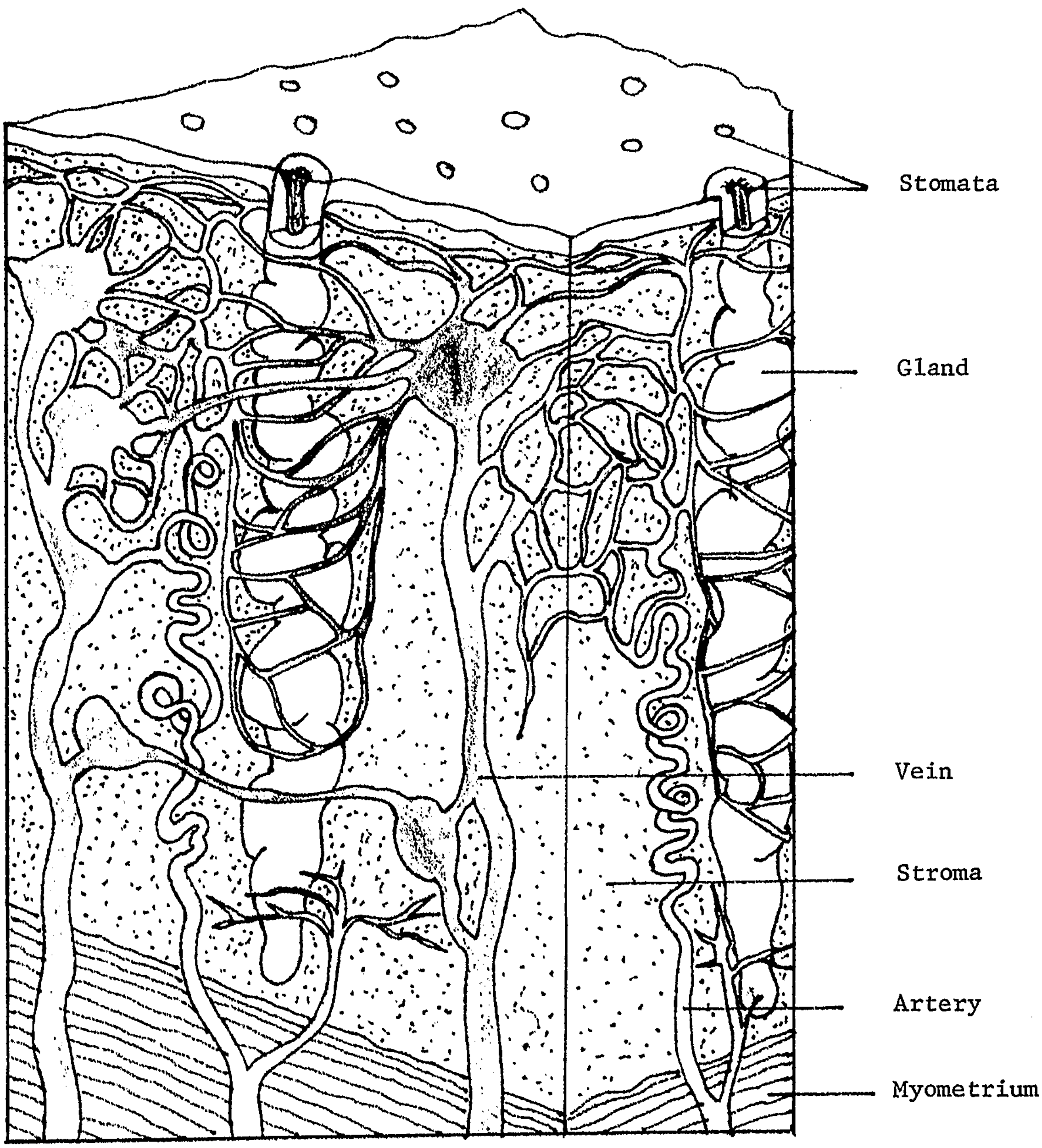
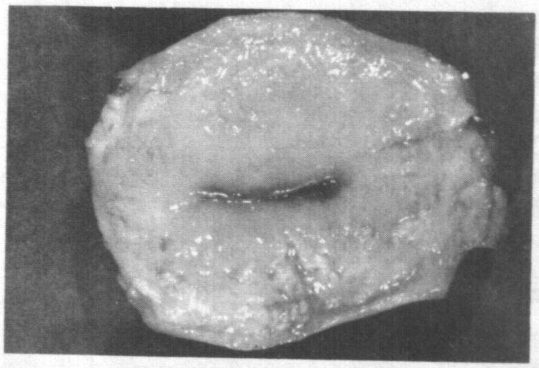


Figure 1. Three-dimensional view of section of endometrium. Diagrammatic.



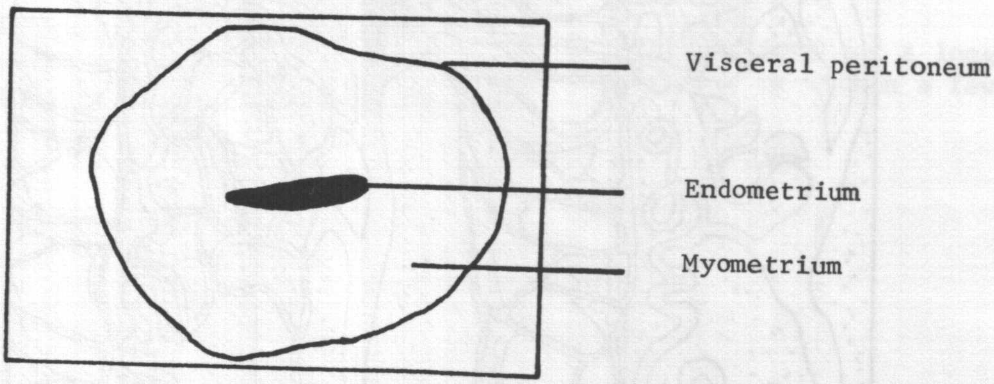


Figure 2a: Photograph of cross section of human uterus. Actual size.

Figure 2b: Diagram of a. to show relationship of size of visceral peritoneum, myometrium, and endometrium. The total A-P depth of the endometrium in this specimen does not exceed 4 mm. and the width is only 20 mm.

CLASSIFICATION OF DEVICES BY GROUPS: PHOTOGRAPHS

Loop Type Devices

Shamrock
Szontagh
Zipper ring
Birnberg Bow
Heart-shaped Device
Dana, Super 3
Organon B
Butterfly
Yusei ring, No. 4A
Comet
Omga
Yusei Ring, No. 4A
Ota Ring
Winata, I
Corolle
Multiloop
Silent Protector
Ragab Ring
M-213
Yusei Ring, No. 1
Chinese Ring
Inhaband

Linear Devices

Lippes Loop, size D ✓
Ahmed or Hong Kong triangle
Beospir ✓
Soonawala
Organon A
Spring Coil ✓
Spira Ring
Sterile M
Plastic T
Ancor, Regular
K.S. Wing, New type ✓
Margulies Spiral, Small
Polish Spiran
Robinson
Quadracoil
Saf-T-Coil ✓

Web Devices

Experimental Postpartum
Web
M-213
Greek Butterfly

Plastic and Metal Devices

"T" with copper wire
"7" with copper wire
"T" with copper sleeve

Multiple Plane Devices

Russian Cross
Lem

Special Devices

Wolfers Device
Majzlin Spring
Silastic
Japanese Device
Filament
Dalkon Shield

This section classifies devices into groups. The photographs give a top view and an angular view, the latter to provide a sense of height. Each square represents 1/4" in the top view.

(1) With one or more loops

    (a) plastic

    (b) metal

(2) Those that can be stretched linearly to fit inside a tube.

    (a) single member

    (b) double member

(3) Membranes

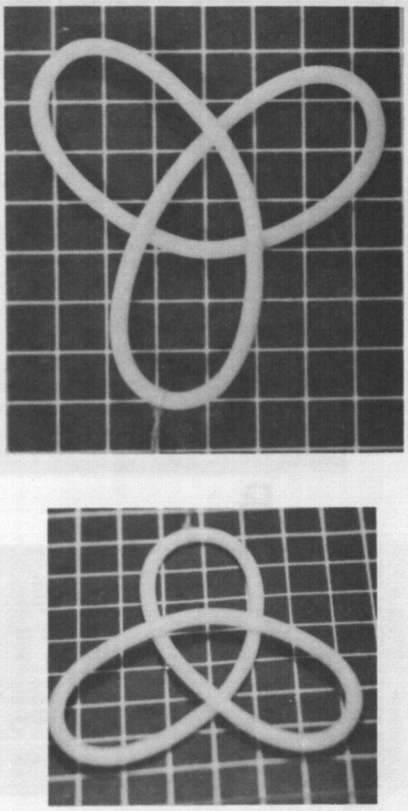
    (a) all plastic

    (b) plastic with metal frame

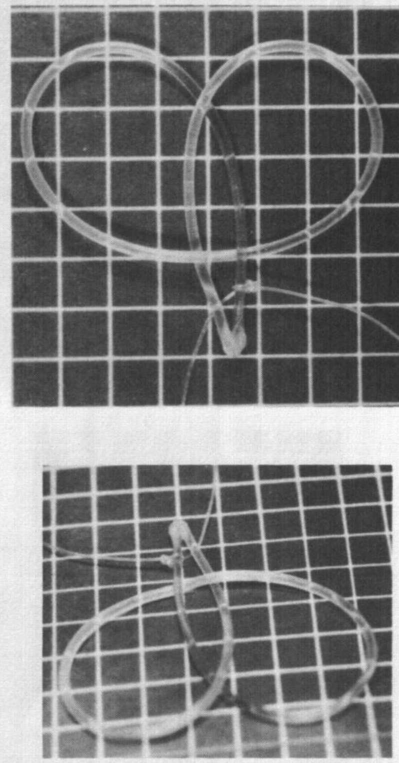
(4) Multiple planes

(5) Metal plus plastic, but no membrane

(6) Special



A



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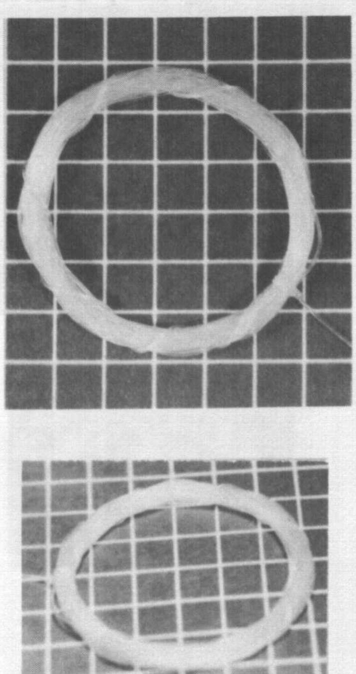


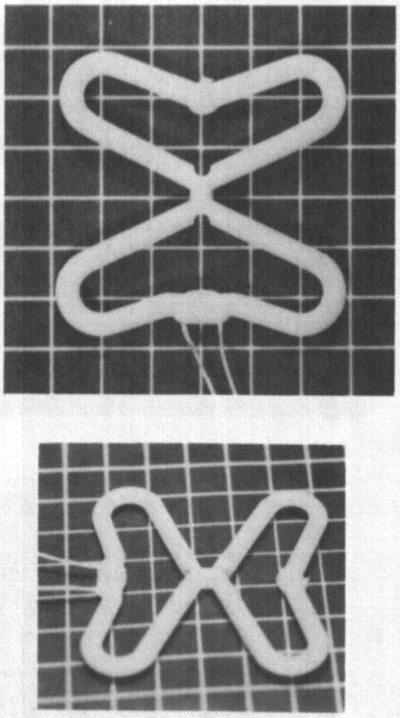
C

Closed Loop Devices

A. Shamrock, medium size

B. Szontagh

C. Zipper ring



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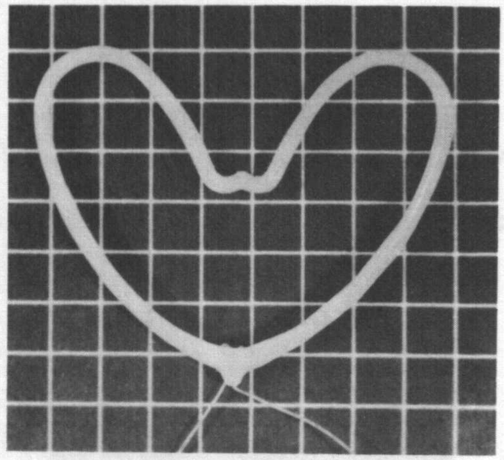

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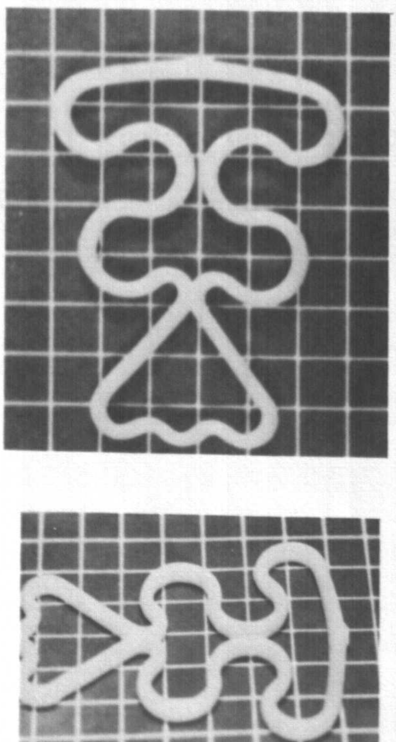


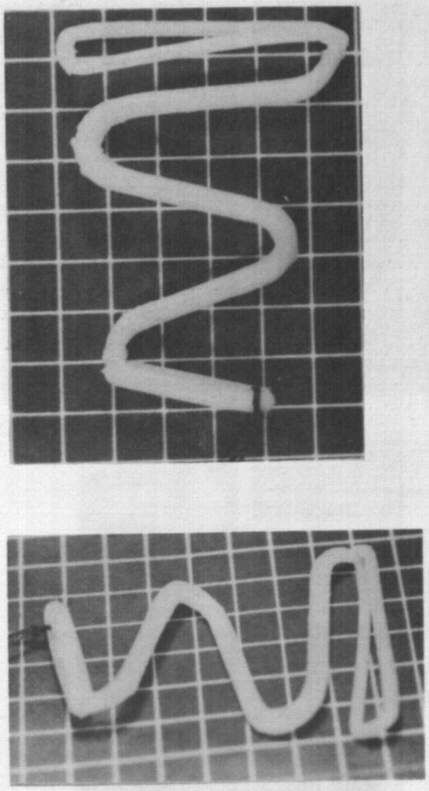
C

Closed Loop Devices

A. Birnberg Bow, standard size

B. Heart-shaped device

C. Dana, Super 3



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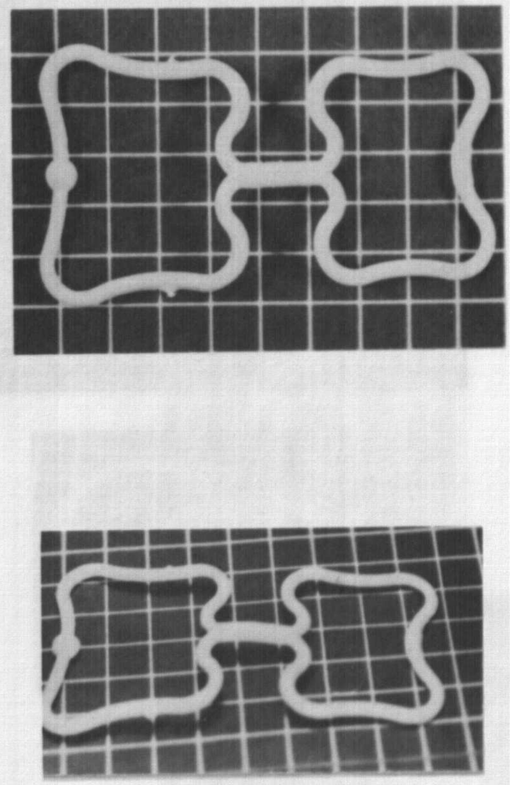

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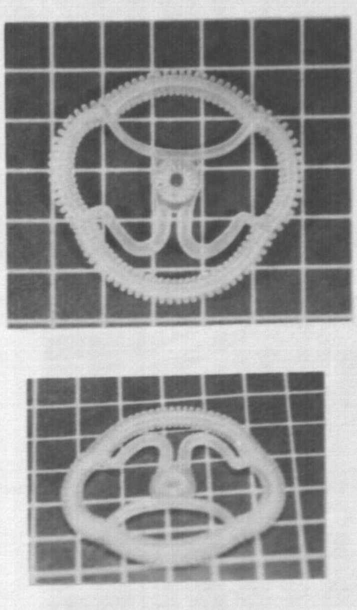


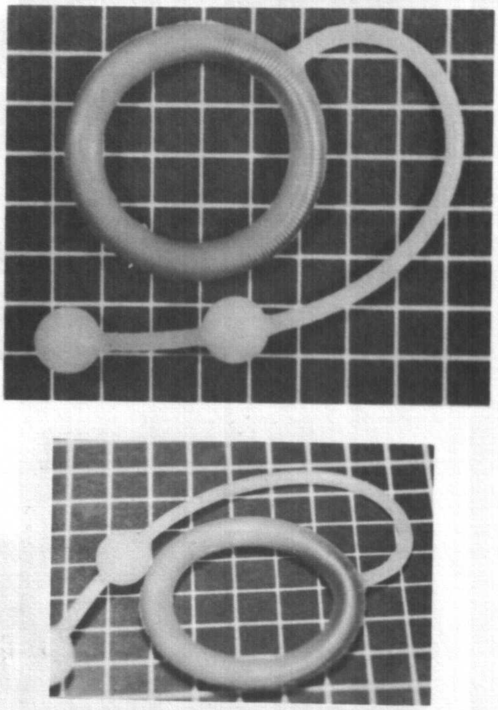
C

Closed Loop Devices

A. Organon B

B. Butterfly

C. Yusei ring, No 4A with gilded metal



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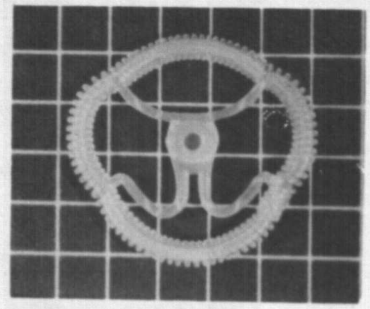

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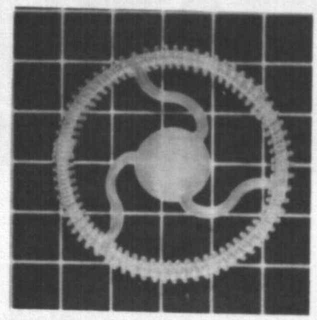

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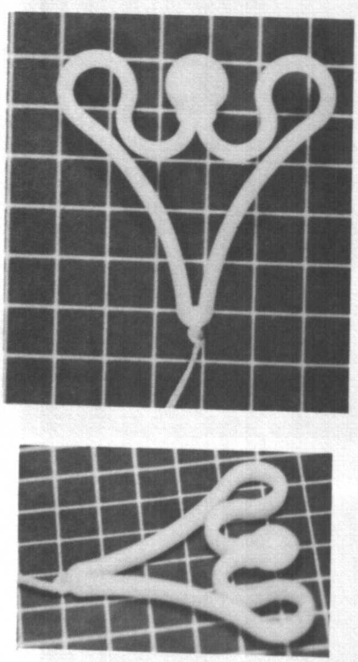


B

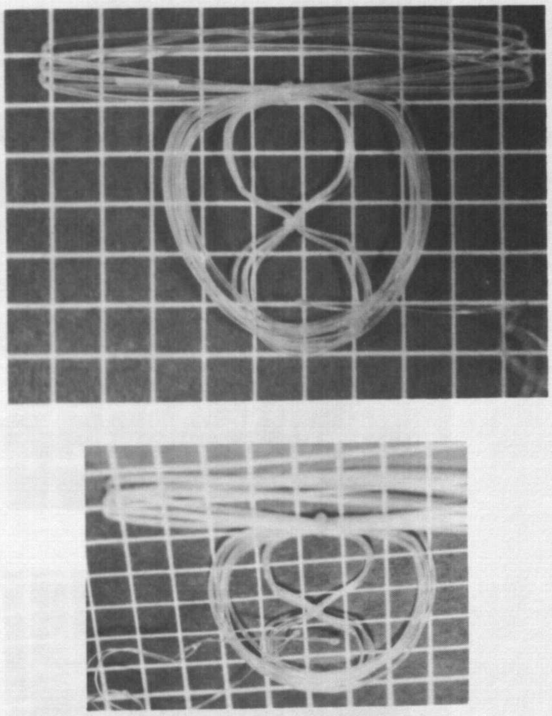
Closed Loop Devices

A. Comet

B. Omga

C. Yusei ring, No. 4A

D. Ota ring



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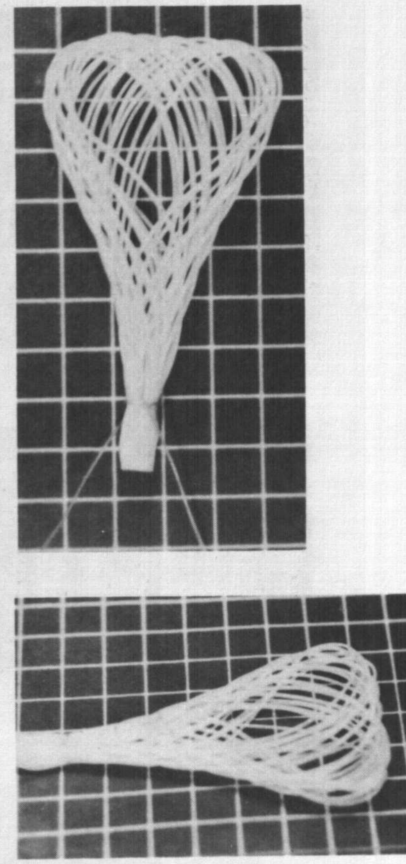

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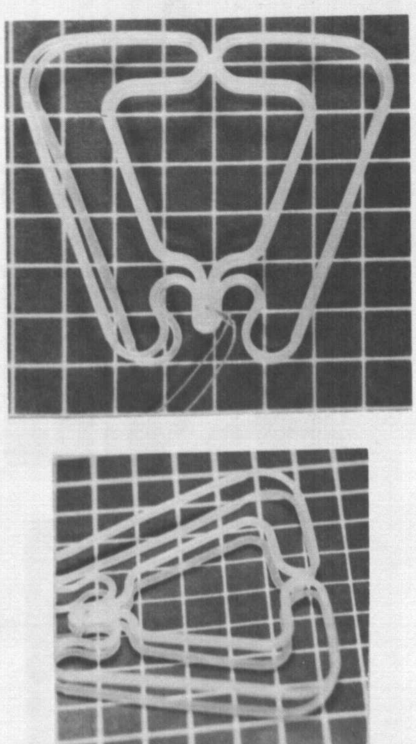


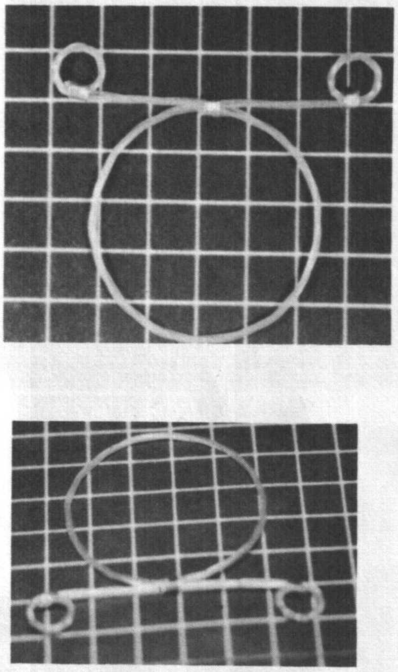
C

Closed Loop Devices

A. Winata, I

B. Corolle

C. Multiloop



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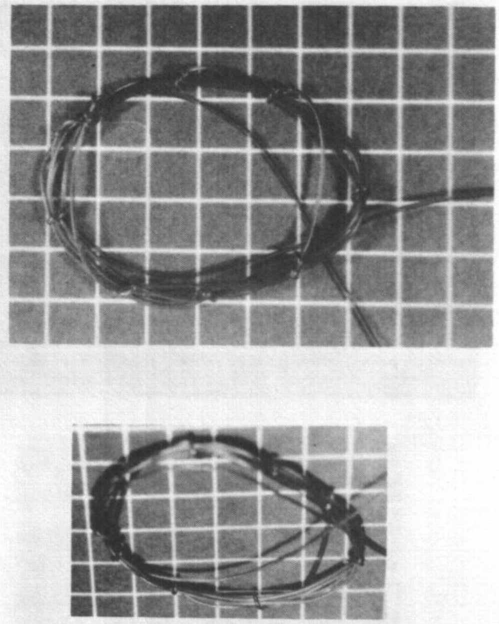
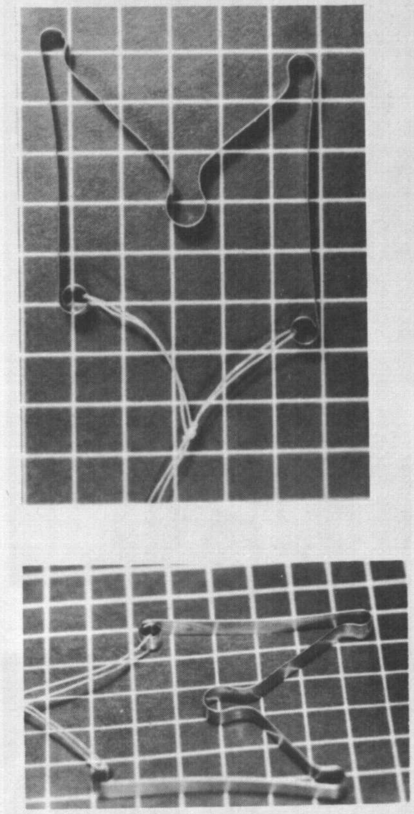


B

Closed Loop Devices

A. Silent Protector, 8½

B. Ragab Ring



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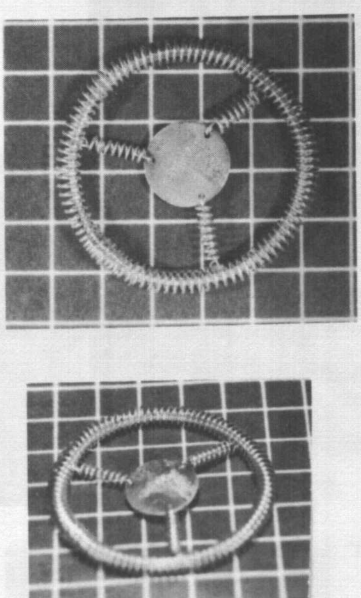
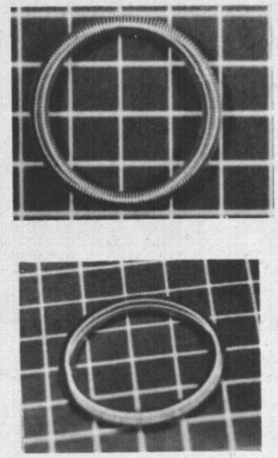


B



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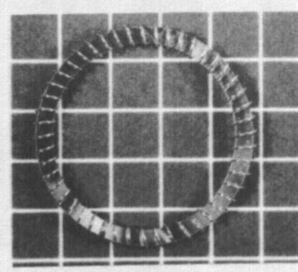


D

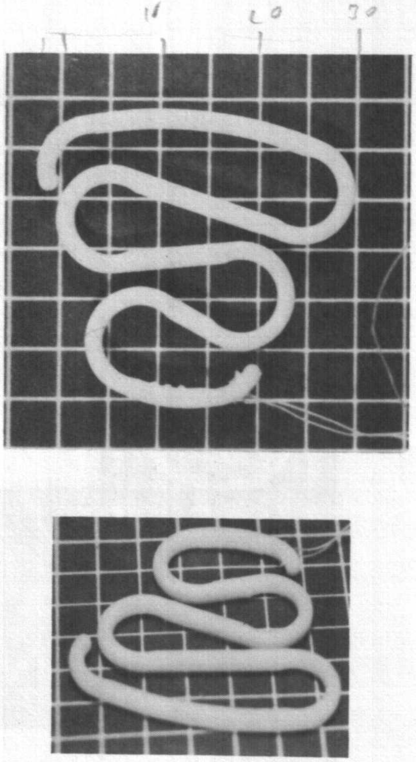
Closed Loop Devices
Metal

A. M-213

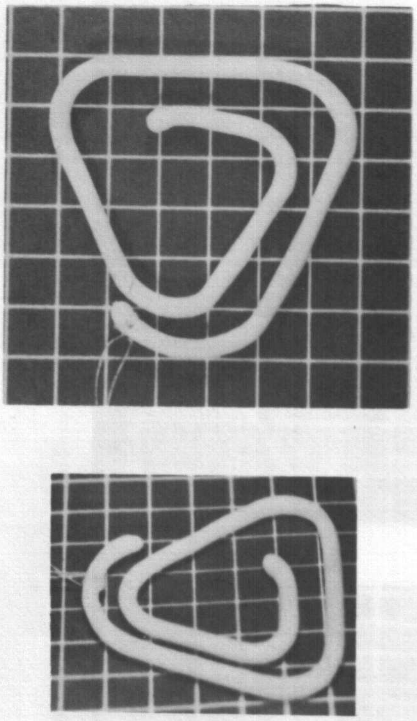
B. Yusei Ring, No. 1

C. Chinese Ring

D. Inhaband



A



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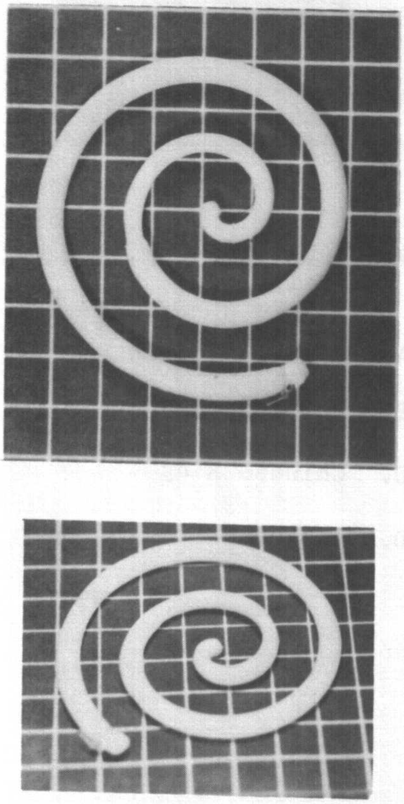

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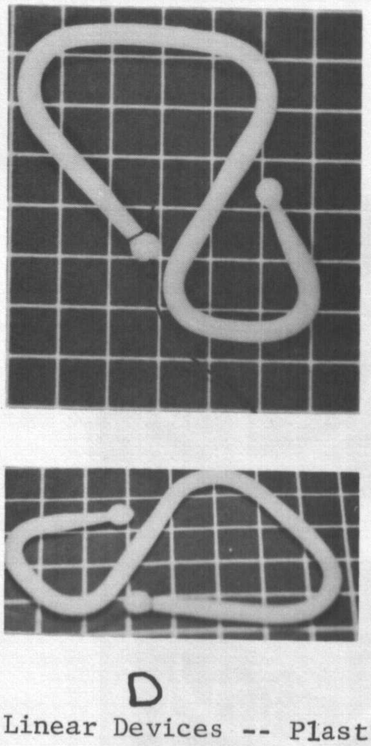
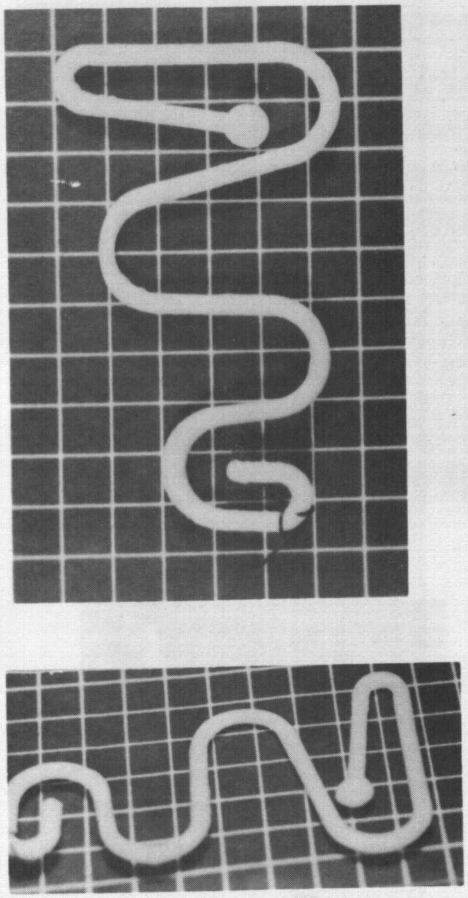


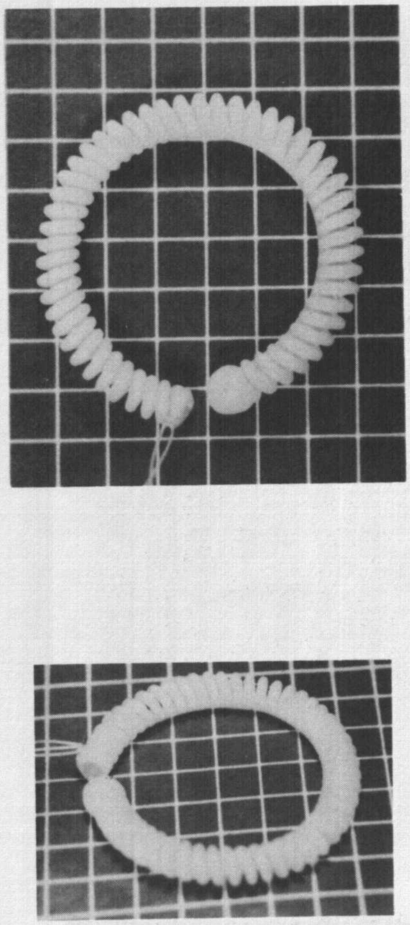
D

Linear Devices -- Plastic

A. Lippes Loop, size D
B. Ahmed or Hong Kong triangle
C. Beospir
D. Soonawala



A



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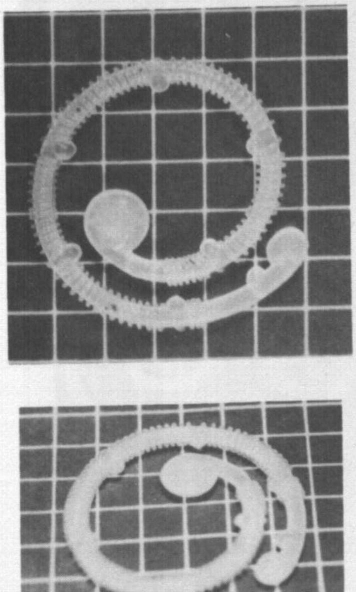


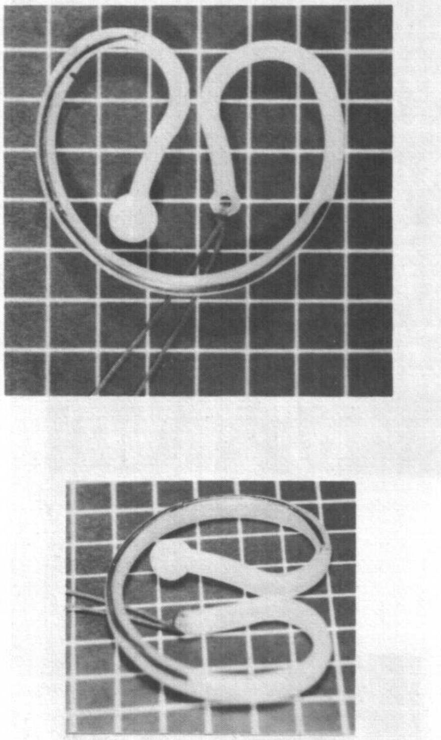
C

Linear Devices -- Plastic

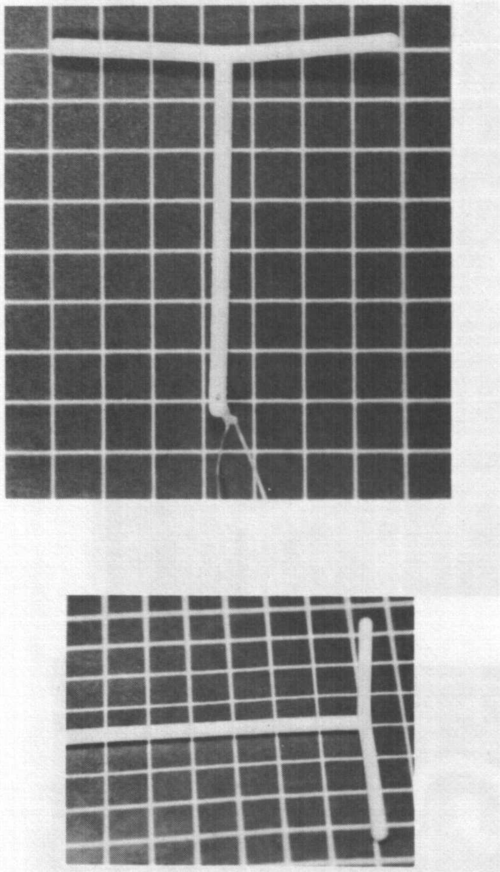
A. Organon A

B. Spring coil

C. Spira Ring



A



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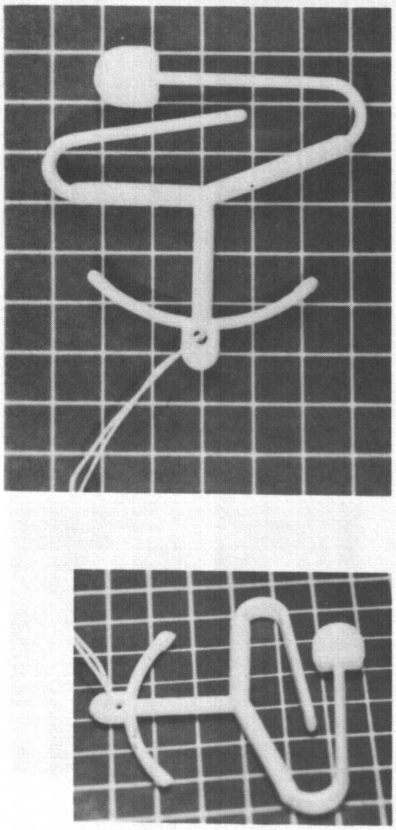


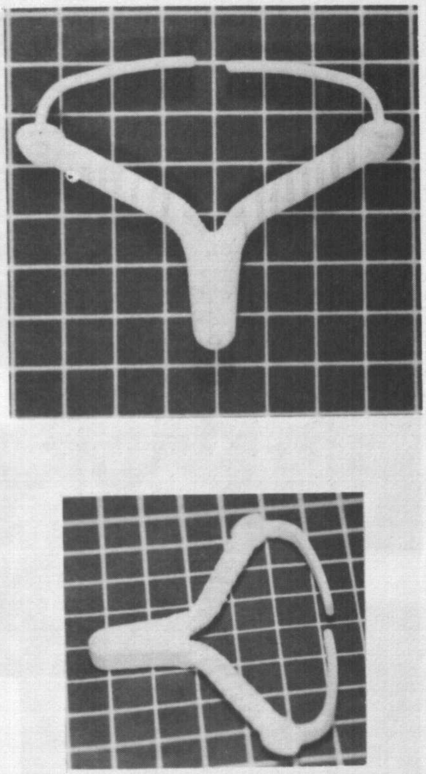
C

Linear Devices

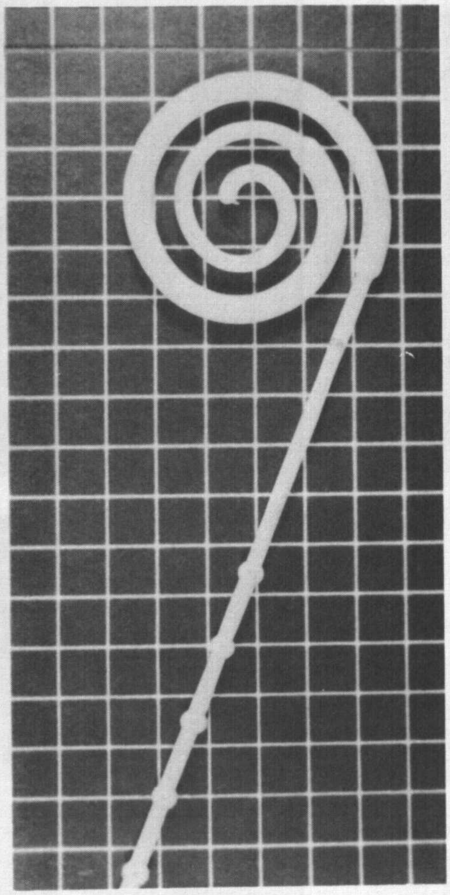
A. Sterile M

B. Plastic T

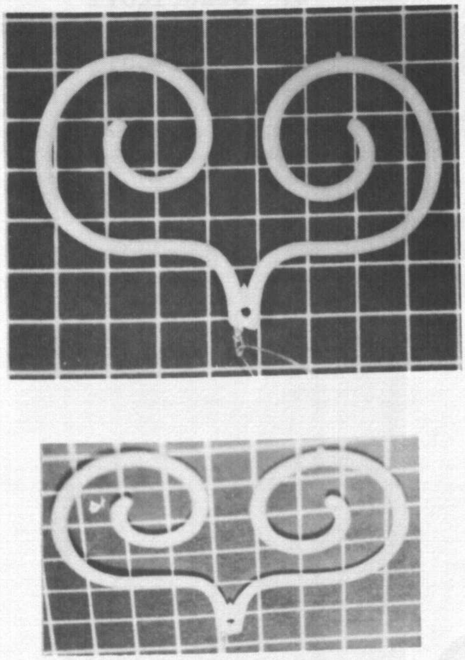
C. Ancor, regular



A



B



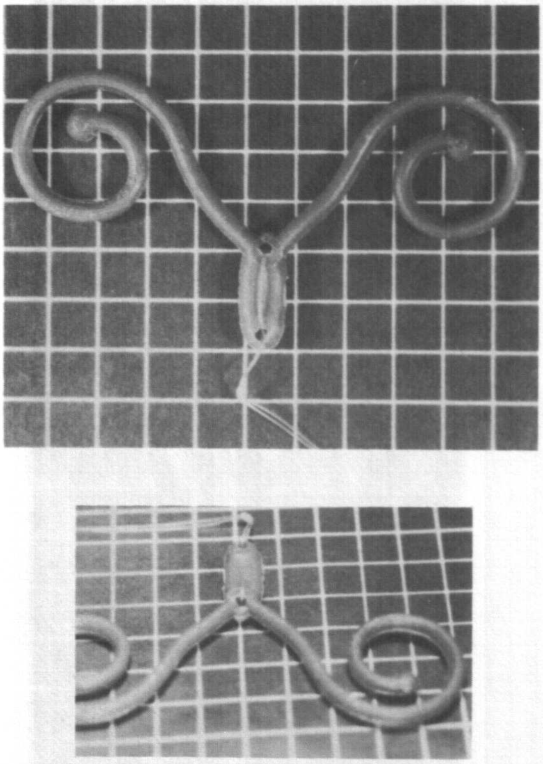
C

Linear Devices -- Plastic

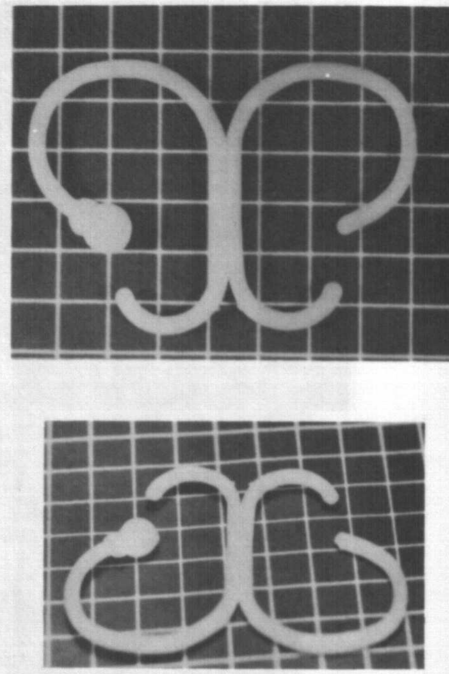
A. K. S. Wing, new type

B. Margulies Spiral, small

C. Polish Spiran



A



B

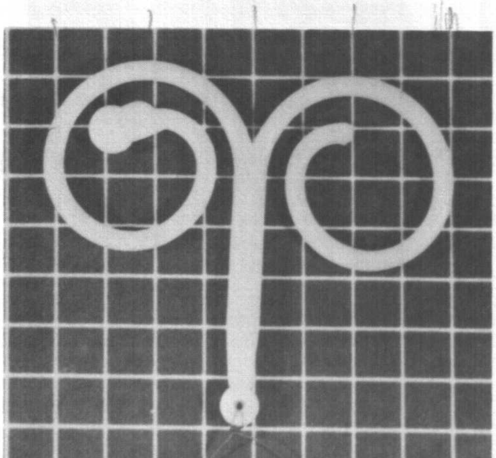
Linear Devices -- Plastic

A. Robinson

B. Quadricoil

C. Saf-T-Coil

10 20 30 40



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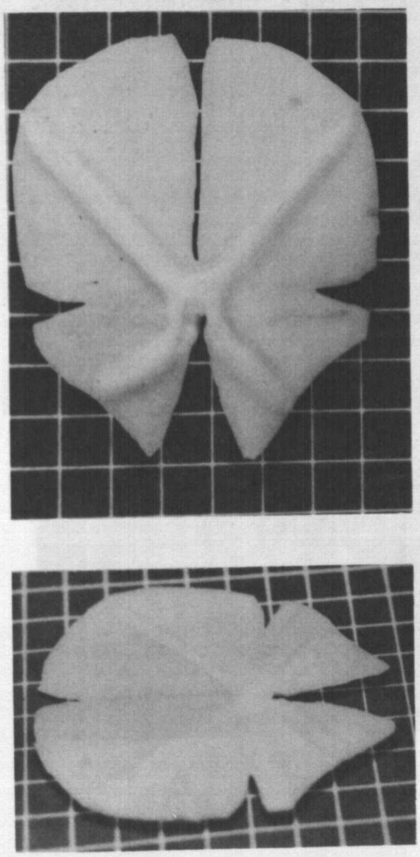
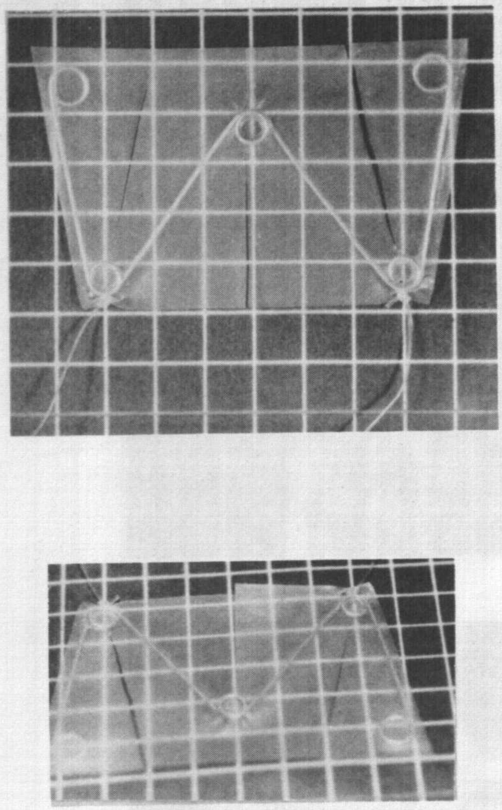


A

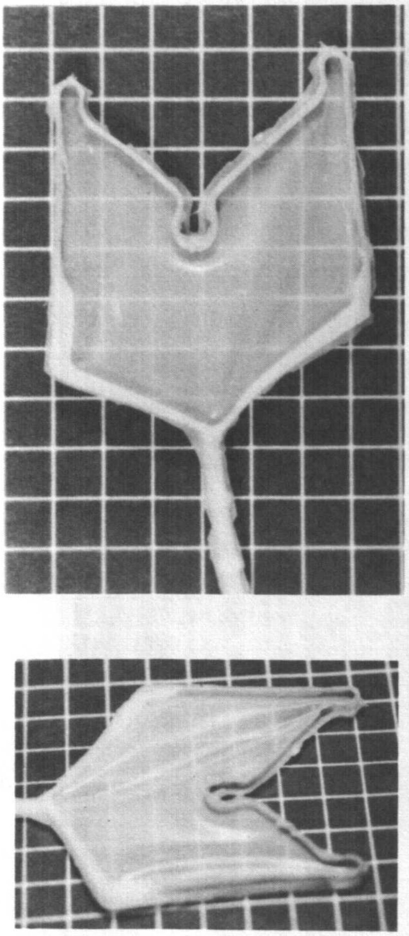


B

Web Devices

A. Experimental Postpartum

B. Web - made of stainless steel wire core and polyether polyurethane membrane of 0.004" thickness.



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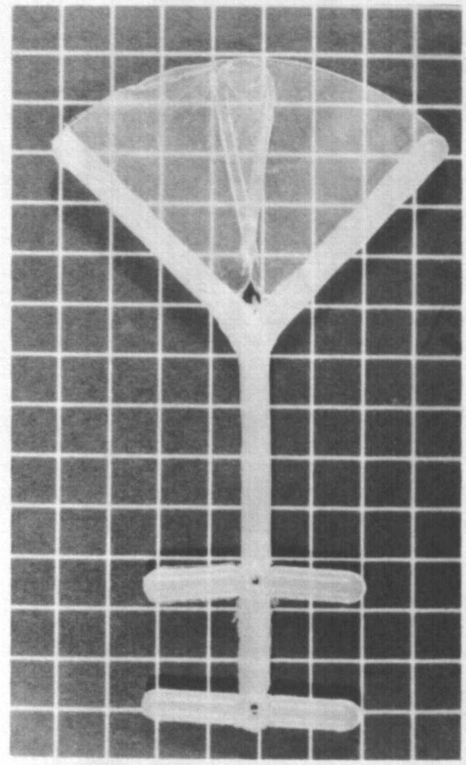
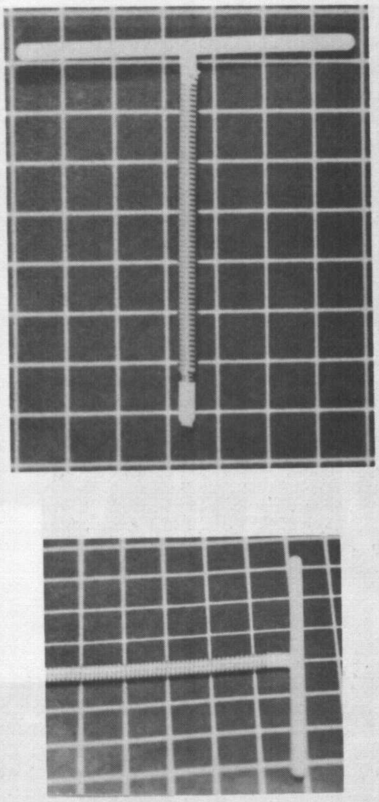


B

Web Devices

A. M-213 with Silastic coating and membrane

B. Greek butterfly



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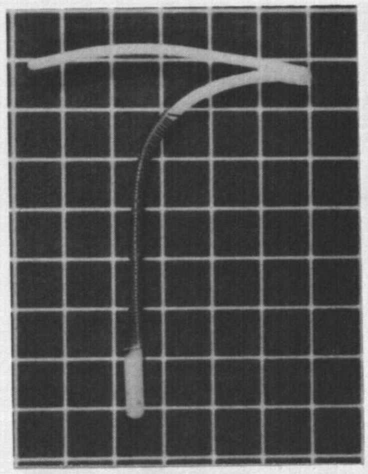


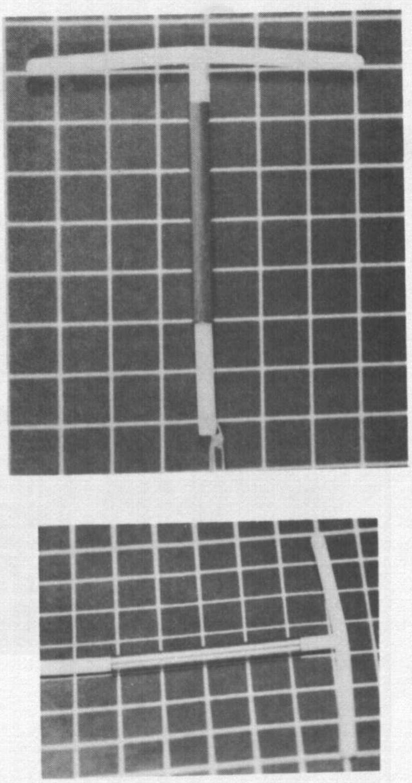
B

Plastic and Metal Devices

A. "T" with copper wire around stem.

B. "7" with copper wire around stem.

C. "T" with copper sleeve on stem.



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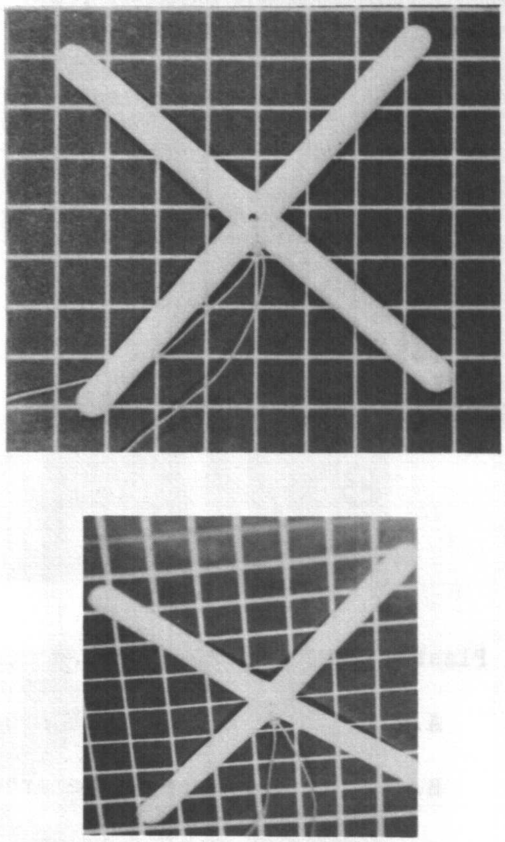

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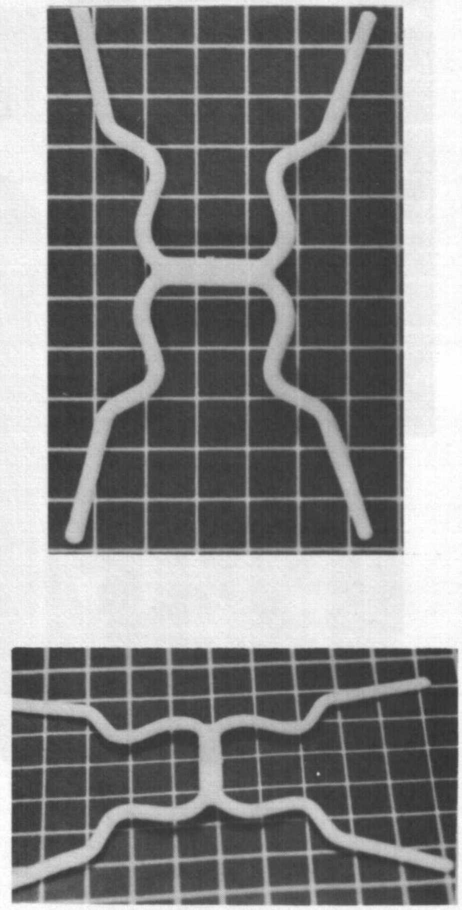


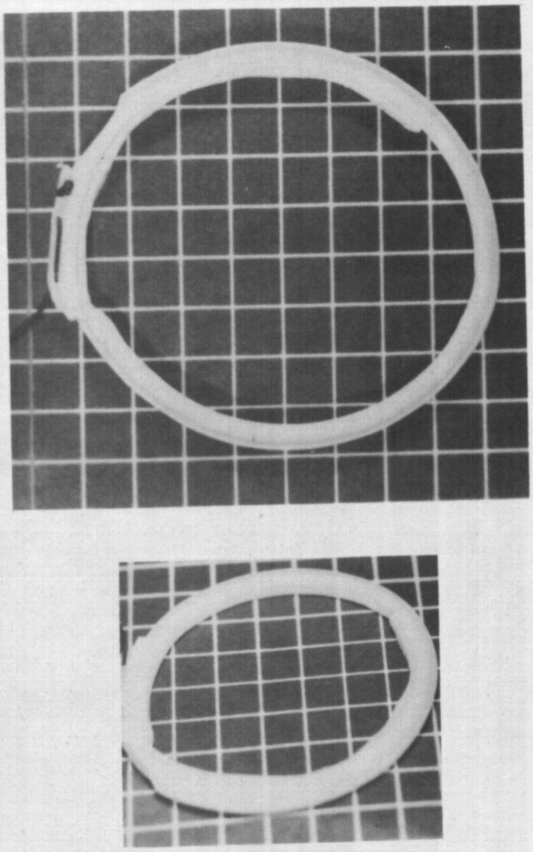
B

Multiple Plane Devices
Plastic

A. Russian Cross

B. Lem

These devices are folded and inserted so that they remain folded in the interior of the uterus.



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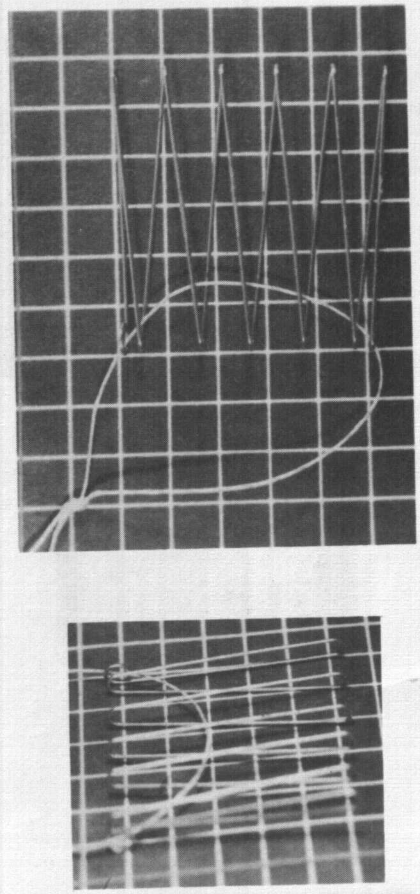

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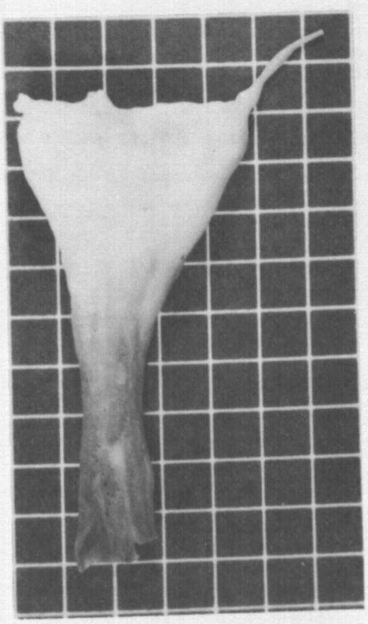


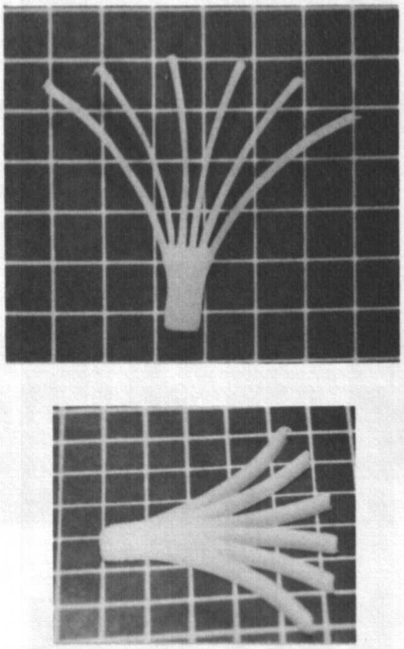
C

Special Devices

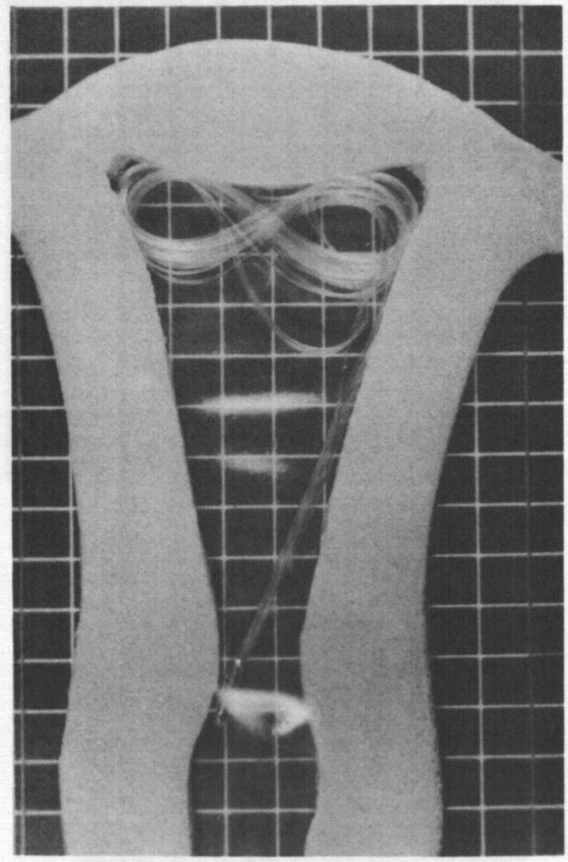
A. Wolfers Device - a spiral but with a sliding channel such that the diameter can shrink with external pressure.

B. Majzlin Spring - with the string tied as shown, this could be considered a closed-loop device. The device is made of wire.

C. Silastic(R) device - made of room-temperature polymerizing plastic which is injected as a thick liquid into the uterine interior where it sets to form a soft, rubber-like solid.



A



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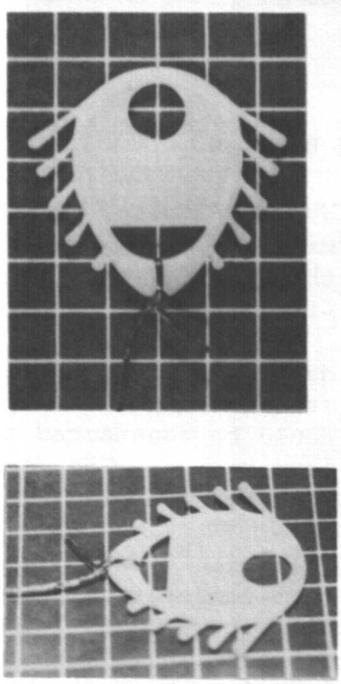


C

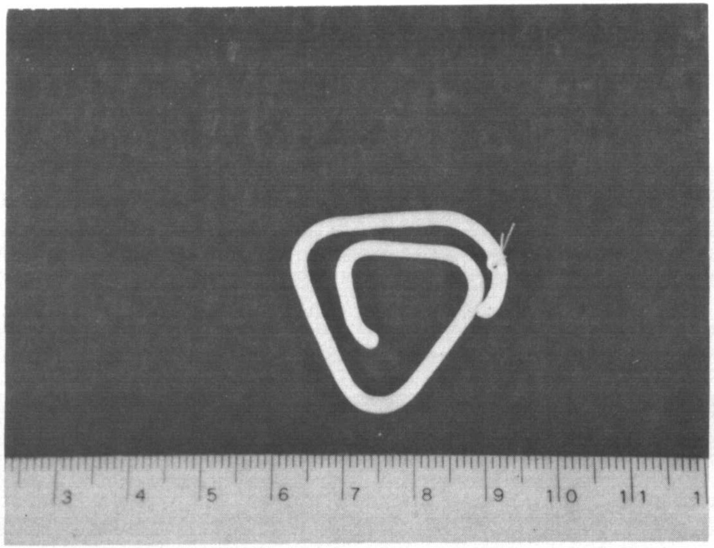
Special Devices -- Plastic

A. Japanese device

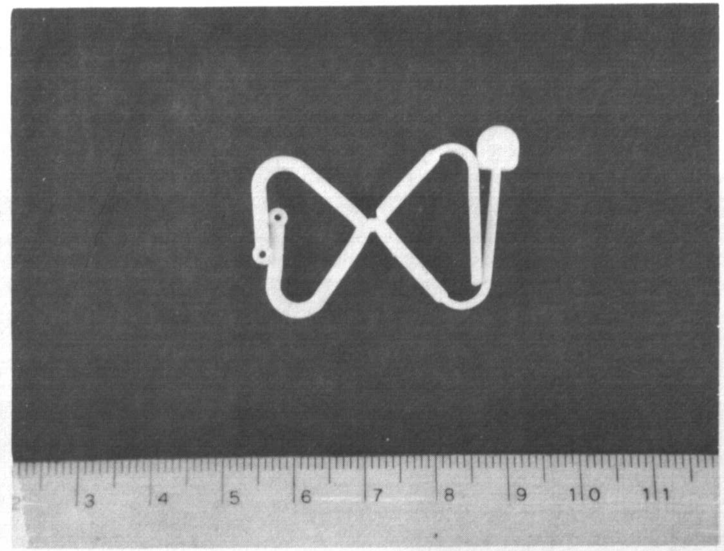
B. Filament

C. Dalkon Shield

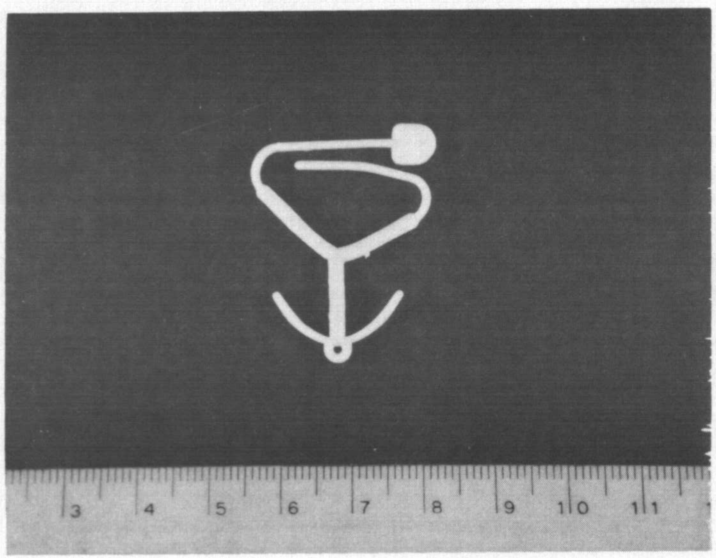
ADDITIONAL PHOTOGRAPHS OF DEVICES



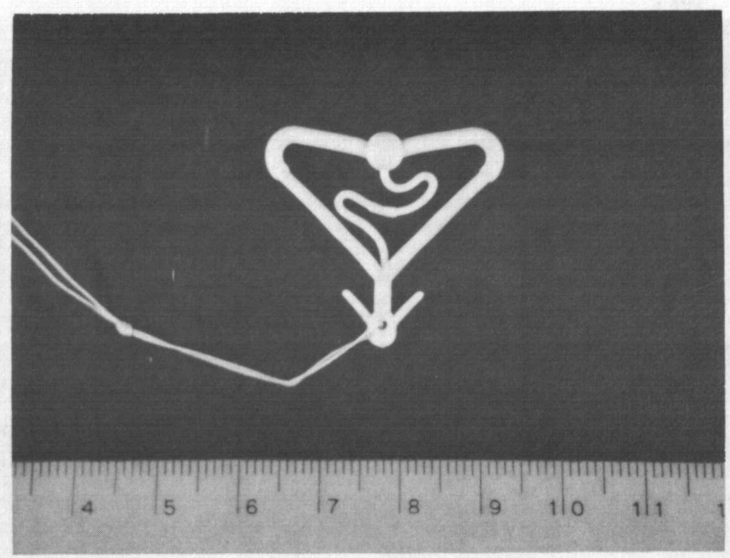
AHMED



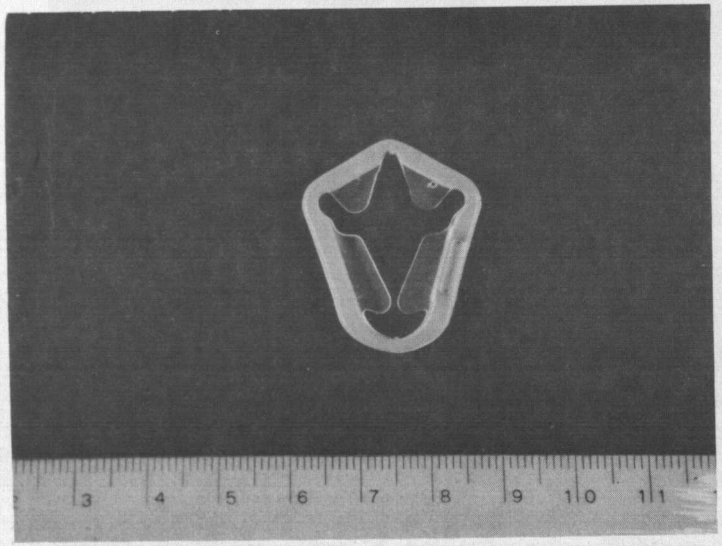
LARGE ANCOR



REGULAR ANCOR

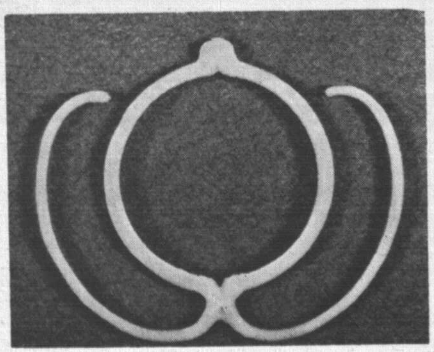


MODIFIED BIRNBERG ANCOR BOW

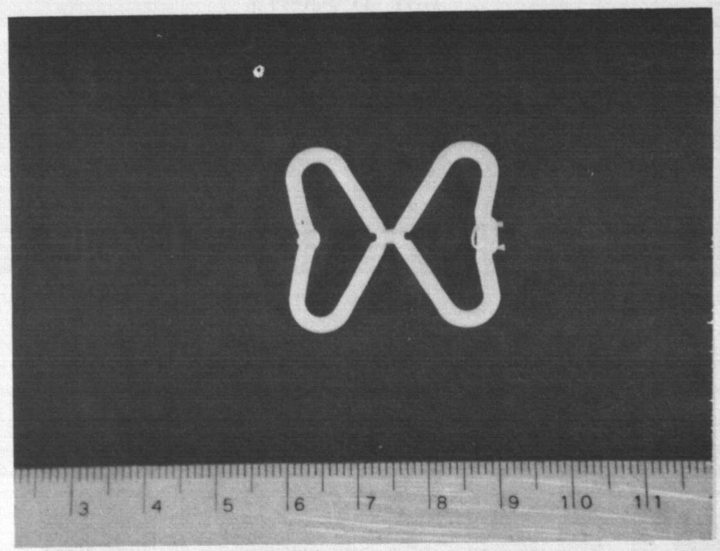


ANTIGON

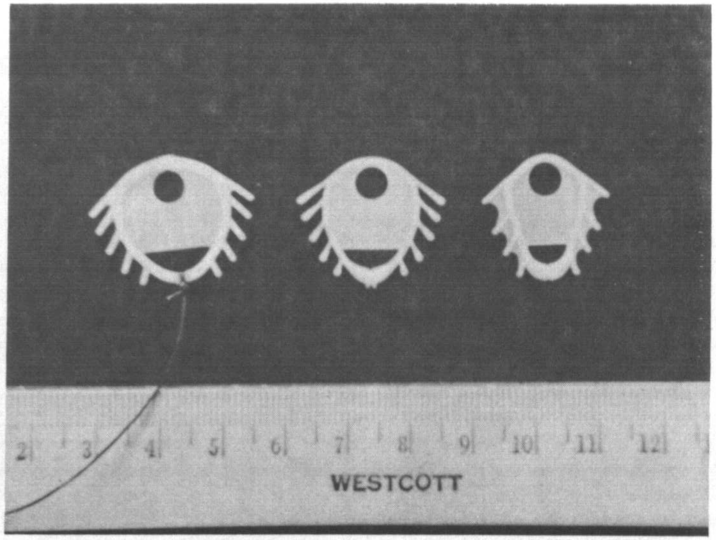
BEOSPIR



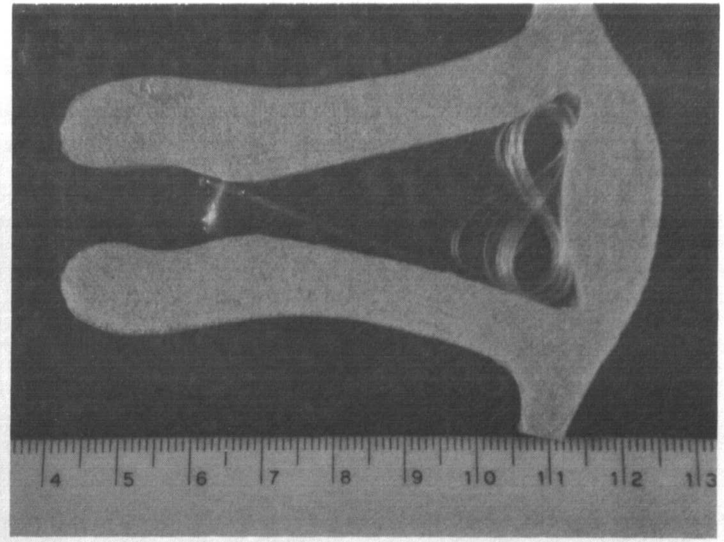
APPLEBY



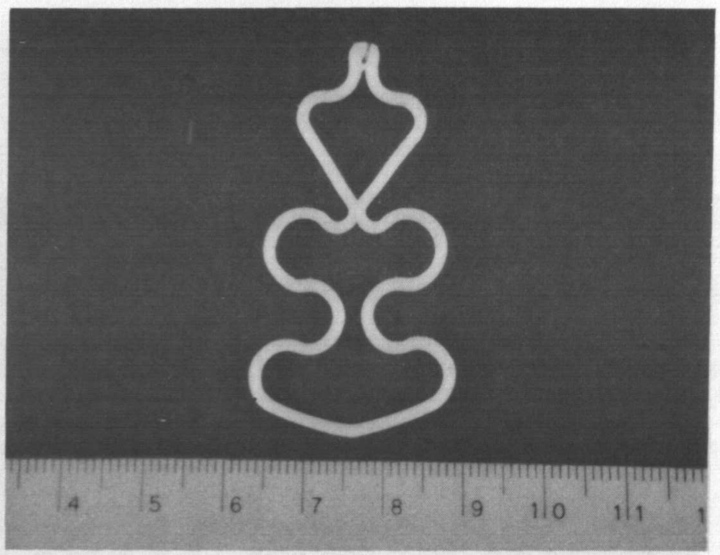
BIRNBERG BOW



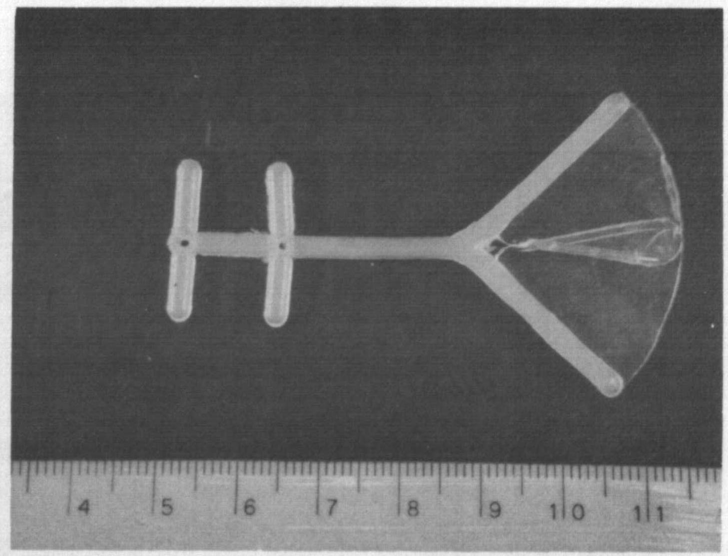
DALKON SHIELDS



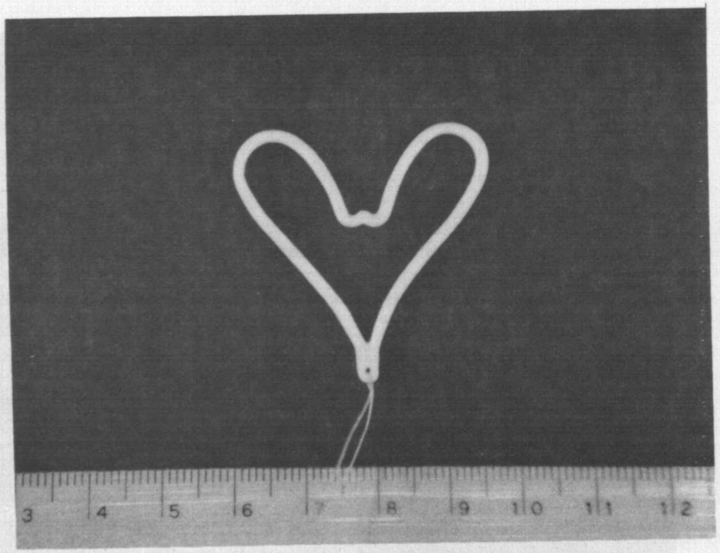
FILAMENT IUD



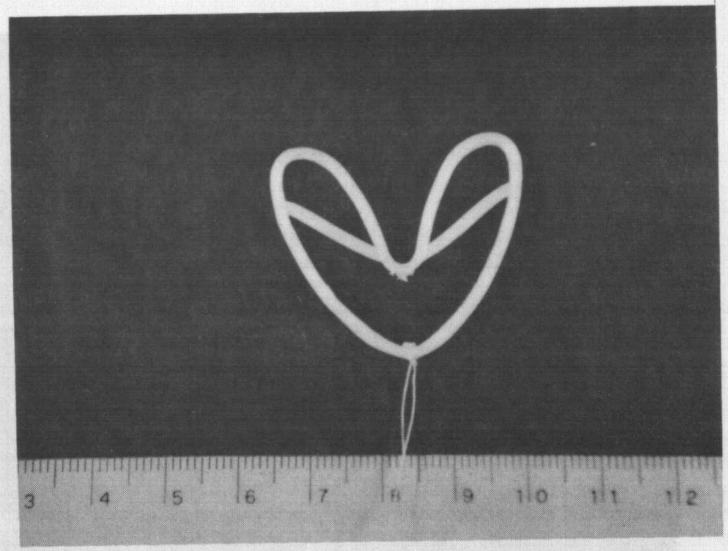
DANA SUPER



GREEK BUTTERFLY



MODIFIED HEART



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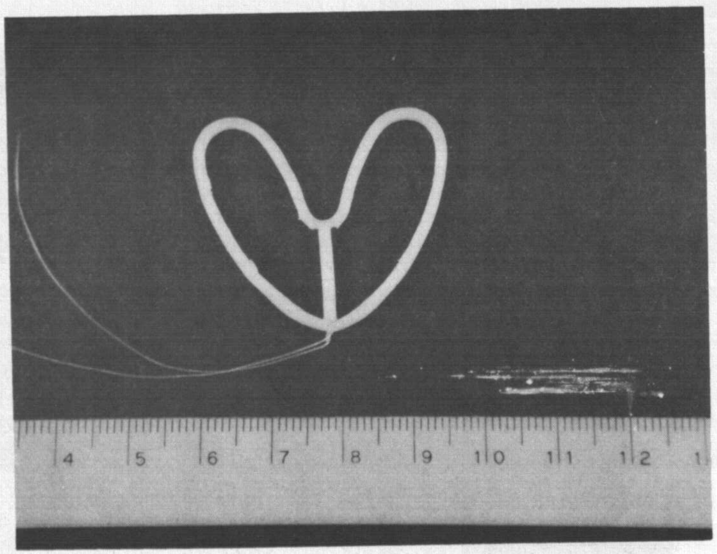

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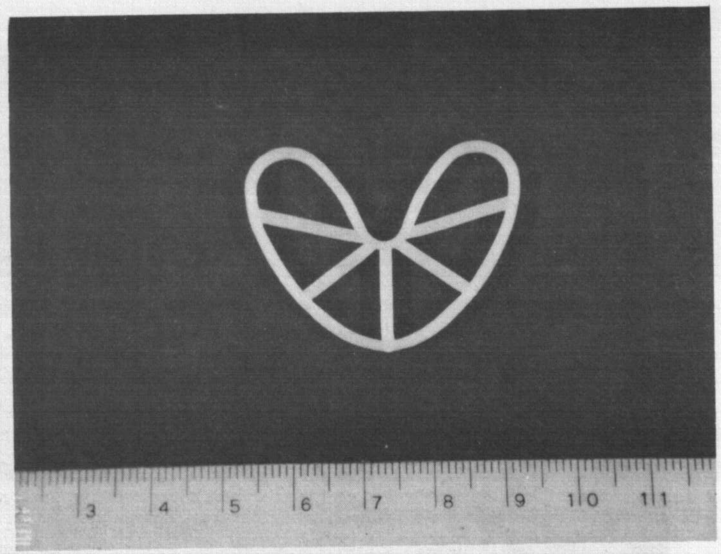
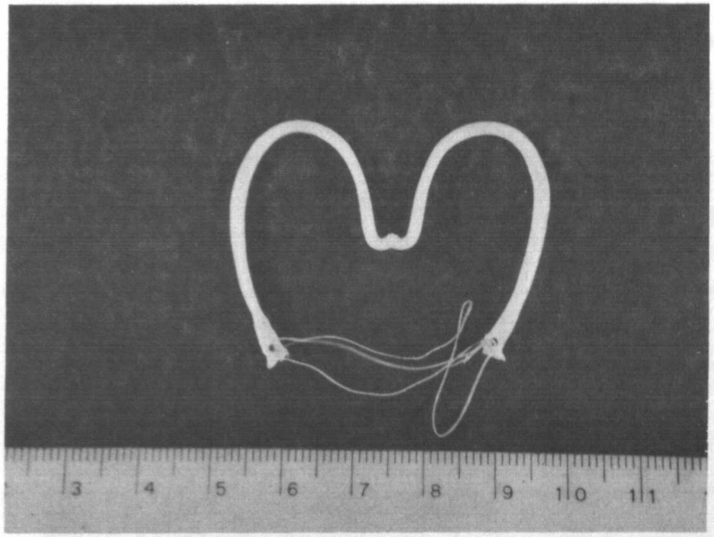
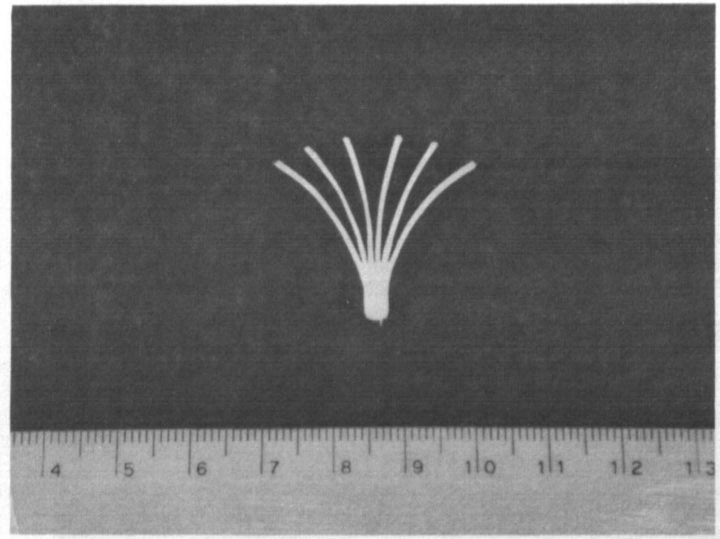


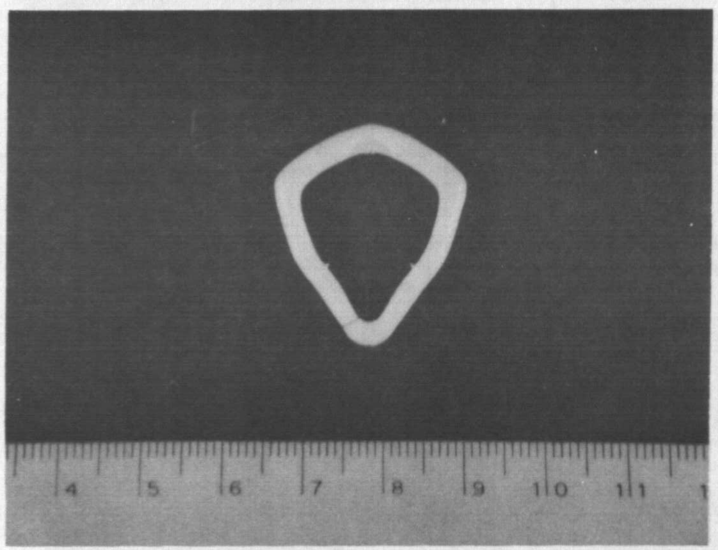
MODIFIED HEART



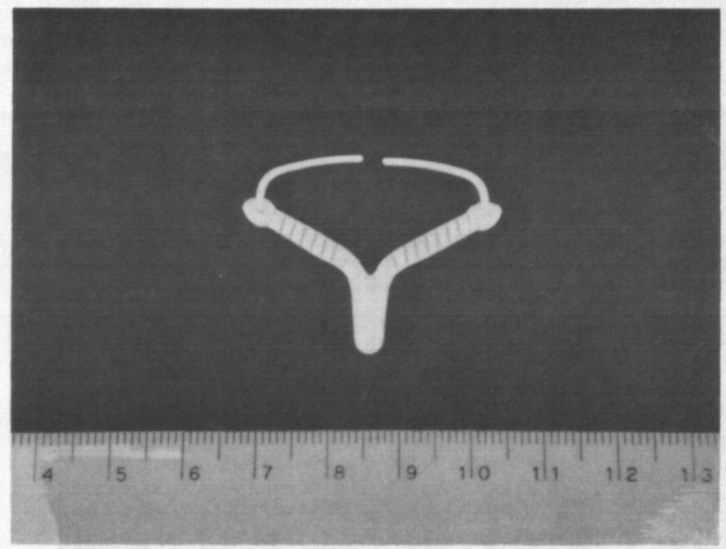
OPEN HEART (DOUBLE V)



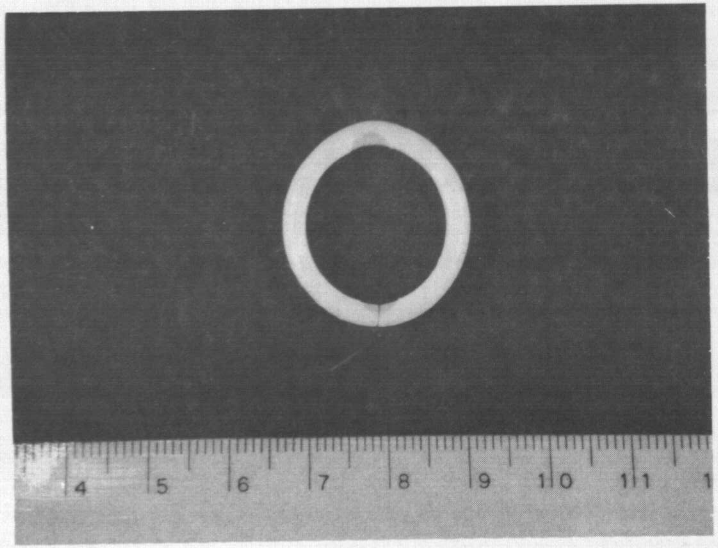
JAPANESE IUD

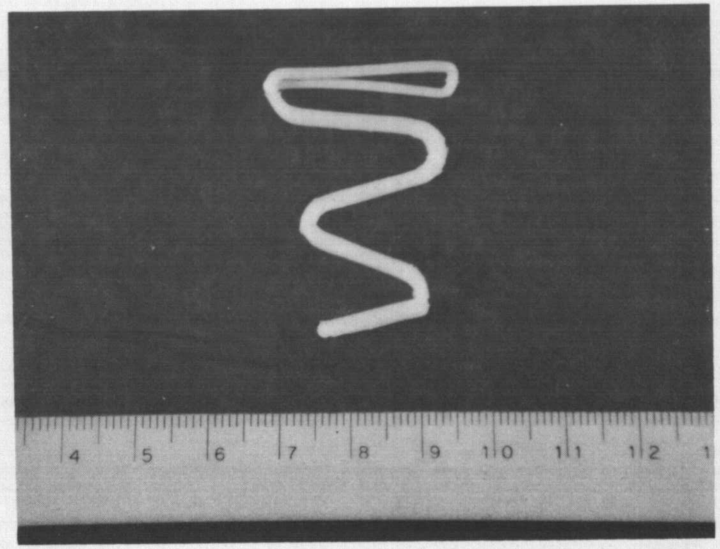


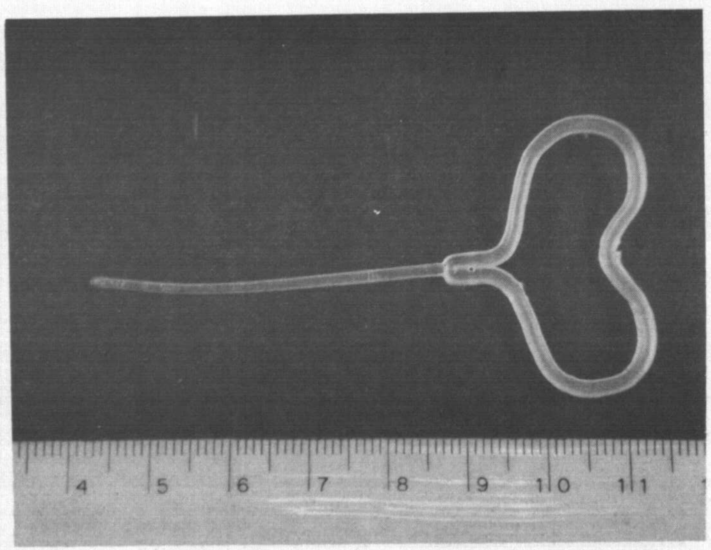
INCON

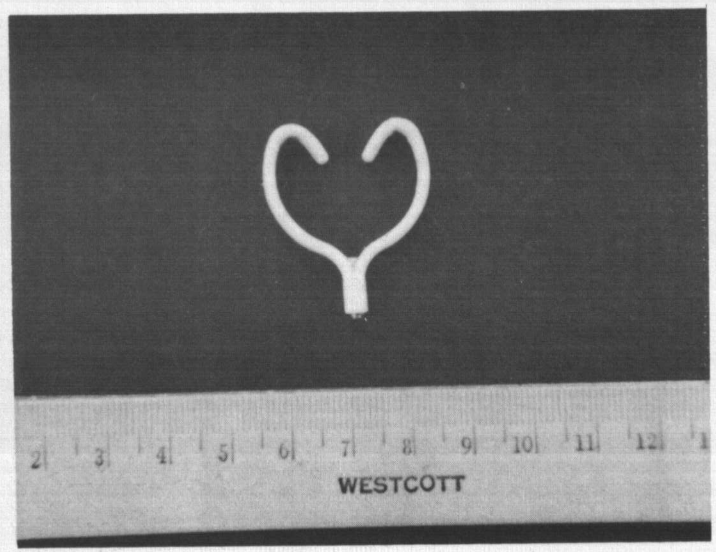


K.S. WING (NEW TYPE)

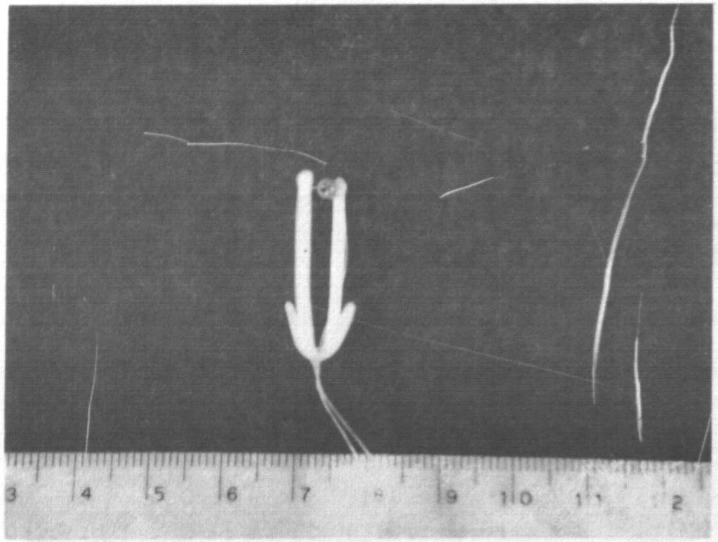


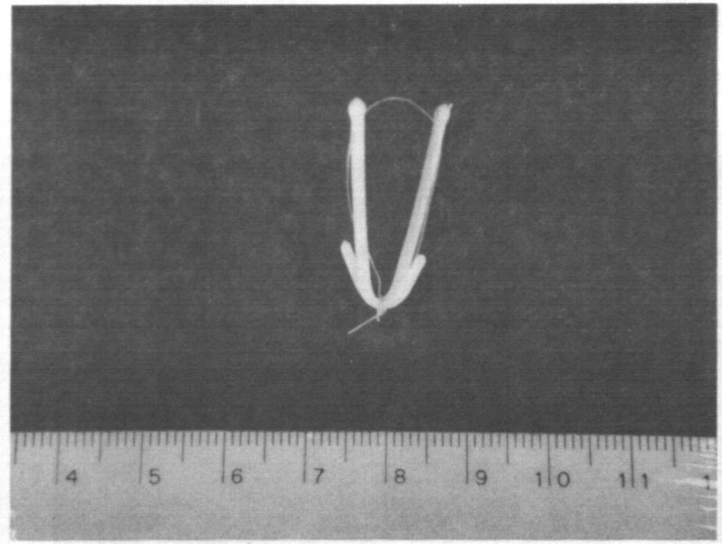






ADDITIONAL DEVICES





ADDITIONAL DEVICES

DEVICE INFORMATION

Ahmed
Ancor
Modified Birnberg Ancor Bow
Antigon
Appleby
Beospir
Birnberg Bow
Butterfly
Comet
Corolle
Dalkon Shield
Dana Super
Filament IUD
Gräfenberg Ring
Greek Butterfly
Gynekoil
Hall-stone Ring
Inhiband (Hall)
Heart Shaped Devices
Hulka's Device
Incon
Japanese IUD
K.S. Wing
The Lem
Lippes Loops
"M" Form
Majzlin Spring
Multiloop
Omega Device
Organon
Ota Ring
Quadracoil
Ragab Ring
Russian Cross
Saf-T-Coil
Shamrock
Silent Protectors
Soonawala
Spiran-W
Spira-Ring
Spring Coil
Stérile M
Szontagh
"T" Device
Web IUD
Weiss IUD
Winata Device I
Wolfers IUD
Yusei Ring
Zipper Ring

Ahmed

Material: polyethylene with radium salt and barium; nylon thread.

Developer: Dr. Mary Aftab Ahmed, Karachi, Pakistan

Manufacture: Schueler & Company, 110 Fifth Avenue, N. Y., N. Y.

Distributor: Schueler & Co.

Photograph, Page
Patent No. 3,306,286 (February 28, 1967

Ancor

Material:

Developer: American Caduceus Industries

Manufacture: American Caduceus Industries, Inc., 110 Fifth Avenue, New York, N.Y. 10011

Distributor:

Photograph, Page
Patent No.

Modified Birnberg Ancor Bow

Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

Antigon

Material: high pressure polyethylene, injection moulded, without the use of lubricants; built-in magnetic strip for detection by galvanometer.

Developer: Drs. Paul E. Lebech and Mogens Osler, Frederiksberg Hospital, Copenhagen, Denmark

Manufacture: Antigon, Svend Schrøder, 112 Bjerringbrovej, Rødovre, Denmark

Distributor: Kalmedic Instruments Inc., (subsidiary of D. Kaltman,) 425 Park Avenue, New York, New York 10022

Photograph, Page
Patent No. (Pending)

Appleby

Material: radially flattened helical coil made of resiliently flexible material (plastic containing barium sulphate), cervical appendage of woven plastic thread.

Developer: Basil Paul Appleby, 136 Harley Street, London W. 1, England

Manufacture: N. V. Organon, Oss, Holland

Distributor:

Photograph, Page
Patent No. 3,319,625 (May 16, 1967)

Beospir

Material:

Developer:

Manufacture: Plastika, Zemun, Yugoslavia

Distributor:

Photograph, Page
Patent No.

Birnberg Bow

Material: radio-opague polyethylene and barium, with nylon thread (two sizes)

Developer: C.H. Birnberg and John L. Marco (old bow)

Manufacture: I.C.D. Corporation
191 Ocean Avenue, Brooklyn, New York 11225

Distributor: (Outside U.S.A. and Candada: Schueler & Company, 110 Fifth Avenue, New York, New York 10011

Photograph, Page
Patent No. 3,253,590 (May,31, 1966) (The New Bow)3,230,953 ( )

Butterfly

Material: polyethylene with barium; nylon thread. (one size only)

Developer: John L. Marco

Manufacture: Marco & Son, Inc., 601 Dow Avenue, Oakhurst, New Jersey 07755

Distributor:

Photograph, Page
Patent No.

Comet

Material: spirally-wound stainless steel ring coated with a silicone polymer (called SILASTIC).

Developer: Drs. Jerone Schwartz and Franklin C. Reyner

Manufacture: Skye-Ray Medical Supply Corporation, 88-61 76th Avenue, Glendale, New York 11227

Distributor: Edlaw Pharmaceutical Division

Photograph, Page
Patent No. 3,256,878 (June 21, 1966)

Corolle
Material: plastic

Developer: Dr. Jean Cohen, 11, rue Villebois Mareuil, Paris 17 e, France.

Manufacture:

Distributor: A.T.N., 156 rue Oberkampf, Paris XI^{e}, France

Photograph, Page
Patent No.

Dalkon Shield
Material: ethylene vinyl acetate (EVA)

Developer:

Manufacture: Dalkon Corporation, 341 Shore Road, Greenwich, Connecticut

Distributor:

Photograph, Page
Patent No.

Dana Super
Material: polyethylene, filled with 25 per cent of barium sulphate

Developer:

Manufacture: State Textile Research Institute, Centre for the Application of Radioactive Isotopes in the Textile Industry, Brno-Vaclavska 6, Czechoslovakia
Distributor: State Textile Research Institute

Photograph, Page
Patent No. CSSR Patent 125.729, CSSR Patent 117.733.

Filament IUD

Material:

Developer: Mr. John Stroop, Products Developments, 25 Broadway, New York, New York 10004

Manufacture:

Distributor:

Photograph, Page
Patent No.

Gräfenberg Ring

Material: silkworm gut

Developer: Dr. Ernst Gräfenberg (1929), Berlin, Germany

Manufacture: Eschmann Bros. & Walsh Ltd., 22 Bartholomew Square, London E.C.1, England

Distributor: John Bell & Croyden, 50-54 Wigmore Street, London W.1., England

Photograph, Page
Patent No.

Greek Butterfly

Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

Gynekoil
Material: radio-opaque polyethylene spiral with beaded cervical appendage. (2 sizes)

Developer: Lazar C. Margulies, M.D.

Manufacture: Ortho Pharmaceutical Corp., Raritan, New Jersey 08869

Distributor: Ortho Pharmaceutical Corp.

Photograph, Page
Patent No. 3,200,815 (August 17, 1965)

Hall-stone Ring
Material: stainless steel coil spring. (one size)

Developer: Drs. Herbert H. Hall, Martin L. Stone, Alexander Sedlis, & Irwin Chabon

Manufacture: Eschmann Bros. and Walsh Ltd., 24 Church Street, Shoreham-by-Sea, Sussex, England

Distributor: Wil-Sher Associates, Inc., 5140 W. 106 Street, Englewood, California 90304

Photograph, Page
Patent No.

Inhiband (Hall)

Material: three laminated rings each 0.001" in thickness surrounded by a stainless steel coil spring.

Developer: Herbert H. Hall, M.D.

Manufacture:

Distributor: Ayerst Laboratories, 685 Third Avenue, New York, New York 10017

Photograph, Page
Patent No. 3,323,520 (June 6, 1967)

Heart Shaped Devices

Material: polyethylene with barium sulfate

Developer: The Pathfinder Fund

Manufacture:

Distributor:

Photograph, Page
Patent No.

Hulka's Device

Material: Loop 12 is of flexible strand, Body 10 is of a snythetic polymeric material, etc.

Developer: Jerry Hulka, M.D., Dept. of Maternal & Child Health, School of Public Health, The University of North Carolina, Chapel Hill, North Carolina 27514

Manufacture:

Distributor:

Photograph, Page
Patent No.

Incon

Material: Ultrathane (polyurethane)(several models)

Developer: Robert Israel, M.D., & Hugh J. Davis, M.D. (at John Hopkins Hospital, Baltimore, Md.)

Manufacture: Ortho Pharmaceutical Corp., Raritan, New Jersey 08869

Distributor:

Photograph, Page
Patent No.

Japanese IUD

Material:

Developer: Iwate Medical University, Uchimaru, Morioka, Japan, Atsumi Ishihama, M.D.

Manufacture:

Distributor:

Photograph, Page
Patent No. 3,353,533 (Nov. 21, 1967)

X K.S. Wing

Material: natural rubber with stainless stell wire in the center (3 types of K.S. Wing IUDs)

Developer: K.S. Wing Laboratory, 123 Hase, Kamakura City, Kanagawa Prefecture, Japan

Manufacture: K.S. Wing Laboratory

Distributor: K.S. Wing Laboratory

Photograph, Page
Patent No.

The Lem

Material: polyethylene with barium; nylon thread (one size only)

Developer: Mr. John L. Marco

Manufacture: Marco & Sons, Inc., 601 Dow Avenue, Oakhurst, New Jersey

Distributor:

Photograph, Page
Patent No.

X Lippes Loops

Material: radio-opaque polyethylene, with nylon thread cervical appendage (4 sizes)

Developer: Jack Lippes, M.D.

Manufacture: Ortho Pharmaceutical Corp., Raritan, New Jersey 08869

Distributor: Ortho Pharmaceutical Corp.

Photograph, Page
Patent No. 3,250,271 (May 10, 1966)

"M" - Form

Material: 316 stainless steel

Developer: Mr. Marc Chaft

Manufacture: Skyron Corporation, 8 New York Avenue, Newark, New Jersey 07105

Distributor:

Photograph, Page
Patent No. 3,410,265 (Nov. 12, 1968)

Majzlin Spring

Material: finely tempered stainless steel wire or gold plated, non-magnetic

Developer: Gregory Majzlin, M.D., (1966) 227 Eastern Parkway, Brooklyn, New York 11238

Manufacture: Anka Research Ltd., 139-01 Archer Avenue, Jamaica, New York

Distributor:

Photograph, Page
Patent No. (world wide) 554,765

Multiloop
Material: radio-opaque polyethylene

Developer: Frank Eshelman, M.D.

Manufacture: North West Plastics, (only to Eshelman's special order)
Minneapolis, Minnesota

Distributor:

Photograph, Page
Patent No. 3,457,915 (July 29, 1969)

X Omega Device
Material:

Developer: Docteur R. Malgouuat (Bordeaux)

Manufacture: Mr. Rene Cournut, 156 Rue des Orangers, Cauderan, Gironde, France

Distributor:

Photograph, Page
Patent No.

Organon
Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

X Ota Ring
Material: polyethylene frame entwined with nylon wire coil; polyethylene frame entwined with 18 Karat gold; gold-plated silver wire binds on polyethylene frame (Type-A); coiled gold-plated silver wire entwining nylon wire.
Developer: Dr. Tenrei Takeo Ota, Research Institute of Ota Ring, 2-1, Kanda Ogawa-machi, Chiyoda-ku, Tokyo, Japan

Manufacture:

Distributor:

Photograph, Page
Patent No.

Quadracoil
Material:

Developer: The Pathfinder Fund

Manufacture:

Distributor:

Photograph, Page
Patent No.

Ragab Ring
Material: nylon

Developer: Dr. Ragab, Cairo, Egypt

Manufacture:

Distributor:

Photograph, Page
Patent No.

Russian Cross
Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

X Saf-T-Coil
Material: radio-opaque polyethylene with cervical appendage of beaded plastic or nylon thread. 5/11/70 now being made of EVA

Developer: Ralph R. Robinson, M.D.

Manufacture: Deseret Pharmaceutical Co., Inc., 19 East Oakland Avenue, Salt Lake City, Utah

Distributor: Julius Schmid, Inc., 423 West 55th Street, New York, New York

Photograph, Page
Patent No. 3,234,938

Shamrock
Material: radio-opaque polyethylene monofil

Developer: C. Lalor Burdick, 4400 Lancaster Pike Wilmington, Delawar 19805

Manufacture:

Distributor:

Photograph, Page
Patent No. 3,312,214 (April 4, 1967)

Silent Protectors
Material:

Developer: M.H. Knoch

Manufacture:

Distributor:

Photograph, Page
Patent No. 3,077,879 (Feb. 19, 1963)

Soonawala
Material: polyethylene impregnated with barium

Developer: Rustom P. Soonawala, M.D., F.R.C.S., 22-A, Empire Estate, Cumballa Hill, Bombay, 26, India

Manufacture:

Distributor:

Photograph, Page
Patent No.

Spiran-W
Material: alkathene WNG-14

Developer: Andrzej Reszczynski, M.D., Wroclaw, ul. Komuny Paryskiej nr 46/2, Poland

Manufacture: (Imperial Chemical Industries)

Distributor:

Photograph, Page
Patent No.

X <u>Spira-Ring</u> (New Ota Ring)
Material: polyethylene frame entwined by nylon coil.

Developer: Dr. Tenrei Takeo Ota, Research Institute of Ota Ring, 2-1, Kanda Ogawa-machi, Chiyoda-ku, Tokyo, Japan

Manufacture: The Ota Ring Kenkyusho, 2-1, Kanda Ogawa-Cho, Chyoda-ku, Tokyo, Japan.

Distributor: The Ota Ring Kenkyusho

Photograph, Page
Patent No.

X <u>Spring Coil</u>

Material:

Developer: The Pathfinder Fund (Dr. Elton Kessel)

Manufacture:

Distributor:

Photograph, Page
Patent No.

<u>Stérile M</u>
Material:

Developer: Laboratoires Fandre

✓

Manufacture: Laboratoires Fandre, Science and Medicine, 5 Place des Alpes, 75 Paris, France

Distributor:

Photograph, Page
Patent No.

X Szontagh

Material: handmade of nylon fishing line

Developer: F.E. Szontagh, M.D., Hungary

Manufacture:

Distributor:

Photograph, Page
Patent No.

X "T" Device

Material:

Developer: Howard Tatum, M.D.

Manufacture:

Distributor:

Photograph, Page
Patent No.

Web IUD

Material: stainless steel wire with polyurethane membrane and polyethylene threads

Developer: F. Shubeck, M.D.

Manufacture:

Distributor:

Photograph, Page
Patent No.

<u>Weiss IUD</u>
Material: polyisoprene, other polymers

Developer: Dr. Leonard Weiss, 230 East Main Street, Middletown, New York

Manufacture: Nuclear Research Corporation, 12 Nevada Drive, New Hyde Park, New York 11040

Distributor:

Photograph, Page
Patent No.

<u>Winata Device I</u>
Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

<u>Wolfers IUD</u> (Postpartum)
Material:

Developer:

Manufacture: Smith & Nephew Research Ltd., Gilston Park

Distributor:

Photograph, Page
Patent No.

X

Yusei Ring

Material: No. 1: gold-plated silver wire envelopes a polyethylene ring; No. 2: same as No. 1; No. 4A: a polyethylene wire wound around polyethylene ring; No. 4B: gold gilt silver ring inserted in the center of No. 4A; No. 5: "toothed wheel" polyethylene

Developer: Onagi Ikemi

Manufacture: Yuseiring-sogokenkyusho, 2-8-14 Shinbashi, Minato-Ku, Tokyo, Japan

Distributor: The Wako Koeki Co., Ltd. 827, Ohtemachi Building, No. 4, Ohtemachi, 1-Chome, Chiyoda-Ku, Tokyo, Japan

Photograph, Page
Patent No.

Zipper Ring

Material: 0.35 mm nylon monofilaments interwound to hold form and equipped with nylon tail strand.

Developer: Jaime Zipper, M.D.

Manufacture: Jaime Zipper, M.D., University of Chile, Institute of Physiology, Alberto Zanartu 1052, Casilla 6524, Santiago, Chile

Distributor: Jaine Zipper, M.D.

Photograph, Page
Patent No.

Material:

Developer:

Manufacture:

Distributor:

Photograph, Page
Patent No.

LISTING OF PATENT DRAWINGS

Ahmed (Feb. 28, 1967)#3,306,286
Burnhill (Nov. 3, 1970) #3,537,445
Lebech (Sept. 16, 1969) #3,467,087
Birnberg (May 31, 1966) #3,253,590
Birnberg (Jan. 25, 1966) #3,230,953
(Corolle)
Margulies (Aug. 17, 1965) #3,200,815
Hall (June 6, 1967) #3,323,520
Hulka (Oct. 29, 1968) #3,407,806
Davis (March 11, 1969) #3,431,905
Ishihama (Nov.21, 1967) #3,353,533
Lippes (May 10,1966) #3,250,271
Chaft (Nov. 12, 1968) #3,410,265
Majzlin (Aug. 20, 1968) #3,397,691
Eshelman (July 29, 1969) #3,457,915
Burdick (April 4, 1967) #3,312,214
Knoch (Feb. 19, 1963) # 3,077,879
Appleby

60

Feb. 28, 1967 M. A. AHMED 3,306,286

INTRAUTERINE DEVICE

Filed April 13, 1965

FIG. 1

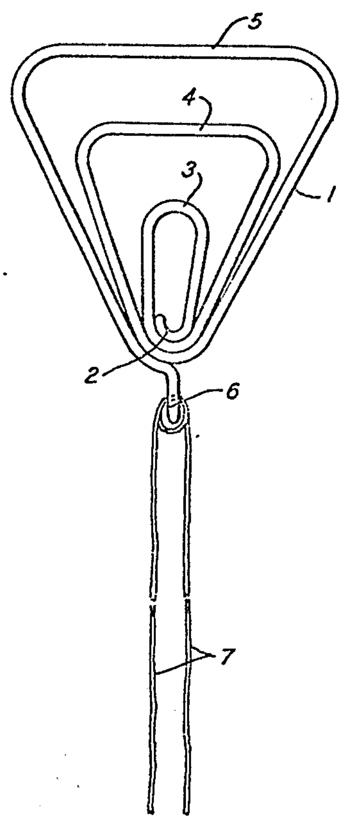
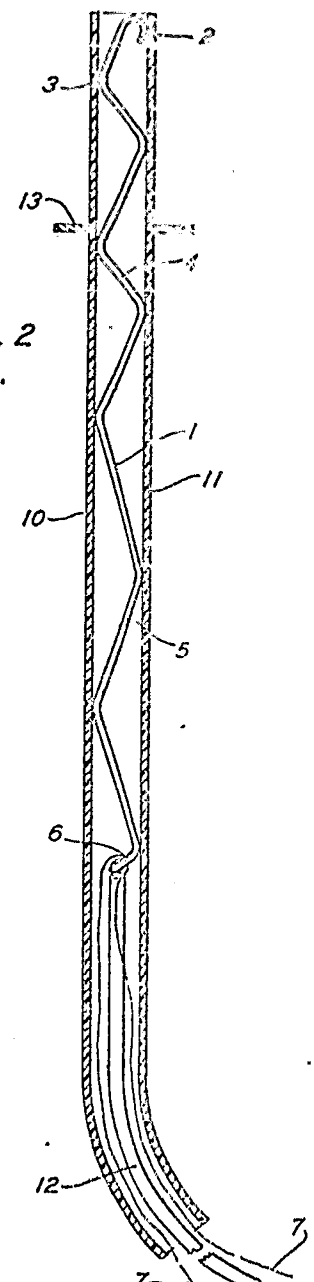


FIG. 2



INVENTOR
M. A. AHMED

BY

ATTORNEY

61

United States Patent

[11] 3,537,445

[72] Inventor Michael S. Burnhill
Brooklyn, New York

[21] Appl. No. 710,857
[22] Filed March 6, 1968
[45] Patented Nov. 3, 1970
[73] Assignee By mesne assignment to
American Caduceus Industries, Inc.,
New York, New York
a corporation of Delaware.

[54] INTRAUTERINE DEVICE
7 Claims, 7 Drawing Figs.

[52] U.S. Cl. 128/130
[51] Int. Cl. A61f 5/24
[50] Field of Search 128/129, 128, 127, 130, 131

[56] References Cited

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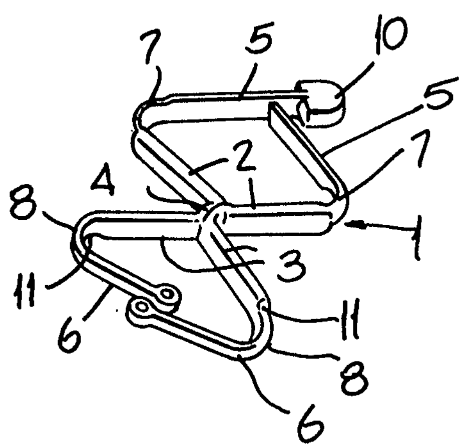
662,716	11/1900	Gaedeke	128/130
533,120	1/1895	Ferguson	128/130
3,253,590	5/1966	Birnberg et al.	128/130
3,291,125	12/1966	Robinson	128/130
3,397,690	8/1968	Majzlin	128/130
3,407,806	10/1968	Hulka et al.	128/130

Primary Examiner—Adele M. Eager
Attorney—Amster and Rothstein

ABSTRACT: An intrauterine device having a pair of highly flexible front legs which are telescopically positioned relative to each other.



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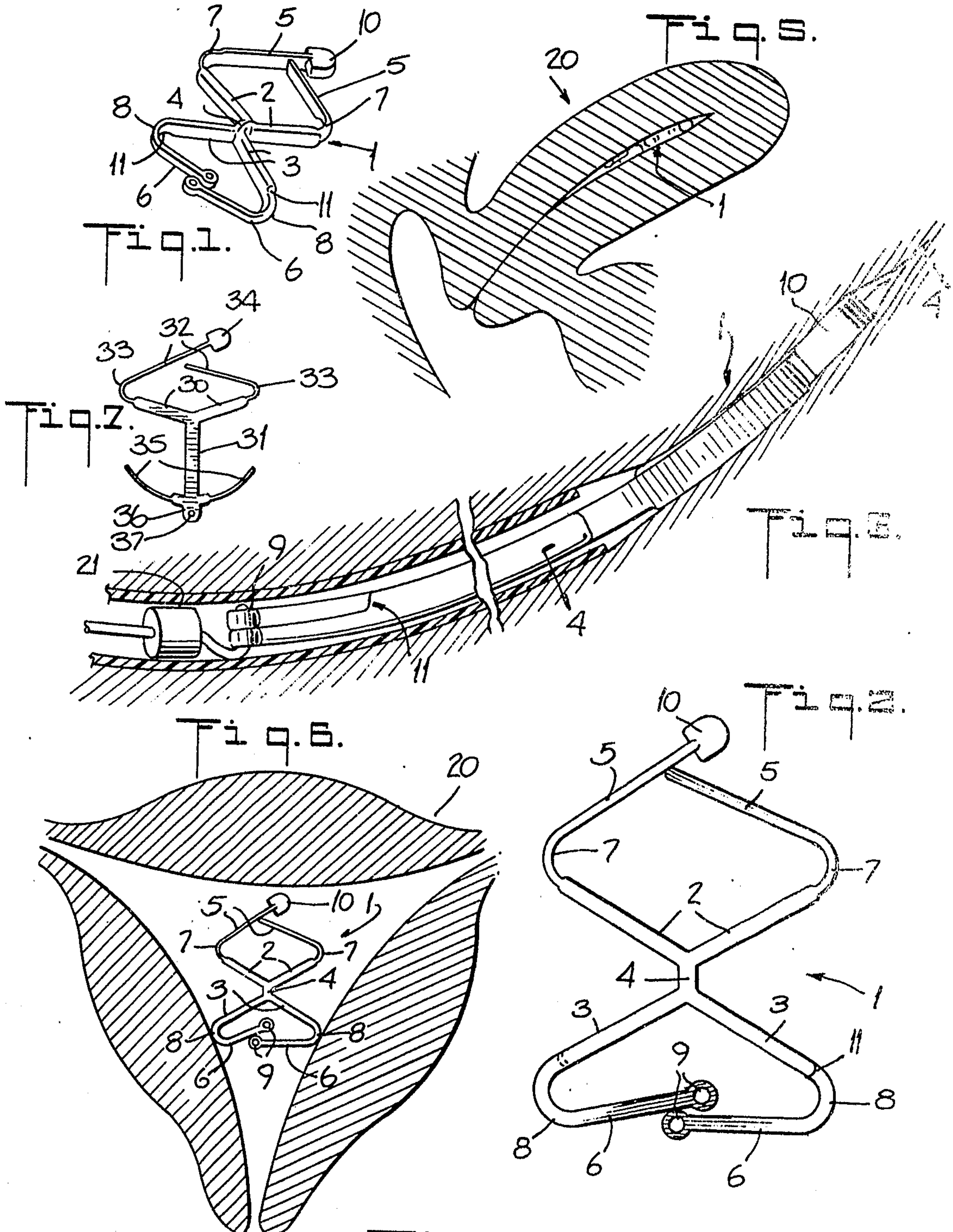
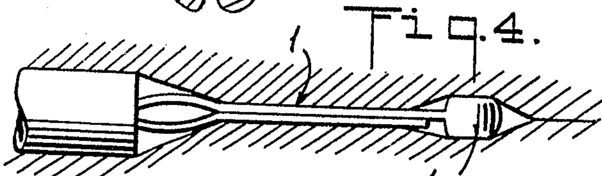
Patented Nov. 3, 1970 3,537,445





INVENTOR.
MICHAEL S. BURNHILL

BY [signature]

ATTORNEY

Sept. 16, 1969 P. E. LEBECH ET AL 3,467,087

INTRAUTERINE DEVICE

Filed Sept. 23, 1966

Fig.1

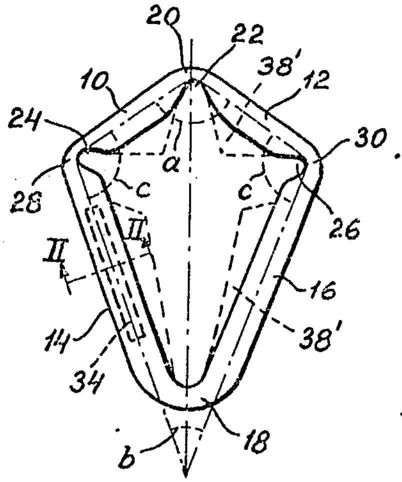


Fig. 3

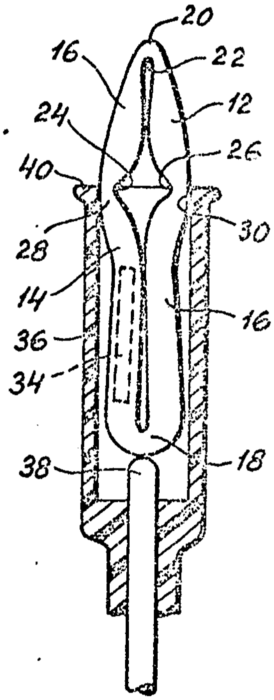


Fig.2

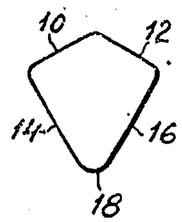


Fig.4

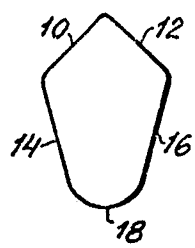


Fig.5

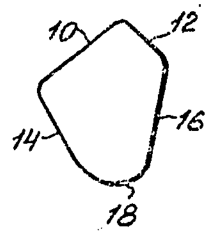


Fig.6

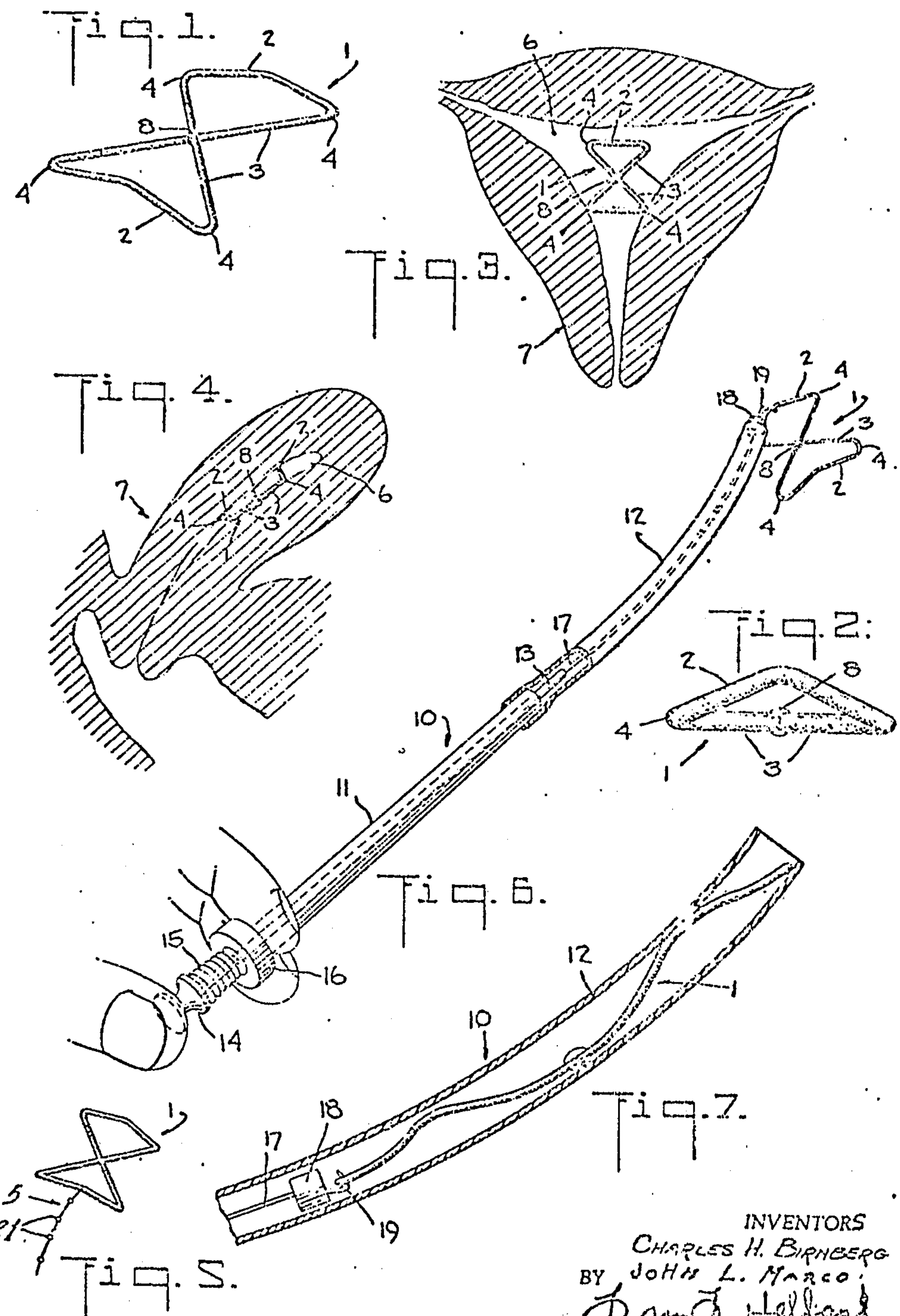
INVENTORS:
Paul Erik Lebech
and Svend Ludvig Schrøder
BY
Ernest D. Maxwell
Their Attorney.

May 31, 1966 C. H. BIRNBERG ETAL 3,253,590

INTRAUTERINE DEVICE

Filed April 24, 1964

3 Sheets-Sheet 1



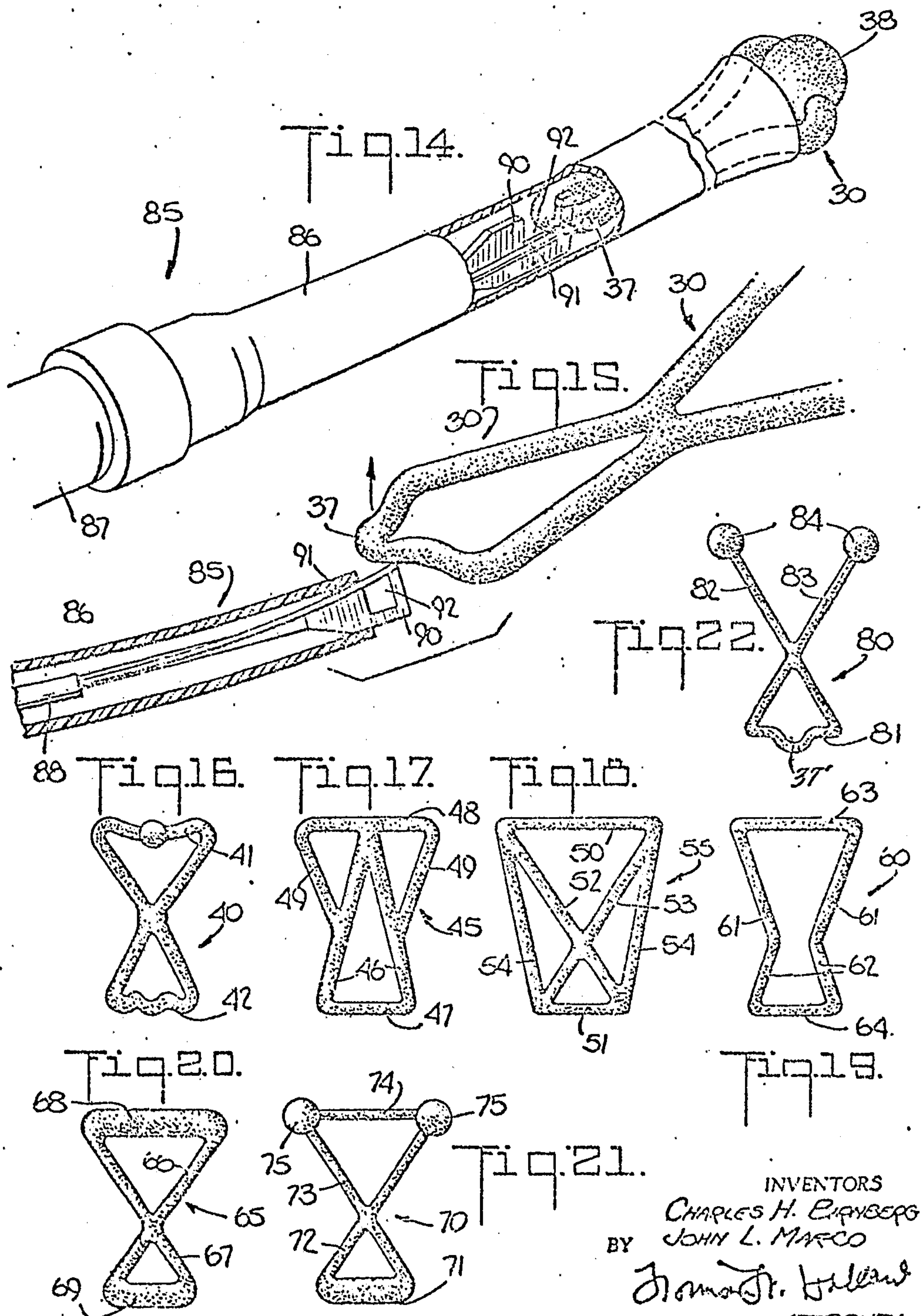
INVENTORS
CHARLES H. BIRNBERG
JOHN L. MARCO
BY

ATTORNEY

May 31, 1966 C. H. BIRNBERG ETAL 3,253,590

INTRAUTERINE DEVICE

Filed April 24, 1964 3 Sheets-Sheet 3



INVENTORS
CHARLES H. BIRNBERG
JOHN L. MARCO
BY
[signature]
ATTORNEY

May 31, 1966 C. H. BIRNBERG ETAL 3,253,590

INTRAUTERINE DEVICE

Filed April 24, 1964 3 Sheets-Sheet 2

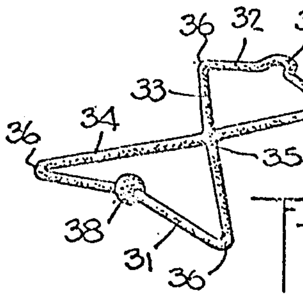


Fig. 8.

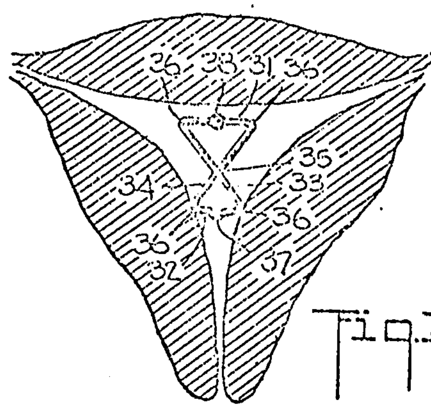


Fig. 10.

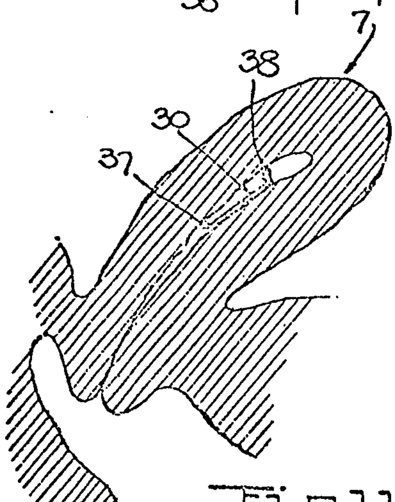


Fig. 11.

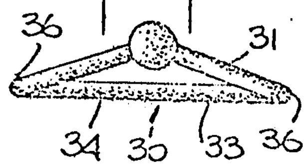


Fig. 9.

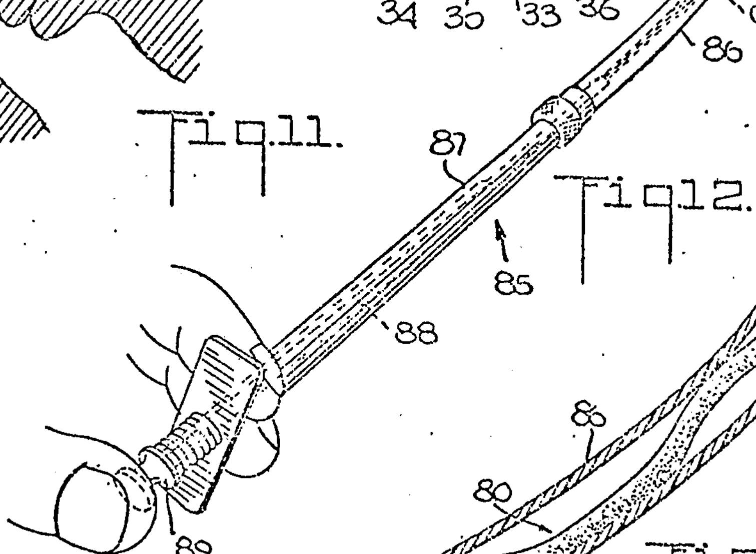


Fig. 12.

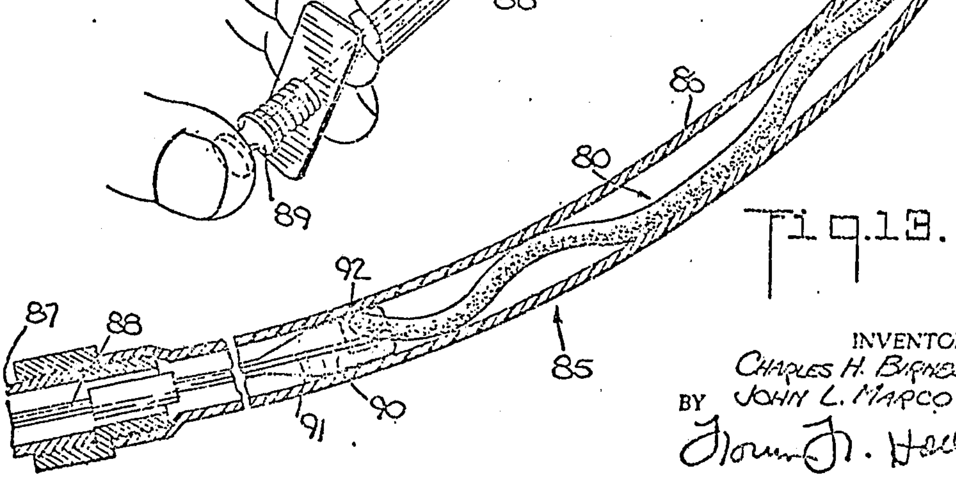


Fig. 13.

INVENTORS
CHARLES H. BIRNBERG
JOHN L. MARCO
BY Thomas J. Holland
ATTORNEY

Jan. 25, 1966 C. H. BIRNBERG ET AL 3,230,953

INTRAUTERINE DEVICE

Filed Jan. 30, 1963

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Fig. 1.

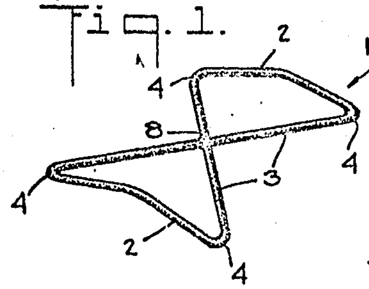


Fig. 3.

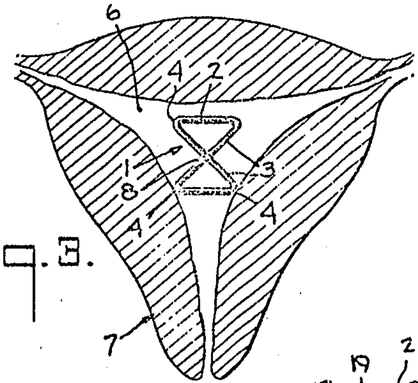
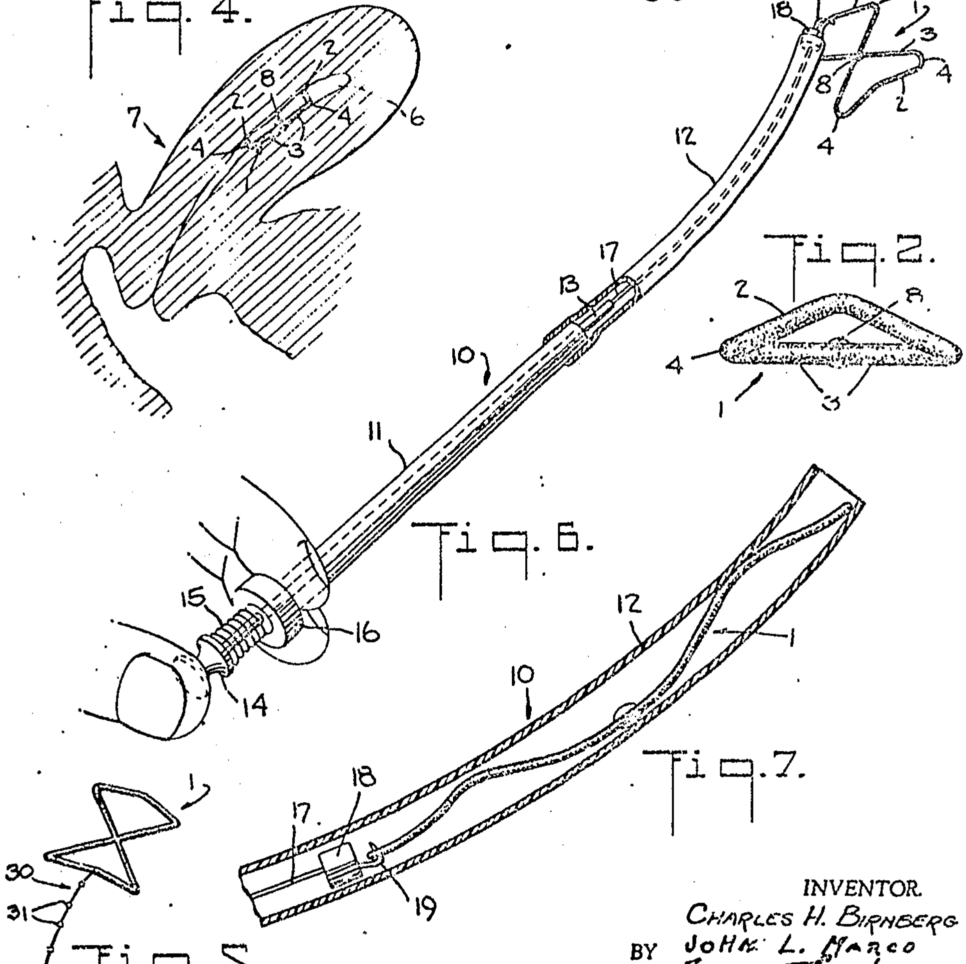


Fig. 4. Fig. 6. Fig. 2. Fig. 7. Fig. 5.



INVENTOR
CHARLES H. BIRNBERG
BY JOHN L. MARCO

[signature]

ATTORNEY

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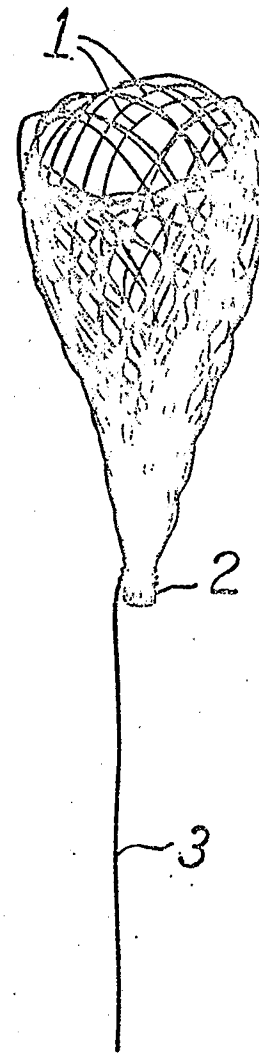
Fig. 1



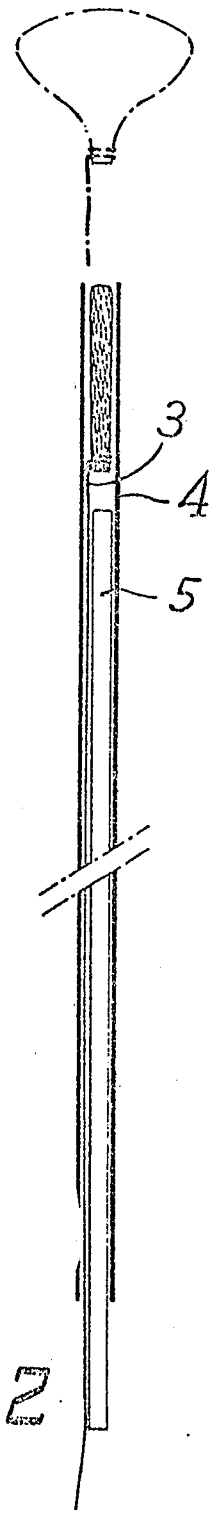


Fig. 2

Aug. 17, 1965 L. MARGULIES 3,200,815
COIL SPRING INTRA-UTERINE CONTRACEPTIVE
DEVICE AND METHOD OF USING
Filed April 24, 1962 2 Sheets-Sheet 1

FIG. 1

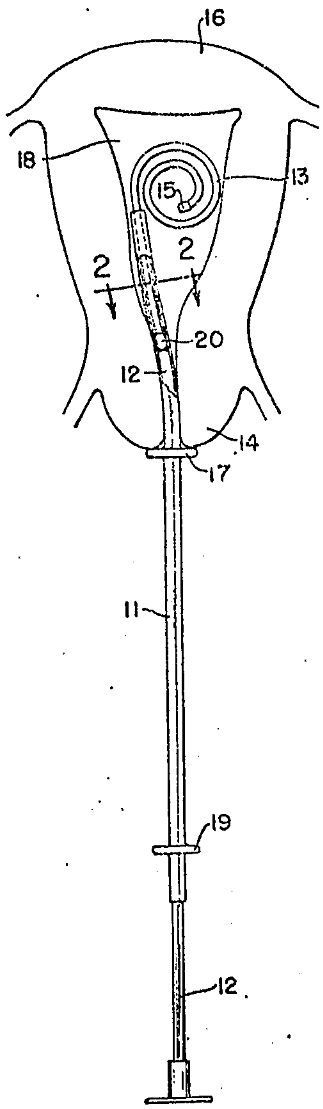


FIG. 3

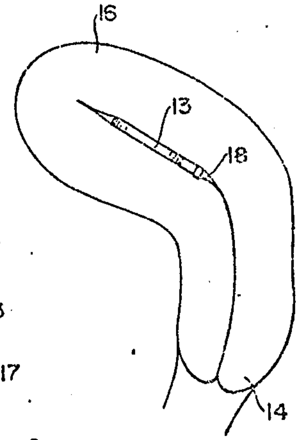


FIG. 2

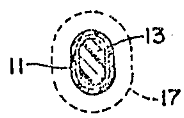


FIG. 4

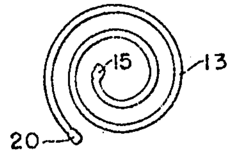


FIG. 5

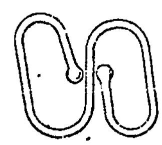


FIG. 6

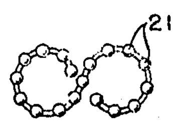


FIG. 7

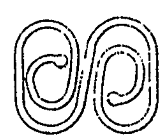
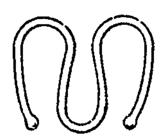


FIG. 8



INVENTOR.
LAZAR MARGULIES
BY Corey, Hart & Stempler
ATTORNEYS

Aug. 17, 1965

L. MARGULIES

3,200,815

COIL SPRING INTRA-UTERINE CONTRACEPTIVE DEVICE AND METHOD OF USING

Filed April 24, 1962

2 Sheets-Sheet 2

Fig. 10.

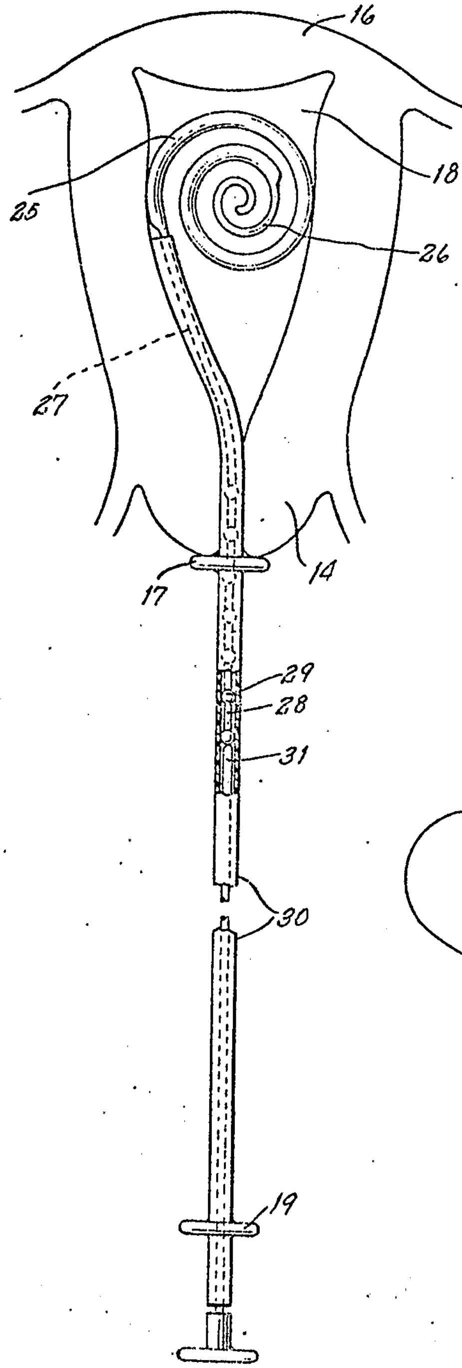
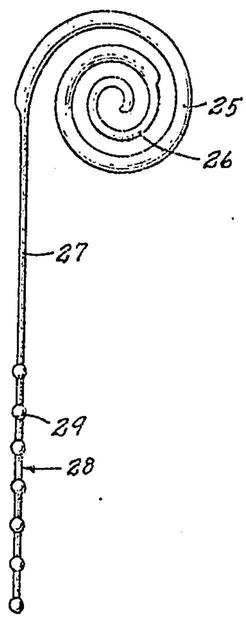


Fig. 9.



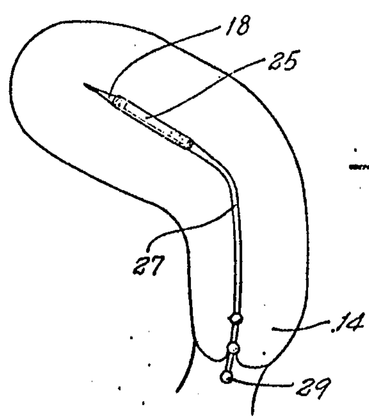


Fig. 11.

INVENTOR
LAZAR MARGULIES
BY
Corey, Hart & Stemple
ATTORNEYS

June 6, 1967 H. H. HALL 3,323,520

INTRAUTERINE PESSARY

Original Filed Oct. 5, 1964 2 Sheets-Sheet 1

FIG. 1

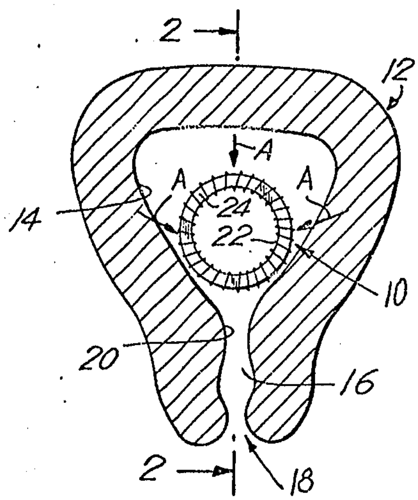


FIG. 2

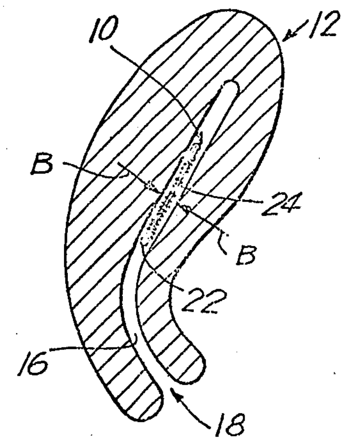


FIG. 3

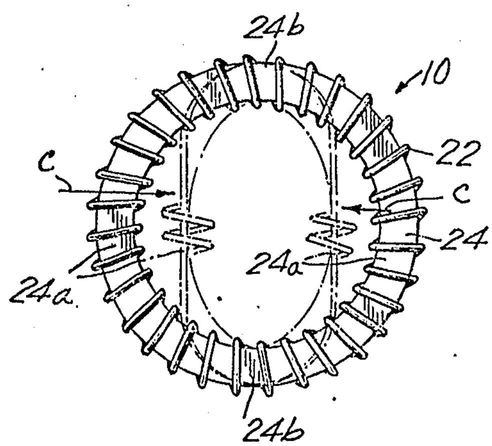


FIG. 4

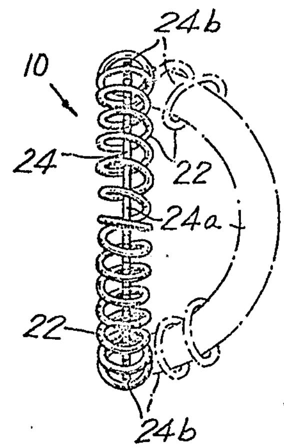
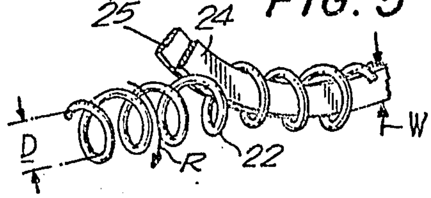


FIG. 5



INVENTOR
HERBERT H. HALL
BY Amster & Rothstein
ATTORNEYS

72

June 6, 1967 H. H. HALL 3,323,520

INTRAUTERINE PESSARY

Original Filed Oct. 5, 1964

2 Sheets-Sheet 2

FIG. 6

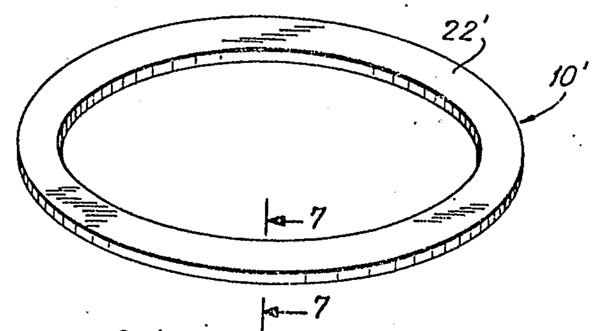


FIG. 7

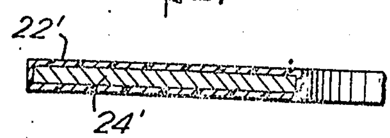


FIG. 8

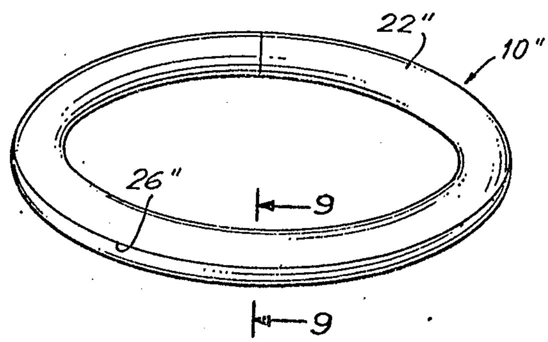
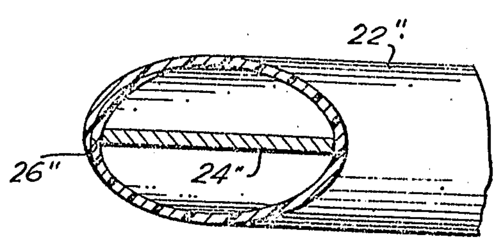


FIG. 9



INVENTOR.
HERBERT H. HALL

BY

Amster & Rothstein
ATTORNEYS

Oct. 29, 1968 J. F. HULKA ET AL 3,407,806

CONTRACEPTIVE INTRA-UTERINE DEVICES

Filed Aug. 24, 1966

Fig. 1

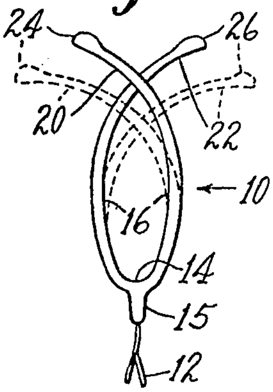


Fig. 4

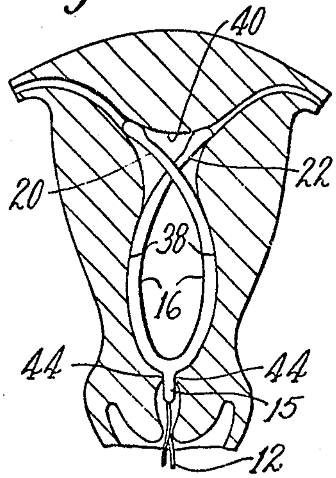


Fig. 6

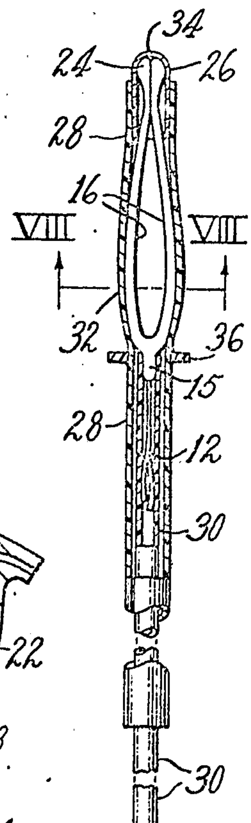


Fig. 2

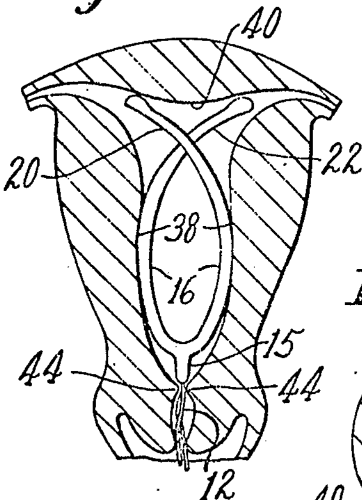


Fig. 5

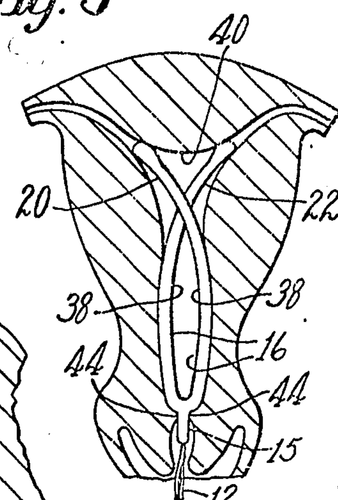


Fig. 7

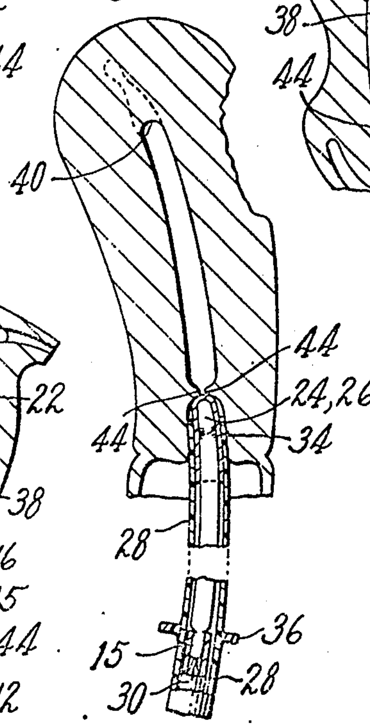


Fig. 8

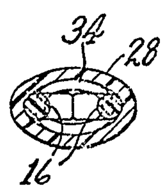
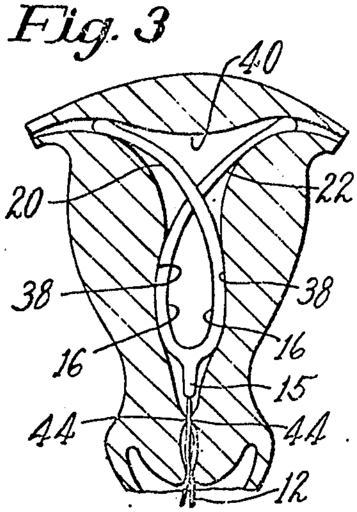


Fig. 3

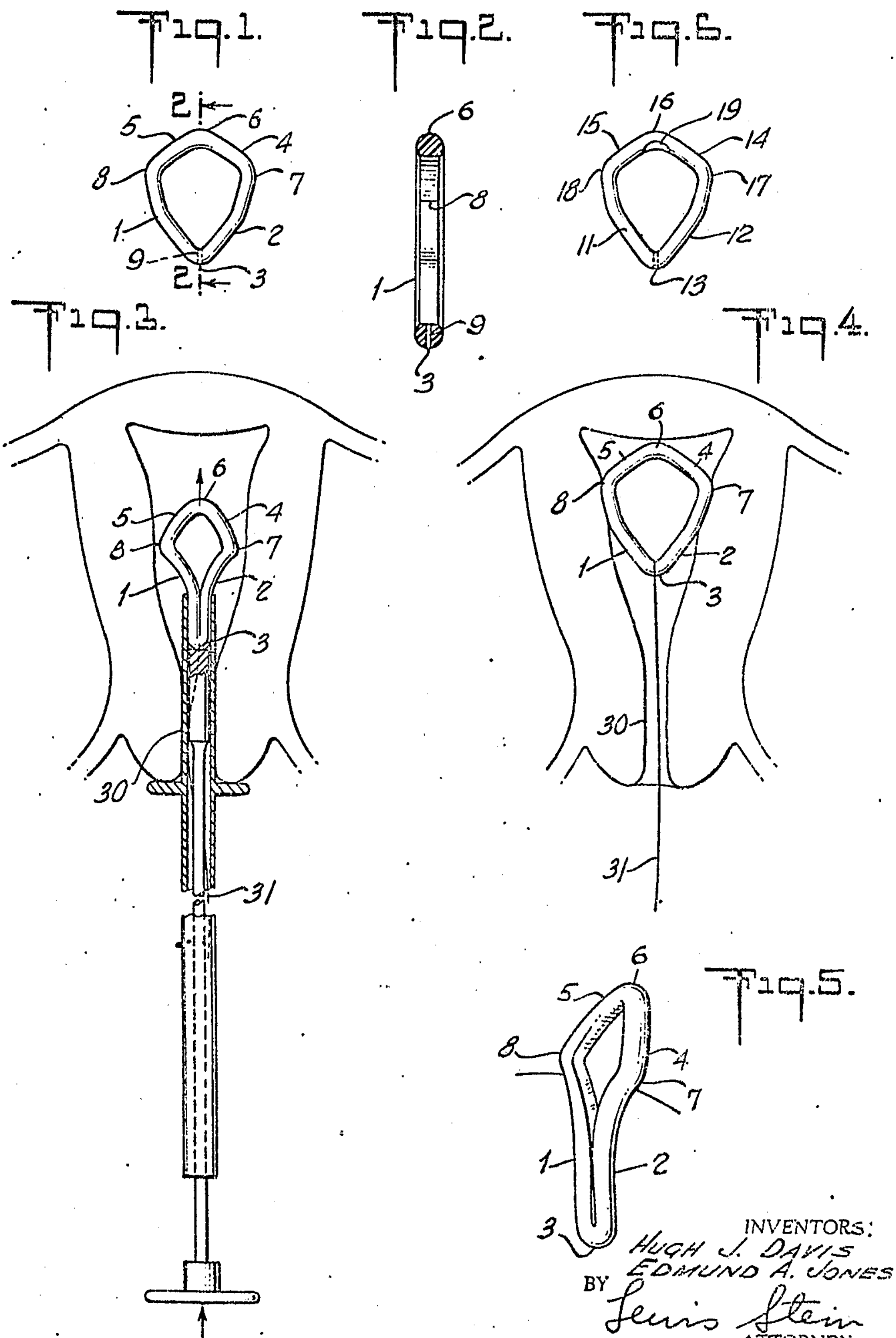


Inventors
Jaroslav F. Hulka
Richard A. Butler Jr.
Alan W. Burke
By their Attorney
Maurice R. Boiteau

March 11, 1969 H. J. DAVIS ET AL 3,431,905

INTRAUTERINE CONTRACEPTIVE DEVICE

Filed May 19, 1966



INVENTORS:
HUGH J. DAVIS
EDMUND A. JONES
BY Lewis Stein
ATTORNEY.

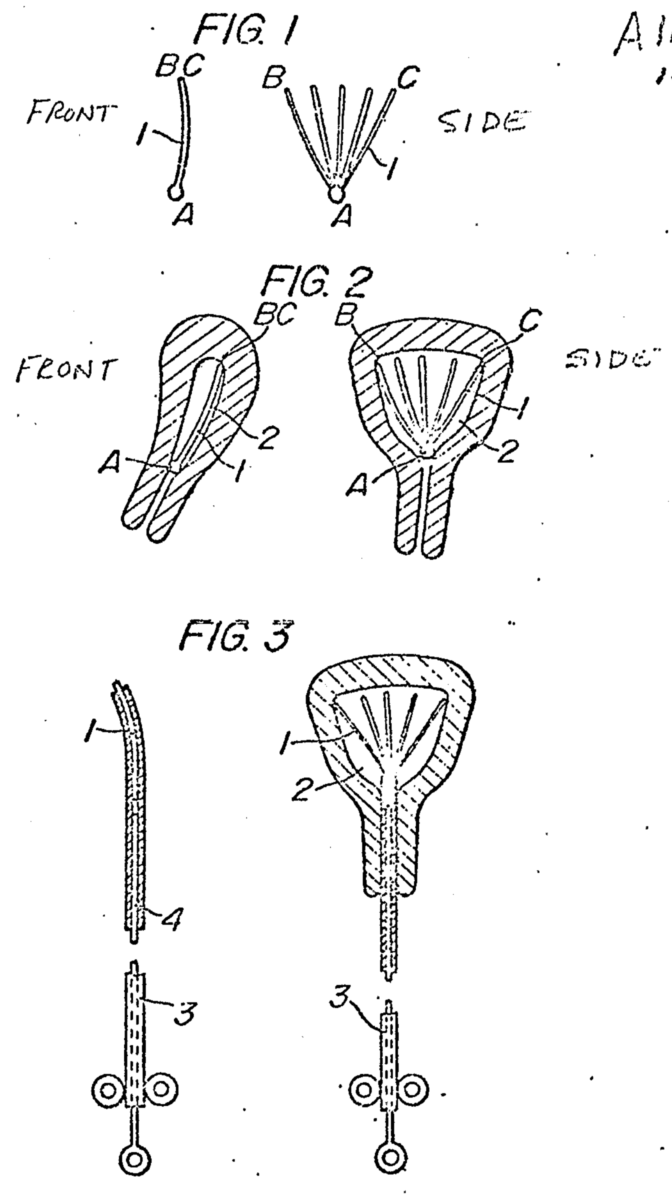
75

Nov. 21, 1967 ATSUMI ISHIHAMA 3,353,533

INTRA-UTERINE CONTRACEPTIVE APPLIANCE

Filed July 12, 1965

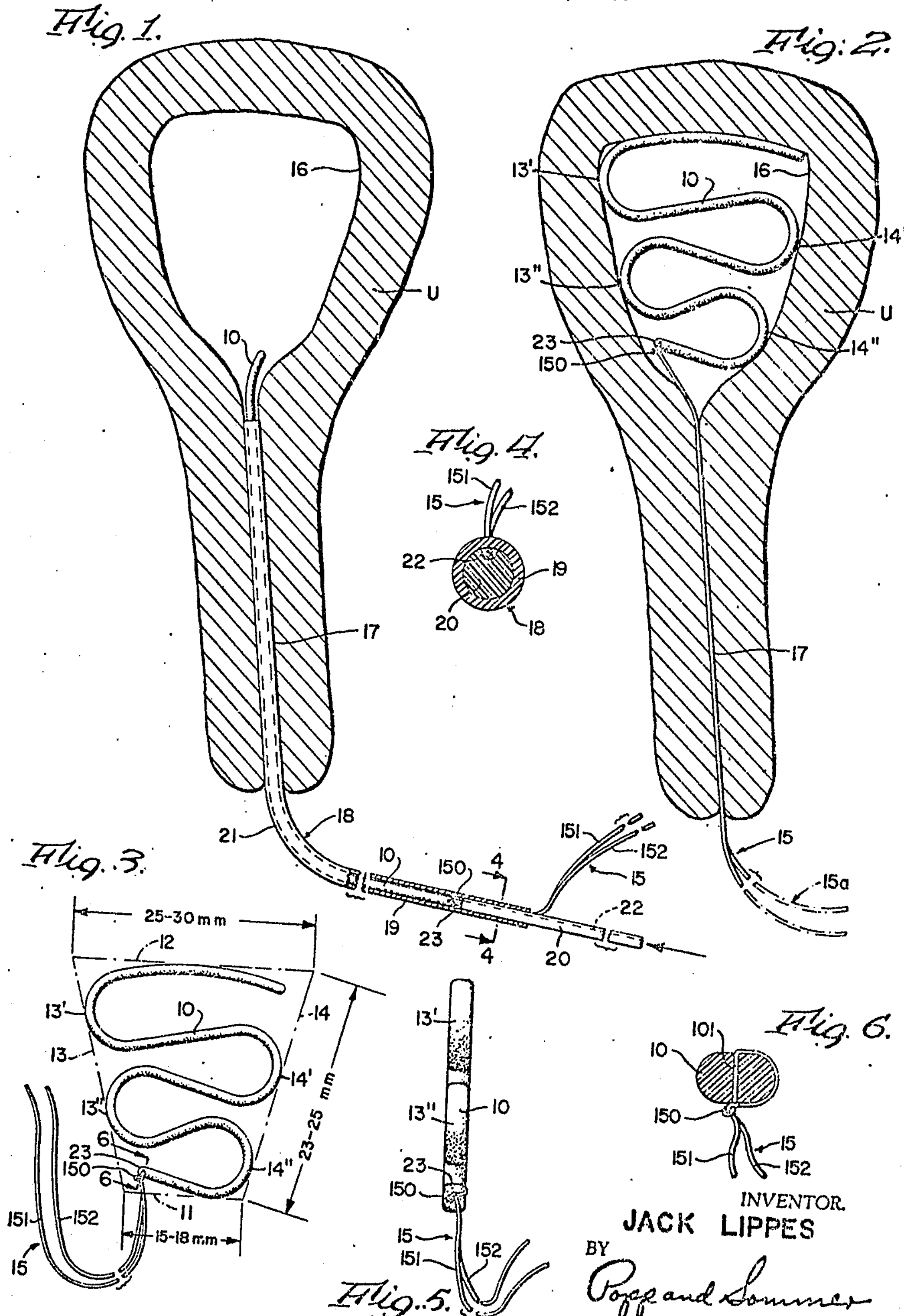
All members in one plane



May 10, 1966 J. LIPPES 3,250,271

INTRAUTERINE DEVICE

Filed April 29, 1963



INVENTOR.
JACK LIPPES
BY
Pozzo and Sommer
ATTORNEYS

Nov. 12, 1968 M. E. CHAFT 3,410,265
INTRA-UTERINE CONTRACEPTIVE DEVICE AND
DEVICE FOR INSERTING THE SAME
Filed Dec. 6, 1965 2 Sheets-Sheet 1

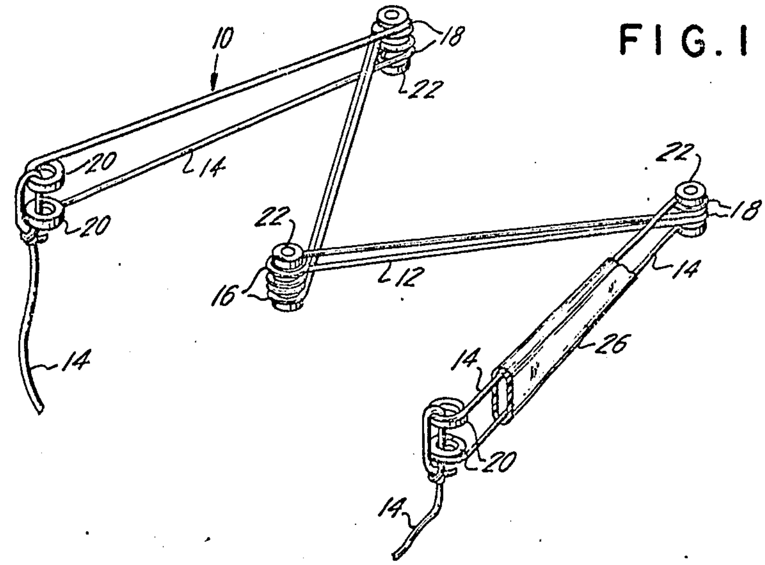


FIG. I

all steel
no spring wire

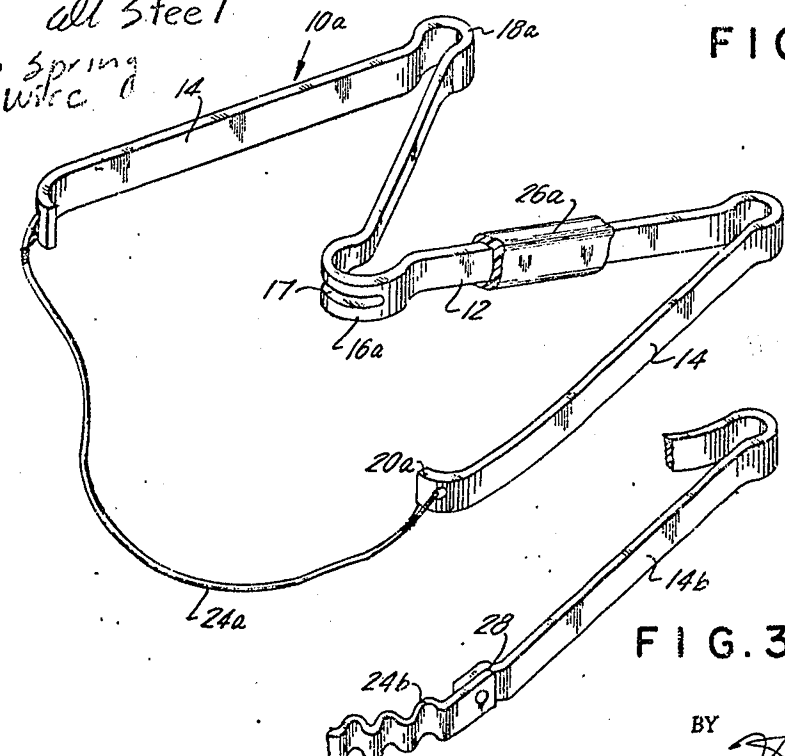


FIG. 2

FIG. 3

INVENTOR.
MARC E. CHAFT
BY [signature]
ATTORNEY

Nov. 12, 1968 M. E. CHAFT 3,410,265
INTRA-UTERINE CONTRACEPTIVE DEVICE AND
DEVICE FOR INSERTING THE SAME
Filed Dec. 6, 1965 2 Sheets-Sheet 2

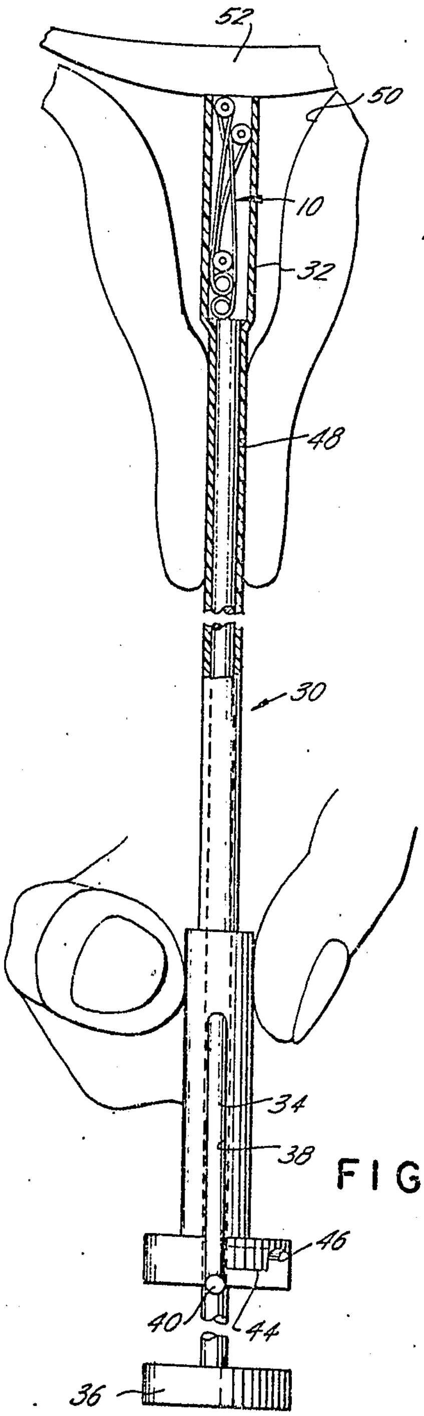


FIG. 4

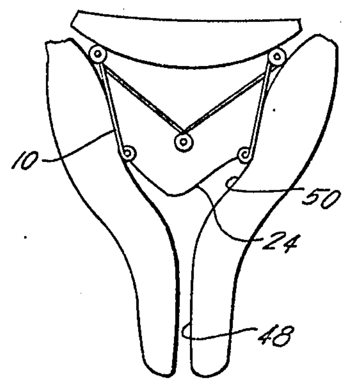


FIG. 5

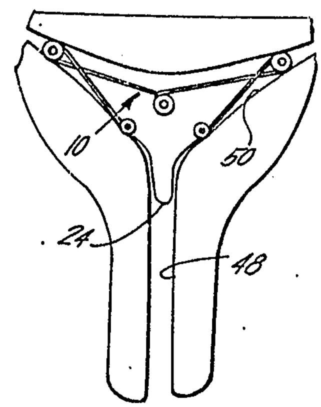


FIG. 6

INVENTOR.
MARC E. CHAFT
BY
[signature]
ATTORNEY

79

Aug. 20, 1968 G. MAJZLIN 3,397,691

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed June 2, 1966

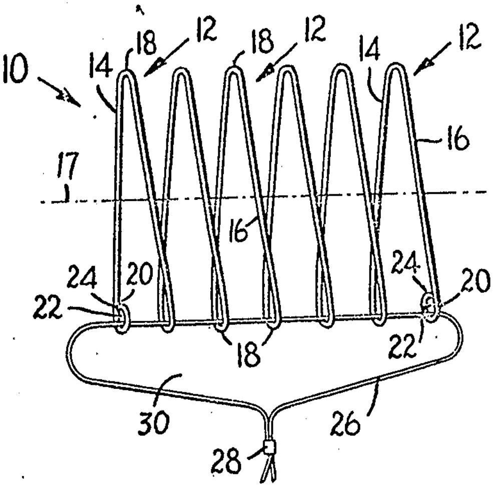


FIG. 1

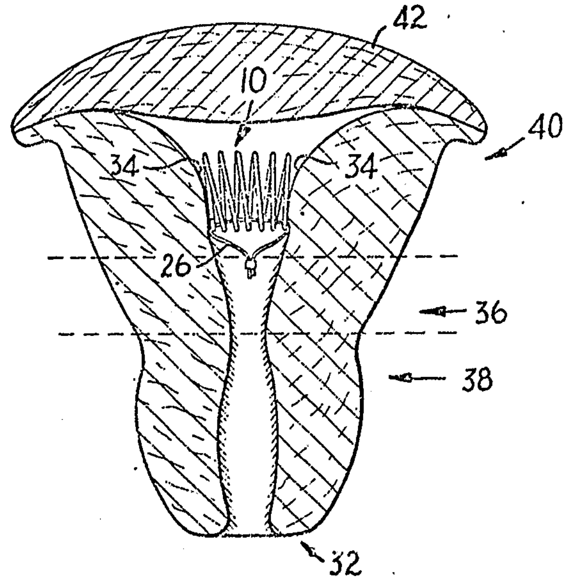


FIG. 2

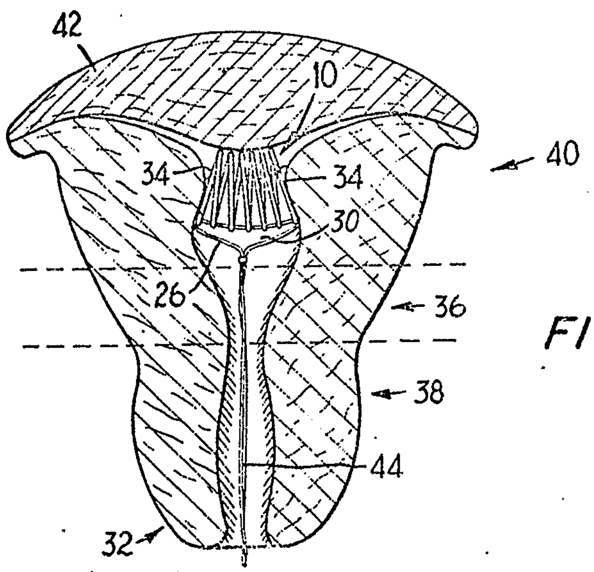


FIG. 3

INVENTOR.
GREGORY MAJZLIN

BY Eyre, Mann & Lucas

ATTORNEYS

July 29, 1969 F. R. ESHELMAN 3,457,915
INTRAUTERINE DEVICE
Filed Aug. 10, 1966

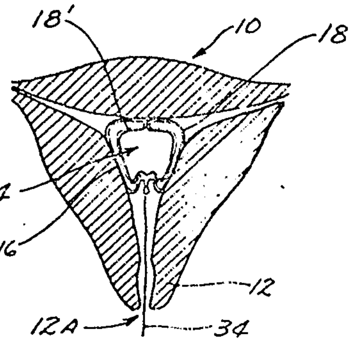


Fig. 1

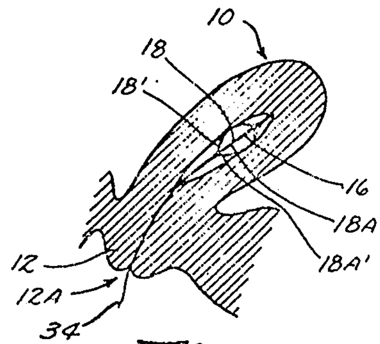


Fig. 2

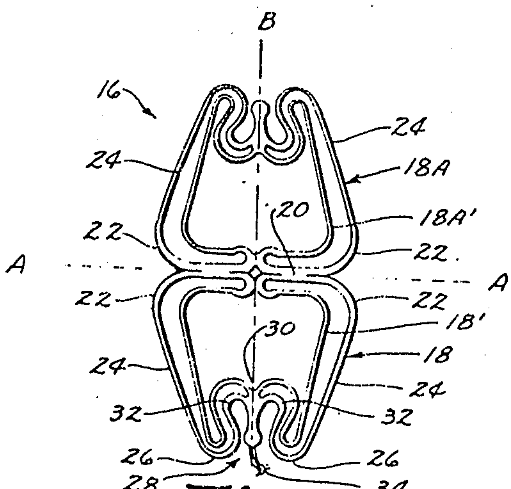


Fig. 3

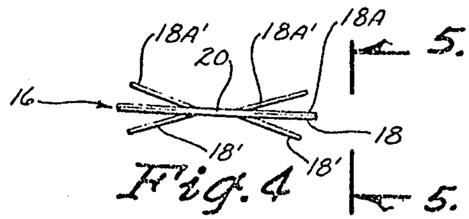


Fig. 4

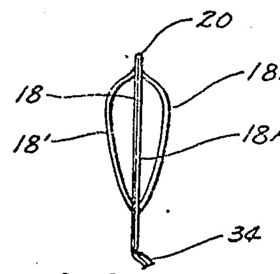


Fig. 5

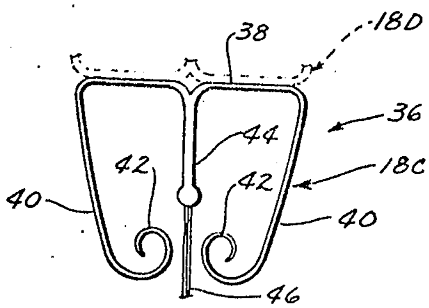


Fig. 6

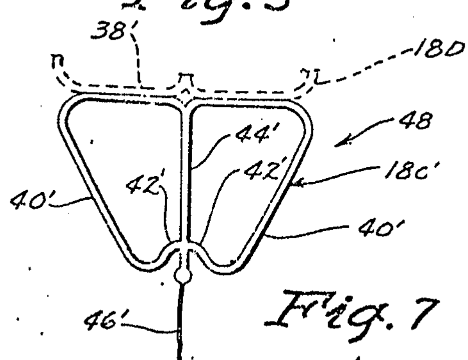


Fig. 7

INVENTOR
FRANK R. ESHELMAN
BY
Nieck, Farley, McKee & Thomte
ATTORNEYS

April 4, 1967 C. L. BURDICK 3,312,214

INTRA-UTERINE DEVICE

Filed June 6, 1966 2 Sheets-Sheet 1

Fig. 1.

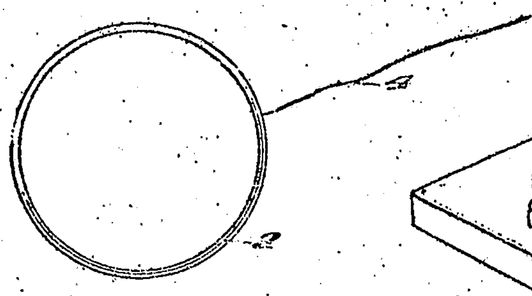


Fig. 2.

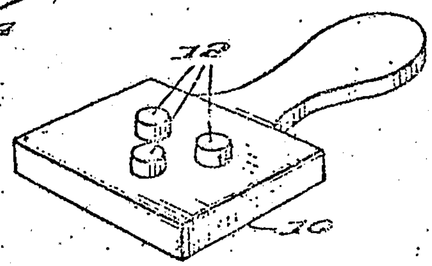


Fig. 3.

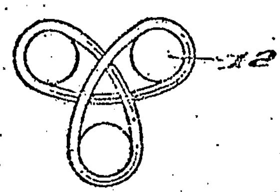


Fig. 4.

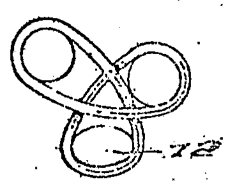


Fig. 5.

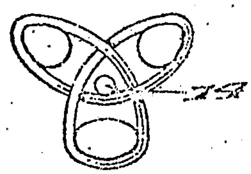


Fig. 6.

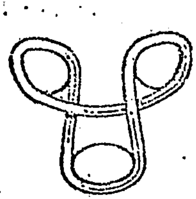


Fig. 7.

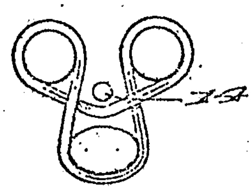
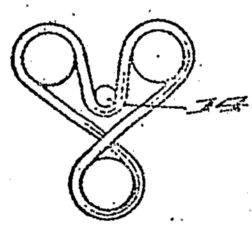


Fig. 8.



INVENTOR
CHARLES LALOR BURDICK,

BY David E. Brook

AGENT

April 4, 1967 C. L. BURDICK 3,312,214

INTRA-UTERINE DEVICE

Filed June 6, 1966 2 Sheets-Sheet 2

Fig. 9.

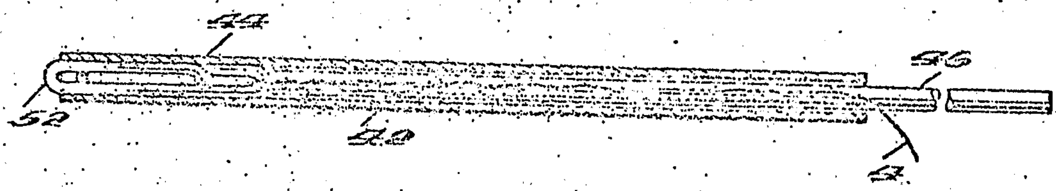
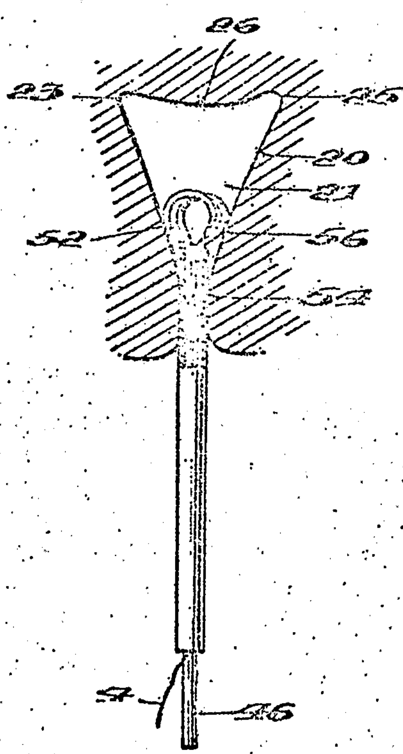


Fig. 10.



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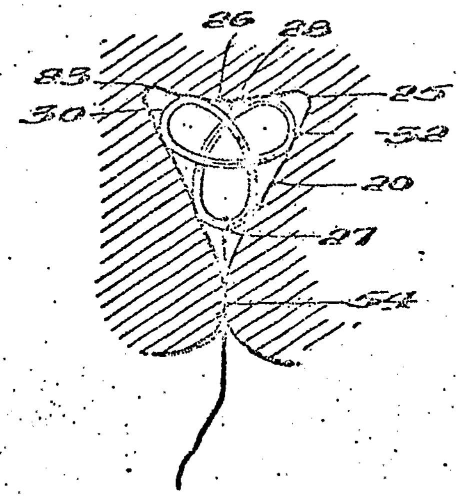

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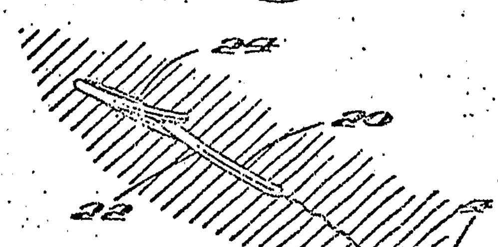


INVENTOR.
CHARLES LALOR BURDICK,
BY David E. Brook
AGENT

Feb. 19, 1963 M. H. KNOCH 3,077,879

CONTRACEPTIVE INTRA-UTERINE APPLIANCE

Filed Feb. 24, 1961

FIG-2

FIG-3

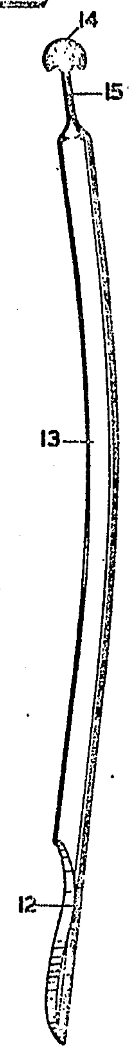
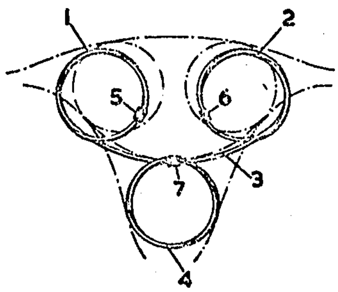


FIG-1



INVENTOR

MAX HERMANN KNOCH

BY Hammond & Littell

ATTORNEYS

1129712 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

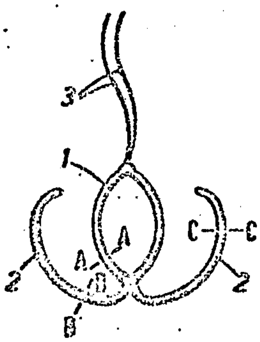


FIG.6

FIG.7

FIG.8

FIG.9

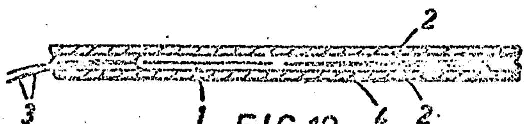


FIG.10

1129712 PROVISIONAL SPECIFICATION

1 SHEET This drawing is a reproduction of the Original on a reduced scale

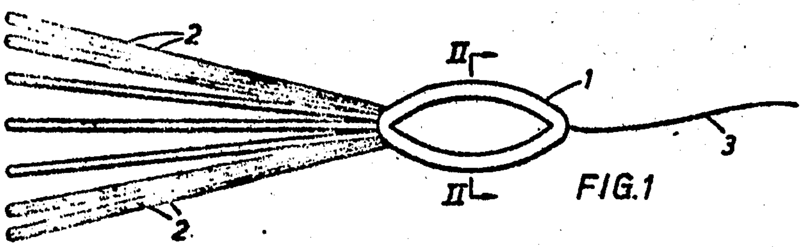


FIG.1

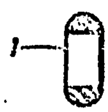


FIG.2

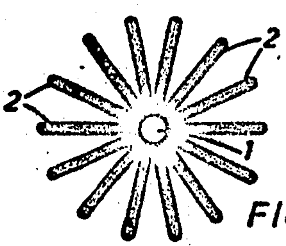


FIG.3

FIG.4

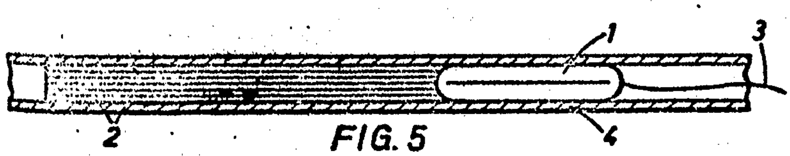


FIG. 5

LISTING OF ADDITIONAL PATENT DRAWINGS

McKnight (June 2, 1970) #3,515,132

Cournut (June 23, 1970) #3,516,403

Towns (Sept. 8, 1970) #3,527,210

Tatum (Oct. 13, 1970) #3,533,406

Sloněk (Jan. 20, 1970) #3,490,446

Meckstroth, (Oct. 17, 1939) #2,176,559

Rosenthal (March 26, 1968) #3,374,788

Meckstroth (July 5, 1938) #2,122,579

Robinson (Dec. 13, 1966) #3,291,125

Schwartz (June 21, 1966) #3,256,878

Appleby, B.P. (May 16, 1967) #3,319,625

Robinson (Jan. 23, 1968) #3,364,927

Hatke (March 26, 1968) #3,374,787

Rigney (May 14, 1968) #3,382,869

Majzlin (Aug. 20, 1968) #3,397,690

Bakunin (Oct. 15, 1968) #3,405,711

Robinson (Feb. 4, 1969) #3,425,411

Taylor, (March 11, 1969) #3,431,906

Burnhill (April 15, 1969) #3,438,369

Krejčí (May 6, 1969) #3,442,266

Leininger (July 8, 1969) #3,454,004

Robinson (Sept. 16, 1969) #3,467,088

Hasson (Sept. 16, 1969) #3,467,089

Burnhill (Nov. 11, 1969) #3,477,430

June 2, 1970 C. A. McKNIGHT 3,515,132

INTRAUTERINE CONTRACEPTIVE DEVICE

Filed Dec. 26, 1967

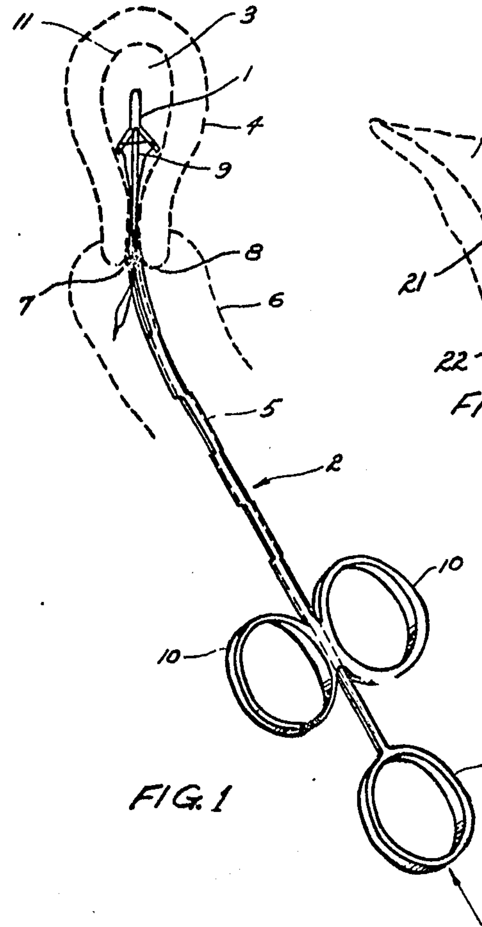


FIG. 1

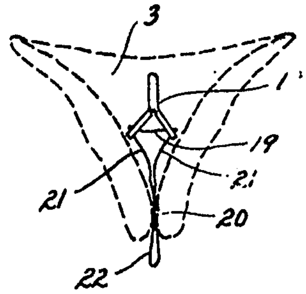


FIG. 2

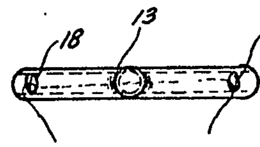


FIG. 4

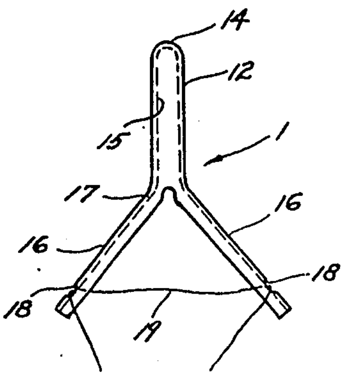


FIG. 3

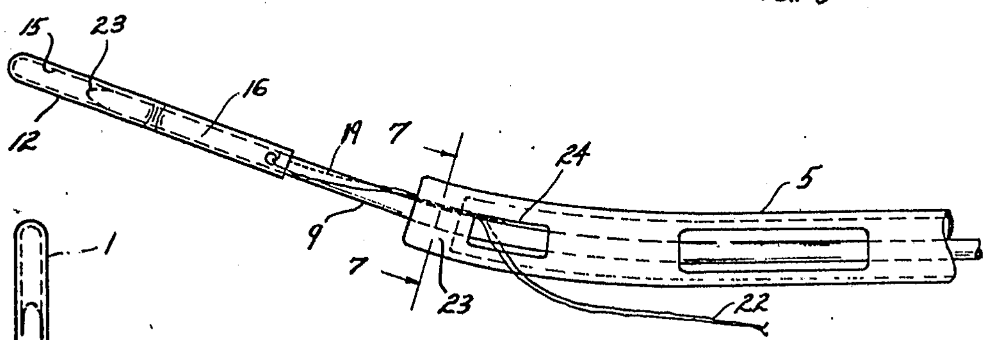


FIG. 6

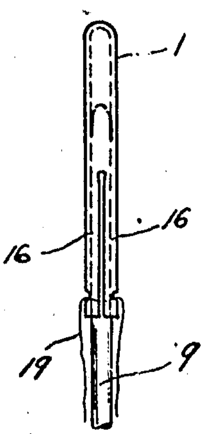


FIG. 5

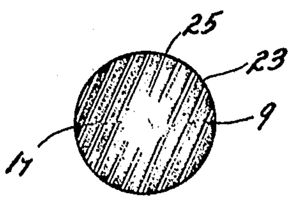


FIG. 7

INVENTOR:
CHARLES ALLEN McKNIGHT

BY Paul M. Denk
ATTORNEY.

88

June 23, 1970 R. COURNUT 3,516,403

INTRAUTERINE CONTRACEPTION DEVICE AND INSTRUMENT FOR PLACING THIS DEVICE IN POSITION

Filed July 5, 1968 2 Sheets-Sheet 1

Fig.1

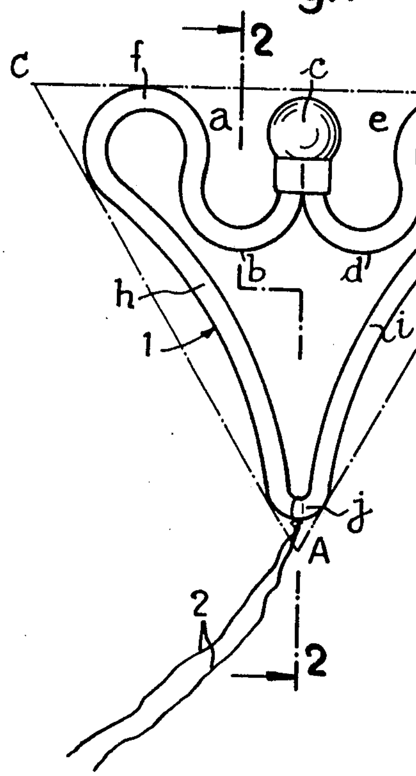


Fig.2

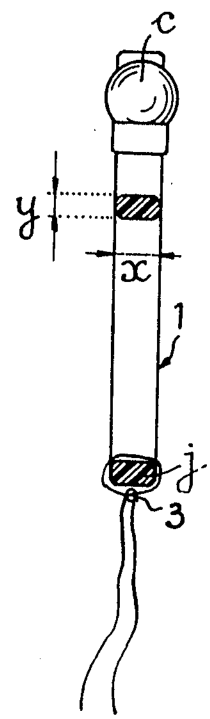


Fig.3

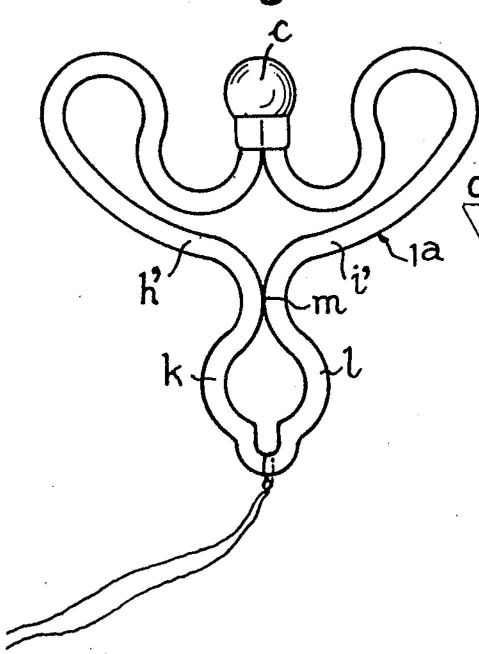
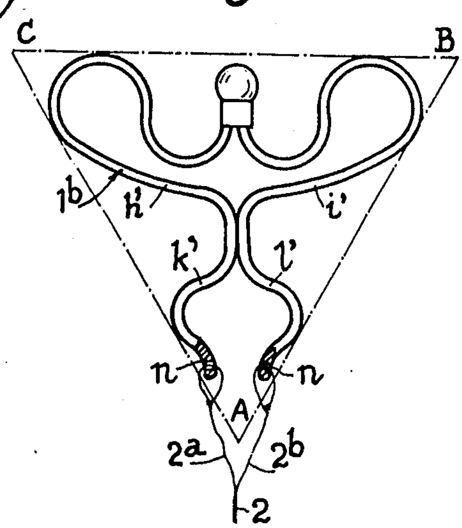


Fig.4

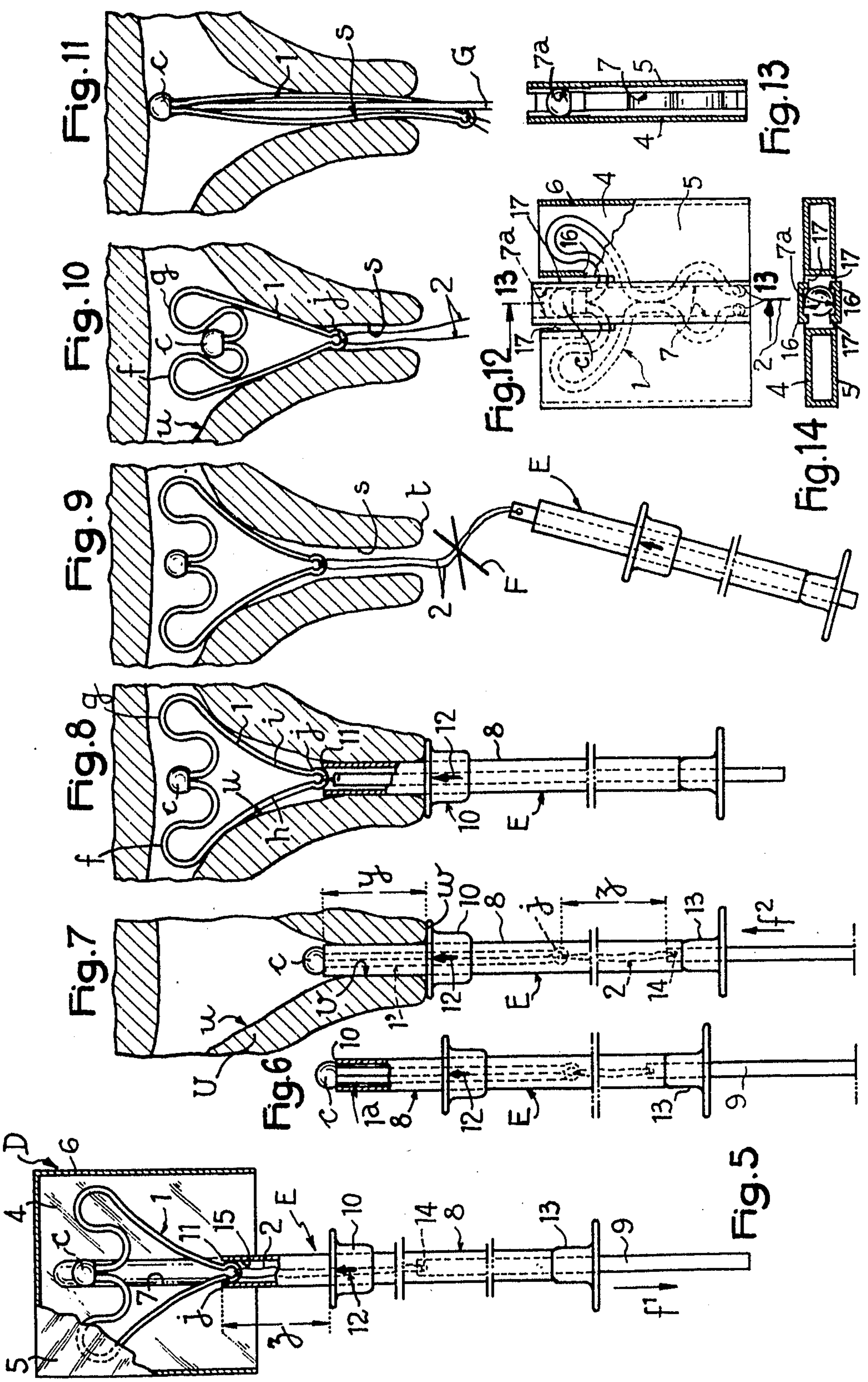


89

June 23, 1970 R. COURNUT 3,516,403

INTRAUTERINE CONTRACEPTION DEVICE AND INSTRUMENT
FOR PLACING THIS DEVICE IN POSITION

Filed July 5, 1968 2 Sheets-Sheet 2



United States Patent

[11] 3,527,210

[72] Inventor Edward J. Towns
Livingston, New Jersey
[21] Appl. No. 452,072
[22] Filed April 30, 1965
[45] Patented Sept. 8, 1970
[73] Assignee By mesne assignments, to
Ortho Pharmaceutical Corporation,
a corporation of New Jersey

[54] MOLDED SPRING RETURN MEANS FOR PLASTIC ARTICLES
5 Claims, 14 Drawing Figs.

[52] U.S. Cl. 128/130, 128/471, 128/472, 2/260
[51] Int. Cl. A61f 5/46
[50] Field of Search 128/130, 233, 132, 127, 465, 433; 24/61; 2/260, 261, 262, 264, 255

[56] References Cited

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664,495	12/1900	Paine	128/30
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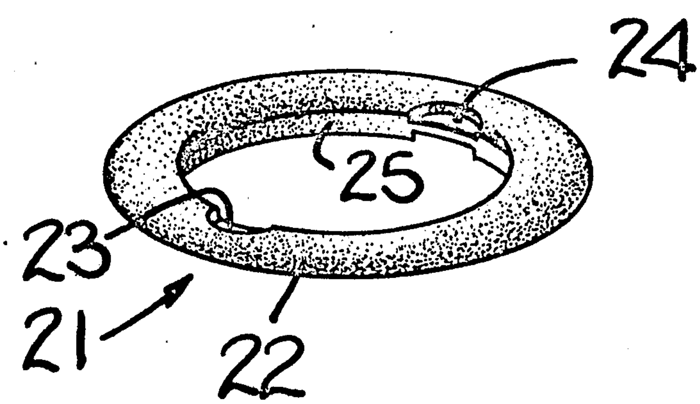
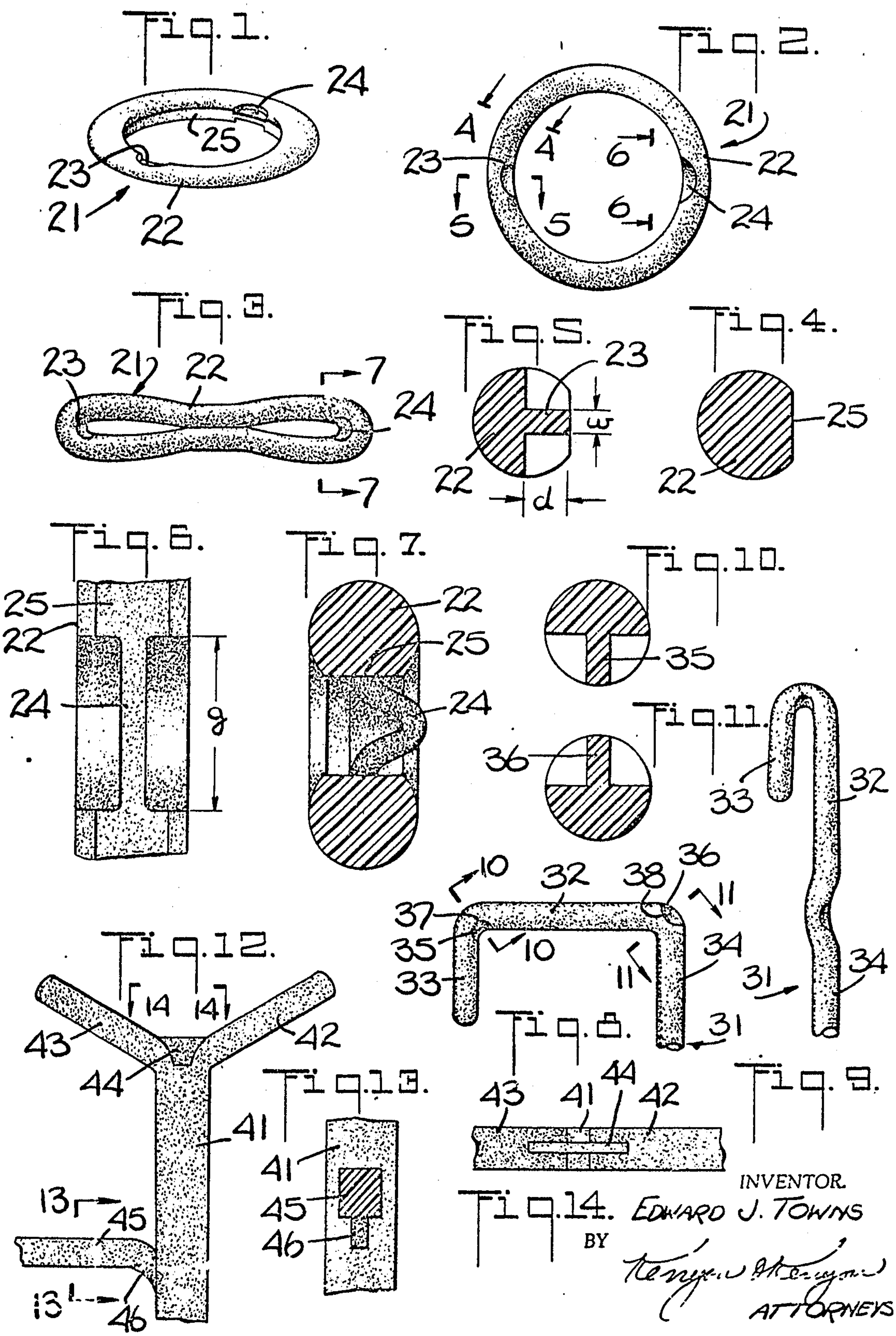
3,200,815	8/1965	Margulies	128/30
3,253,590	5/1966	Birnberg et al.	128/30

Primary Examiner—Adele M. Eager
Attorney—Kenyon and Kenyon, Reilly, Carr and Chapin

CLAIM: 1. A ring-shaped molded plastic intrauterine device having an inside diameter substantially greater than its maximum cross-sectional dimension taken along a radius and adapted to be bent at at least one particular location, said device having molded therein at least one hinge comprising a web disposed on the inside perimeter of said device and at the location at which said device is intended to be bent, said web having a thickness in the plane essentially perpendicular to the plane of bending which is substantially less than the thickness of the adjacent portions of said device in the plane essentially perpendicular to the plane of bending and said web being of such thickness and such depth to initially resist deformation of said device in response to an externally applied force and to urge said device back to its original ring-shaped configuration after having been bent and upon release of externally applied force, whereby when said device is bent in the intended direction, said web bends in a plane essentially perpendicular thereto.



Patented Sept. 8, 1970 3,527,210



INVENTOR.
EDWARD J. TOWNS
BY
Kenyon & Kenyon
ATTORNEYS

United States Patent

[11] 3,533,406

[72] Inventor Howard J. Tatum
New York, New York
[21] Appl. No. 760,609
[22] Filed Sept. 18, 1968
[45] Patented Oct. 13, 1970
[73] Assignee The Population Council
New York, New York
a corporation of New York

[54] INTRAUTERINE CONTRACEPTIVE DEVICE
2 Claims, 6 Drawing Figs.

[52] U.S. Cl. 128/130, 128/267
[51] Int. Cl. A61f 5/46
[50] Field of Search 128/127, 128, 129, 130, 131, 260, 267

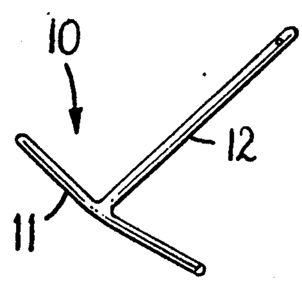
[56] References Cited

UNITED STATES PATENTS

3,454,004 7/1969 Leininger et al. 128/130

Primary Examiner—Adele M. Eager
Attorney—Brumbaugh, Graves, Donohue and Raymond

ABSTRACT: An intrauterine contraceptive device is disclosed which has a characteristic "T" shape. The length of the crossbar of the "T" is approximately equal to the lateral dimension of the fundus of the uterus, and the length of the depending leg of the "T" is adapted to extend down toward the cervical os.



Patented Oct. 13, 1970 3,533,406

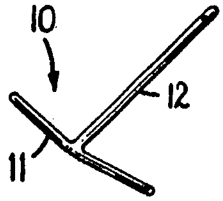


FIG. 1

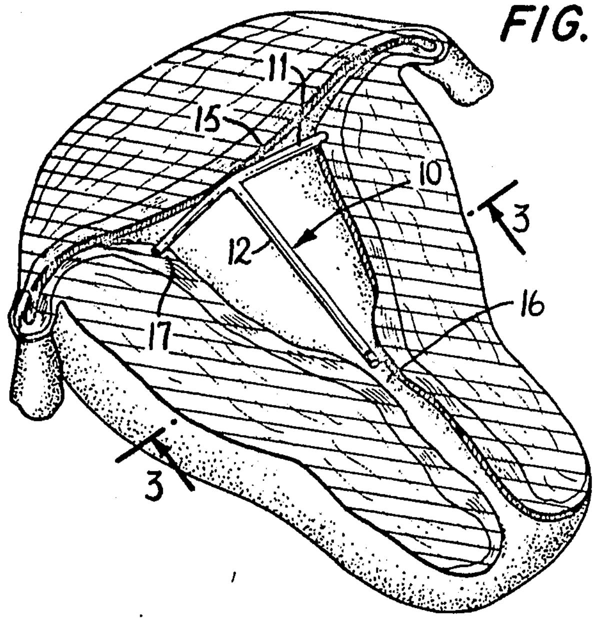


FIG. 2

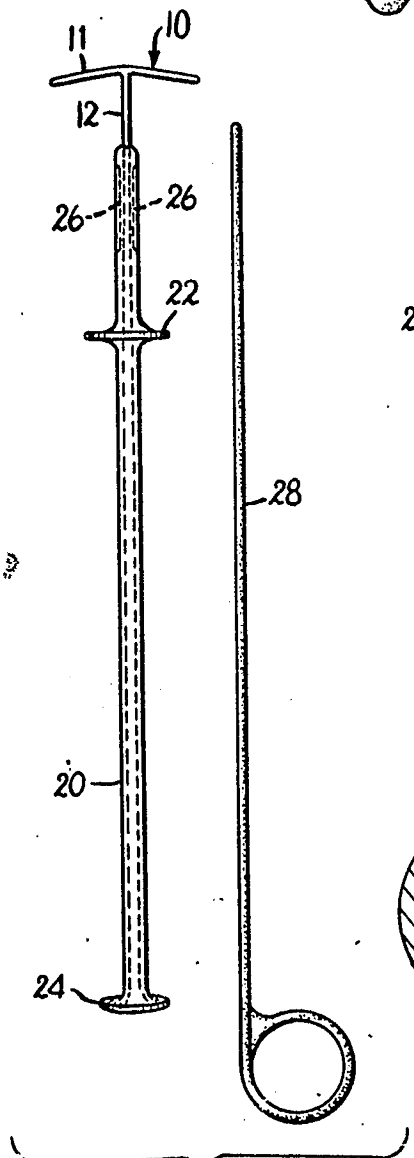


FIG. 5

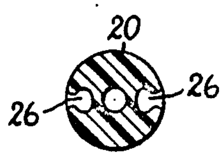


FIG. 6

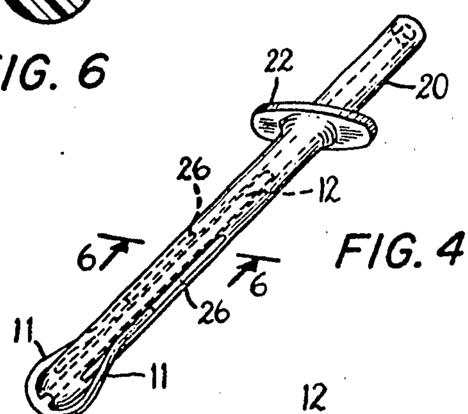


FIG. 4

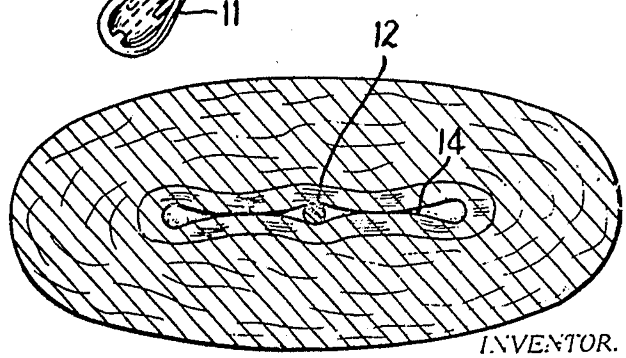


FIG. 3

INVENTOR.
HOWARD J. TATUM

BY
Baumbaugh, Graves, Donohue & Raymond
his ATTORNEYS

94

Jan. 20, 1970 M. SLONĚK ET AL 3,490,446

CONTRACEPTIVE

Filed April 6, 1967

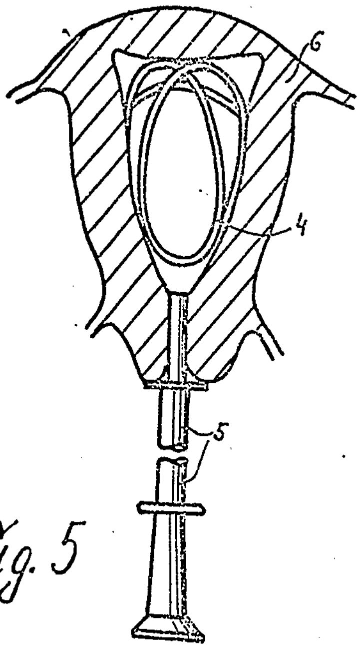


Fig. 5

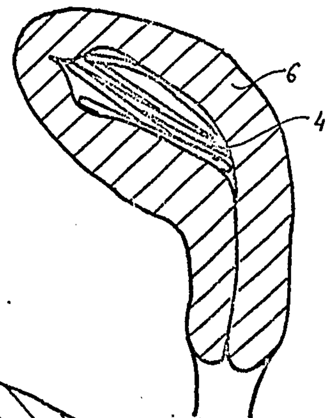


Fig. 6

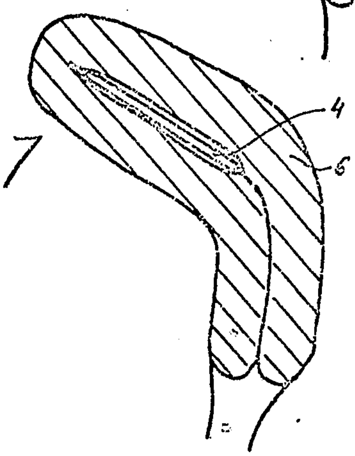


Fig. 7

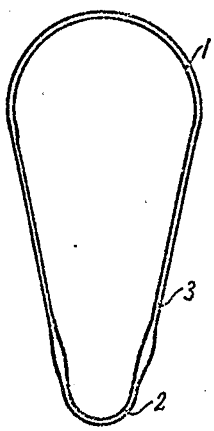
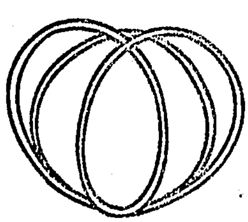


Fig. 1

Fig. 3

Fig. 4

Fig. 2



Oct. 17, 1939. L. W. MECKSTROTH 2,176,559

INTRA-UTERINE DEVICE

Filed Jan. 13, 1936 2 Sheets-Sheet 1

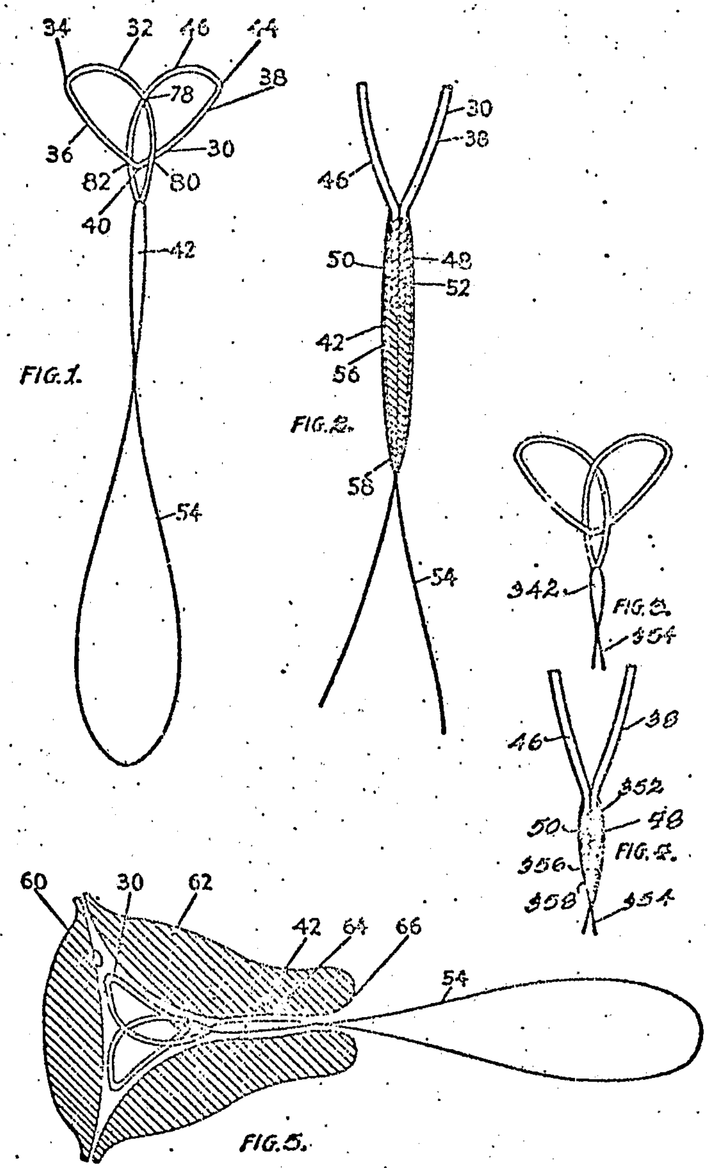


FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5.

Louis W. Meckstroth Inventor

Wilkinson, Huxley, Byron & Knight

Oct. 17, 1939. L. W. MECKSTROTH 2,176,559
INTRA-UTERINE DEVICE
Filed Jan. 13, 1936 2 Sheets-Sheet 2

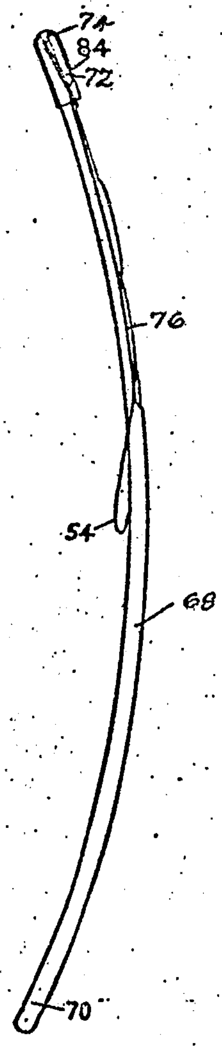


FIG. 6.

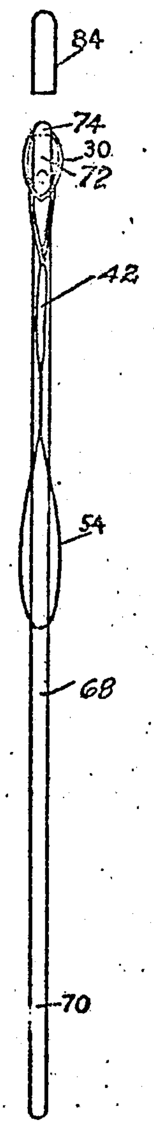


FIG. 7.

Louis W. Meckstroth Inventor
Atkinson, Huxley, Byrne & Knight

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 1

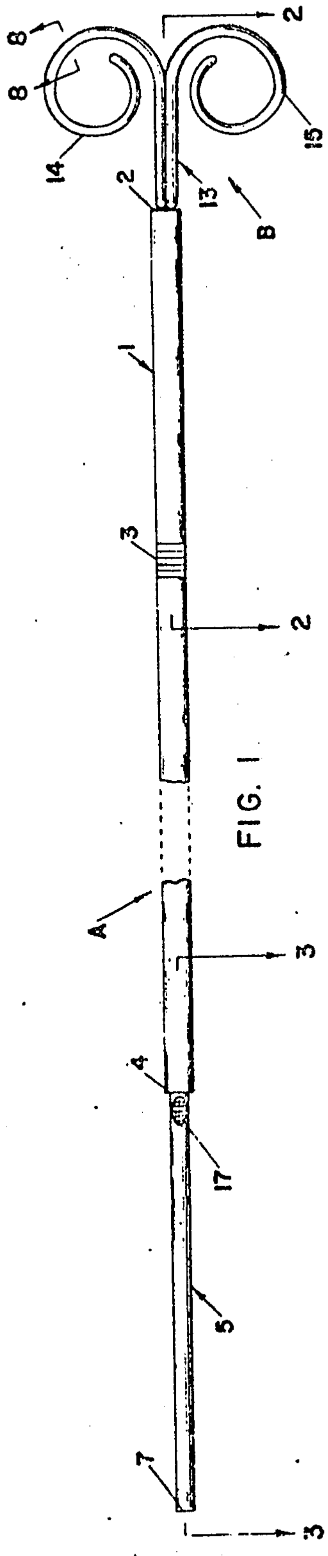


FIG. 1

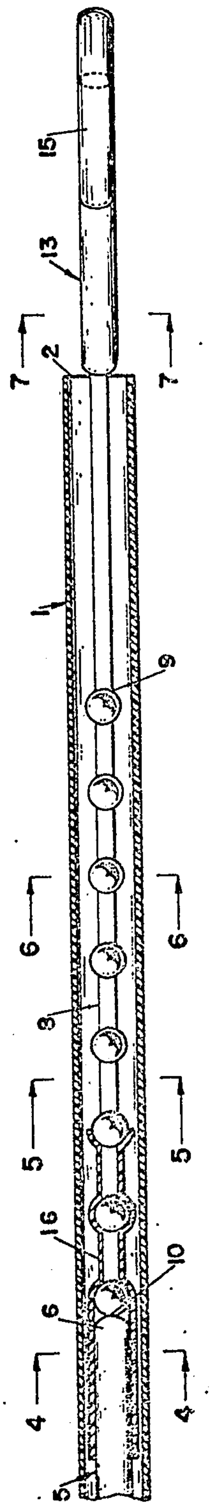


FIG. 2

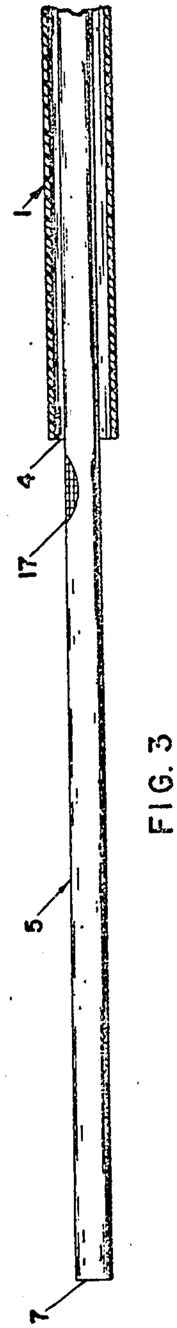


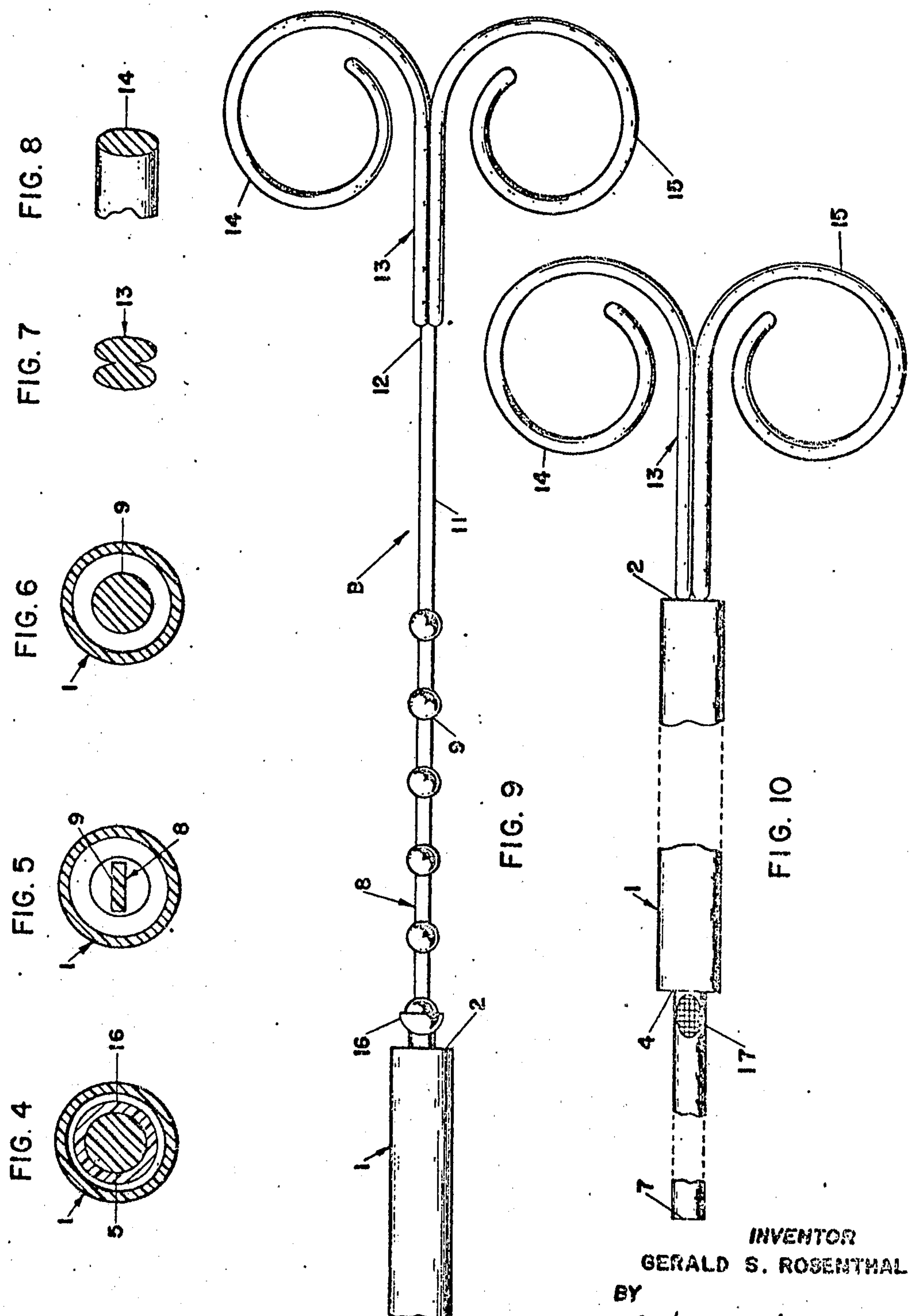
FIG. 3

INVENTOR
GERALD S. ROSENTHAL
BY Alfred W. Petchaft
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 2



INVENTOR
GERALD S. ROSENTHAL
BY
Alfred W. Petchaft
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 3

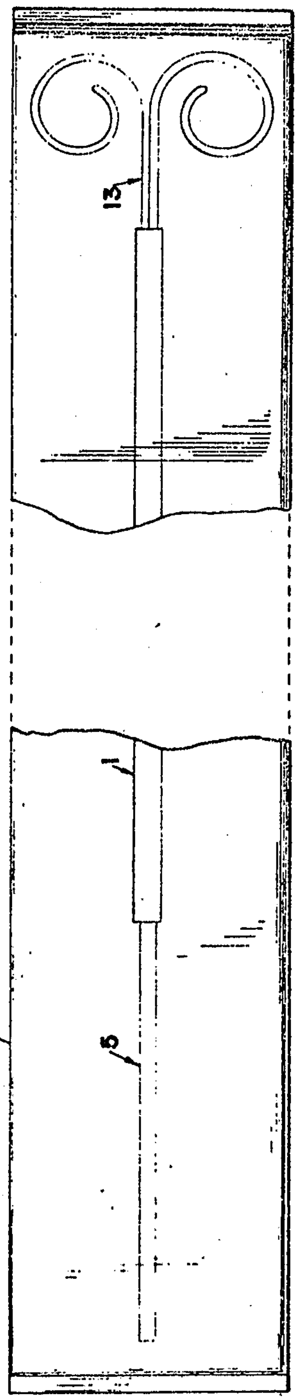


FIG. 11

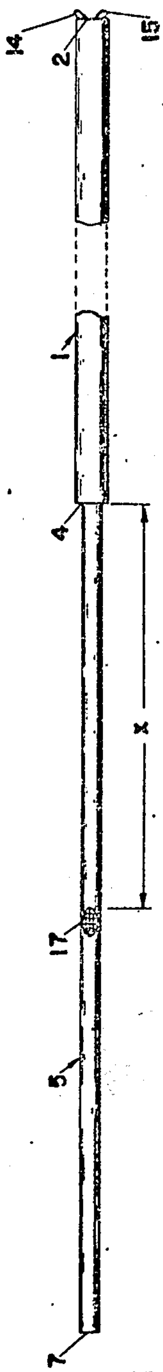


FIG. 12

INVENTOR
GERALD S. ROSENTHAL
BY Alfred W. Petchaft
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 4

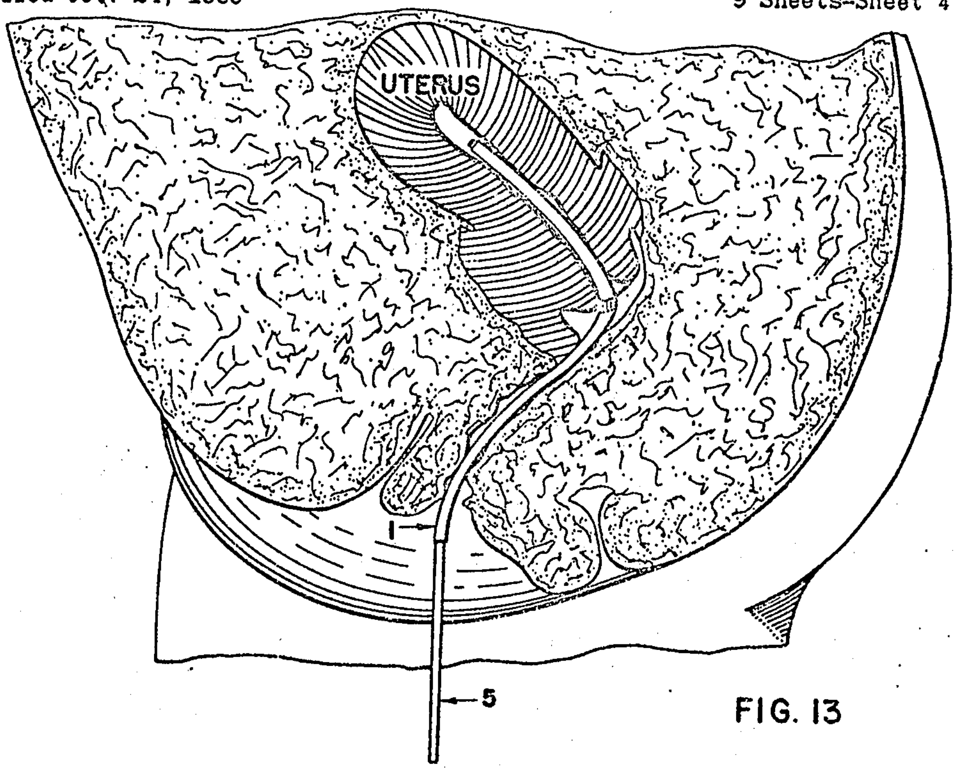


FIG. 13

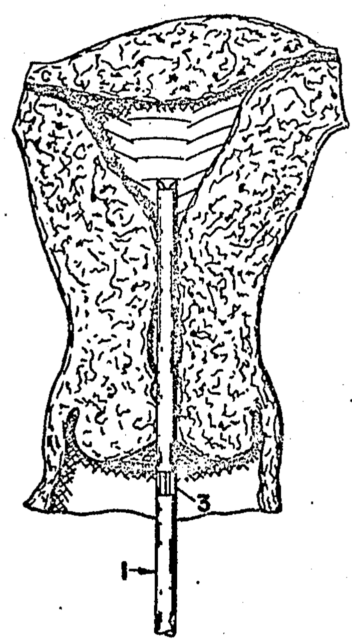


FIG. 14

INVENTOR
GERALD S. ROSENTHAL
BY
Alfred Letchaft
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 5

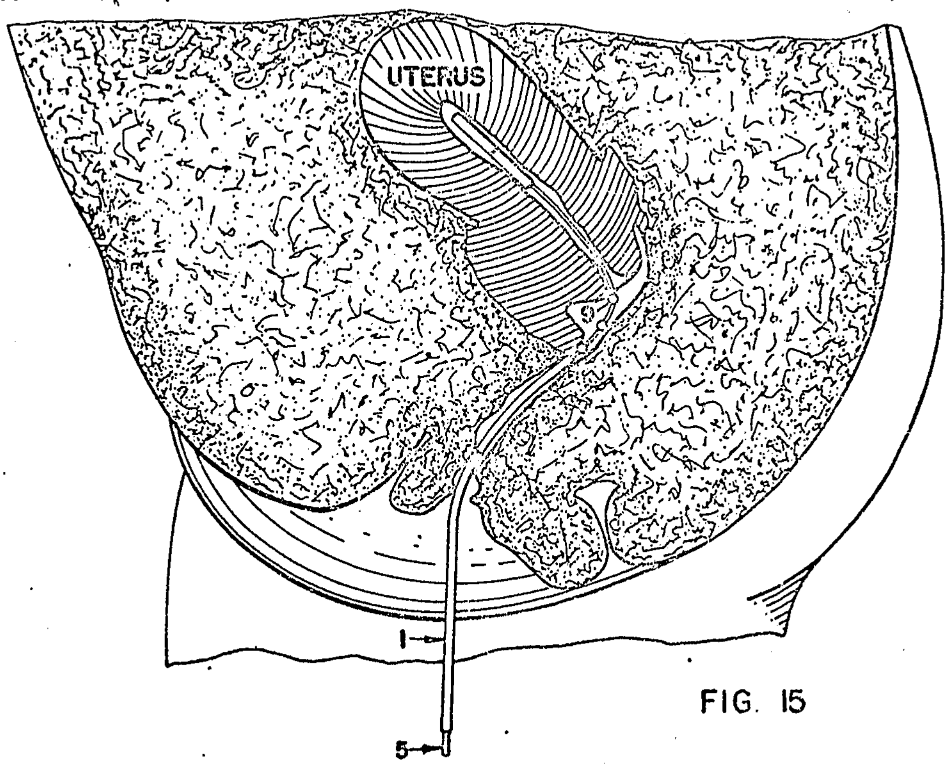


FIG. 15

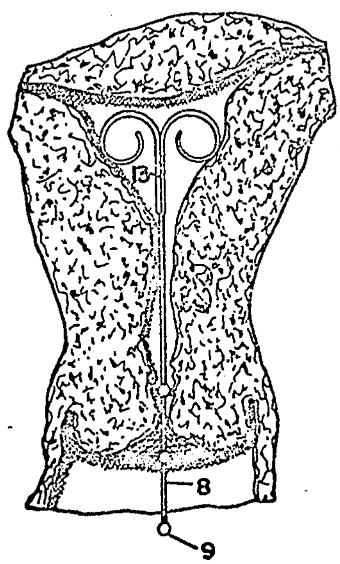


FIG. 16

INVENTOR
GERALD S. ROSENTHAL
BY
Alfred Letzheft
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965

9 Sheets-Sheet 6

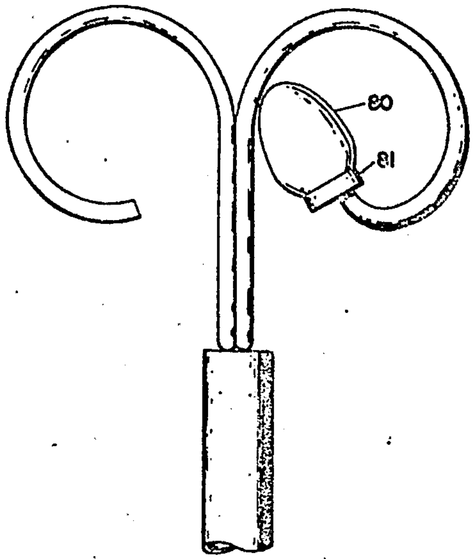


FIG. 31

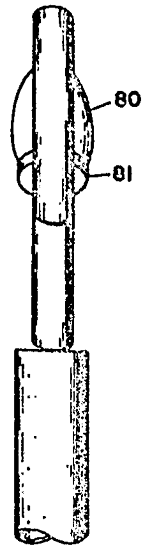


FIG. 32

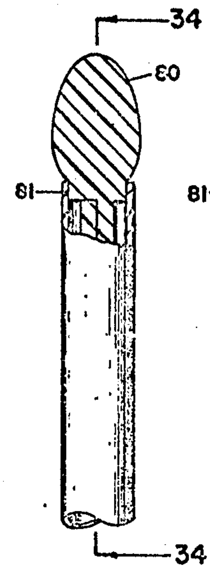


FIG. 33

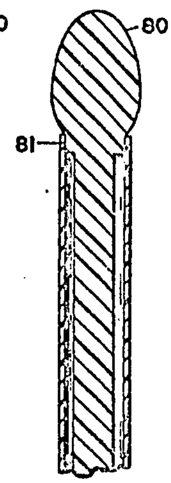


FIG. 34

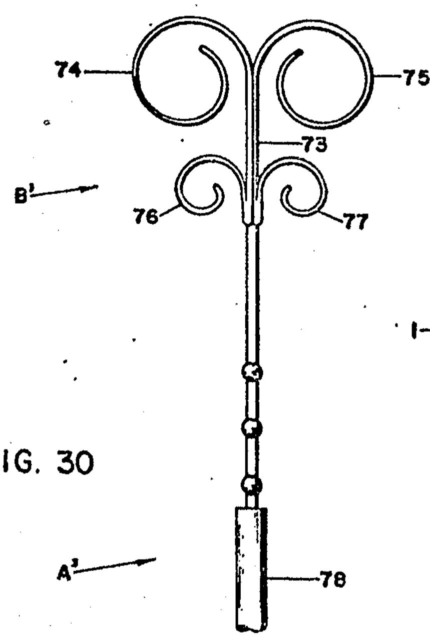


FIG. 30

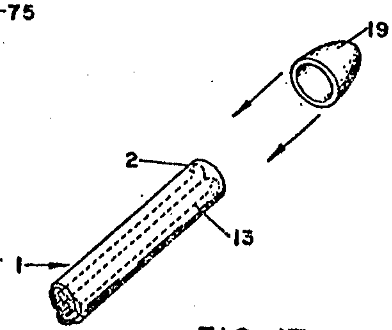


FIG. 17

INVENTOR
GERALD S. ROSENTHAL
BY John D. Pope
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 7

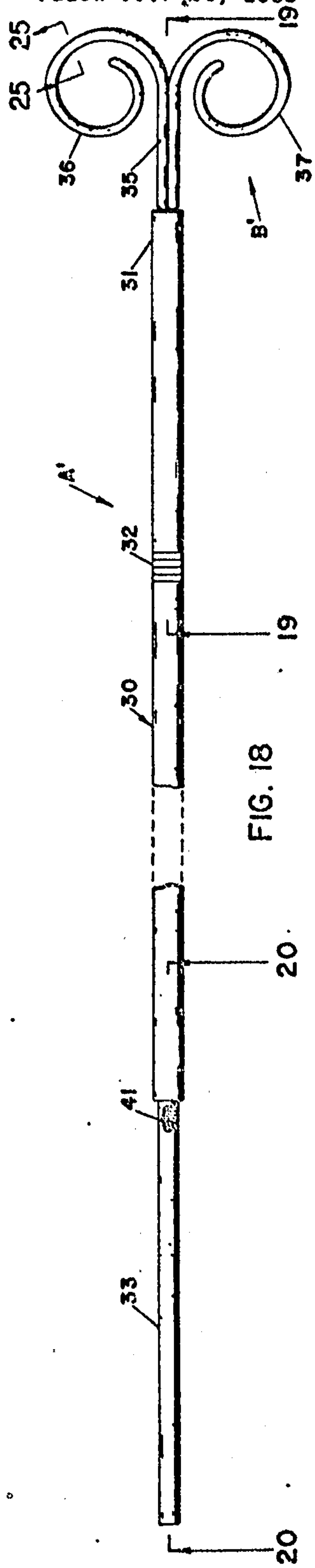


FIG. 18

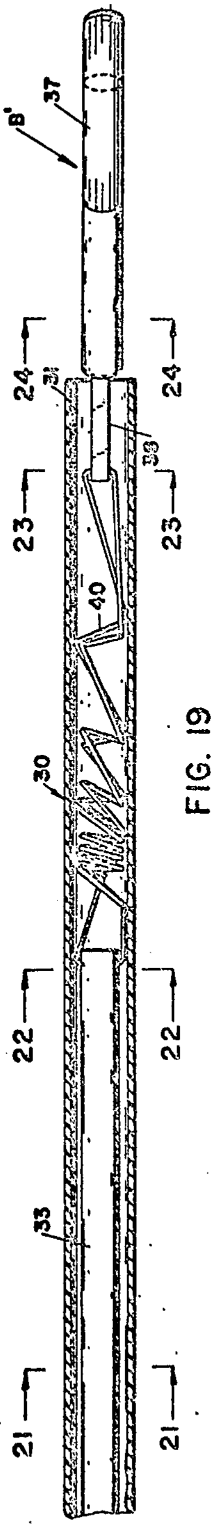


FIG. 19

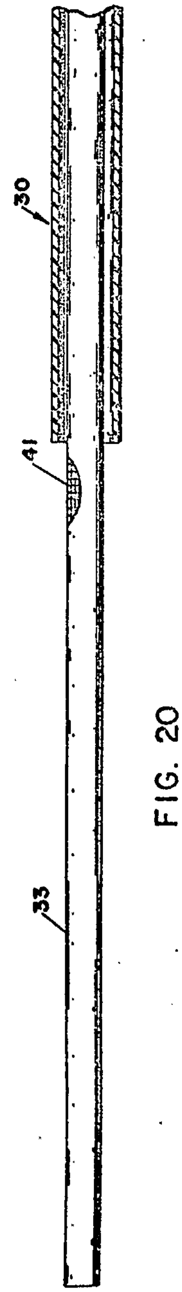


FIG. 20

INVENTOR
GERALD S. ROSENTHAL
BY John D. [signature]
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 8

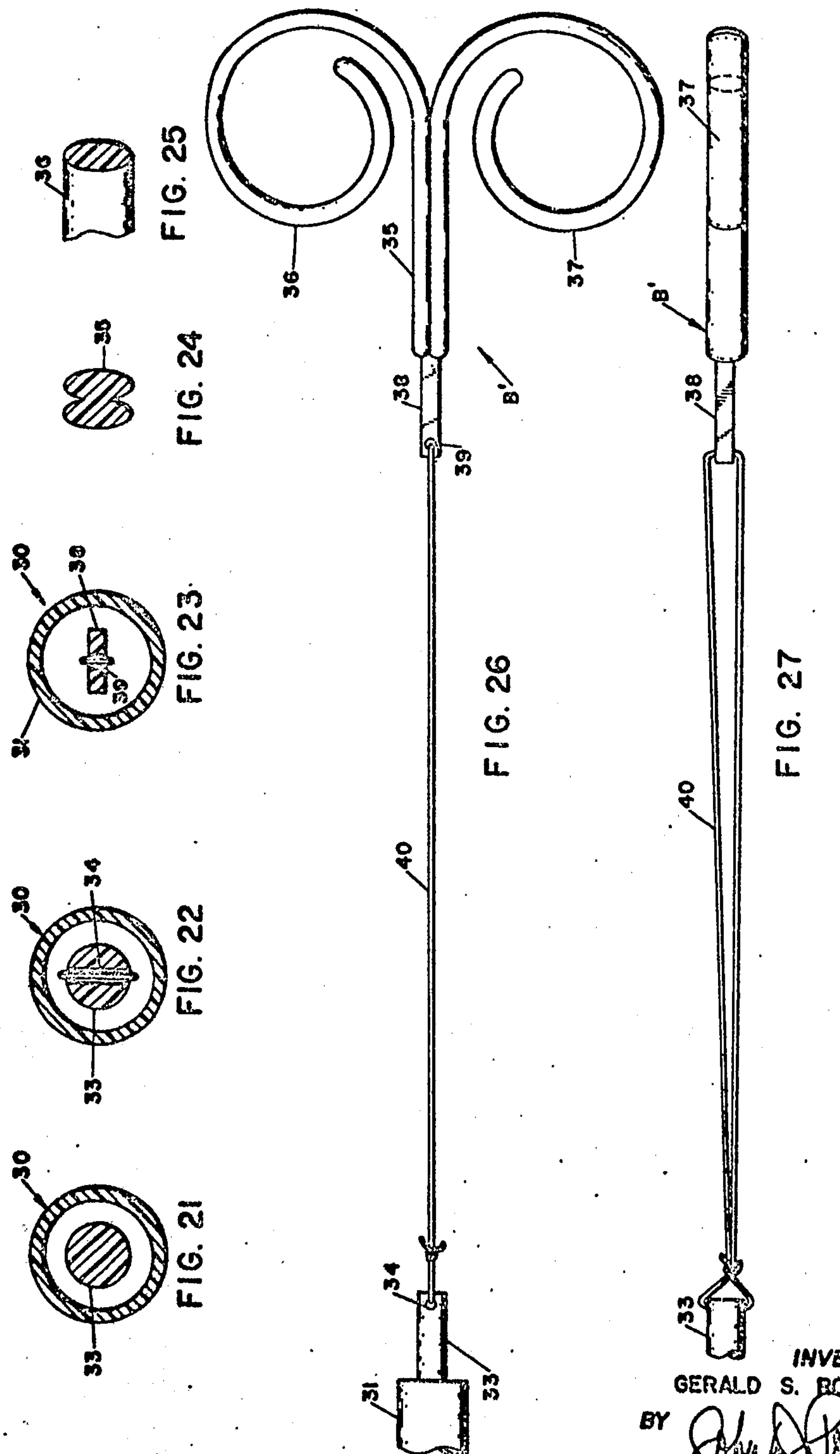


FIG. 21

FIG. 22

FIG. 23

FIG. 24

FIG. 25

FIG. 26

FIG. 27

INVENTOR
GERALD S. ROSENTHAL
BY [signature]
ATTORNEY

March 26, 1968 G. S. ROSENTHAL 3,374,788

CONTRACEPTIVE DEVICES AND METHODS

Filed Oct. 24, 1965 9 Sheets-Sheet 9

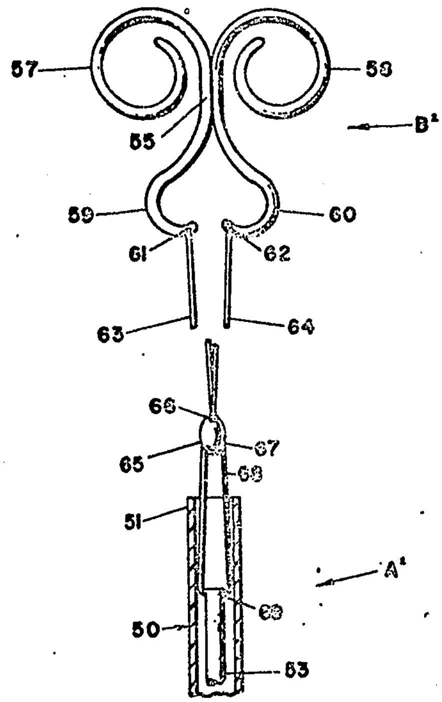


FIG. 28

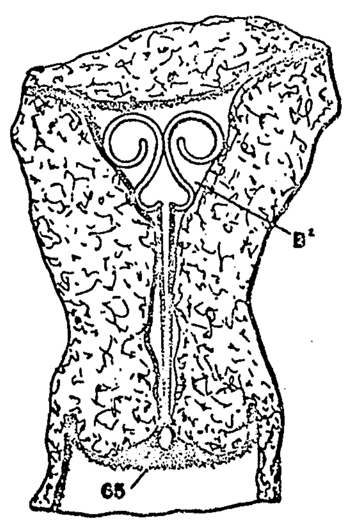


FIG. 29

INVENTOR
GERALD S. ROSENTHAL
BY
ATTORNEY

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EXPIRED 1955

see Figs 6-8
and Claims 9-11

July 5, 1938. L. W. MECKSTROTH 2,122,579

INTRA-UTERINE DEVICE

Filed June 13, 1934 4 Sheets-Sheet 1

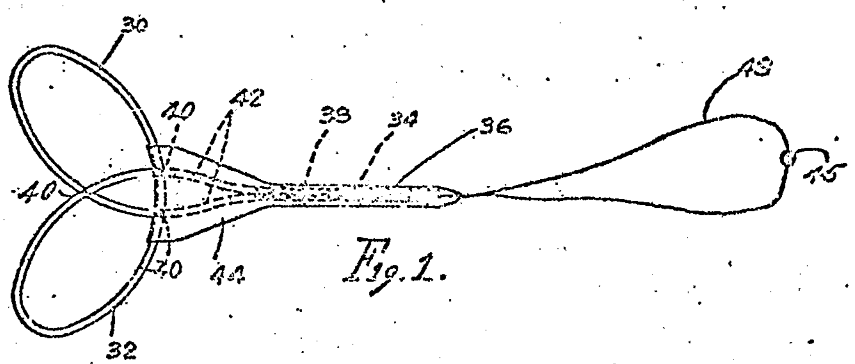

Fig. 1.

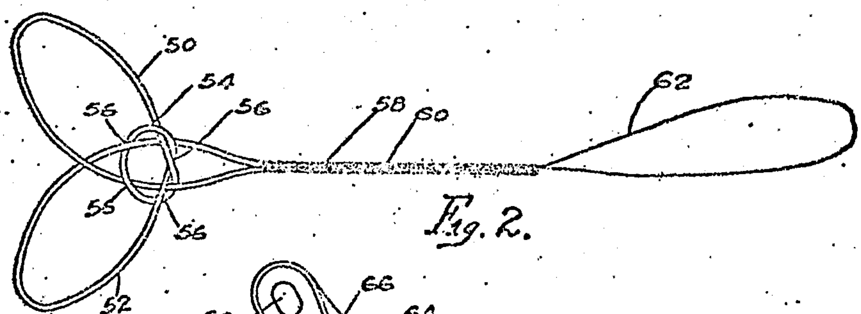

Fig. 2.

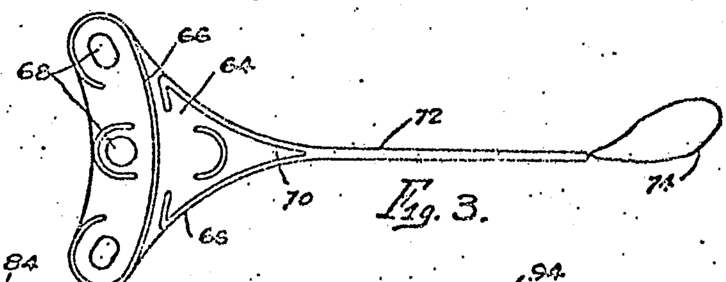

Fig. 3.

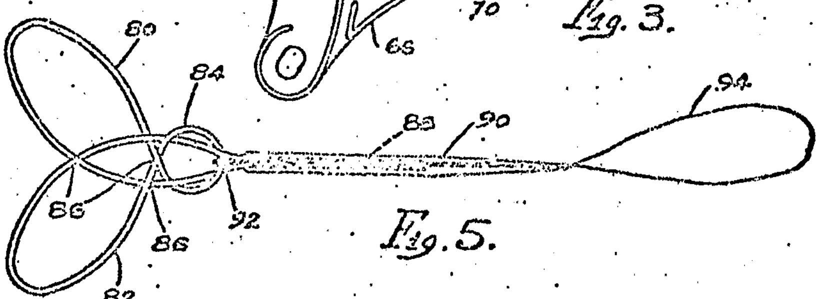

Fig. 5.

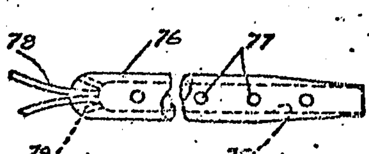

Fig. 4

Inventor
Louis W. Meckstroth.
By
Williams, Bradley, Pierson & Knight
Attorneys

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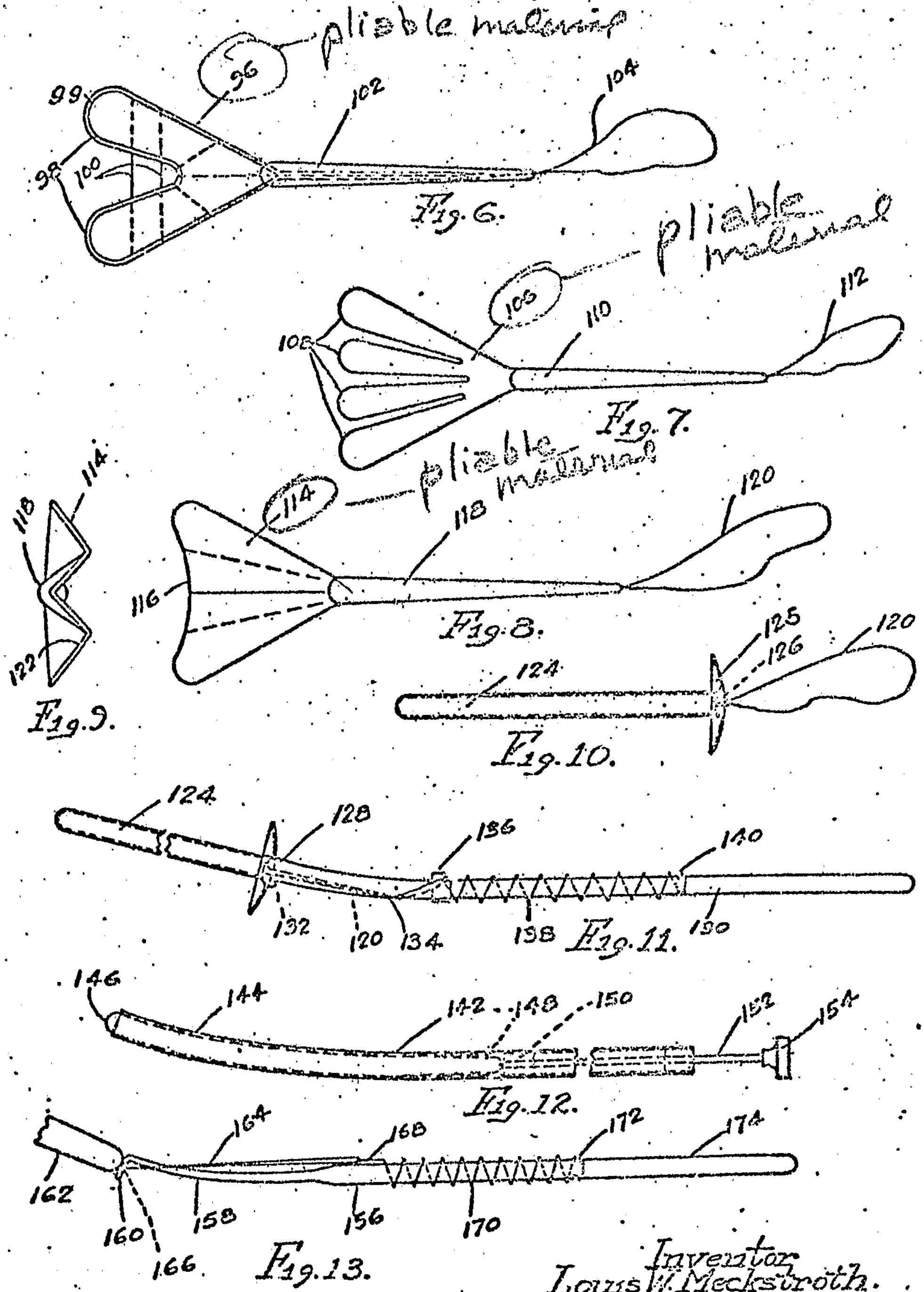
July 5, 1938. L. W. MECKSTROTH 2,122,579

INTRA-UTERINE DEVICE

Filed June 13, 1934 4 Sheets-Sheet 2



Inventor
Louis W. Meckstroth.

By
Attorneys.

July 5, 1938. L. W. MECKSTROTH 2,122,579

INTRA-UTERINE DEVICE

Filed June 13, 1934 4 Sheets-Sheet 3

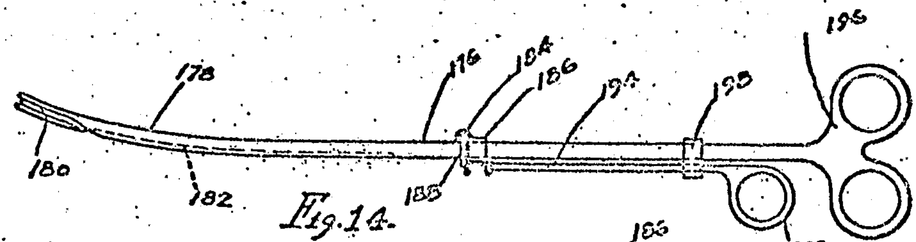


Fig. 14.

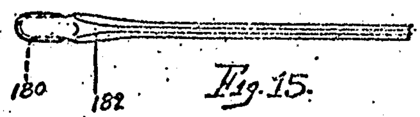


Fig. 15.

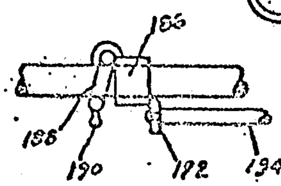
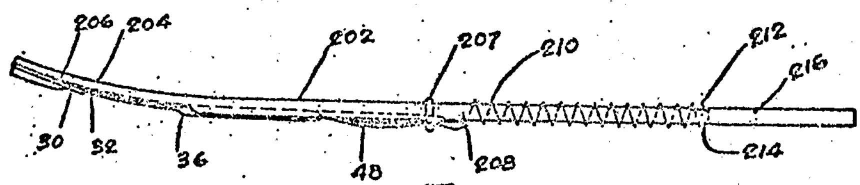


Fig. 16.



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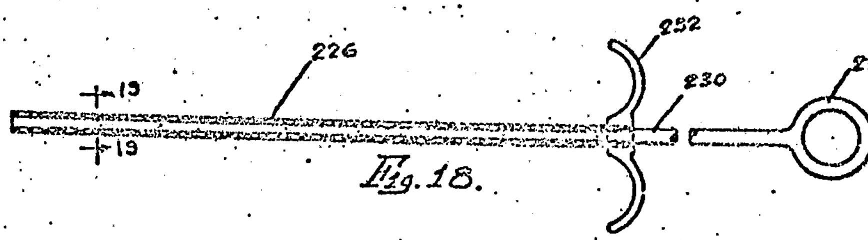


Fig. 18.

Fig. 19.

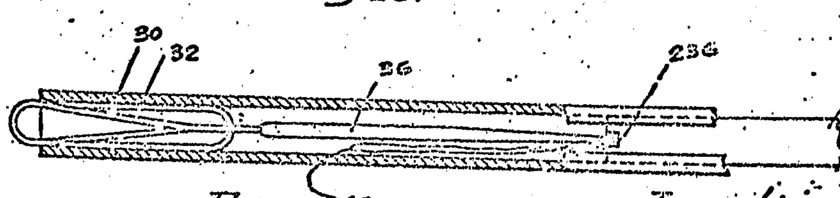


Fig. 20.

Inventor
Louis W. Meckstroth
By Atkinson, Hopkins, Brown & Knight
Attorneys.

July 5, 1938. L. W. MECKSTROTH 2,122,579

INTRA-UTERINE DEVICE

Filed June 13, 1934 4 Sheets-Sheet 4

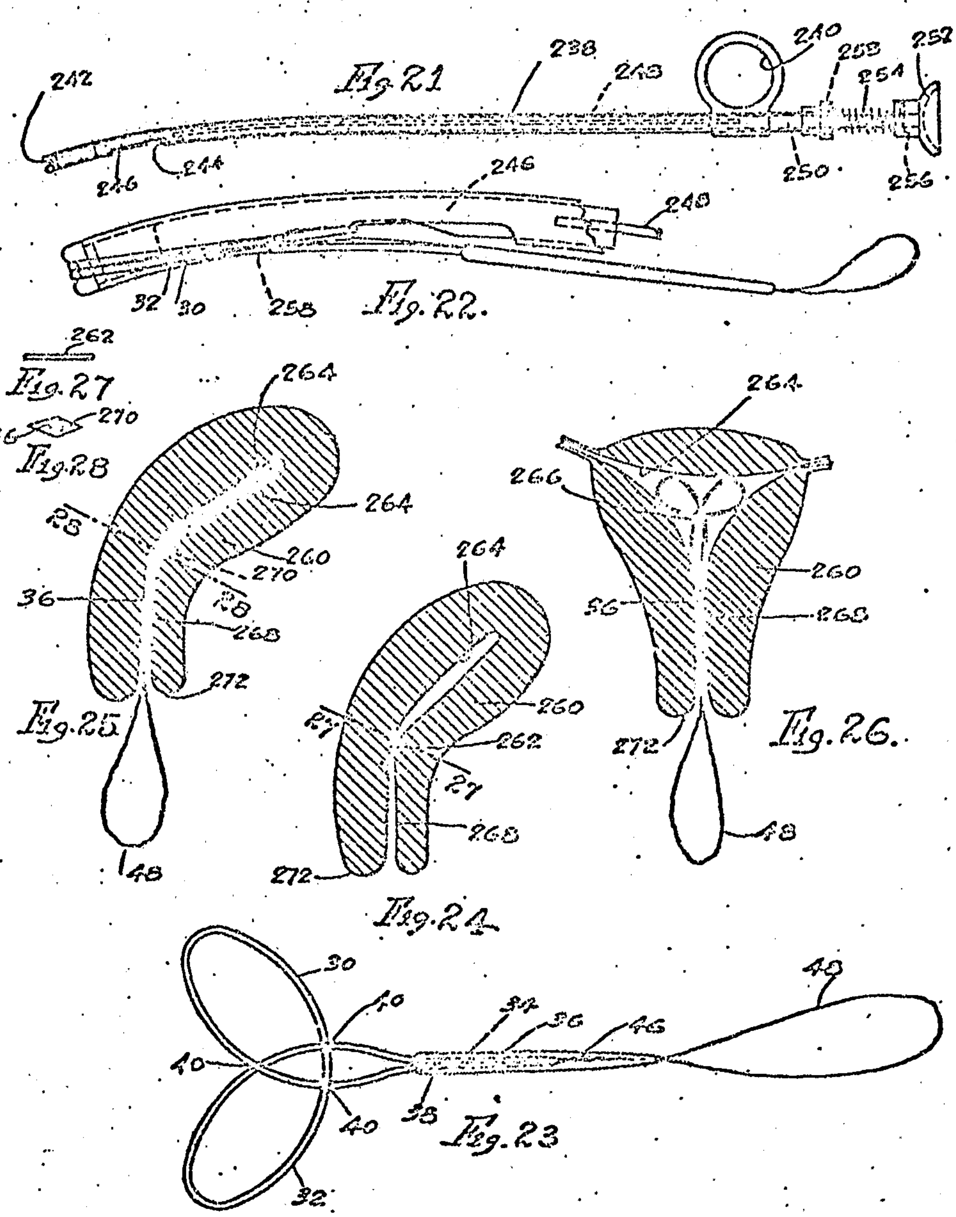


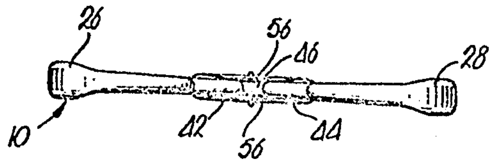
Fig. 21. Fig. 22. Fig. 27 Fig. 28 Fig. 25 Fig. 24 Fig. 26. Fig. 23

Inventor:
Louis W. Meckstroth.
By [illegible]
Attorneys.

Dec. 13, 1966 R. R. ROBINSON 3,291,125

INTRAUTERINE U-SHAPED PESSARY

Filed Sept. 23, 1965



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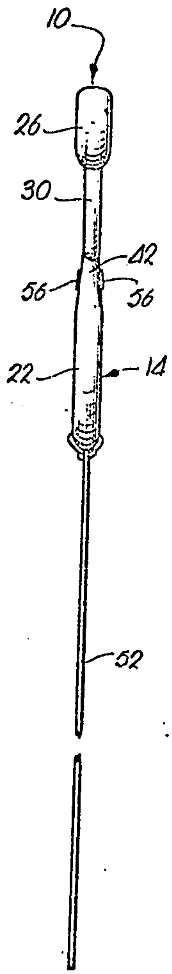

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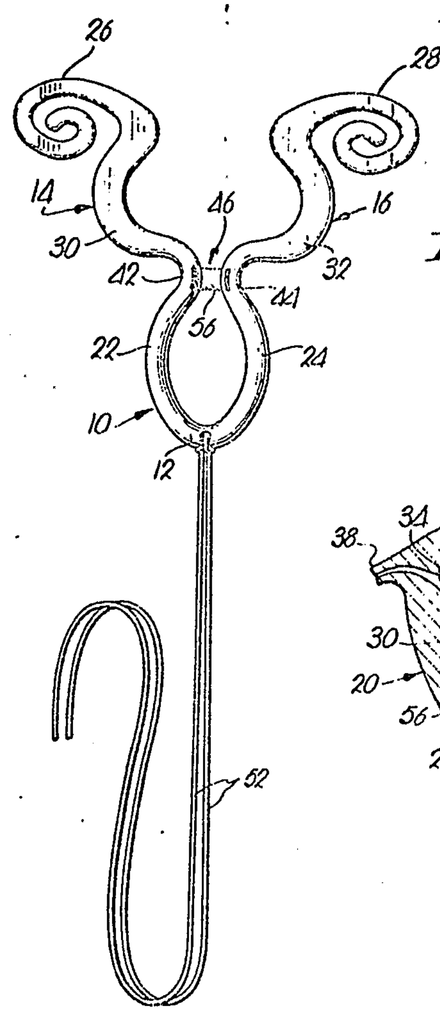
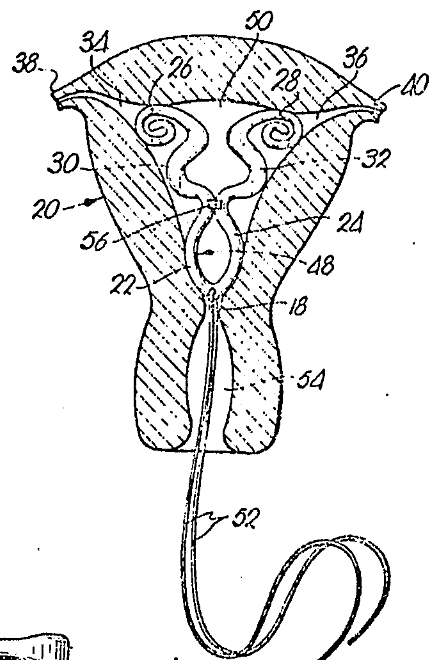


Fig.1.

Fig.5.



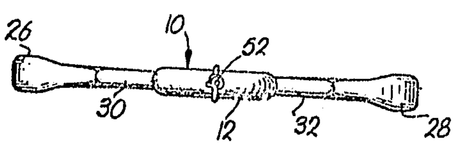


Fig.4.

INVENTOR.
Ralph R. Robinson
BY
Hovey, Schmidt, Johnson & Hovey.
ATTORNEYS.

111

June 21, 1966 J. SCHWARTZ ETAL 3,256,878

INTRA-UTERINE CONTRACEPTIVE APPLIANCE

Filed May 28, 1964

FIG. 1

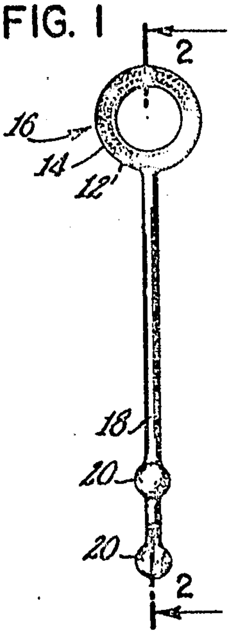


FIG. 2

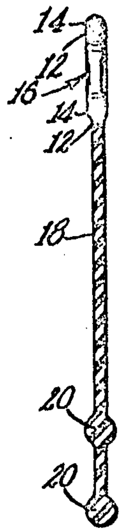


FIG. 3

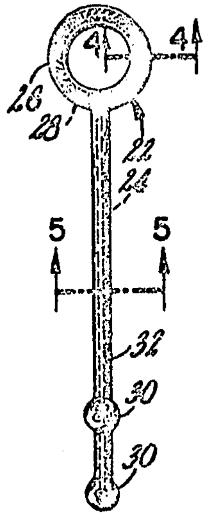


FIG. 6

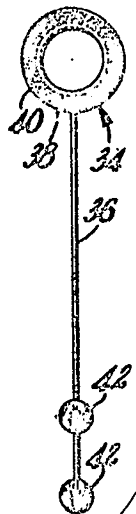
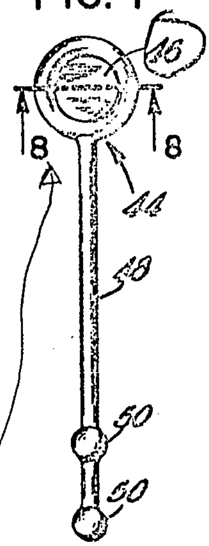


FIG. 7



flexible stiffening web

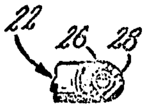


FIG. 4

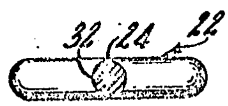


FIG. 5

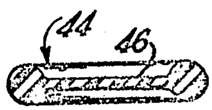


FIG. 8

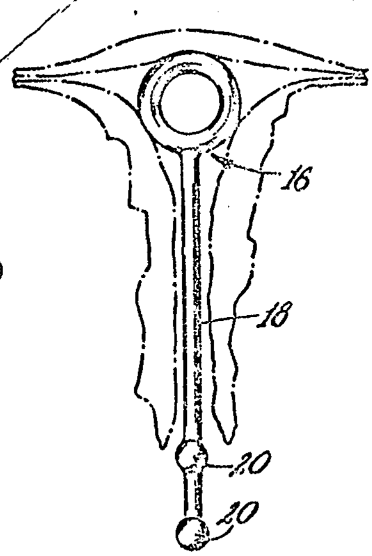


FIG. 10

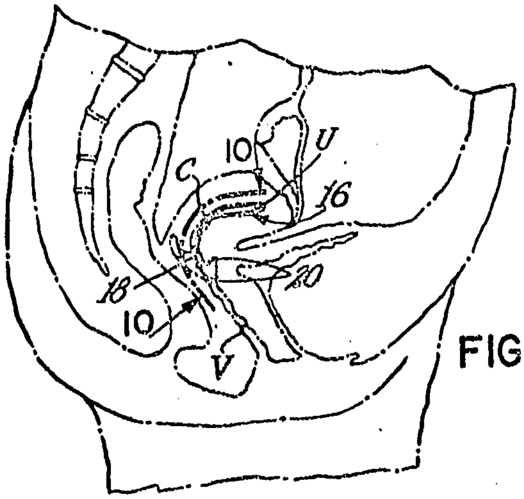


FIG. 9

INVENTORS.
JEROME SCHWARTZ
FRANKLIN C. REYNER

BY

Leonard H. King
ATTORNEY

May 16, 1967 B. P. APPLEBY 3,319,625

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed July 6, 1966

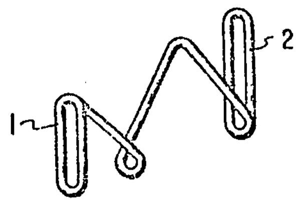


FIG. 1

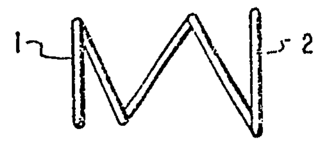


FIG. 2

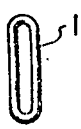


FIG. 3

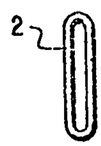


FIG. 4

FIG. 5

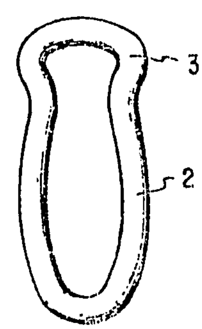


FIG. 6

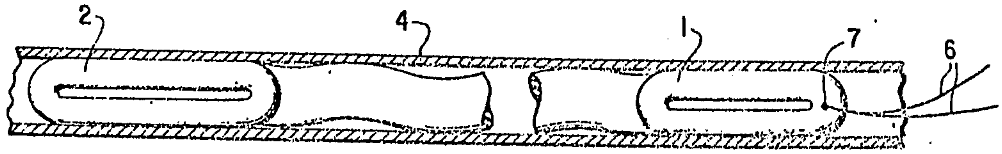


FIG. 7

INVENTOR

BASIL PAUL APPLEBY

BY Hugo E. Weisberger

ATTORNEY

113

Jan. 23, 1968 R. R. ROBINSON 3,364,927

DEVICE FOR INTRAUTERINE USE

Filed Aug. 12, 1966

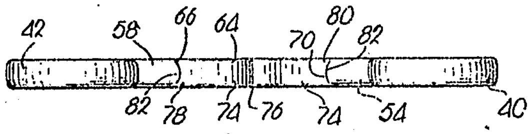


Fig.3.

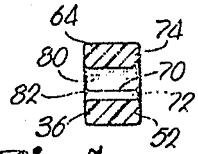


Fig.5.

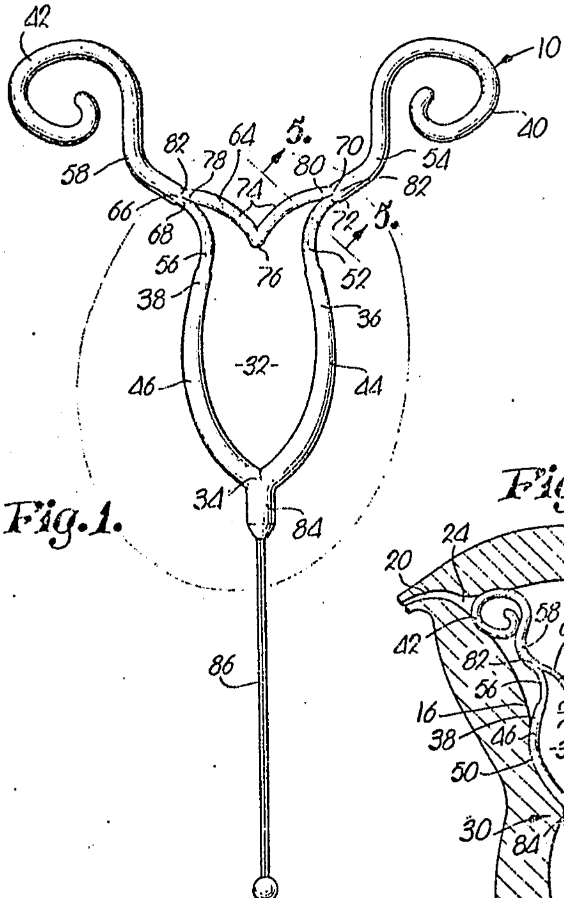


Fig.1.

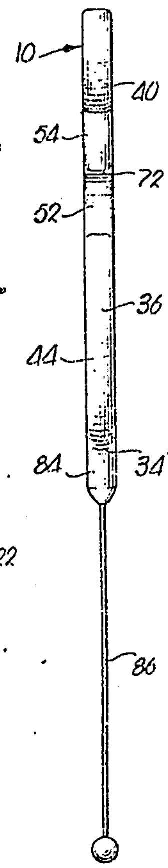
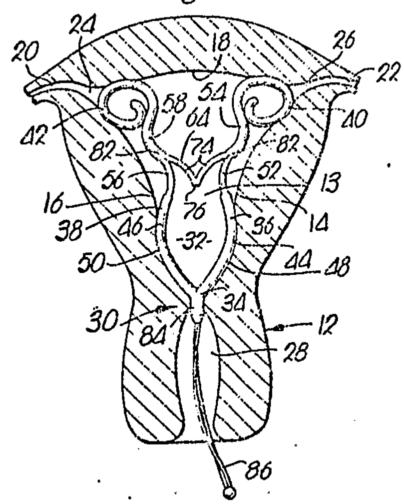


Fig.2.

Fig.6.



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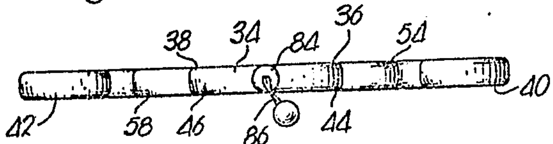


INVENTOR
Ralph R. Robinson

BY Hovey, Schmidt, Johnson & Hovey
ATTORNEYS.

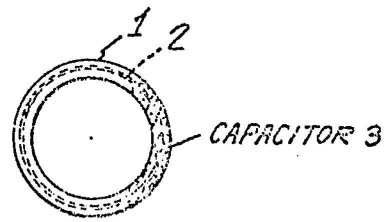
114

March 26, 1968 F. L. HATKE 3,374,787

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed Nov. 18, 1965

Fig. 1.



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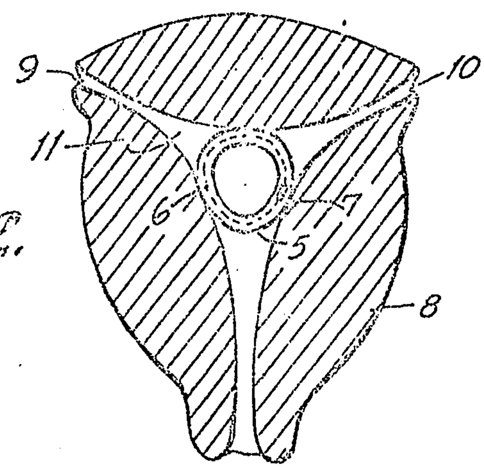


INVENTOR
FRED L. HATKE

BY

Edward J. Norton
Attorney

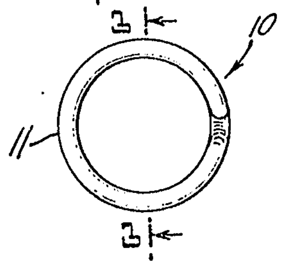
115

May 14, 1968 W. R. RIGNEY ET AL 3,382,869

INTRAUTERINE CONTRACEPTIVE DEVICE

Filed Feb. 2, 1966

Fig. 1.



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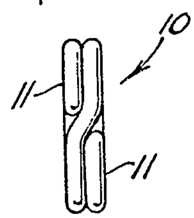

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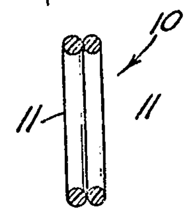
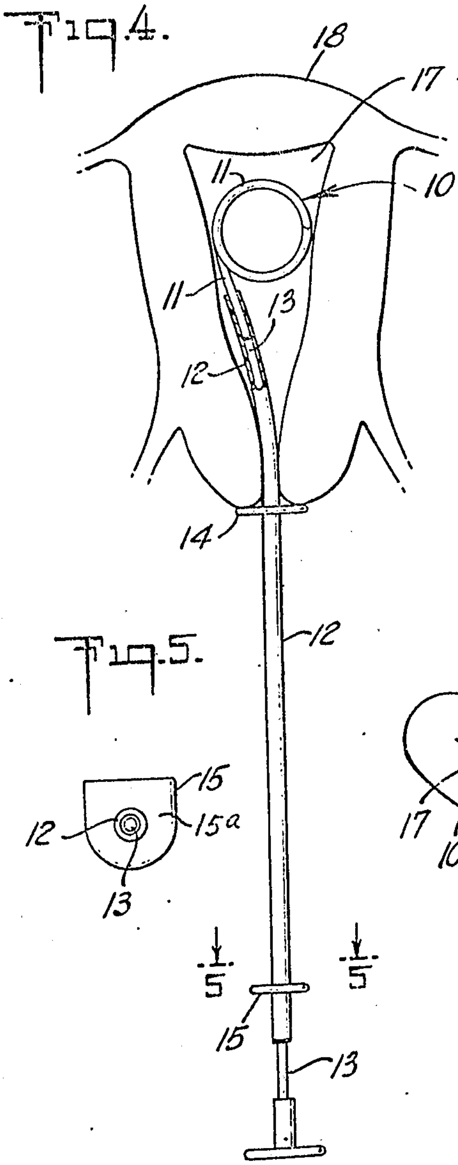


Fig. 4.



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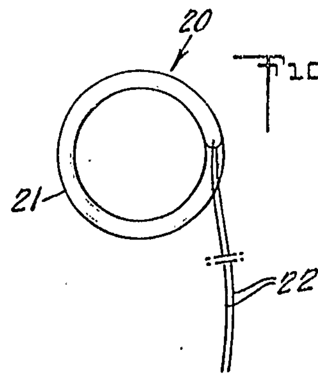


Fig. 8.

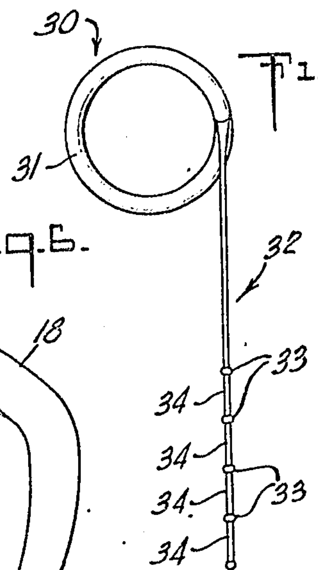
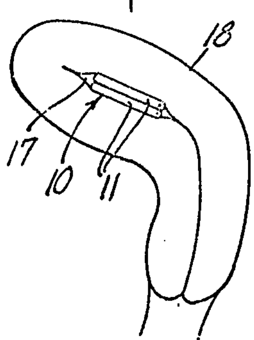


Fig. 5.

Fig. 6.



INVENTORS:
WILLIAM R. RIGNEY
EDMUND A. JONES
BY Lewis Stein
ATTORNEY

Aug. 20, 1968 G. MAJZLIN 3,397,690

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed Dec. 1, 1965 2 Sheets-Sheet 1

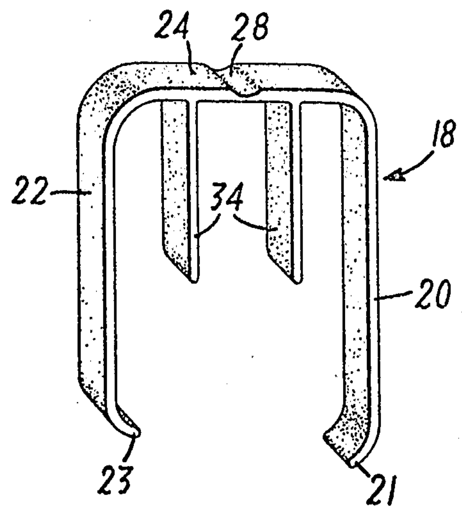


FIG. 1

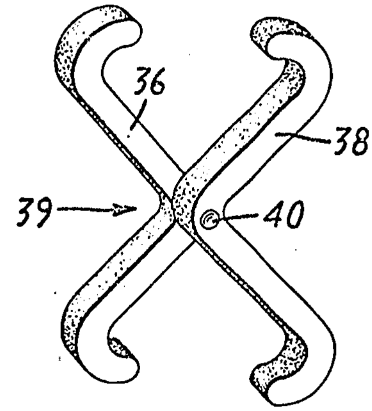
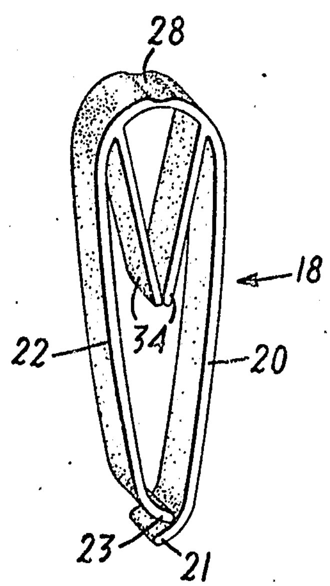


FIG. 5



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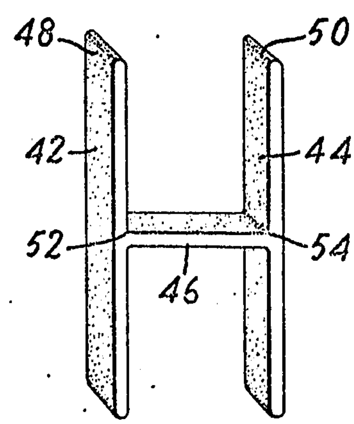


FIG. 6

INVENTOR.
GREGORY MAJZLIN

BY Eyre, Mann & Lucas

ATTORNEYS

Aug. 20, 1968 G. MAJZLIN 3,397,690

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed Dec. 1, 1965 2 Sheets-Sheet 2

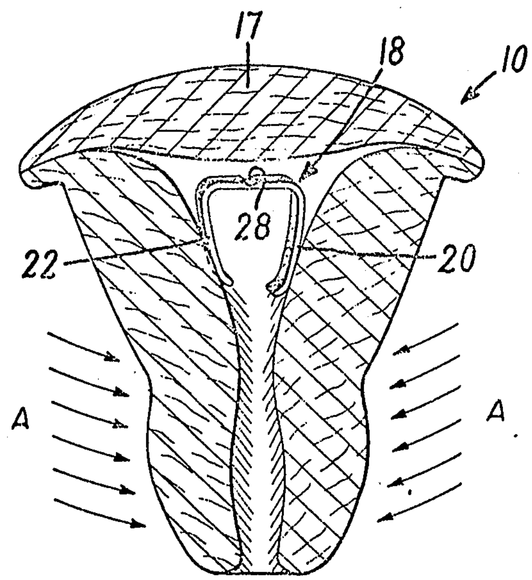


FIG. 3

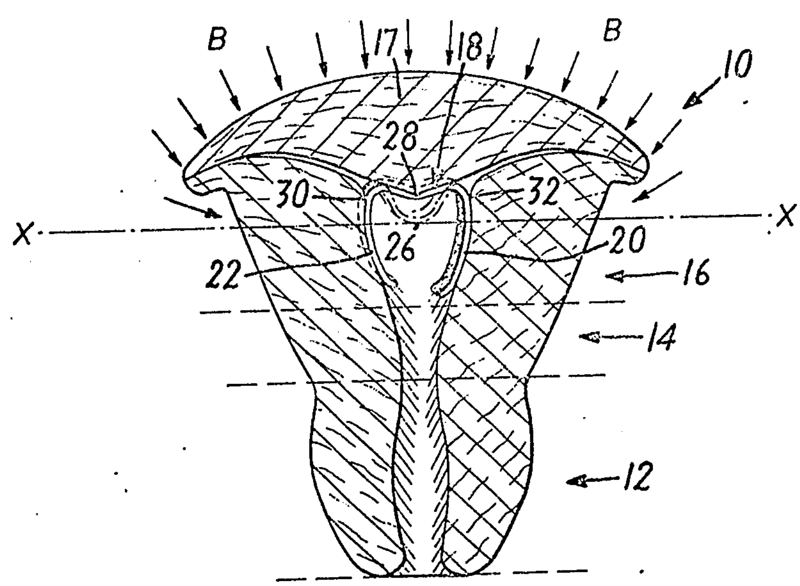


FIG. 4

INVENTOR.
GREGORY MAJZLIN

BY Eyre, Mann & Lucas

ATTORNEYS

Oct. 15, 1968 M. I. BAKUNIN 3,405,711
INTRAUTERINE CONTRACEPTIVE DEVICE
Filed July 22, 1966 2 Sheets-Sheet 1

Fig. 1

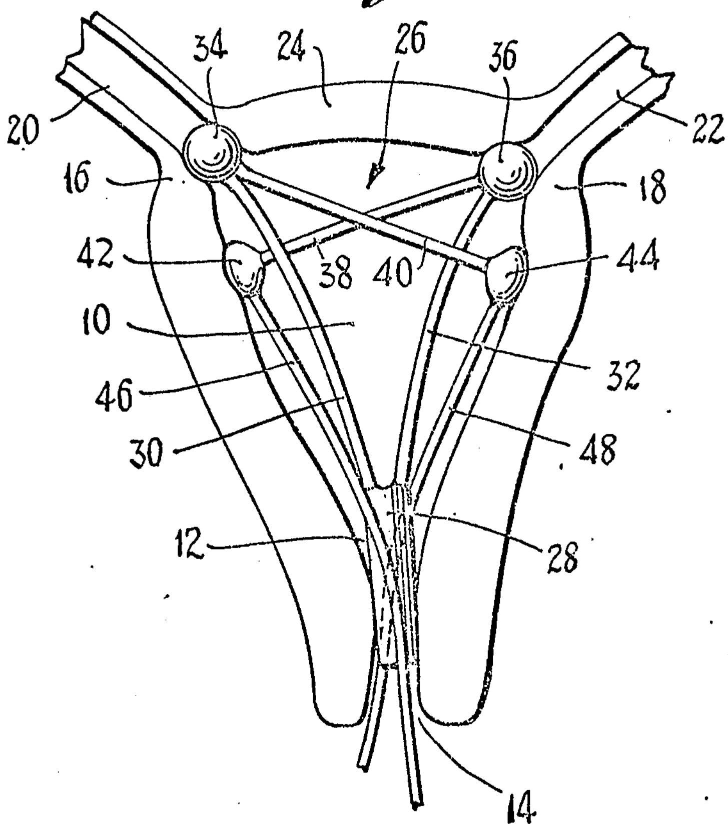
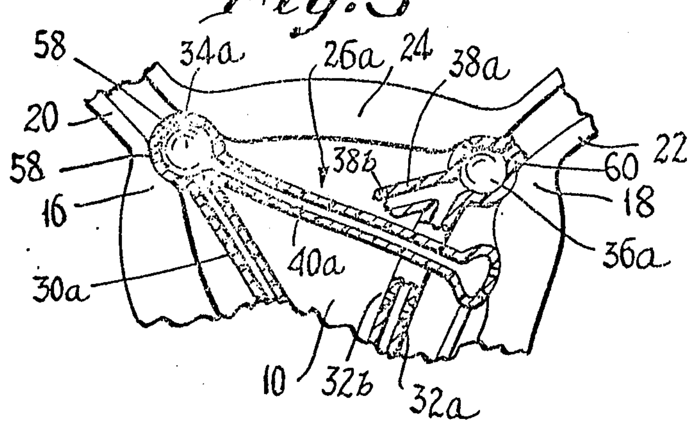


Fig. 3



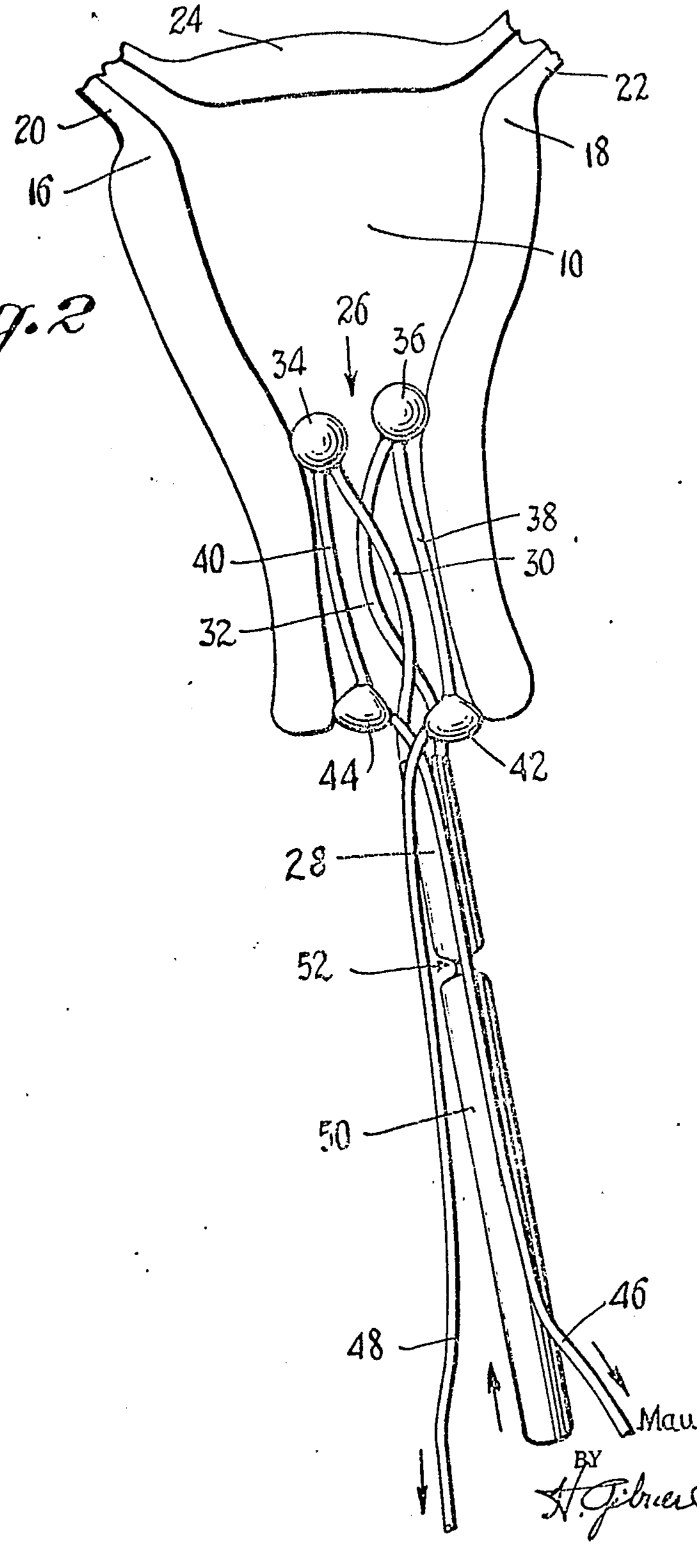
INVENTOR
Maurice I. Bakunin
BY
H. Gilbert Sherman
AGENT

Oct. 15, 1968 M. I. BAKUNIN 3,405,711

INTRAUTERINE CONTRACEPTIVE DEVICE

Filed July 22, 1966 2 Sheets-Sheet 2

Fig. 2



INVENTOR
Maurice I. Bakunin

BY
H. Gibner Lehmann
AGENT

120

Feb. 4, 1969 R. R. ROBINSON 3,425,411

INTRA-UTERINE DEVICE

Filed May 19, 1966

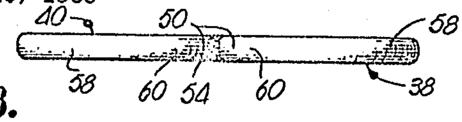
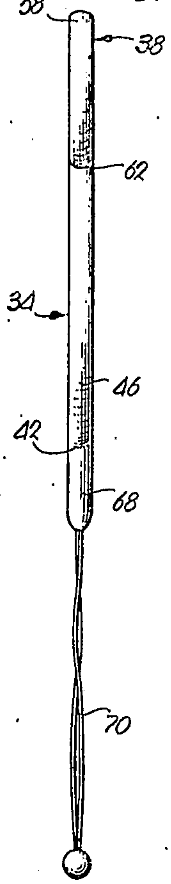


Fig.3.

Fig.2.



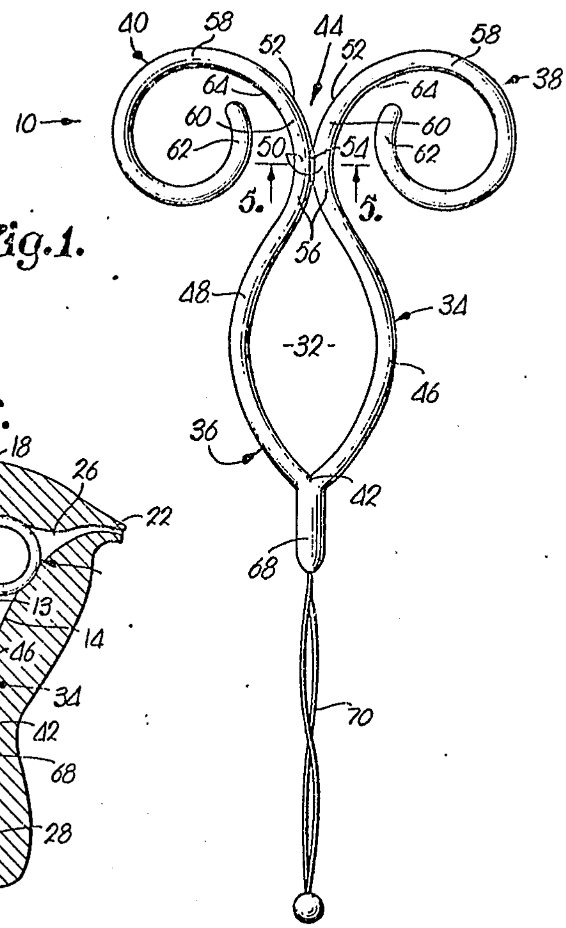
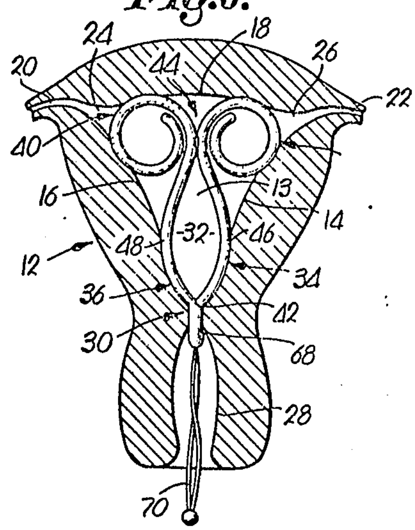


Fig.1.

Fig.6.



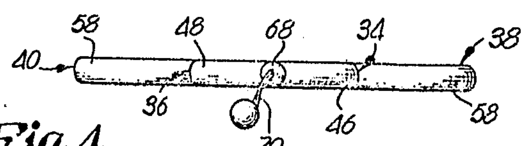


Fig.4.

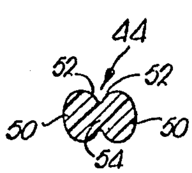


Fig.5.

INVENTOR
Ralph R. Robinson

BY

Hovey, Schmidt, Johnson & Hovey
ATTORNEYS.

March 11, 1969 C. E. TAYLOR 3,431,906

CONTRACEPTIVE DEVICE

Filed April 22, 1966 Sheet 1 of 2

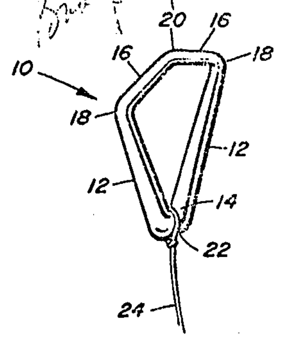


FIG. 1.

FIG. 3A

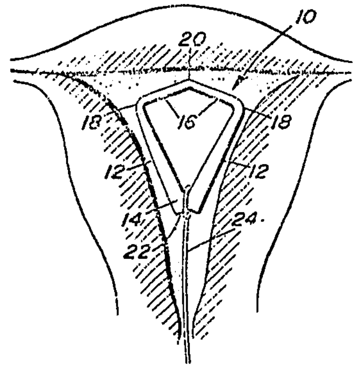


FIG. 2.

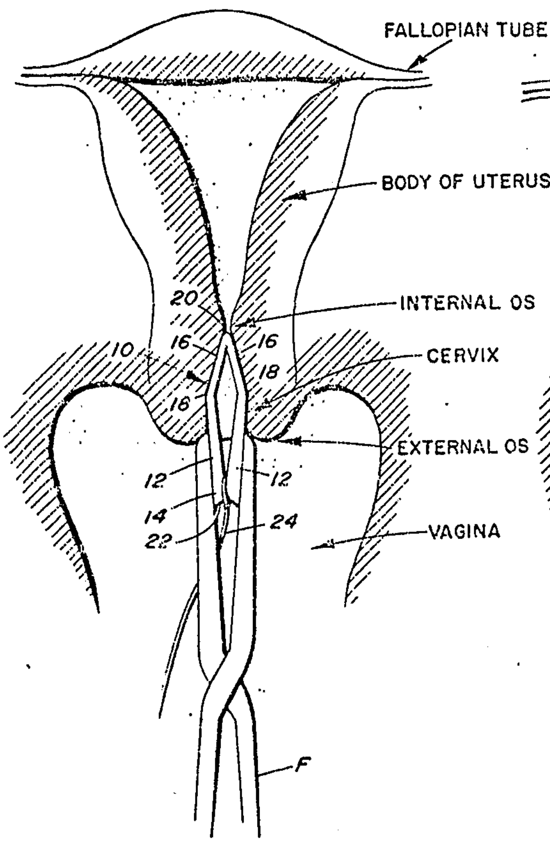
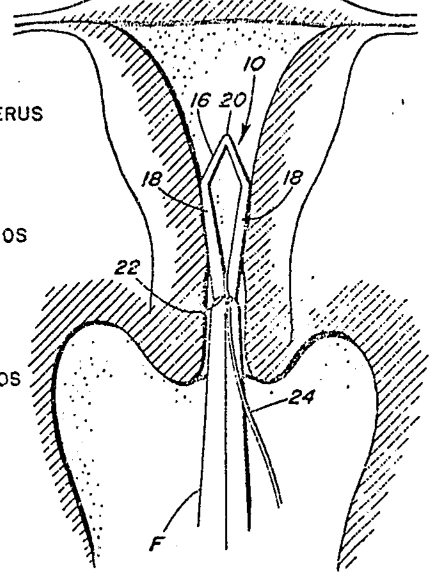


FIG. 3.



CARL E. TAYLOR
INVENTOR

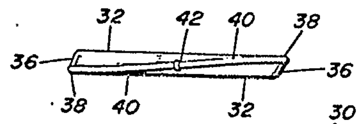
BY Walter G. Finch
ATTORNEY

March 11, 1969 C. E. TAYLOR 3,431,906

CONTRACEPTIVE DEVICE

Filed April 22, 1966 Sheet 2 of 2

FIG. 6.



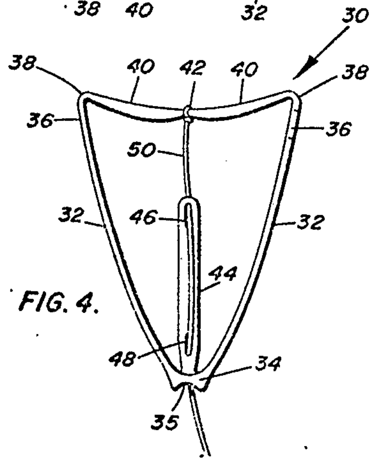


FIG. 4.

FIG. 5.

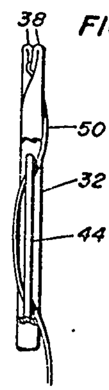
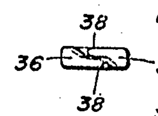


FIG. 8.



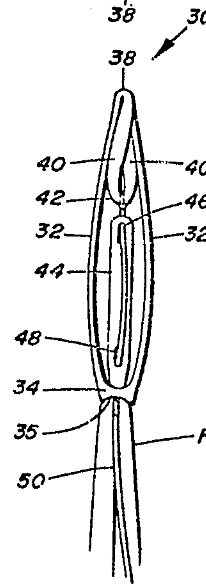
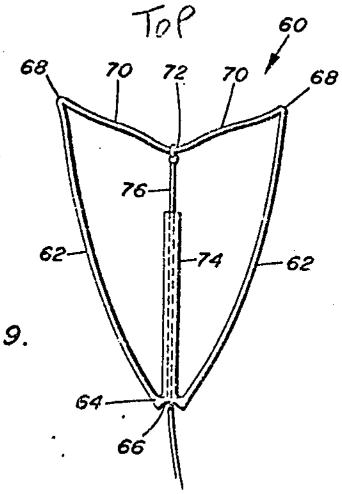


FIG. 7.

Top



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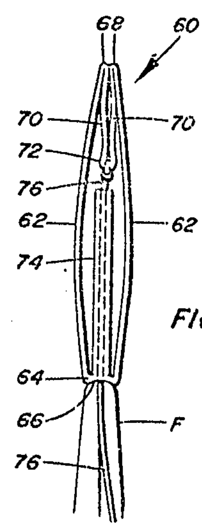


FIG. 10.

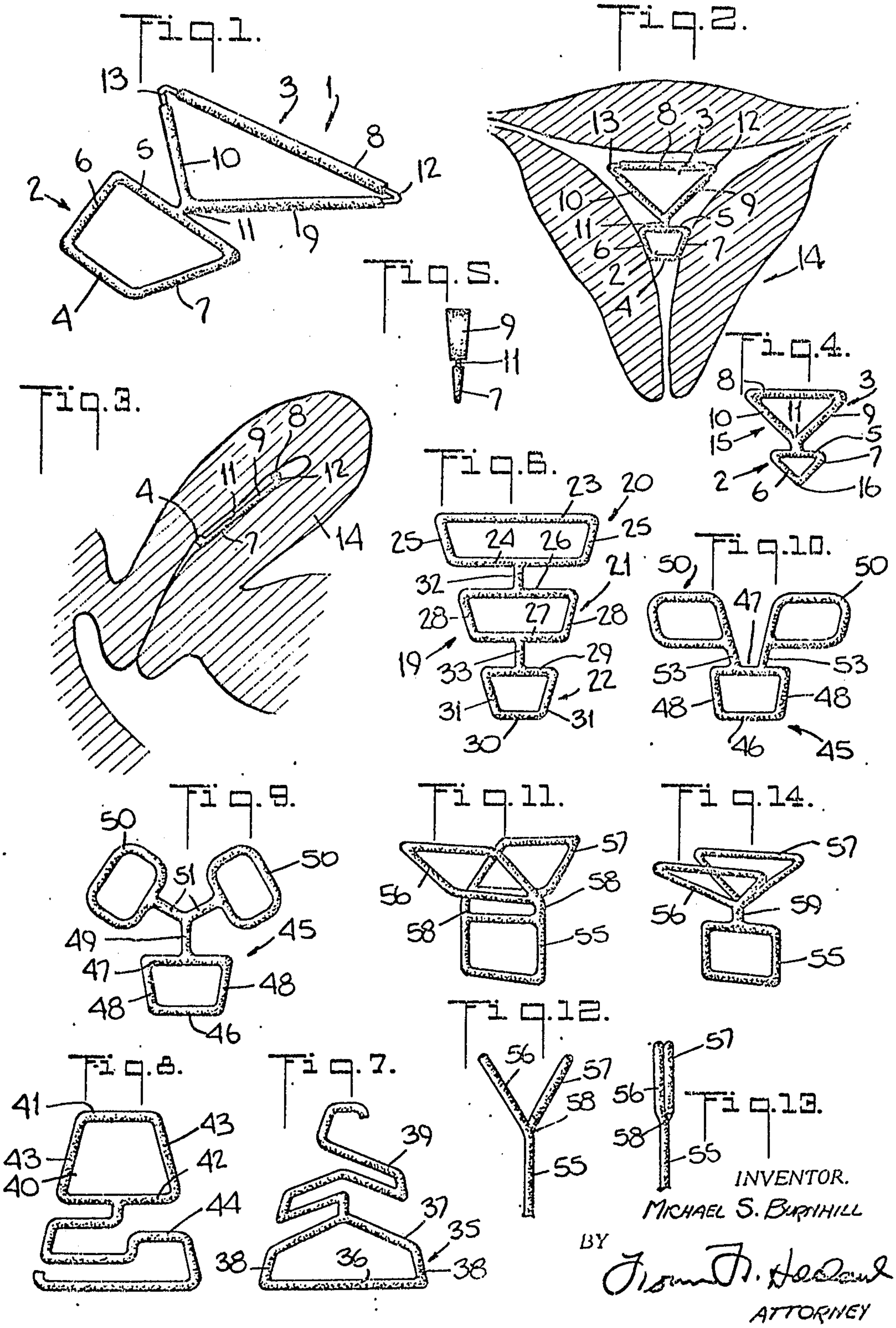
INVENTOR
CARL E. TAYLOR

BY Walter G. Finch
ATTORNEY

April 15, 1969 M. S. BURNHILL 3,438,369

INTRAUTERINE DEVICE

Filed March 11, 1966



INVENTOR.
MICHAEL S. BURNHILL

BY

ATTORNEY

May 6, 1969 O. KREJČÍ ET AL 3,442,266

INTRA-UTERINE CONTRACEPTIVE DEVICE

Filed Feb. 13, 1967

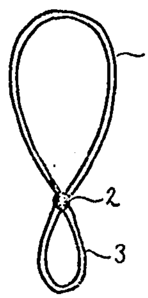


Fig. 1

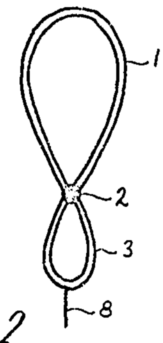


Fig. 2

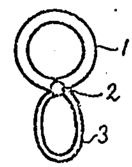
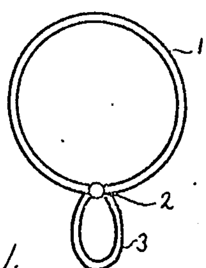


Fig. 3



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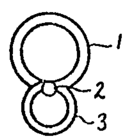


Fig. 5

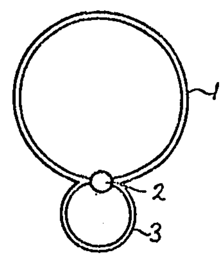


Fig. 6

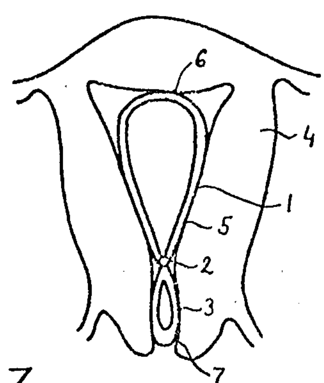


Fig. 7

125

July 8, 1969 R. I. LEININGER ET AL 3,454,004

INTRAUTERINE CONTRACEPTIVE DEVICE

Filed Aug. 18, 1967

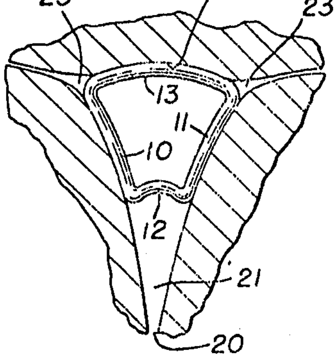


Fig 1

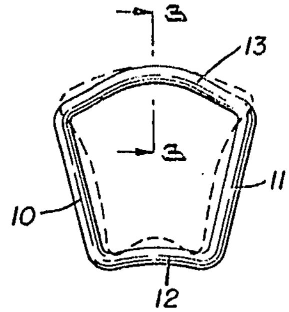
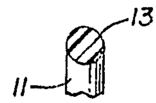


Fig 2



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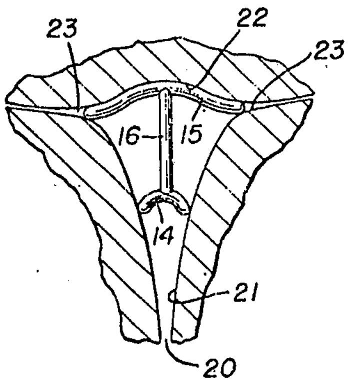

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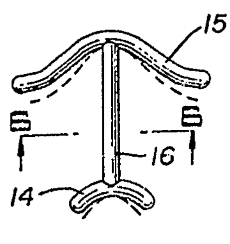

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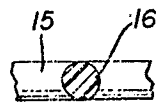


Fig 6

INVENTORS
R. I. LEININGER,
J. L. SPENCER &
N. D. VORYS
BY
MAHONEY, MILLER & RAMBO
BY W. S. Rambo
ATTORNEYS

Sept. 16, 1969

R. R. ROBINSON

3,467,088

INTRAUTERINE DEVICE INSERTER

Filed Dec. 22, 1966

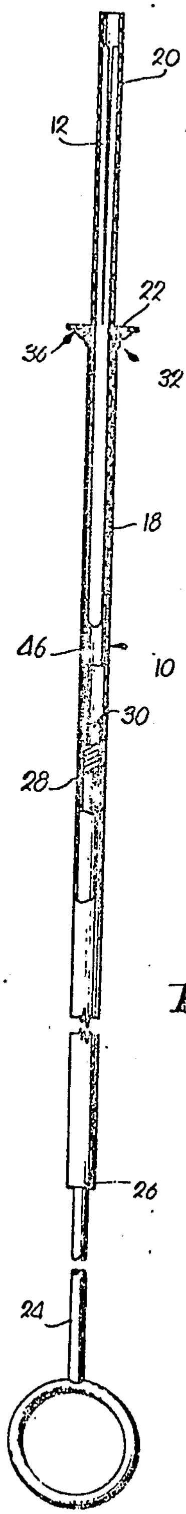


Fig.1.

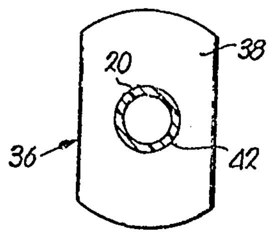
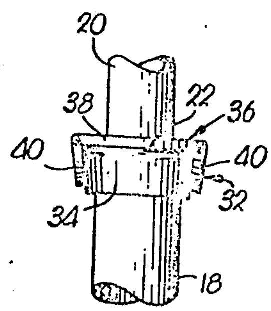


Fig. 4.



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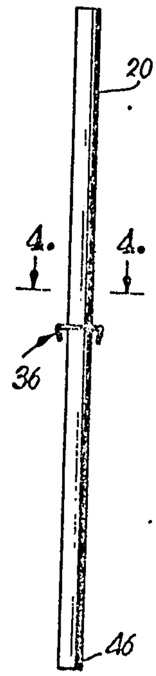

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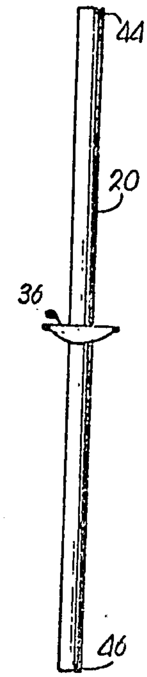


Fig.2.

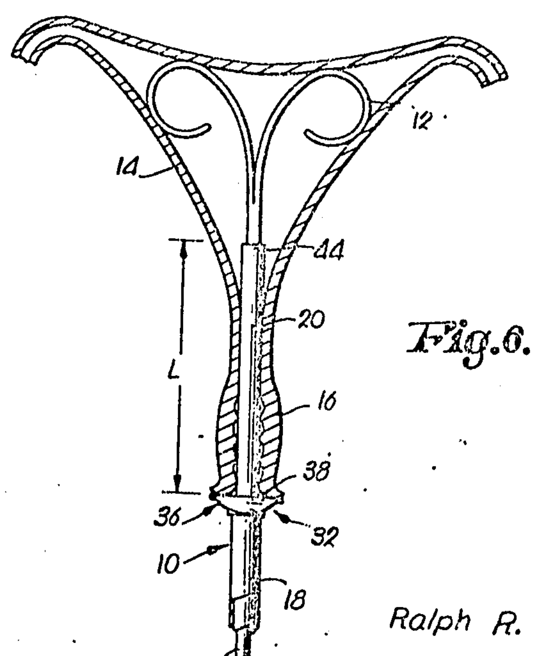


Fig.6.

INVENTOR
Ralph R. Robinson

BY

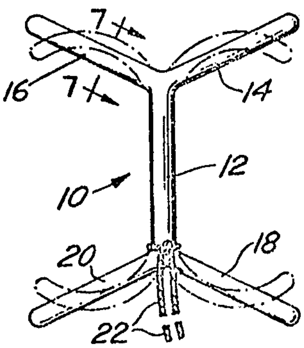
Hovey, Schmidt, Johnson & Hovey
ATTORNEYS.

Sept. 16, 1969 H. M. HASSON 3,467,089

INTRAUTERINE CONTRACEPTIVE DEVICE (IUD)

Filed Feb. 14, 1967

Fig 1



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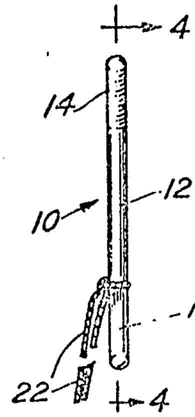


Fig. 3

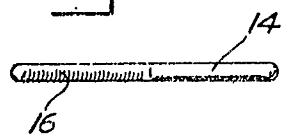
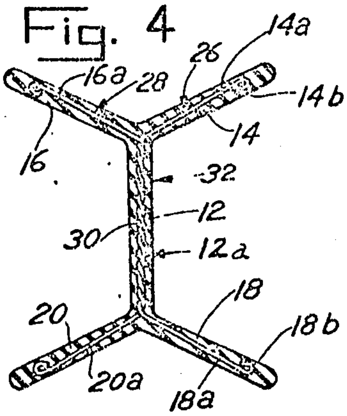


Fig. 4



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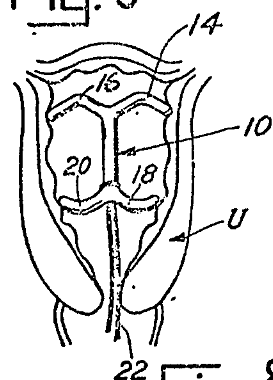

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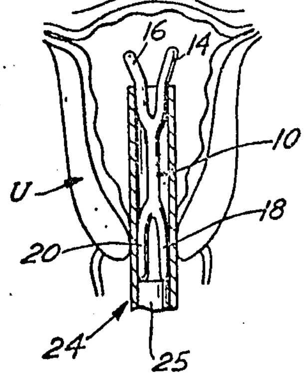

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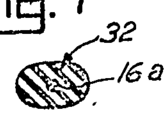

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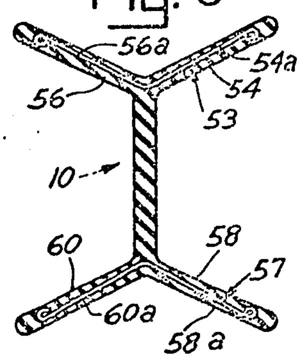
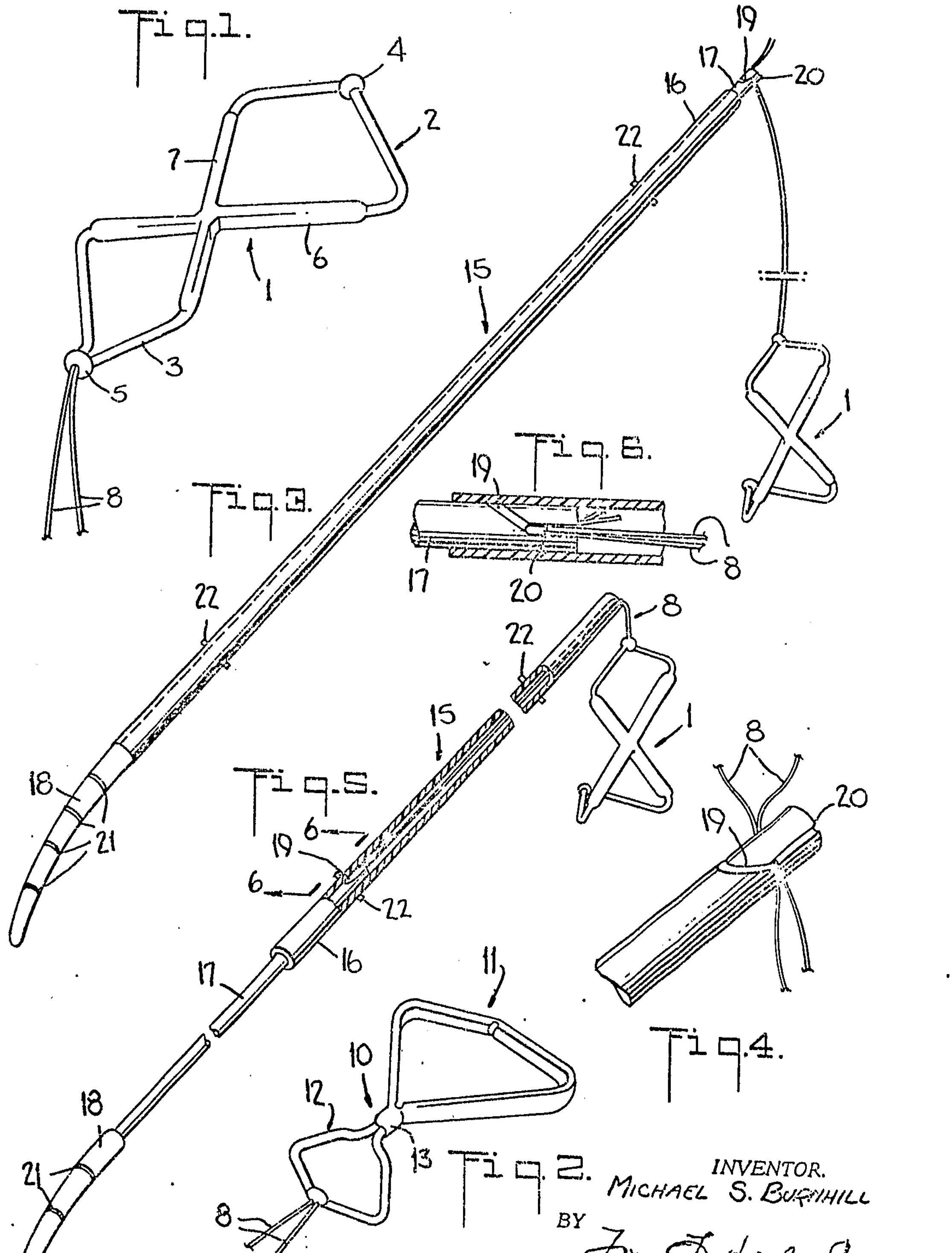


INVENTOR.
HASAN M. HASSON

BY
Bair, Freeman & Molinare
ATTORNEYS

Nov. 11, 1969 M. S. BURNHILL 3,477,430
INTRAUTERINE DEVICE, INSERTING MECHANISM THEREFOR
AND METHOD OF INSERTING SAME
Filed May 13, 1966 2 Sheets-Sheet 1

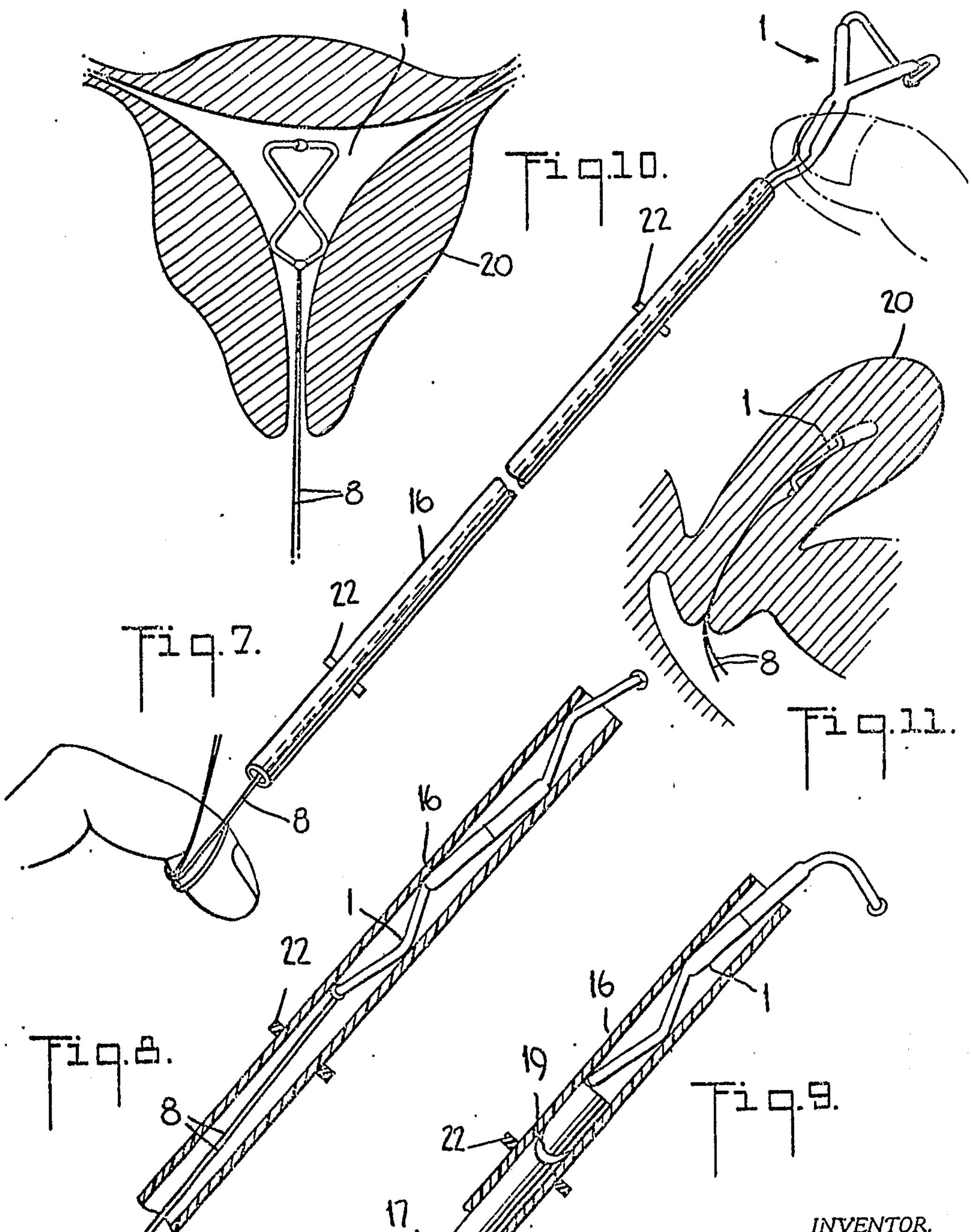


INVENTOR.
MICHAEL S. BURNHILL
BY
ATTORNEY

Nov. 11, 1969 M. S. BURNHILL 3,477,430

INTRAUTERINE DEVICE, INSERTING MECHANISM THEREFOR
AND METHOD OF INSERTING SAME

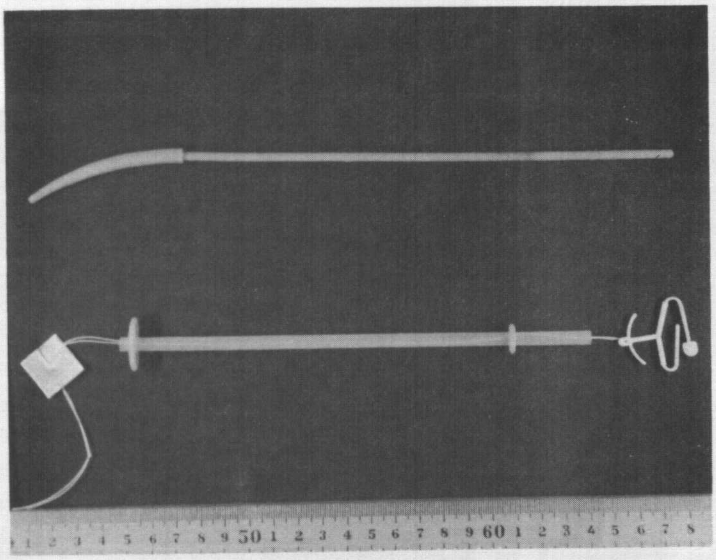
Filed May 13, 1966 2 Sheets-Sheet 2



INVENTOR.
MICHAEL S. BURNHILL

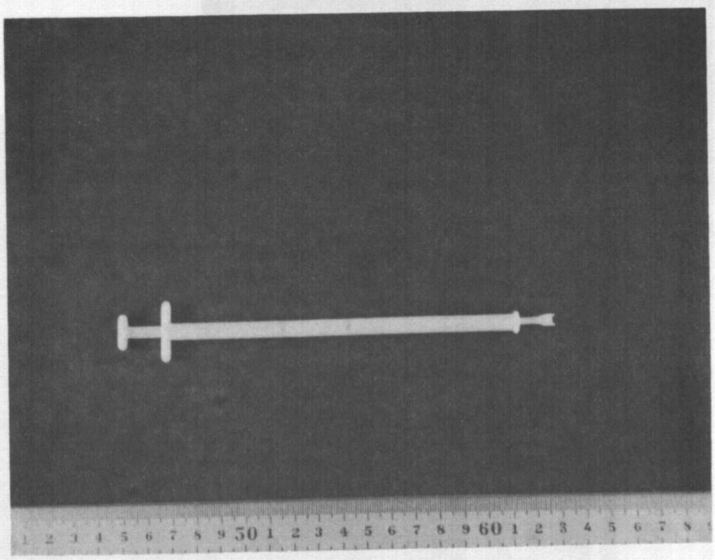
BY [signature]
ATTORNEY

APPENDIX 1 PHOTOGRAPHS OF SOME INSERTERS; INSERTER CROSS SECTIONAL DIMENSIONS



dia. of cross-section = 5.66 mm.

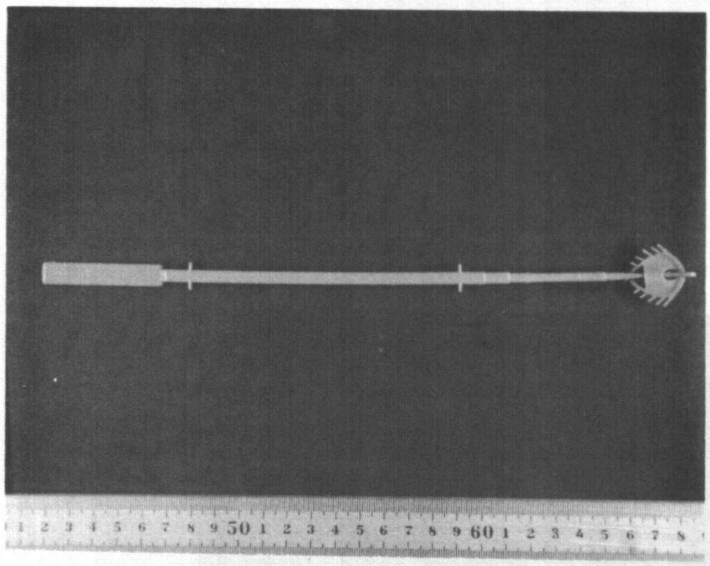
ANCOR INSERTER



maximum width of cross-section = 10.9 mm.

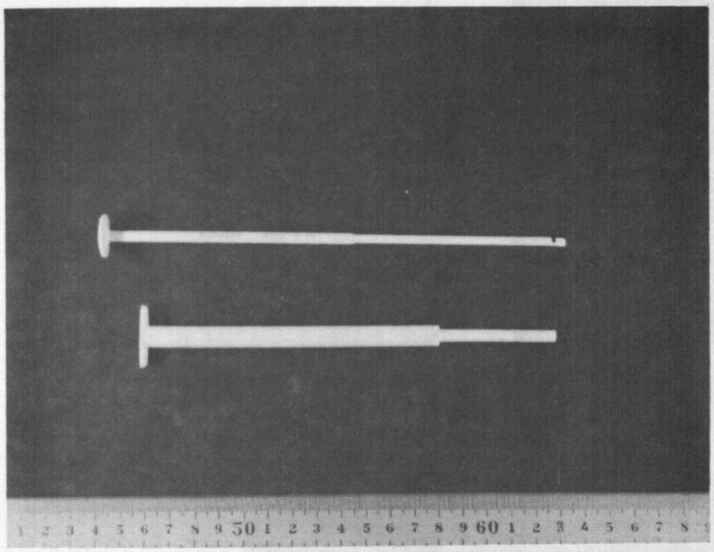
minimum width of cross-section = 9.1 mm.

ANTIGON INSERTER



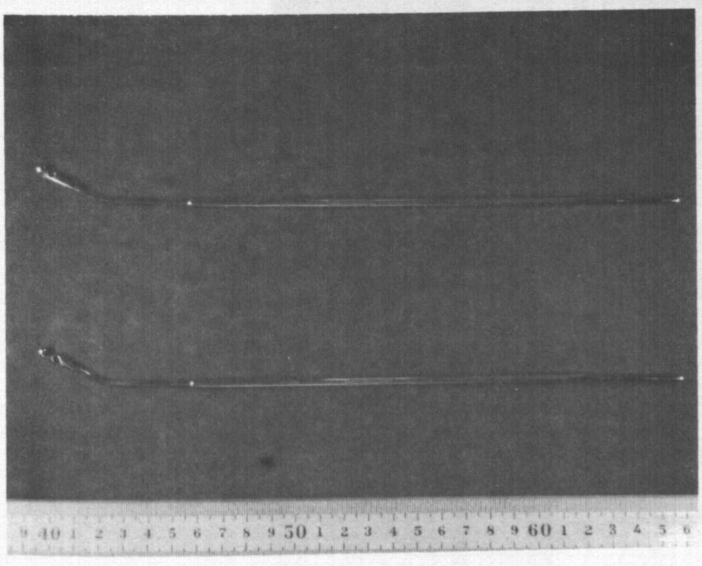
<u>DALKON SHIELD INSERTER</u>

max. width of cross-section
tapers from 5.8 mm. to 1.7 mm.
min. width of cross-section
tapers from 5.43 mm. to 4.27 mm.



dia. of cross-section
= 4.7 mm.

DANA INSERTER

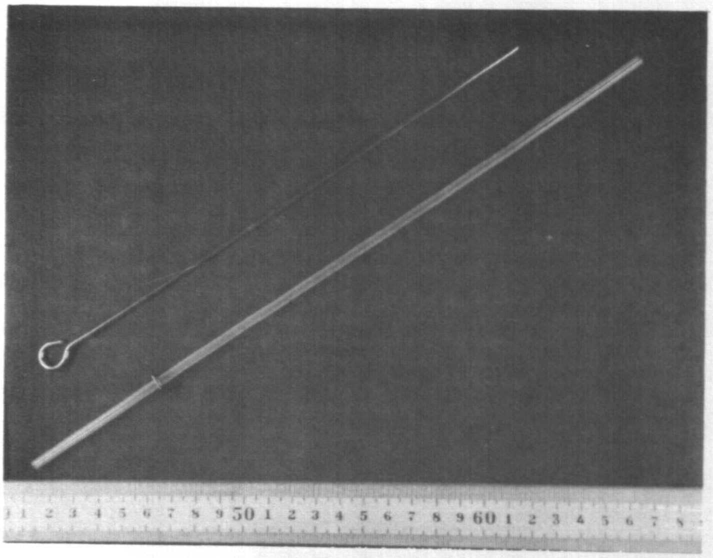


dia. of point at tip of
inserter = 4.7 mm.
dia. of point at tip of
extractor = 4.7 mm.

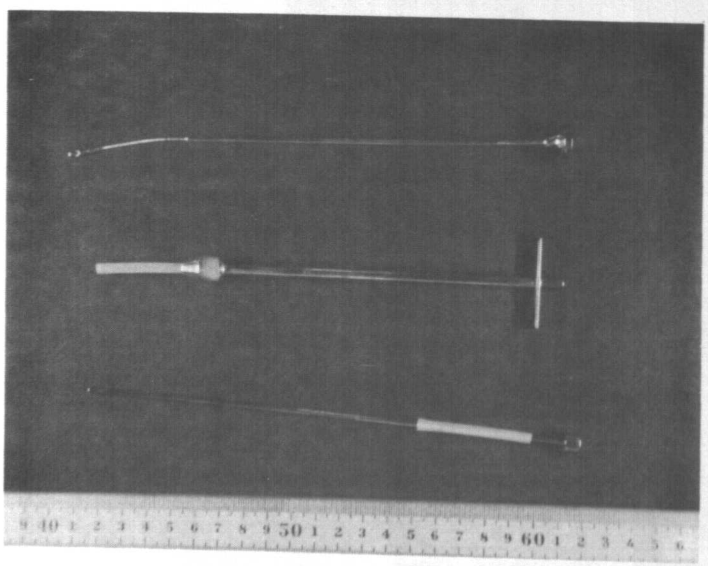
INHIBAND INSERTER

Inserter (top)

Extractor (bottom)



dia. of cross-section
= 3.81 mm.

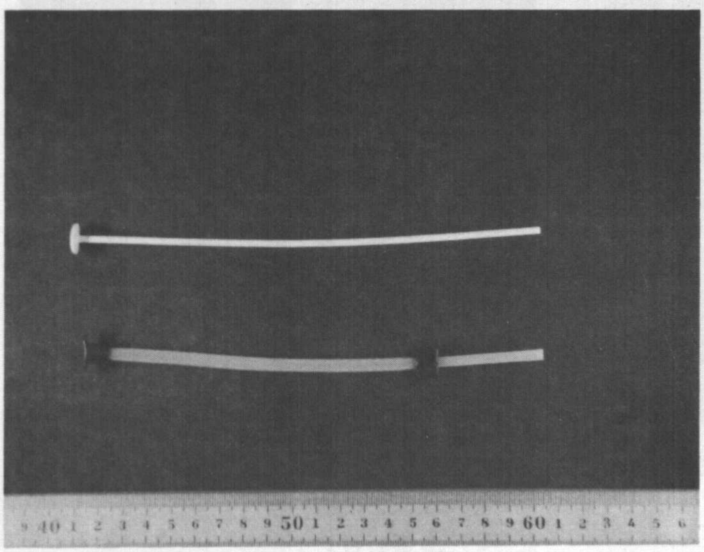


dia. of cross-section
= 4.12 mm.

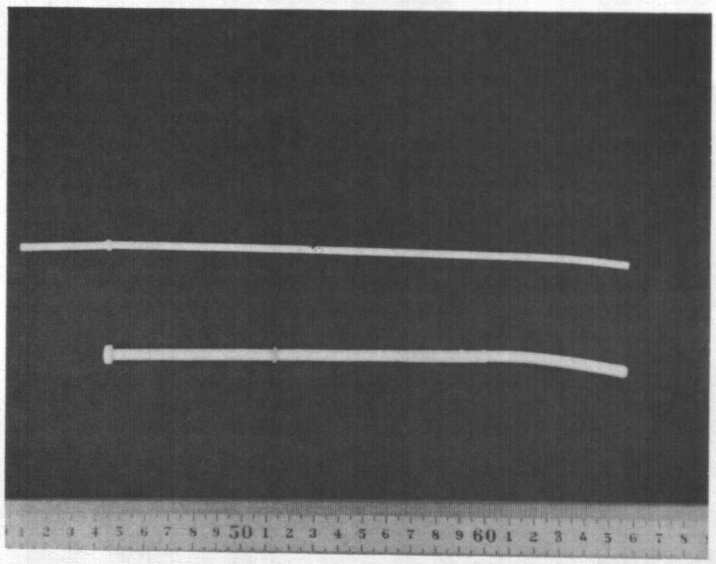
SOONAWALA INSERTER

Flexible Plunger (top)

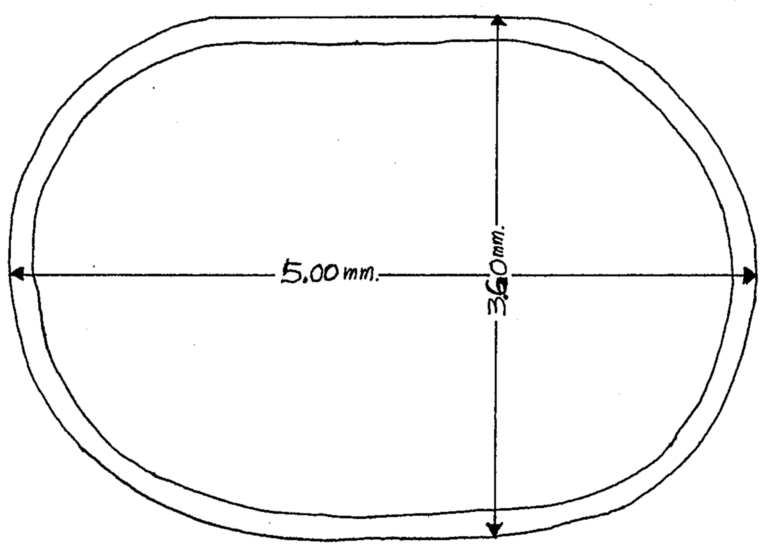
Rigid Plunger (bottom)



LIPPES LOOP INSERTER



M-217 INSERTER



LIPPES

INSERTER CROSS SECTION

Dimensions of Typical Inserters:

Standard Straw Inserter, circular, D = 5.15 mm

Majzlin Spring, circular, D = 4.83 mm

M-213, rectangular, 5.4 mm x 4.95 mm

M-211, rectangular, 5.4 mm x 5.15 mm

Sterile M, rectangular, 5.3 mm x 4.93 mm

APPENDIX 2 TABLE OF CONTENTS OF "IUD INFORMATION HANDBOOK"

This table of contents of the four volumes of the IUD Information Handbook is meant to provide information on the contents of the original. The original is available at THE PATHFINDER FUND.

The purpose of this listing of contents is to summarize the major areas of interest related to IUD development in the hope this will prevent duplication and encourage others to make information available. The Handbook will be continually updated and revised in the light of new information.

The Handbook is a part of a series of reports submitted by M.I.T. to THE PATHFINDER FUND. References in the present Table of Contents refer to these reports, in particular, Nos. 3 and 4. Copies of these reports are also available from THE PATHFINDER FUND. The full list of the reports submitted to the Pathfinder Fund are:

1. "Survey of Reproductive Biology", T.J. Lardner, W.J. Shack, and E.M. Waibel.
2. "Notes on Uterine Dimensions", E.M. Waibel. [This report has been worked into Report No. 4].
3. "Some Considerations on Testing Hypothesis for the Performance of Existing IUDs", T.J. Lardner, W.J. Shack, and E.M. Waibel.
4. "Biomechanics of the Female Reproductive System and The Development of Intra-Uterine Devices", E.M. Waibel. [M.S. Thesis].
5. "IUD Information Handbook", 4 volumes, T.J. Lardner, W.J. Shack, P.Y. Tam; R. Belsky, F. Schubeck.
6. "Final Report", T.J. Lardner, W.J. Shack, Sept. 1970.

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Section (I) Photographs, Data, and Properties of Existing Devices

(i) Performance data.

(ii) Device information.

Volume 3

Section (I) Materials for Devices; Data on Material

(i) Report on physical properties of Nitinol.

(ii) Properties of stainless steel.

(iii) Polymer information: Properties of polyethylene, polypropylene, eva, and elastothane.

Section (II) Interaction between Materials and Living Organisms

(i) Reports on tissue reaction with polyethylene and ethylene vinyl acetate.

(ii) Reprints of articles on biomaterials.

(iii) Observations on stainless steel and plastic IUDs.

Section (III) Use of Steriods with IUDs: Diffusion

(i) Reprints of articles on diffusion of steriods.

Volume 4

List of IUD Patents and Patent Information

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