

July 1, 1969

E. H. RIEDELL

3,452,749

CONTRACEPTIVE DEVICE

Filed Oct. 27, 1966

Sheet 1 of 2

FIG. 1.

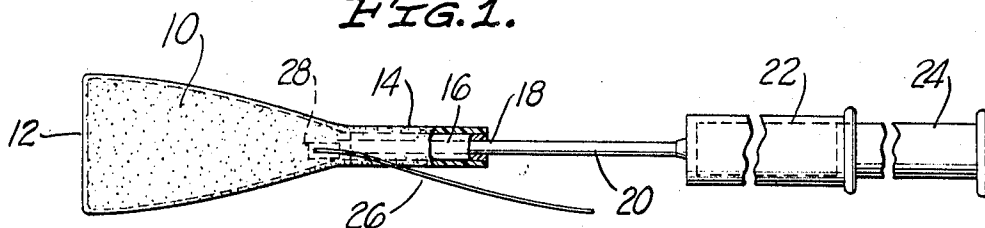


FIG. 2.

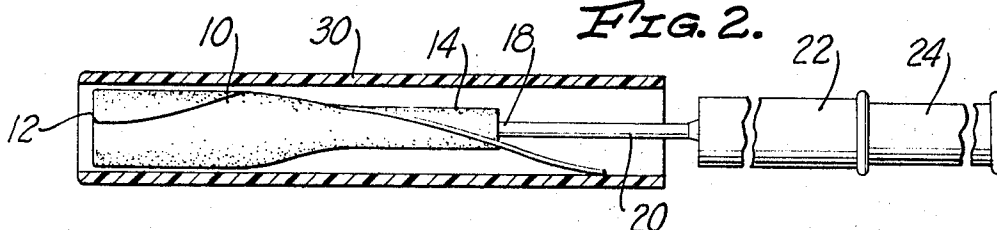


FIG. 3.

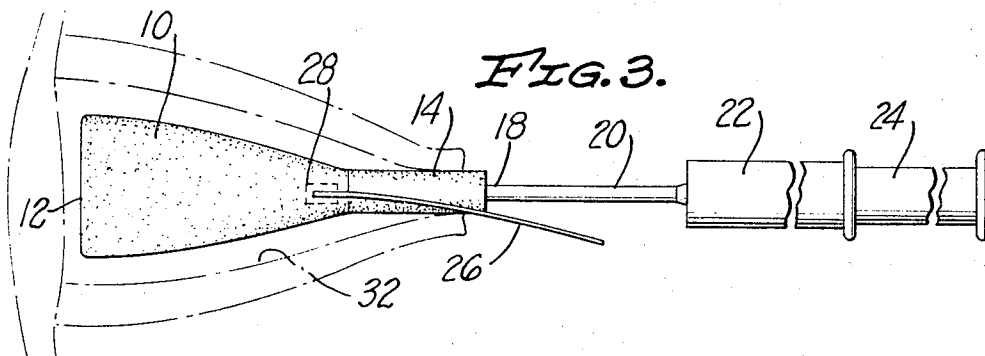


FIG. 4.

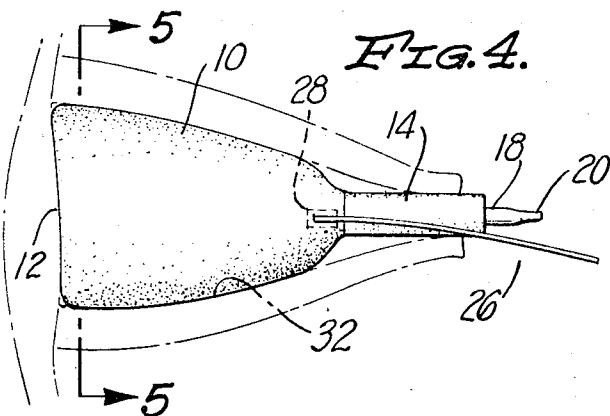
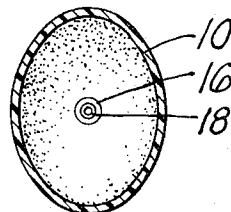


FIG. 5.



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FIG. 6.

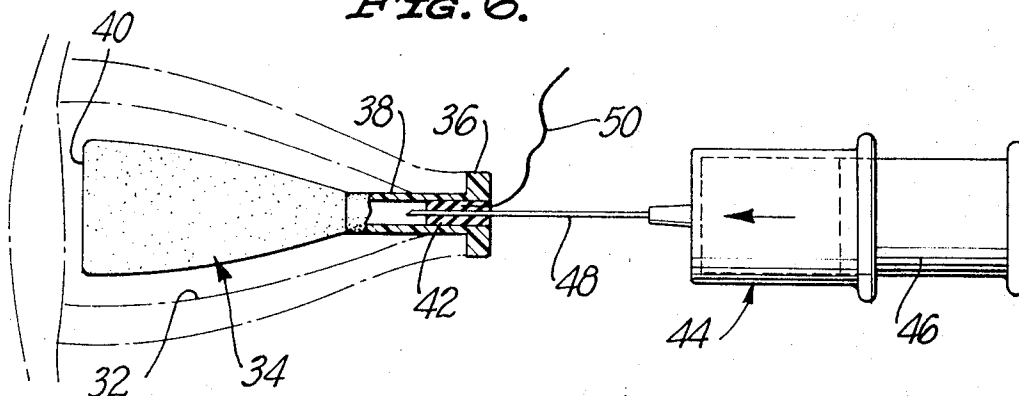


FIG. 7.

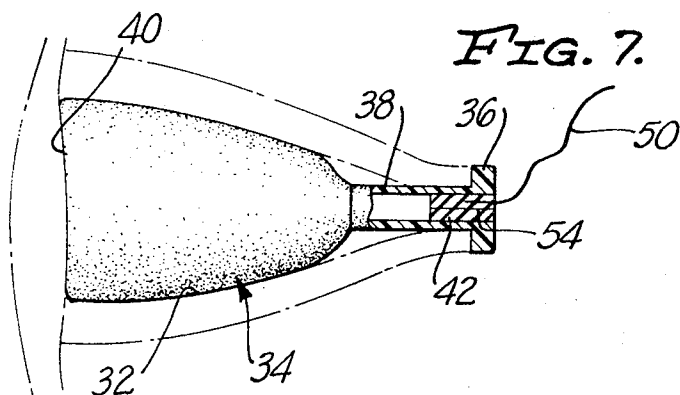
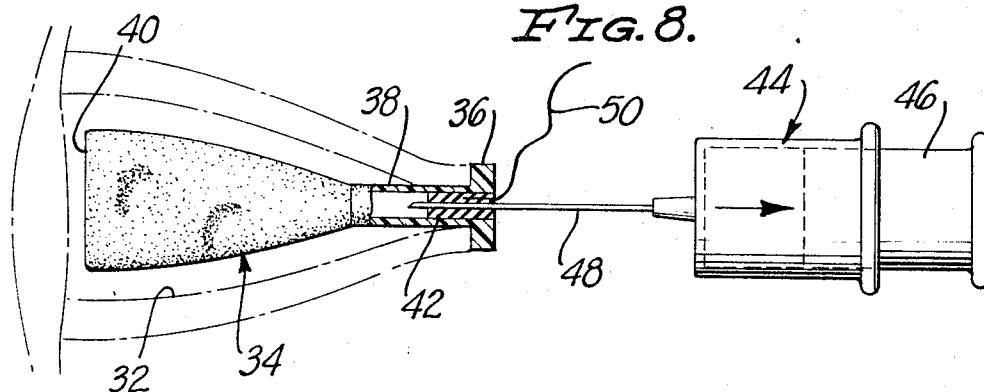


FIG. 8.



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3,452,749

CONTRACEPTIVE DEVICE

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19 Claims

ABSTRACT OF THE DISCLOSURE

The device is a triangular shaped, resilient material balloon which is inserted in non-inflated, compacted form through the vagina substantially totally into the uterine cavity with an inflating end of said balloon retained positioned slightly projecting from the mouth of said uterine cavity. The balloon is then fluid inflated within the uterine cavity to contact a major portion of the internal wall surfaces of said uterine cavity with the inflating end thereof at and substantially filling the mouth of said uterine cavity, said balloon so positioned being substantially free of any obstruction of the vagina exterior of said uterine cavity. The balloon is fluid inflated from exterior of the uterine cavity through the inflating end thereof, said inflating being through an initially connected tube which is then removed and the inflating end heat sealed, or by use of a conventional syringe penetrating the inflating end and the inflating end being formed of self-sealing resilient material upon removal of said syringe. Deflation of the balloon for removal may be through a penetrating syringe or by forming a weakened section in the balloon connected to a string projecting into the vagina.

This invention relates to a contraceptive device, and more particularly, to an intrauterine contraceptive device of balloon-like form inserted into the uterine cavity uninflated and inflatable in said uterine cavity to substantially fill and conform to the same. Even more particularly, this invention relates to an intrauterine contraceptive device of the foregoing character which may be originally supplied in a rolled, compacted form contained within an inserting tube, said device having inflating means connected thereto or insertable therein for inflation of the device once it has been properly positioned within the uterine cavity.

Various prior forms of contraceptive devices have been provided and many of the intrauterine type. Those contraceptive devices of the intrauterine type have been formed with some means for insertion into and blocking the uterine cavity in order to perform the contraceptive function. All such prior intrauterine contraceptive devices, to my knowledge, prior to the present invention, have necessarily been of a rigid type and insertable in such rigid form to block the uterine cavity.

Many difficulties have been encountered with the prior forms of intrauterine contraceptive devices as a result of this relatively rigid form. One such difficulty is the difficulty in inserting the particular device into the uterine cavity in view of the necessary rigid size thereof. Furthermore, the rigidity presents the danger of irritation to the uterine cavity and the possibility of damage to or puncturing of the uterus walls, both of which can be extremely dangerous.

It is an object of my invention, therefore, to provide an intrauterine contraceptive device which is relatively easy to install without discomfort and does not present the danger of irritation or damage to the uterus walls. The contraceptive device of the present invention is formed of a resilient material balloon-like member insertable in a compacted, uninflated form, yet upon infla-

tion thereof, will conform to and substantially fill the uterine cavity. Furthermore, the resilient material of the member is relatively soft and pliable and does not present the danger of irritation or damage to the uterus walls, as with the prior constructions discussed in the foregoing.

It is a further object of my invention to provide an intrauterine contraceptive device of the foregoing type which may be originally provided in a compacted form contained within an inserting tube, said device having the inflating means directly connected thereto or insertable therein. The inflating means may be in the form of an inflating syringe connected to the balloon-like member through an inflating conduit either of plastic or metal hypodermic needle type form, all of which may be contained within the inserting tube so that upon insertion of the balloon-like member properly located within the uterine cavity, the inserting tube may be withdrawn and the inflating syringe manipulated to inflate the balloon-like member to conform to and substantially fill the uterine cavity. After said inflation, the balloon-like member is sealed in the inflated form with the inflating syringe and conduit removed.

It is still a further object of my invention to provide an intrauterine contraceptive device of the foregoing character wherein the final sealing operation of the balloon-like member in the installed and inflated form may be accomplished simply and efficiently without the need for special sealing means. The inflating conduit may be formed of a heat sealable plastic such that once the inflating operation has been completed, the conduit may be heat sealed by use of a hot cautery adjacent the member inflating end and then quickly severed. In another form, the portion of the device receiving the inflating conduit is self-sealing resilient material so that the inflating conduit, in this case a metal hypodermic needle type, is merely withdrawn.

It is an additional object of my invention to provide an intrauterine contraceptive device of the foregoing inflatable type wherein the device may be quickly and easily removed from the uterine cavity when the function of the device is no longer desired. In one form, with the device in the installed and inflated condition, it is merely necessary to puncture the same for effecting release therefrom of the fluid inflating the same. In another form, a metal hypodermic needle type conduit is inserted in the device and the inflating fluid withdrawn. In either form, it is merely necessary thereafter to remove the device from the uterine cavity in the uninflated form.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawing which is for the purpose of illustration only, and in which:

FIG. 1 is a plan view of one embodiment of the intrauterine contraceptive device of the present invention in uninflated form and with the inflating means connected thereto;

FIG. 2 is a view similar to FIG. 1, but with the device in a rolled, compacted form contained within an inserting tube, said tube being shown in section;

FIG. 3 is a view similar to FIG. 1, with the device installed in a uterine cavity and ready for inflating, said uterine cavity being illustrated in phantom lines;

FIG. 4 is a view similar to FIG. 3, but with the device in inflated form substantially conforming to and filling the uterine cavity and with an inflating end of the device sealed to retain the device in said inflated form;

FIG. 5 is a sectional view taken along the broken line 5—5 in FIG. 4;

FIG. 6 is a plan view of a second embodiment of the intrauterine contraceptive device of the present invention installed in a uterine cavity, with the inflating means connected thereto and prior to inflation thereof;

FIG. 7 is a view similar to FIG. 6, with the device inflated and the inflating means removed; and

FIG. 8 is a view similar to FIG. 6, with the inflating means reinserted in the device and the device partially deflated during the procedure for removal of the device from the uterine cavity.

Referring to FIGS. 1 through 5 of the drawings, the first embodiment of the intrauterine contraceptive device of the present invention includes a resilient material balloon-like member, generally indicated at 10 and hereinafter and in the appended claims referred to as a balloon, said balloon preferably being formed of a relatively soft, nonirritating plastic, such as vinyl plastic. Further, the balloon 10 is generally triangular in plan view, as shown in FIG. 1, tapering from a maximum width at an interior end 12 thereof lengthwise to a relatively narrow inflating end 14 and being of a maximum depth at said interior end less than said maximum width. The balloon inflating end 14 has secured therein a tubular plug 16 in turn securing an end portion 18 of an inflating conduit 20, said plug and inflating conduit also preferably being formed of plastic material.

At least the inflating conduit 20 is preferably formed of a heat sealable plastic, with said conduit communicating interiorly of the balloon 10 and being connected in communication with a preferably plastic syringe 22 spaced from the balloon inflating end 14. The syringe 22 is of usual construction and may be filled with a fluid, such as air or water, for depression of an actuating plunger 24 thereof to force the fluid through the inflating conduit and into the balloon 10 for inflating said balloon. Thus, the balloon 10, inflating conduit 20 and syringe 22 may be provided as an assembled unit interconnected ready for the inflating function of the balloon 10.

A string 26 may have the inner end thereof secured to a tear section 28 of the balloon 10, said string extending outwardly along the balloon inflating end 14 and being accessible beyond said end. The balloon tear section 28 is formed of slightly weakened edges normally maintaining a sealed section on the balloon 10 and normally resisting tearing upon moderate pulling of the string 26. Such tear section 28, however, is formed with sufficiently weakened edges so that a strong positive pull on the string 26 will puncture or form an opening in the balloon 10 for deflating the same, as will be hereinafter described.

The balloon 10 in the uninflated form shown in FIG. 1 may be laterally curled or rolled, as shown in FIG. 2, and the entire balloon and a part of the inflating conduit 20 inserted in an installing tube 30, also preferably formed of plastic. Retained in such installing tube 30 in the uninflated, compacted form, the balloon 10 may then be inserted into a uterine cavity 32 and the installing tube 30 removed by lengthwise withdrawing the same while maintaining the balloon positioned, said uninflated balloon 10 then being in the position shown in FIG. 3, with the uterine cavity illustrated in phantom lines. It will be noted the string 26 extends outwardly of the uterine cavity 32 adjacent the balloon inflating end 14.

The actuating plunger 24 of the syringe 22 is then depressed to force the fluid into the balloon 10 and inflate the same to an expanded or inflated condition, as shown in FIG. 4, substantially filling and conforming to the uterine cavity 32. The tubular plug 16 at the balloon inflating end 14 retains the balloon 10 properly positioned within the uterine cavity 32 such inflation and also maintains the string 26 properly positioned extending outwardly of said uterine cavity, as shown. Thereafter the end portion 18 of the inflating conduit 20 adjacent the balloon inflating end 14, being formed of a heat sealable plastic, may be heat sealed using the usual cautery found in every physician's office to retain the balloon 10 sealed in the inflated form, with the inflating conduit then being cut outward of the heat sealing thereof for removal of the remainder or the inflating conduit and the syringe 22.

Thus, the balloon 10 in the inflated form shown in FIG. 4 substantially fills and conforms to the uterine cavity 32

for properly serving the contraceptive function. In such inflated form, the balloon 10 will have dimensions in the order of approximately two centimeters maximum width in plan view, as shown in FIG. 4, and approximately six centimeters in overall length, with a plan view depth of approximately one and one-half centimeters, as shown in FIG. 5. Further, the string 26, in view of its extension outwardly of the uterine cavity 32 may be used for palpation by the patient at any time.

When the contraceptive function of the balloon 10 is no longer desired and it is desired to remove the balloon, it is merely necessary to apply a pulling force on the string 26 sufficient to tear the weakened edges of the tear section 28, causing a puncture in the balloon. The inflating fluid contained therein will then leak from the balloon 10, causing a deflation thereof, after which the balloon may be easily and simply removed merely by grasping the inflating end 14. Thus, complete and simple removal of the balloon 10 is assured.

Referring to FIGS. 6 through 8 of the drawings, the second embodiment of the intrauterine contraceptive device of the present invention includes a similar resilient material balloon-like member, generally indicated at 34, and as before, hereinafter referred to as a balloon. In the second embodiment form, however, the balloon 34 is formed with a flange 36 for locating a relatively narrow inflating end 38 and serving as the outer termination of said inflating end. Otherwise, the balloon 34 is, as before, generally triangular in plan view, tapering from a maximum width at an interior end 40 to said inflating end 38.

The narrow inflating end 38 is, again, provided with a tubular plug 42 secured therein, but in this case, said tubular plug is composed of a resilient material, usually plastic, of the type used in closures for serum containing bottles and the like from which hypodermic syringes are filled in a physician's office. Such resilient material is specifically composed for being pierced by the needle of a hypodermic syringe, with said needle projecting into the particular bottle so that the liquid thereof may be withdrawn through the needle into the syringe, yet when the needle is removed, the material is self-sealing and will not permit the passage of fluids therethrough. As hereinbefore stated, said resilient material is of a well known form and for purposes of the present invention, is hereinafter and in the appended claims referred to as a self-sealing resilient material, meaning capable of self-sealing a hypodermic needle puncture after removal of said needle.

A hypodermic syringe 44 used with this second embodiment balloon 34 may be generally of usual type, with an actuating plunger 46, but having a relatively long hypodermic needle 48 formed of the usual metal. Also, an inner end of a string 50 of nondeteriorating form is embedded in the tubular plug 42 for extending from the inflating end 38 exterior of the uterine cavity when the balloon 34 is installed in said uterine cavity to serve for palpation by the patient after installation and inflation of the balloon, as hereinbefore described.

The balloon 34 is installed in the uterine cavity in the same manner, with or without the needle 48 of the syringe 44 inserted through the tubular plug 42 of the balloon. The flange 36 on the balloon inflating end 38, however, serves to locate said inflating end and abuts the outer terminus of the uterine cavity cervix in said installed position. The needle 48 of the syringe 44 either previously or after installation of the uninflated balloon 34, is inserted through the balloon tubular plug 42, said syringe at this point being filled with the inflating fluid. The installed balloon 34 prior to inflation thereof with the syringe 44 ready for such inflation is shown in FIG. 6.

The plunger 46 of the syringe 44 is then actuated to inflate the balloon 34 and cause said balloon to substantially fill and conform to the uterine cavity 32, as shown in FIG. 7, and the syringe 44 is removed, with the tubular plug 42 of the self-sealing resilient material immediately self-sealing around the puncture 54 of said tubular plug,

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thereby retaining the fluid within the balloon and the balloon properly inflated. As shown in FIG. 7, the string 50 projects outwardly of the uterine cavity 32 and is in position for said palpation by the patient to assure continued and proper inflation and positioning of the balloon.

Thus, the balloon 34 in such inflated condition, substantially filling and conforming to the uterine cavity 32 will properly serve the contraceptive function.

When it is desired to remove the balloon 34, the needle 48 of the syringe 44, said syringe now being in the non-filled condition, with the plunger 46 depressed, is reinserted through the tubular plug 42 so that said needle again projects interiorly of the balloon 34. Withdrawal of the syringe plunger 46 will, therefore, deflate the balloon 10, withdrawing the fluid therefrom, as shown in FIG. 8. The deflated balloon 34 may then easily be removed.

I have provided, therefore, according to the principles of the present invention, an intrauterine contraceptive device which eliminates the dangers and difficulties of the prior devices. The balloon 10 or 34, being of a relatively soft, resilient material form not only substantially fills and conforms to the uterine cavity 32 for performing the contraceptive function in an efficient manner, but also, being of such soft, pliable form, cannot irritate or damage the walls of the uterine cavity. Furthermore, the device of the present invention is adapted for easy insertion and foolproof installation, yet may be easily and simply removed by the various methods described when desired.

I claim:

1. In an intrauterine contraceptive device, the combination of: a resilient material balloon inflatable from an end, said balloon normally being uninflated and being inflatable from said end while positioned substantially totally within a uterine cavity to substantially fill and conform to said uterine cavity, said balloon when inflated in said uterine cavity being constructed and arranged to contact a major portion of internal wall surfaces of said uterine cavity substantially filling said uterine cavity with said balloon end at and substantially filling a mouth of said uterine cavity, said inflated balloon being substantially free of any obstruction of a vagina exterior of said uterine cavity; tubular means retaining said balloon in an uninflated compacted form for insertion into said uterine cavity with said balloon end at said mouth of said uterine cavity, said tubular means being retractable from said uterine cavity with said balloon remaining in said cavity; means connected to said balloon end at said uterine cavity mouth for inflating said balloon with a fluid from exterior of said uterine cavity to substantially fill and conform to said uterine cavity contacting said wall surfaces after retraction of said tubular means; and means operably connected to said balloon end for sealing said end at said uterine cavity mouth after said inflation of said balloon.

2. A contraceptive device as defined in claim 1 in which said balloon in said uninflated form is of a compacted size spaced less than said uterine cavity, said balloon being inflatable from said end at said uterine cavity mouth to resiliently expand and substantially fill said cavity contacting said major portion of said wall surfaces.

3. A contraceptive device as defined in claim 1 in which said balloon is formed of a vinyl plastic material constructed and arranged sufficiently resilient for said inflating and said uterine cavity filling.

4. A contraceptive device as defined in claim 1 in which said means connected to said balloon end at said uterine cavity mouth for inflating said balloon includes a syringe exterior of said uterine cavity having fluid therein connected through a tubular conduit to said balloon end.

5. A contraceptive device as defined in claim 1 in which said means for sealing said balloon end at said uterine cavity mouth includes a heat sealed portion connected to said end.

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6. A contraceptive device as defined in claim 1 in which said means for sealing said balloon end at said uterine cavity mouth includes a tubular plug at said balloon end formed of a self-sealing resilient material.

7. A contraceptive device as defined in claim 1 in which a weakened section is formed on said balloon; in which means is connected to said balloon weakened section extending outward of said uterine cavity into said vagina exterior of said uterine cavity when said balloon is inflated in said uterine cavity for selectively rupturing and deflating said balloon by tearing said weakened section through a force applied to said means from exterior of said uterine cavity.

8. A contraceptive device as defined in claim 1 in which said balloon is formed of a plastic material constructed and arranged sufficiently resilient for said inflating and said uterine cavity filling and in uninflated form is generally triangular in plan tapering to said balloon end; and in which said means connected to said balloon end at said uterine cavity mouth for inflating said balloon includes a syringe exterior of said uterine cavity connected to said balloon end through a tubular conduit.

9. An intrauterine contraceptive device including, a resilient material balloon generally triangular in plan tapering to an inflating end, said balloon being compactible to a size spaced smaller than a uterine cavity in an uninflated or, said balloon being inflatable from said inflating end with a fluid while positioned substantially totally within said uterine cavity to substantially fill and conform to said uterine cavity, said balloon when inflated in said uterine cavity being constructed and arranged to contact a major portion of internal wall surfaces of said uterine cavity substantially filling said uterine cavity with said balloon end at and substantially filling a mouth of said uterine cavity, said inflated balloon being substantially free of any obstruction of a vagina exterior of said uterine cavity and means operably connected to and sealing said end at said uterine cavity mouth in said balloon inflated form.

10. A contraceptive device as defined in claim 9 in which said inflating end includes a flange adapted to lie outwardly of said uterine cavity engaged at said uterine cavity mouth overlying and substantially closing said mouth.

11. A contraceptive device as defined in claim 9 in which a conduit is connected communicating interiorly of said balloon through said inflating end at said uterine cavity mouth; and in which syringe means is connected to said conduit spaced from said balloon inflating end outward of said uterine cavity for inflating said balloon through said conduit with a fluid upon said balloon being positioned in said uninflated form in said uterine cavity with said inflating end at said uterine cavity mouth.

12. A contraceptive device as defined in claim 9 in which said balloon is formed of a plastic material constructed and arranged sufficiently resilient for said inflating and said uterine cavity filling; in which a plastic material conduit is connected communicating interiorly of said balloon at said balloon inflating end from exteriorly of said uterine cavity; and in which said means operably connected to and sealing said end includes a heat sealed end portion of said conduit adjacent said end at said uterine cavity mouth.

13. A contraceptive device as defined in claim 9 in which said means operably connected to and sealing said end includes a self-sealing resilient material section at said end accessible from exteriorly of said uterine cavity.

14. A contraceptive device as defined in claim 9 in which said balloon includes string-like means connected to said balloon and adapted to extend outwardly of said uterine cavity through said uterine cavity mouth into said vagina when said balloon is positioned in said uterine cavity.

15. A contraceptive device as defined in claim 9 in which said balloon is inflatable in said uterine cavity through said inflating end at said uterine cavity mouth

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to the approximate dimensions in plan in the order of two centimeters in maximum width and six centimeters in length and one and one-half centimeters in maximum depth.

16. A contraceptive device as defined in claim 9 in which a weakened section is formed on said balloon within said uterine cavity; in which means is connected to said balloon weakened section extending outward of said uterine cavity through said uterine cavity mouth and into said vagina when said balloon is inflated in said uterine cavity for selectively rupturing and deflating said balloon by tearing said weakened section through a force applied to said means exteriorly of said uterine cavity.

17. In a method of installing an intrauterine contraceptive device, the steps of: compacting an inflatable balloon-like intrauterine contraceptive device in uninflated form to a size spaced smaller than a uterine cavity; retaining said device compacted and inserting said device substantially totally into said uterine cavity through a cavity mouth; inflating said device inserted in said uterine cavity to expand said device to substantially fill and conform to said uterine cavity and engage a major portion of internal walls of said uterine cavity, said device when inflated being maintained substantially free of any obstruction of a vagina exterior of said uterine cavity; and sealing said inflated device while filling and substantially conforming to said uterine cavity.

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18. A method as defined in claim 17 in which said step of retaining said device compacted includes the steps of: retaining said device compacted in a rolled compacted form and inserting said device in said rolled compacted form substantially totally into said uterine cavity.

19. A method as defined in claim 17 in which the step of sealing said inflated device includes the step of: heat sealing said inflated device at and from exteriorly of said uterine cavity mouth.

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ADELE M. EAGER, *Primary Examiner.*

U.S. Cl. X.R.

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