

March 22, 1938.

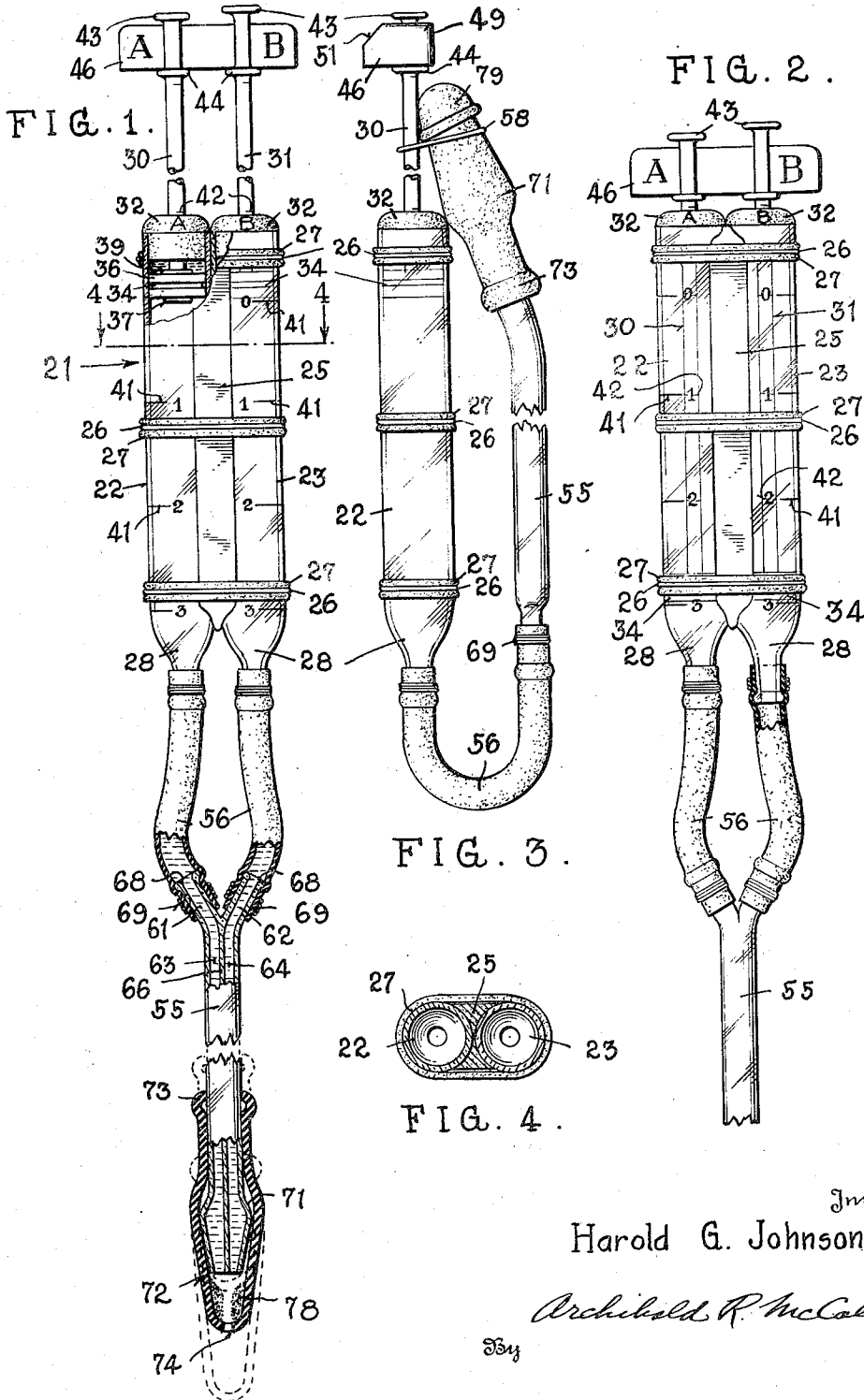
H. G. JOHNSON

2,112,160

METHOD OF AND APPARATUS FOR EFFECTING MEDICINAL TREATMENT

Filed April 4, 1933

2 Sheets-Sheet 1



Inventor
Harold G. Johnson,
Archibald R. McCallum

By *Edy* Attorney

March 22, 1938.

H. G. JOHNSON

2,112,160

METHOD OF AND APPARATUS FOR EFFECTING MEDICINAL TREATMENT

Filed April 4, 1933

2 Sheets-Sheet 2

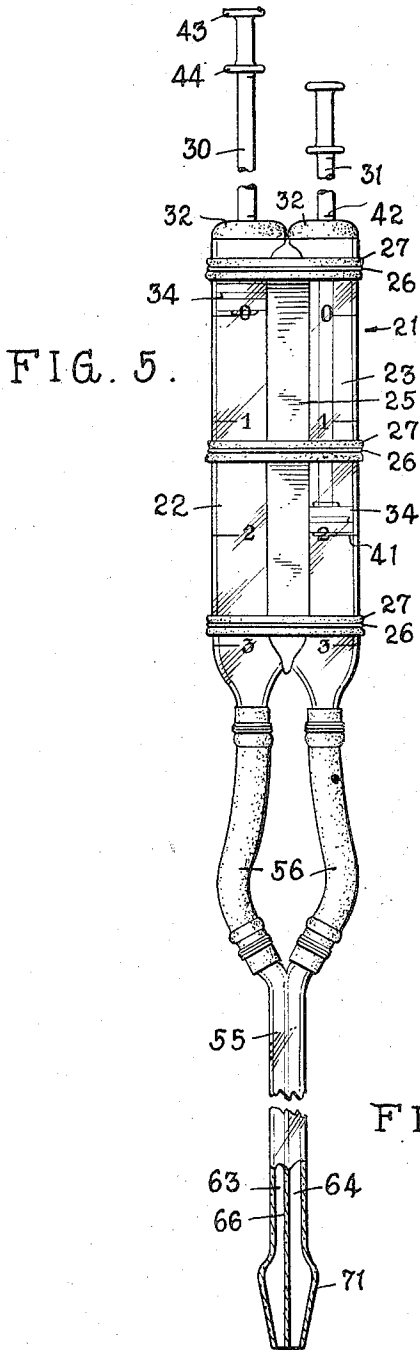


FIG. 5.

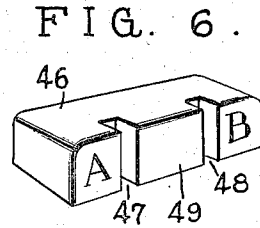


FIG. 6.

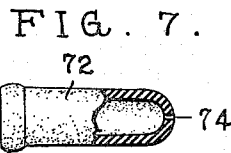


FIG. 7.



FIG. 8.

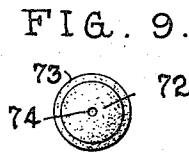


FIG. 9.

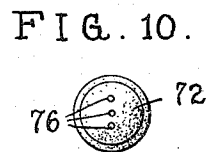


FIG. 10.

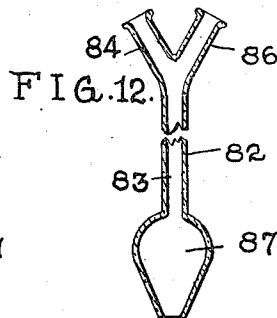


FIG. 12.

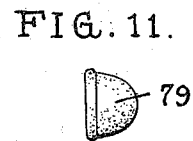


FIG. 11.

Inventor
Harold G. Johnson,

Archibald R. McCallum

334

Attorney

UNITED STATES PATENT OFFICE

2,112,160

METHOD OF AND APPARATUS FOR EFFECTING MEDICINAL TREATMENT

Harold G. Johnson, Yonkers, N. Y., assignor to
Kenneth Fredericks, Seattle, Wash.

Application April 4, 1933, Serial No. 664,413

8 Claims. (Cl. 128—234)

The present invention relates to a method of and apparatus for medicinally treating selected portions of animal bodies, and more particularly to the art of forming medicinal compounds and applying them within natural cavities of the human structure, such as the vagina or the rectum.

During recent years considerable time and attention has been devoted, with some success, to removing or lessening the limitations imposed by the factor of surface tension upon the action of liquid antiseptics which prevented powerful and otherwise satisfactory disinfecting solutions from reaching into the minute folds and recesses characterizing skin and membraneous tissue and effectually treating such remote areas. Some branches of investigation have resulted in the development of a technique employing the tendency of gases to expand to drive or carry a medicament to the desired point of application, thereby accomplishing, in some instances, results superior to those which would be obtainable were it possible to have a purely liquid antiseptic with zero surface tension.

Objects of the present invention are to provide a method of and apparatus for effecting medicinal treatment.

Another object of the invention is to provide a method of and apparatus for introducing medicinal substances, of a nature that they will react in a predetermined manner upon contact each with the other, into a cavity whereby their intermingling may be efficiently controlled.

Another object of the invention is to provide a method of and apparatus for conveniently handling two or more medicinal substances adapted to be mixed prior to or upon their application to insure their being brought together in the proper proportions.

Another object of the invention is to provide a vaginal syringe which will be simple and durable in construction, and convenient and efficient in operation for the purposes set forth.

The full nature of the invention, it is believed, will be apparent from the following detailed description of preferred and optional embodiments of the invention, read in conjunction with the accompanying drawings, forming a part thereof, in which,

Fig. 1 is an elevation of a syringe constructed in accordance with one embodiment of the present invention, showing the cylinders and passages of the characteristic duplex arrangement, and the mixing chamber loaded, and preparatory to the downward discharging movement of the pistons;

Fig. 2 is a corresponding view showing the position of the pistons when the reservoir cylinders have been completely emptied;

Fig. 3 is a side elevation showing the mixing chamber sealed and the manner in which the syringe may be folded when not in use;

Fig. 4 is a section taken on the line 4—4 of Fig. 1, showing the construction of the reservoir or body portion of the syringe;

Fig. 5 is a view corresponding to Fig. 1, and illustrates the method of filling the reservoir cylinders with different medicaments;

Fig. 6 is a detail in perspective of the piston rod yoke for insuring the discharge of the medicaments from the cylinders in equal amounts when the pistons are pressed downwardly;

Fig. 7 is a detail view, partly in section, showing the structure of one type of mixing chamber nozzle which may be employed;

Fig. 8 is a view corresponding to Fig. 7, showing another type of mixing chamber nozzle;

Fig. 9 is an end elevation of a mixing chamber nozzle, showing a single outlet hole;

Fig. 10 is a view corresponding to Fig. 9, showing the arrangement of a plurality of outlet holes in parallel alinement with the dividing wall of the bi-passage Y-tube;

Fig. 11 is a detailed view of a flexible, imperforate cap for sealing the outlet of the mixing chamber nozzle, as shown in Fig. 3; and

Fig. 12 is a view in elevation of a single-passage Y-tube having a non-variable mixing chamber, which may be substituted for the outlet structures shown in the remaining views, if desired, for certain treatments.

Referring to the drawings, wherein the same parts are indicated by identical reference numerals in the several views, Fig. 1 shows a vaginal syringe having a body or reservoir portion, generally denoted by the numeral 21, consisting preferably of two alined glass cylinders 22 and 23 of equal length. The reservoir cylinders 22 and 23 are rigidly held in parallel relation by an application of celluloid or any suitable cementitious material 25 and reinforced, preferably at three equal points, by wire strands 26 applied tightly thereto and cushioned from the glass on bands of rubber 27. In assembling the body portion 21, care is taken to insure that the ends of the cylinders are even, for reasons to be made clear hereinafter. At the lower extremity each of the reservoir cylinders 22 and 23 is funnel-shaped and flared, as shown most clearly at 28 in Fig. 2, in order to facilitate the making fast thereon of tubing to be later described.

Slidable within the cylinders 22 and 23 are piston rods 30 and 31, respectively, of glass or other suitable material. The upper end of each cylinder is closed by a rubber stopper 32 which is axially apertured to form a bushing for the piston rod, and is fitted tightly in the cylinder against dislodgment when the piston rods are drawn outwardly with respect to the cylinders, as when filling them with medicaments. To provide a pumping means for filling the cylinders 22 and 23 and for discharging the medicaments therefrom, pistons 34 are provided fast between annular flanges 36 and 37 on the lower ends of the piston rods. A small quantity of glycerine or other inert non-volatile lubricant 39 is preferably maintained in the cylinders above the pistons 34 to insure a perfect seal and prevent their oxidation and sticking. As shown in Figs. 1 and 3, the flanges 36 space the pistons from the stoppers 32 when the piston rods 30 and 31 are withdrawn, to provide room for the glycerine 39. When the piston rods are pressed downwardly the glycerine trickles down the inner walls of the cylinders and thereby constantly lubricates the paths of the pistons 34. The supply of glycerine may be renewed by means of a medicine dropper applied at the aperture of the stopper 32, the fit of the piston rods in the bushings being sufficiently loose to afford an aperture for admitting the glycerine when the piston rods are pressed against the surrounding rubber.

Preferably, the cylinders 22 and 23 contain a number of doses or applications. In the present embodiment each of the cylinders indicates a capacity of approximately seven and one-half cubic centimeters, or a total syringe reservoir capacity of fifteen cubic centimeters. As shown, the cylinders are graduated, by etching or in any other suitable manner, in thirds for dosage, although obviously the capacity of the cylinders, dosage and the nature of the calibrations 41 may be of any value to suit the indicated treatment. Referring to Fig. 2, the piston rods 30 and 31 may also be calibrated, as at 42, to permit control of the quantity of the medicaments applied from the two cylinders, this feature being of marked convenience, in some instances, as when the vaginal syringe is being used in self-treatment by the operator since with the cylinders even partially loaded, the piston rods extend nearer to a normal line of vision than the reservoir cylinders. However, in some instances, even in the case of self-treatment, satisfactory results are obtainable by referring to either the markings on the cylinders or those on the piston rods.

The piston rods 30 and 31 are each provided at the upper end, with spaced annular flanges 43 and 44. The lower flange 44 is preferably accurately spaced from the lower rod flanges 36 and 37 so that when it rests upon the stopper 32 the piston 34 is in its lowermost position to insure expulsion of the last full dose from the reservoir. It will thus be apparent that when the flanges 43-43 of adjacent piston rods are advanced in alinement the cylinders are emptied at equal rates and therefore where the cylinders are of equal dimensions as the preferred showing indicates, equal volumes of the substances will be expelled therefrom.

In order to insure that the method may be practiced and the apparatus conveniently and efficiently operated by a lay person or any other without the necessity of practice, a holder or piston yoke 46, Fig. 6, is provided. This holder consists preferably of a single piece of wood or

molded material with two parallel notches 47 and 48 formed in the forward face 49 thereof. The notches 47 and 48 are spaced to receive the piston rods, fitting thereon between the flanges 43 and 44, and hold them true in vertical position, as shown in Figs. 1, 2 and 3. The bottom 49 of the yoke 46 is preferably flat and rests on the flanges 44, acting as a leveler for them. The upper edges of the holder 46 are beveled as at 51 for easy engagement by the fingers of the operator in pushing the pistons downwardly. When the yoke 46 is pressed down to inject a dose of the substances in the cylinders the pistons are advanced in unison with the flanges 44 and piston heads 34 in alinement, thus insuring that the ingredients will be brought together in equal quantities. It is obvious that this function of unitary control of the rates of expulsion by the yoke 46 may be exercised when the cylinders 22 and 23 vary in diameter, and with limitations, 20 also where they are of different length, since such may be the construction of the syringe reservoir if dictated by the nature of the desired treatment. In lieu of the notches 47 and 48, vertical holes may be formed in the yoke 46 for 25 receiving the upper extremities of piston rods, should it be desired to eliminate the upper terminal flanges 43-43. However, since the upper flanges 43 are of assistance in withdrawing the piston rods as when filling the reservoir cylinders, 30 the construction shown is thought to be preferable. The yoke 46 is readily detachable by slipping the rods out of the notches 47 and 48, as when filling the cylinders in a manner to be made clear below.

The present syringe includes as an important element an adaptor or delivery tube 55, designed to extend the length of the vagina without requiring insertion of the syringe body into the orifice thereof, and to deposit in the vicinity of the cervix, or at any outward point, the substances from the reservoir cylinders. As shown in Fig. 1, the tube 55 is connected with the lower flared ends of the reservoir cylinders by two sections of preferably non-kinkable rubber tubing 55-56, which are preferably detachably mounted on the cylinders 22 and 23. The tubing 56 is of relatively heavy stock and its interior diameter is such as to permit it to have a very snug fit on the cylinder-end to withstand the expulsion pressure of the medicaments to pass therethrough; or, suitable clamps of a detachable character may be used to hold the rubber on the cylinder outlets. The tubing 56 which may be of any desired length, constitutes a flexible or hinged connector for the delivery tube 55 and the syringe body. Since it is non-kinkable, the same easy operation of the syringe is permitted regardless of the relative positions of the tube and the syringe body. The syringe is thereby caused to be admirably adapted for self-treatment by the operator in sitting, standing or reclining position. The provision of the flexible tubing 56 greatly conveniences the accommodation of the syringe when not in use, since the latter may be easily doubled up and the required length of storage space reduced by one half. This feature particularly adapts the syringe to be stored in the conventional medicine cabinet or physician's instrument case. Furthermore, the ability to fold the syringe renders it possible to put up the device in a carton of handy size for merchandising aid. As shown in Fig. 3, a rubber band or other holder 58 may be used to retain the apparatus in folded position, upon removing which the flexible

tube unbends to permit the delivery tube 55 to assume its extended operative position.

In the preferred embodiment illustrated, Fig. 1, the delivery tube 55 is of Y-formation, being bifurcated at the top to form branches 61 and 62 which are connected by the tubes 56—56 to the cylinders 22 and 23 respectively. The shank of the tube 55 has two parallel passages 63 and 64 separated by a common wall 66 extending to the lower end or mouth of the delivery tube. This construction insures that substances moved from the cylinders are maintained apart during their traversing of the passages 63 and 64. A collar 68 may be provided on the extremity of each of the branches 61 and 62 for preventing the tubing 56 from slipping therefrom, and the tubing 56 is preferably secured permanently to the branches of the Y-tube by any suitable means, such as a wire 69. At its lower extremity the tube 55 is preferably bulged outwardly, as shown at 71, to assist in retaining thereon against accidental displacement a variable mixing chamber 72 to be described hereinafter.

The mixing chamber 72, which is also in the nature of a nozzle, is made preferably of rubber, although it may be of any other non-porous material not readily attacked by chemicals usually used in medicine. One end of the nozzle 72 is apertured to admit the tube 55 and provided with a collar 73 adapted to closely engage the periphery of the tube 55 to prevent accidental shifting of the mixing chamber therealong. The mixing chamber 72 is attached by inserting the extremity of the tube 55 in the collar 73 and sliding the mixing chamber therealong to cause the collar 73 to ride over and lock behind the bulge 71, thus enclosing the ends of the passages 63 and 64 within the mixing chamber. The lower end of the mixing chamber 72, in one embodiment of the invention, is provided centrally with a relatively small outlet hole 74, Figs. 1, 7 to 9, through which the substances are extruded from the syringe. This hole, being centrally located, is designed to emit equal quantities of the substances from the passages 63 and 64.

In Fig. 10 is illustrated a modified mixing chamber having three outlet holes 75—75 aligned and preferably arranged parallel with the center wall 66 of the tube 55. This type of nozzle or mixing chamber permits the two streams of material to have a greater extent of lateral contact than permitted when the nozzle having the single outlet hole 74 is used, and provides for their limited combining regardless of whether or not the substances are mixed in the nozzle 72.

When it is desired that the substances be not mixed until after their discharge from the syringe, the mixing chamber 72 is moved up the tube 55 until the lower end of the tube abuts the end of the mixing chamber, as shown in dotted lines in Fig. 1. Such a method of application is especially adapted where the mixing is to result from bodily heat or muscular activity of the subject, and therefore necessarily delayed beyond the time of injection.

Where the nature of the indicated treatment calls for a slight degree of mixing of the substances before their expulsion from the mixing chamber, the latter may be moved farther down the tube 55 approximately to the position shown in full lines in Fig. 1. Where the treatment requires a thorough mixing of the substances before discharge, as when an immediate activity is sought between the substances, the mixing chamber 72 may be moved to the lowermost posi-

tion shown in dotted lines in Fig. 1, wherein the full extent of the interior of the chamber 72 is available for mixing and the nozzle is held on the delivery tube 55 by the collar 73 engaging the bulge 71.

The mixing chamber 72 is also capable of use as a combined mixing and reservoir chamber. If desired, a third substance may be brought into contact with the substances from the cylinders by placing it in the mixing chamber before the extrusion step occurs. Such an application is shown in Fig. 1, wherein it will appear that a powdered deposit is on the interior wall of the mixing chamber near the outlet aperture 74, as indicated at 78. The mixing chamber may thus be used to present for mixing immediately before application any additional substance, such as a liquid, colloid, powder or tablet, intended to provide an additional medicament, catalyzer or other agent for the injection. Mixing of said additional material may, of course, be controlled as the materials from the cylinders, by selecting and varying the position of the mixing chamber 72.

The apparatus described is therefore capable of use in applying, orifically, for natural cavities such as the vagina, compounds prepared in several ways. For instance, materials from both cylinders, both cylinders and the mixing chamber, or either cylinder and the mixing chamber may be compounded before or upon injection, with or without previous contact each with the other.

An imperforate cap 79, Figs. 3 and 11, of rubber or other suitable material is provided for placing over the discharge end of the mixing chamber for the purpose of sealing the contents against drying, oxidation or contamination from the atmosphere, or any deterioration due to being exposed. The apparatus is thereby adapted to be used at intervals of time without emptying, and therefore convenient for use in cases where it is filled with several doses put up personally by the physician and intended to be returned for refilling after the elapse of several days' time.

Fig. 8 discloses a modified form of mixing chamber 81, adapted to be used in lieu of the chamber 72, wherein the lower or discharge end of the chamber is enlarged over the barrel portion to provide greater room for mixing.

Fig. 12 is illustrative of a modified form of the invention consisting of a delivery tube 82 having a single passage 83, communicating with two branches 84 and 86 and adapted to be connected by the rubber tubing 56 to the cylinders. On its opposite end, and in direct communication with the passage 82, is an integral mixing chamber 87. This structure is capable, in combination with the cylinders 22 and 23 and the flexible connection 56 preferably, of satisfactory use in lieu of the double or bi-passage tube 55 and variable mixing chamber 72 where the natures of the substances compounded permit their mixing shortly before application, and it is desired that they be extremely well mixed before extrusion.

The operation of the device is as follows: The chambers or cylinders 22 and 23 are preferably filled separately by removing the tubing 56 and connecting a short length of tubing to the cylinder first to be filled. The piston yoke 46 having been disconnected, the piston of said cylinder is pushed down to its fullest extent, and the tubing inserted into the mass of the material to be loaded. By withdrawing the piston its fullest extent, sufficient of the material is sucked up to completely fill the cylinder, and the operation is repeated with the material to fill the other

cylinder. The tubing 56 is then replaced to connect the tube 55 with the cylinders. For maximum filling, the tube 55, with the mixing chamber removed, is placed in the material and after the pistons are pushed down to expel the air from the passages of the Y-tube 55, the pistons are drawn up separately until the cylinders and their respective communicating passages are completely filled with the substances desired. If such is to be used, the third ingredient 78 is placed within the mixing chamber 72 and the latter placed on the tube 55 in the desired position for proper mixing. The yoke 46 is attached to the rods 30 and 31 between the collars 43 and 44. The syringe is then inserted into the vagina and the injection effected by manually pressing down on the yoke 46 to cause the pistons 34 to advance until they reach the first calibration 41 whereupon the proper dose will have been injected. The syringe may then be withdrawn and rinsed or sterilized externally and sealed by application of the cap 19, after which it is folded to the position shown in Fig. 3 and stored away.

The construction shown is particularly designed for the simultaneous application of equal amounts of any portion of liquids or colloids placed in the reservoir cylinders, which, upon contacting each with the other produce a gas, thereby increasing the volume of the original substances and aiding medicaments which may be incorporated therein to be driven or carried into small crevices or remote tissue areas by the pressure of the gas, to an extent which has not hitherto been possible with liquids. Not only does the gas formed constitute a vehicle or pump for the medicaments of the original substances, but in many instances it greatly increases the antiseptic or germicidal effectiveness of both solutions. For example, cylinder 22 could contain any well known acid like tartaric acid, and cylinder 23 an alkali like sodium carbonate. The two solutions or colloids containing these substances react upon contacting with each other and generate gas, and the resulting foamy material would be extruded through the outlet hole of the mixing chamber. Another example would be a solution of sodium perborate in one cylinder and citric acid in the other. The resulting combination, when brought together would produce hydrogen peroxide. It is to be understood that more complex compounds may be used in this manner, such that upon contact would generate chlorine and other known useful nascent gases. In other words, the double syringe disclosed is not intended solely for the mixing of two solutions which might contain substances to produce carbon dioxide or hydrogen peroxide, but for any solutions which when contacting each other will generate an appropriate gas.

Although the preferred embodiment of the invention described above discloses the use of two reservoir cylinders or storage chambers for the medicaments, it will be apparent that the apparatus may be constructed with more than two cylinders, as for instance, where it is desired that more than two medicaments be simultaneously expelled from the syringe, without departing from the spirit of the invention. In such a case, it will be understood that the syringe will preferably be equipped with an adaptor or delivery tube which may have more than two separate passages, or a number to correspond with the number of different medicaments or storage chambers being used.

Having described my invention in detail above, it is to be understood that I am not to be limited to the embodiments herein shown and described, but only by the scope of the appended claims.

What is claimed is:

1. The method of handling substances for medicinal treatment which consists in confining separately different liquids the natures of which are such as to cause them upon contact to chemically combine to form a gas, confining a still different material the nature of which is such as to cause it to chemically combine with the first-mentioned liquids, the said material being confined at a point predetermined and removed from the first-mentioned liquids, advancing the liquids while still confined in spaced planes along substantially parallel paths, bringing the liquids together adjacent to the predetermined point while still advancing them to permit mixing, permitting the liquids to mix with the material at the predetermined point and freeing the substances during mixing and while still advancing to permit release of the gas.
2. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially in parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a mixing chamber communicating with the reservoirs, and means for varying the capacity of the mixing chamber for controlling the mixing of the materials.
3. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially in parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a conduit communicating with both reservoirs, a mixing chamber communicating with the conduit, and means for varying the capacity of the mixing chamber for controlling the mixing of the materials.
4. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially in parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a conduit communicating with both reservoirs at one end, and having an outlet at the other end, a mixing chamber communicating with the conduit adjacent the outlet end, means for varying the capacity of the mixing chamber for controlling the mixing of the materials, and means for moving the materials from the reservoirs and through the conduit and the mixing chamber.
5. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially in parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a conduit one end of which communicates with both reservoirs, a mixing chamber communicating with the other end of the conduit, means for varying the capacity of the mixing chamber for controlling the mixing of the materials, and means for simultaneously moving equal quantities of the materials from the reservoirs and through the conduit and the mixing chamber.
6. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially in parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a tubular mixing chamber communicating with the reservoirs and having a central outlet, and means for varying the capacity of the mixing chamber for controlling the

mixing of the materials prior to their extrusion through the outlet.

5 7. A portable vaginal syringe consisting of a pair of reservoirs, a surrounding reinforcing element for maintaining said reservoirs in rigid alignment and adapted to be held in one hand during use, a delivery tube adapted to extend from the reservoirs, and a flexible tube substantially intermediate the device and communicating with the reservoirs and the delivery tube whereby the delivery tube may be folded toward the reservoirs.

8. In a syringe for compounding medicinal substances, a plurality of reservoirs arranged substantially parallel for containing reactable substances adapted to be mixed to produce a predetermined effect, a conduit communicating with both reservoirs at one end and having an outlet adjacent the other end, an elastic mixing chamber communicating with the conduit adjacent the outlet end, and means for moving the materials from the reservoirs and through the conduit and mixing chamber.

HAROLD G. JOHNSON.