

June 10, 1969

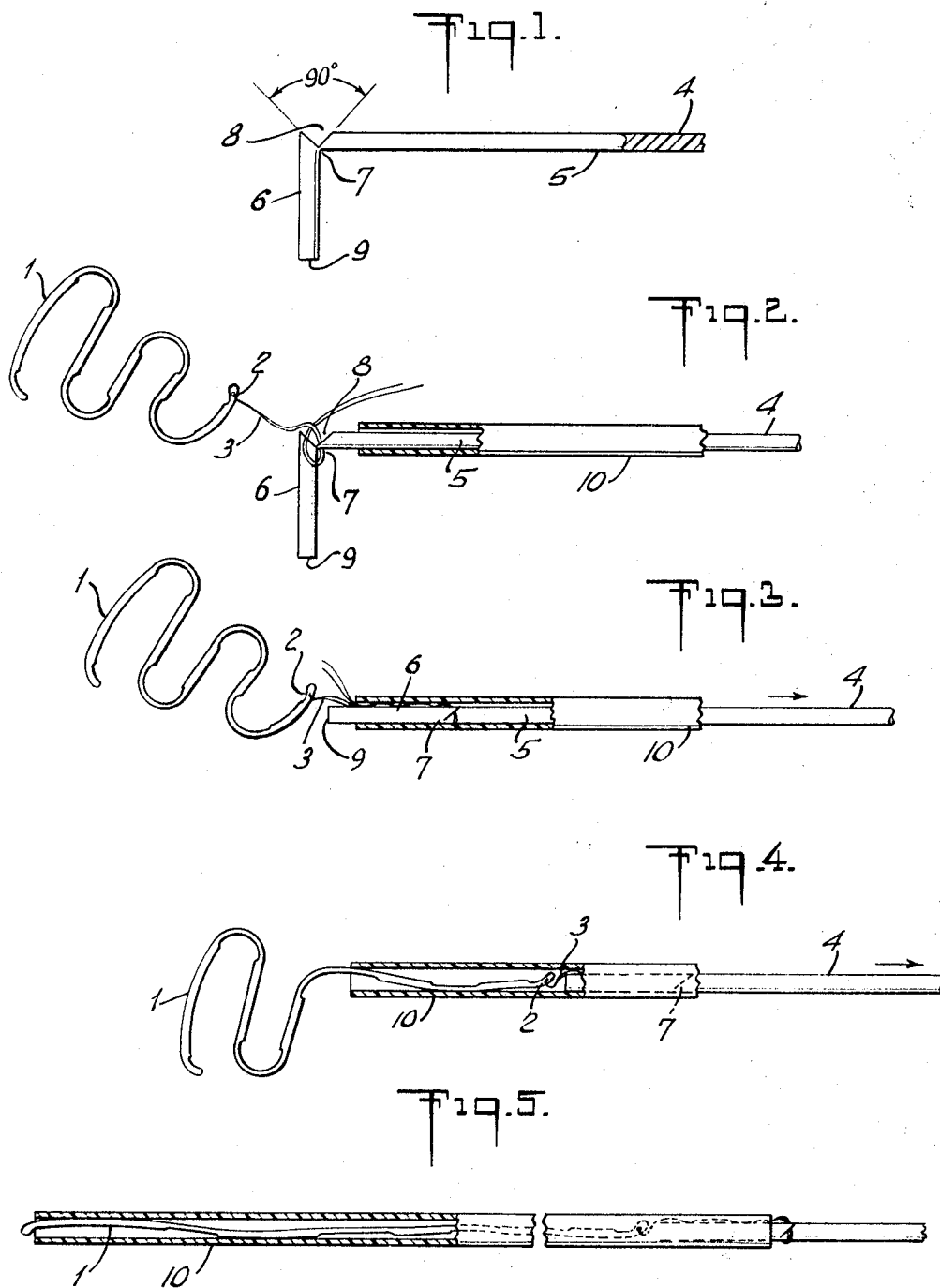
C. M. HUCK

3,448,737

INSERTION UNIT

Filed Aug. 16, 1966

Sheet 1 of 3



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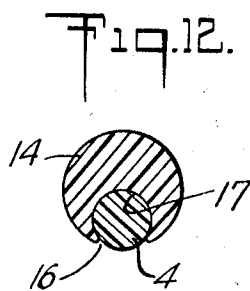
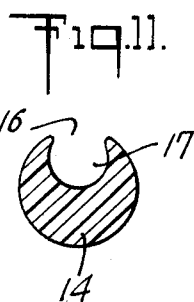
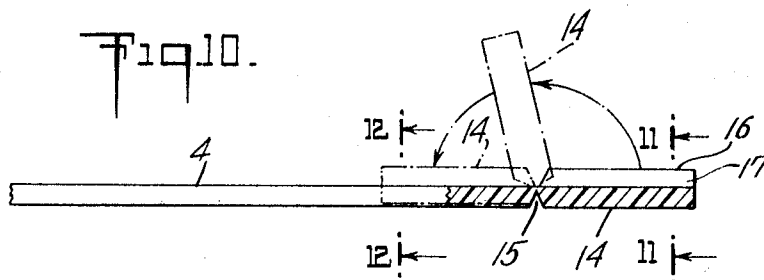
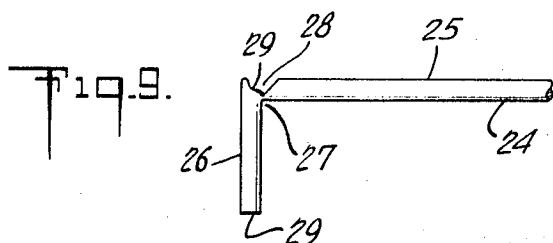
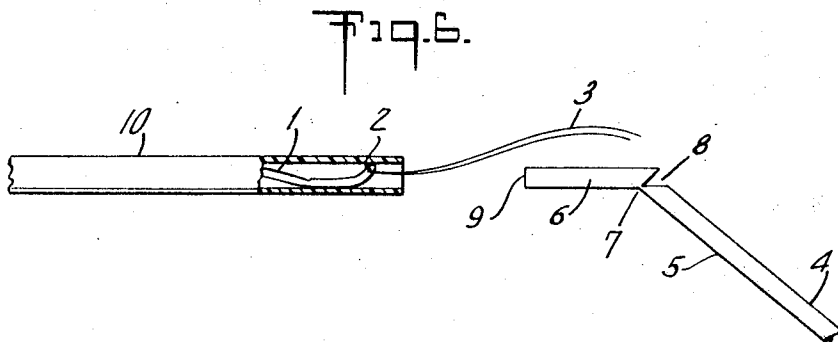
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Filed Aug. 16, 1966

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Fig. 7.

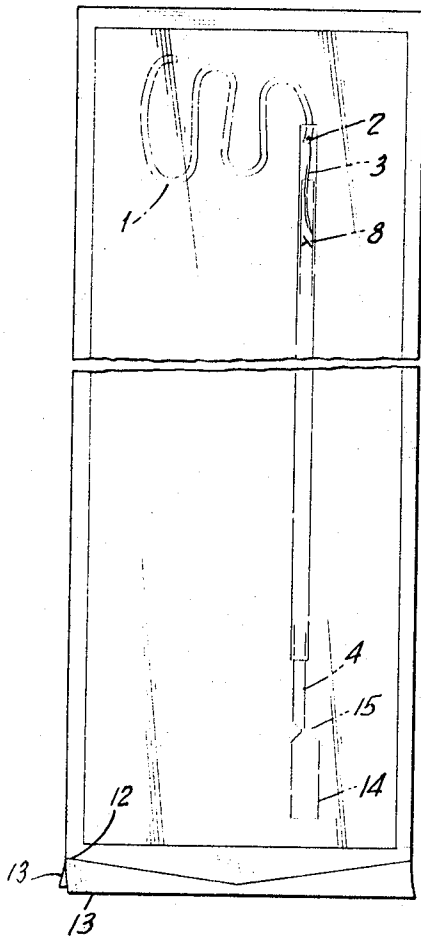
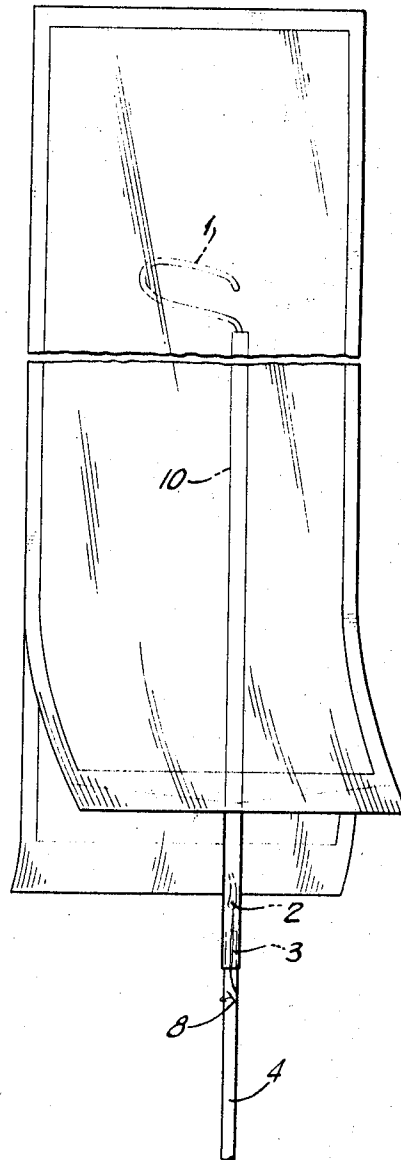


Fig. 8.



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3,448,737

INSERTION UNIT

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Filed Aug. 16, 1966, Ser. No. 572,715

Int. Cl. A61f 5/46; A61b 19/02

U.S. Cl. 128—127

6 Claims

ABSTRACT OF THE DISCLOSURE

An insertion unit for a nonlinear medical appliance such as an intrauterine contraceptive device is provided. This unit consists of a cannula and a plunger, the plunger having a slightly smaller diameter than the cannula. The plunger itself is divided lengthwise into two sections which are physically connected only by a thin web. When the portion of the plunger containing the hinge lies outward of the cannula, the plunger is angularly deformable from linear to provide a notch at the juncture of the two sections. The medical appliance is provided with a flexible tail which may be and is placed in the notch thus formed. Upon pulling the plunger back into the cannula, the plunger again becomes linear, thus closing the notch, gripping the tail of the medical appliance and pulling the same into the cannula.

This invention relates to new and useful improvements in the sterile handling of surgical and medical appliances.

Prior to the placement of a surgical or medical appliance into the human body, good medical practice requires that the appliance and the instrument used for the insertion of the appliance be in sterile condition. When the appliance is to be inserted in a doctor's office, the doctor generally has the facilities necessary to assure proper conditions of sterility. However, in the field of mass public health programs in remote areas, proper sterilization equipment is rarely available.

In recent years, mass programs of population control have been undertaken through the use of intrauterine contraceptive devices of the type described in U.S. Patent Nos. 3,200,815 and 3,250,371. These devices which are made of plastic materials, such as polyethylene, and the insertion units used for their insertion which are also made of plastic materials, such as fluorinated hydrocarbons, are not susceptible to sterilization by autoclaving. In order to sterilize them in the field, some form of cold sterilization is used. Cold sterilization, while adequate to kill many microorganisms, is ineffective unless properly carried out by properly trained personnel. In order to obviate the need for sterilization in the field, it is proposed to prepackage intrauterine contraceptive devices and other surgical and medical appliances and their insertion units in sterile condition.

It is an object of the present invention to provide a sterile packaged medical appliance and insertion unit.

It is a further object of the invention to provide a means of loading a medical appliance into an insertion unit while maintaining the sterility of both the appliance and the insertion unit.

It is a still further object of the invention to provide an insertion unit for a medical appliance which may be discarded after use.

The invention will be more fully understood by reference to the specification and drawings in which:

FIG. 1 is a side view of a push rod prior to use.

FIG. 2 is a view of the first step in loading an intrauterine contraceptive device into an insertion unit.

FIG. 3 is a view of a further step in loading an intrauterine contraceptive device into an insertion unit.

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FIG. 4 is a view of an intrauterine contraceptive device loaded into an insertion unit in preparation for sterile packaging.

FIG. 5 is a view of a fully loaded insertion unit prior to insertion.

FIG. 6 is a view showing the disengagement of the withdrawal string on the intrauterine contraceptive device, prior to insertion.

FIG. 7 is a plane view of a presterilized packaged unit containing an intrauterine contraceptive device and insertion unit.

FIG. 8 is a view of the opening of the packaged unit of FIG. 7.

FIG. 9 is a modification of the withdrawal string engaging portion of the insertion unit.

FIG. 10 is a view of a finger grip on the push rod.

FIG. 11 is a cross section of the finger grip through 11—11.

FIGURE 12 is a cross section of the finger grip through 12—12.

FIGURE 1 illustrates the rod 4 which is used to both load an intrauterine contraceptive device into an insertion unit, and also to push the intrauterine contraceptive device from the insertion unit into the uterus.

The rod 4 is molded from any suitable plastic material, such as polyethylene or polypropylene. Rod 4 is molded so as to provide at one end a short portion 6 which is at an angle to the main portion 5 of the rod. Rod portions 5 and 6 are joined by the plastic hinge 7. When rod portions 5 and 6 are offset from one another as shown in FIG. 1, an opening or notch 8 is formed. While FIG. 1 shows rod portions 5 and 6 to be at right angles to one another, rod 4 may be molded to provide a lesser angle. Notch 8 may be at any point along the surface of rod 4, but it is preferably 1 to 2 inches from the rod end 9.

FIGURES 2—4 illustrate the means by which an intrauterine contraceptive device (hereinafter referred to as IUCD) is placed into an insertion unit prior to sterile packaging.

Referring to FIGURES 2—4, an IUCD 1 has provided at one end thereof, a hole 2 or other suitable means for attaching a string 3. The string 3 may be of any suitable material such as nylon or silk. The insertion unit is made up of a cannula 10 and a rod 4. The cannula 10 is formed from a material possessing sufficient internal slipperiness to prevent the binding of the IUCD 1 when the IUCD is fully within the cannula. It has been found that materials such as fluorinated hydrocarbon and cellulosic materials are suitable for the formation of the cannula. The rod 4 is provided with a notch 8 which is described above.

As shown in FIG. 2, rod 4 is inserted through cannula 10 and a portion of string 3 is placed in notch 8.

Rod 4 is drawn into cannula 10 with the string 3 caught in notch 8 as shown in FIG. 2. As rod portion 6 is urged into alignment with rod portion 5, the string 3 is firmly held in notch 8.

By continuing to draw rod 4 through cannula 7 as in FIG. 3, the leading end of IUCD 1 is brought into the cannula.

The cannula, rod and IUCD are then placed in a suitable package, such as that illustrated in FIG. 7. The package may be formed of sheets of a transparent, impermeable material, such as polyethylene. The package or envelope containing the assembled cannula, rod and IUCD may be sterilized prior to sealing by means such as sterilization with a bactericidal gas such as ethylene oxide or it may be sterilized after sealing by exposing the package to a sterilizing beam such as high energy radiation from a source such as radioactive cobalt.

Immediately prior to the insertion of the IUCD, the envelope is opened in such manner as to maintain the sterility of the contents thereof. In the envelope illustrated in FIG. 7, opening is accomplished by grasping the flaps 13, 13 and gently pulling them apart to release the seal along line 12.

The cannula is partially removed from the envelope and then is either held by hand while wearing sterile gloves or is held through the envelope and the rod is drawn completely through the cannula as shown in FIGS. 5, 6 and 8. Upon complete withdrawal of the rod 4 from cannula 10 as shown in FIG. 6, the string 3 is released from notch 8. The IUCD 1 is now fully located within the cannula 10 and is ready for insertion according to the procedure described in U.S. Patent Nos. 3,200,815 and 3,250,271.

A further means for grasping the string 3 is illustrated in FIG. 9 wherein there is shown a portion of a rod 4 having a notch 28. One face of the notch is slightly indented as at 29 in order to accommodate the string.

In order to assure that upon insertion of the IUCD into the uterus, the rod portion 6 does not enter the uterus, a means should be provided to limit the distance that rod 4 can travel in cannula 10. One means of accomplishing this is shown in FIG. 10, wherein rod 4 is provided at the end remote from the notch 8 with a grip 14 which is hingedly molded to rod 4 at hinge 15. Grip 14 is provided with an internal channel 17 which is of sufficient diameter to accommodate rod 4. Prior to the insertion of the IUCD into the uterus, grip 14 is rotated as seen in FIG. 10 and snapped over rod 4. The length of grip 14 should be slightly greater than the distance from rod end 9 to notch 8. Other suitable means for limiting the distance of travel of rod 4 will be apparent to those skilled in the art.

While the invention has been described with reference to intrauterine contraceptive devices, it will be understood that the invention is applicable to other types of surgical and medical appliances, such as catheters and drains.

What is claimed is:

1. An insertion unit for a medical appliance which comprises in combination a cannula and a plunger, said plunger being slightly smaller in diameter than said cannula and adapted to pass through said cannula, said plunger being physically divided lengthwise into at least two sections, said sections being hingedly connected whereby when the portion of the plunger adjacent the hinge lies outward of the cannula, the plunger may be angularly deformed from the linear to thus form an open gripping notch adapted to receive a portion of a medical appliance, and whereby when said plunger is pulled within said cannula, the plunger becomes linear, thus closing the gripping notch to securely grip the medical appliance and to pull said medical appliance into said cannula.

2. An insertion unit according to claim 1, wherein said plunger is formed from a resilient deformable material.

3. An insertion unit for a medical appliance which comprises in combination a medical appliance, a cannula and a plunger, said medical appliance being readily deformable to pass through said cannula, said plunger being slightly smaller in diameter than said cannula and being adapted to pass through said cannula, said plunger being physically divided lengthwise into at least two sections, said sections being hingedly connected, whereby when the portion of the plunger adjacent the hinge lies outward of the cannula, the plunger may be angularly deformed from the linear to thus form an open gripping notch adapted to receive a portion of the medical appliance, and whereby when said plunger is pulled within said cannula, the plunger becomes linear, thus closing the gripping notch to securely grip the medical appliance and to pull said medical appliance into said cannula, said portion of said appliance being in said notch and said notch being within said cannula.

4. An insertion unit according to claim 3, wherein said medical appliance is an intrauterine contraceptive device.

5. A method of inserting a medical appliance into a cannula which comprises

providing a plunger and a cannula, said plunger being positioned through the cannula, said plunger being physically divided lengthwise into at least two sections, said section being hingedly connected whereby when the portion of the plunger adjacent the hinge lies outward of the cannula, the plunger may be angularly deformed from the linear to thus form an open gripping notch adapted to receive a portion of a medical appliance, and whereby when said plunger is pulled within said cannula, the plunger becomes linear, thus closing the gripping notch to securely grip the medical appliance and to pull said medical appliance into said cannula,

positioning said hinged portion of said plunger outward of said cannula, disposing a portion of said medical appliance into said gripping notch, and pulling said plunger by its end which is distal from said medical appliance so as to draw said hinged portion of said plunger and said medical appliance into said cannula.

6. A method according to claim 5, wherein said medical appliance is an intrauterine contraceptive device.

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U.S. Cl. X.R.

128—130; 206—63.2