Jan. 20, 1959 L. A. ORSTEN ET AL 2,869,542

UNIVERSAL ASPIRATING SYRINGE FOR LONG AND SHORT CARTRIDGES

Filed Feb. 1, 1957

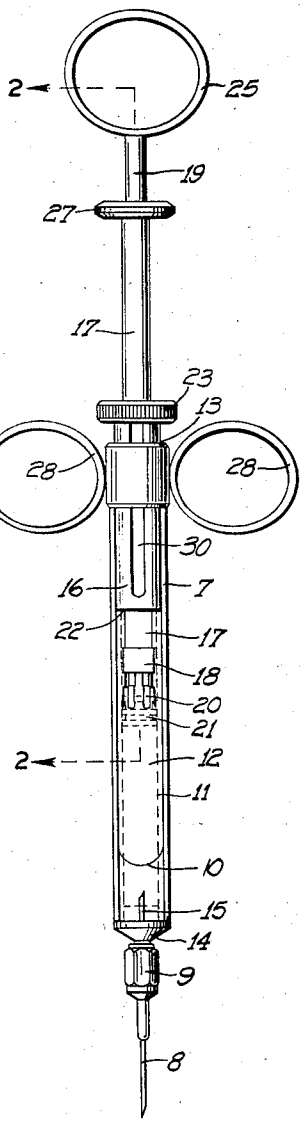

FIG. 1.

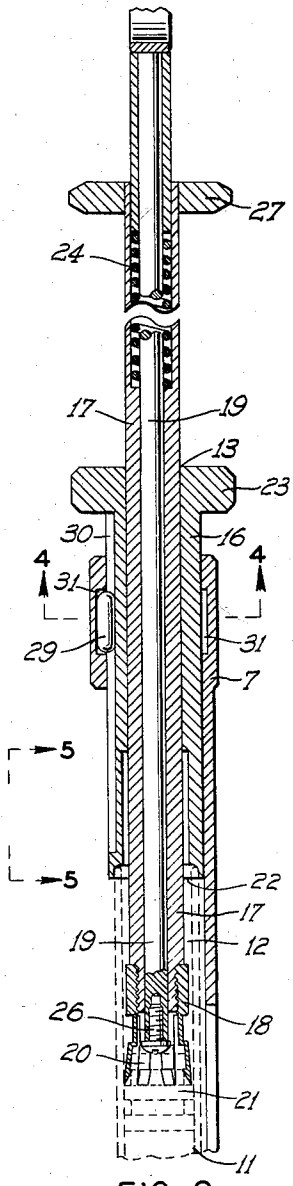

FIG. 2.

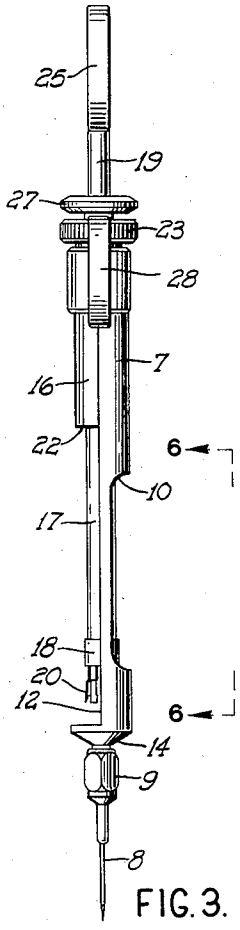

FIG. 3.

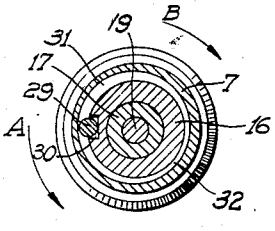

FIG. 4.

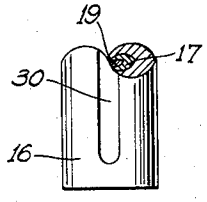

FIG. 5.

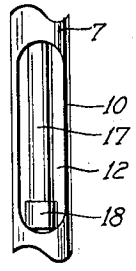

FIG. 6.

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United States Patent Office

2,869,542

Patented Jan. 20, 1959

2,869,542

UNIVERSAL ASPIRATING SYRINGE FOR LONG AND SHORT CARTRIDGES

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Application February 1, 1957, Serial No. 637,650

9 Claims. (Cl. 128—218)

Generally speaking, the present invention relates to the hypodermic syringe art and, more particularly, relates to an improved aspirating syringe which is cooperable for use with long and short cartridges.

Applicants are aware of the fact that prior art hypodermic syringe devices have been developed heretofore and that such prior art hypodermic syringe devices are disadvantageous for numerous reasons. Most of the prior art syringe arrangements are adapted to only inject and the doctor or nurse thus must be doubly cautious not to inject those serums or medicines which cannot be injected into the bloodstream. To be absolutely sure that the hypodermic needle is not in a vein or artery the doctor or nurse must aspirate. In should be noted in reference to the prior art aspirating syringes that these devices are not adjustable and are adapted to take only certain size cartridges or ampules. Thus, there may be two or three prior art hypodermic syringes of the same type in a doctor's office, all of which are essentially the same with the only distinction among them being the cartridge carrying capacity. Not only is this economically wasteful, but it is also time consuming and indirectly leads to disorganization and waste of medicine. Another disadvantageous feature of the prior art aspirating hypodermic syringes is the inadequate and easily disengageable piston engaging member which, because of its design, tends to become easily disengaged, especially with repeated use. Conversely, the prior art piston engaging members are relatively difficult to put into operation, especially if the piston engaging member is of the corkscrew type and the piston is hard or of a material which easily tears. Mounting of the cartridge in the prior art hypodermic syringe is generally a problem and easy and rapid ingress and egress from the prior art arrangements are not usually possible.

The present invention was developed primarily to overcome the aforementioned problems and, generally speaking, can be said to be an aspirating syringe which is cooperable for use with long and short cartridges and comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end (with or without a hypodermic needle attached thereto), an eccentric radial groove on the inside diameter of said open end of the body; rotatably lockable and longitudinally slidable lock bushing means which is cooperable for adjustably locking a cartridge within said cartridge chamber; a spring biased plunger which is cooperable for aspirating and injecting; a slidable hollow sleeve having a chuck attached with respect thereto and with said sleeve being mounted within the lock bushing means and with the plunger being slidably mounted within the sleeve. The chuck is expandable and includes a plurality of flexible wedge-shaped terminals which are cooperable for removably gripping the piston of a cartridge. A bearing mounted between a longitudinal groove on the lock bushing means and the eccentric radial groove, is cooperable for frictionally locking the lock bushing means upon rotation towards the point of minimum eccentricity. Finger gripping means are affixed with respect to the body and a thumb engaging ring is provided at the apex of the plunger.

From the above description of basic and generic forms of the present invention, it will be apparent to those skilled in the art that virtually all of the hereinbefore mentioned prior art problems and/or disadvantages are substantially entirely eliminated, met and/or overcome in and through use of the present invention.

For example, it is obvious that various size cartridges can be rapidly and easily inserted into the cartridge chamber, and that, when mounted therein, it is very firmly positioned with respect to the syringe in a manner which completely eliminates the likelihood that the cartridge may become accidentally disengaged.

With the above points in mind, it is an object of the present invention to provide a universal aspirating syringe for long and short cartridges including very easily lockable and unlockable, positive action, locking means of greatly improved characteristics.

It is a further object of the present invention to provide a universal aspirating syringe for use with various length cartridges and including an easily lockable and unlockable expandable chuck which is cooperable for removably gripping the piston of a cartridge.

It is a still further object of the present invention to provide a device of the character set forth in the preceding objects, which is inexpensive, simple, easy-to-operate and of virtually foolproof construction.

Other and allied objects will be apparent to those skilled in the art after a careful perusal, examination and study of the accompanying illustrations, the present specification, and the appended claims.

To facilitate understanding, reference will be made to the hereinbelow described figures, in which:

Fig. 1 is a front elevational view of the universal aspirating syringe with the device set for a short cartridge (shown in broken lines) and with the expandable chuck gripping the outside diameter of the piston (shown in broken lines for reasons of clarity);

Fig. 2 is a sectional view of the present invention taken along the lines 2—2 in Fig. 1 and reveals the spring biased plunger and the locking means, with the plunger shown partly in elevation;

Fig. 3 is a side elevational view of the present invention showing the plunger and the sleeve fully extended;

Fig. 4 is a transverse sectional view taken along the lines 4—4 in Fig. 2 and partly shows the eccentric radial groove of the body;

Fig. 5 is a fragmentary view, partly top plan and partly sectional, taken along the lines 5—5 in Fig. 2 and shows the longitudinal groove of the lock bushing means;

Fig. 6 is a fragmentary view taken along the lines 6—6 in Fig. 3 and looking at the sleeve through the slotted window of the body.

Generally speaking, the universal aspirating syringe of the present invention comprises a body 7 having at one end a hypodermic needle 8 secured in place by a threaded nut 9, and having a slotted window 10 for viewing the contents of cartridge 11 carried in the cartridge chamber 12, as best shown in Fig. 1.

The body 7 has, in the particular example illustrated in Fig. 3, a substantially semi-cylindrical, open cartridge chamber 12 which is cooperable for accommodating cartridges 11 of various sizes and is open so as to facilitate ingress and egress therefrom, a hollow open end 13, and a hypodermic needle end 14.

The cartridge 11 is inserted into the chamber 12 and the lock bushing means 16 is slidably moved so as to abut the top of the cartridge 11 and the sleeve 17, which has

a chuck 18 mounted thereto, is slidably moved into position by means of the plunger 19 and then the chuck 18 is slidably moved into the inside of the cartridge 11 and with the wedge-shaped terminals 20 of the expandable chuck 18 being slidably moved forward until the flexible, longitudinally split terminals 20 are wedged around the piston 21 of the cartridge 11 thus firmly and removably gripping the piston 21 for injection and retraction. The sealed end 15 of the cartridge 11 is then fully seated in the chamber 12 thereby causing the needle 8 to penetrate the sealed end 15 and permitting access to the contents therein; whereupon the lock bushing means 16 is rotated either to the left or to the right, as indicated by the arrows A or B in Fig. 4, so as to removably lock the cartridge 11 therein.

The lock bushing means 16 is hollow, as best shown in Fig. 2, has an open end 22 and an enlarged head 23, and is cooperable for adjustably locking the cartridge 11 within the cartridge chamber 12.

The plunger 19 is slidably mounted within the sleeve 17 and the sleeve 17 in turn is slidably mounted within the lock bushing 16. The plunger 19 has spring biasing means 24 which is cooperable for maintaining the plunger 19 in a retracted position, as shown in Fig. 2. The plunger 19 has a thumb engaging ring 25 at the top thereof and a detent screw 26 at the opposite end; the detent means 26 being cooperable for preventing disengagement from the sleeve 17. By pushing downward (thereby compressing the spring 24) on the plunger 19 and firmly holding the flange 27 of the sleeve 17 the chuck 18 becomes disengaged from the piston 21, whereupon pressure may be released from the spring 24 and the plunger 19 fully retracts into the sleeve 17.

Twin finger gripping means comprising finger grips 28 are affixed with respect to the body 7 and cooperate with the thumb engaging ring 25 to facilitate the retraction and injection of the plunger 19. Thus the plunger ring 25 controls both the retraction and the injection of the plunger 19.

A lock bearing 29 is cooperable with a groove 30 and an eccentric radial groove 31 for frictionally locking the lock bushing means, as best illustrated in Figs. 2, 4, and 5. The frictional bearing 29 is journalled between the longitudinal groove 30 of the lock bushing 16 and an eccentric radial groove 31 and is cooperable for frictionally locking the lock bushing 16 upon rotation of the bushing 16 towards the point of minimum eccentricity 32. The longitudinal groove 30 runs almost the entire length of the bushing 16, as best shown in Fig. 2, and the eccentric radial groove 31 is recessed into the inside diameter of the open end 13 of the body 7, as best illustrated in Figs. 2 and 4. The bushing 16 may be frictionally locked either to the left or to the right.

It should be noted that the term "cartridge" refers to a cartridge (commonly known as ampules) having a sealed end, is cooperable for insertion with respect to a hypodermic needle, a movable piston head at the opposite end, and with the cartridge generally containing serum of medicine of some sort.

Numerous modifications and variations of the present invention will occur to those skilled in the art after a careful study hereof. All such properly within the basic spirit, scope and/or teachings of the present invention are intended to be included and comprehended herein as fully as if specifically described, illustrated and claimed.

For example, it is obvious that the chuck and the locking means of the present invention may be modified substantially so as to fall within the scope of the present invention. It is also readily apparent that the spring is not absolutely vital on all embodiments of the present invention and that the cartridge chamber may also be substantially modified in conformity with the spirit of the present invention.

The exact compositions, configurations, constructions, relative positionings, and cooperative relationships of the various component parts of the present invention are not critical, and can be modified substantially within the spirit of the present invention.

The embodiments of the present invention specifically described and illustrated herein are exemplary only, and are not intended to limit the scope of the present invention, which is to be interpreted in the light of the prior art and the appended claims only, with due consideration for the doctrine of equivalents.

We claim:

1. An aspirating syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end; said cartridge chamber being cooperable for receiving different size cartridges; said open end of said body being at least partly eccentric on the inside diameter thereof; longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber; a spring biased plunger having gripping means at one end and detent means at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve; an expandable chuck, attached with respect to said sleeve, having a plurality of flexible wedge-shaped terminals which are cooperable for removably gripping the piston of a cartridge; gripping means affixed with respect to said body.

2. An aspirating syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end; said cartridge chamber being cooperable for receiving different size cartridges; an eccentric radial groove on the inside diameter of said open end of said body; longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber; a spring biased plunger having gripping means at one end and detent means at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve; an expandable chuck, attached with respect to said sleeve, having a plurality of flexible wedge-shaped terminals which are cooperable for removably gripping the piston of a cartridge; a bearing mounted between said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means.

3. An aspirating syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end, said cartridge chamber being cooperable for receiving long and short cartridges; an eccentric radial groove on the inside diameter of said open end of said body; rotatably lockable and longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber; a plunger cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve; a chuck cooperable for engaging the piston of a cartridge; said lock bushing means having a groove thereon; a bearing mounted between said groove of said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means.

4. An aspirating syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end, said cartridge chamber being cooperable for receiving different size cartridges; an eccentric radial groove on the inside diameter of said open end of said body; rotatably lockable and longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means having an open end

and an enlarged head opposite said open end; a spring biased plunger having a thumb engaging ring at one end and detent means at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve, said sleeve having an open end and a flange at the opposite end; an expandable chuck, attached with respect to said open end of said sleeve, having a plurality of longitudinally sectioned, flexible wedge-shaped terminals which are cooperable for removably gripping the piston of a cartridge; said lock bushing means having a longitudinal groove on the outside diameter thereof; a bearing mounted between said longitudinal groove of said lock bushing means and said eccentric radial groove said bearing being cooperable for frictionally locking said lock bushing means upon rotation of said lock bushing means towards the point of minimum eccentricity, gripping means affixed with respect to said body.

5. An aspirating syringe, comprising: a body having a semi-cylindrical, open cartridge chamber, a hollow open end, and a hypodermic needle end, said cartridge chamber being cooperable for receiving different size cartridges; a recessed eccentric radial groove on the inside diameter of said open end of said body; rotatably lockable and longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means being substantially cylindrical and having an open end and an enlarged head opposite said open end; a spring biased plunger having a thumb engaging ring at one end and a detent screw at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve, said sleeve having an open end, adjacent said detent means, and a flange at the opposite end which is cooperable for abutment with said enlarged head of said lock bushing means; an expandable chuck, attached with respect to said open end of said sleeve, having a plurality of longitudinally sectioned, flexible wedge-shaped terminals which are cooperable for removably gripping the outside diameter of the piston of a cartridge; said lock bushing means having a longitudinal groove on the outside diameter thereof; a bearing mounted between said longitudinal groove of said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means upon rotation of said lock bushing means towards the point of minimum eccentricity, twin gripping means affixed with respect to said body.

6. An aspirating hypodermic syringe, comprising: a cylindrical body having a semi-cylindrical, open cartridge chamber, a hollow open end, and a hypodermic needle end; a hypodermic needle attached with respect to said hypodermic needle end; said cartridge chamber being cooperable for receiving long and short cartridges; a recessed eccentric radial groove on the inside diameter of said open end of said body; rotatably lockable and longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means being substantially cylindrical and having an open end and an enlarged head opposite said open end; a spring biased plunger having a thumb engaging ring at one end and a detent screw at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve, said sleeve having an open end, adjacent said detent means, and a flange at the opposite end which is cooperable for abutment with said enlarged head of said lock bushing means; an expandable chuck, attached with respect to said open end of said sleeve, having a plurality of longitudinally sectioned, flexible wedge-shaped terminals which are cooperable

for removably gripping the outside diameter of the piston of a cartridge; said lock bushing means having a longitudinal groove on the outside diameter thereof; a bearing mounted between said longitudinal groove of said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means upon rotation of said lock bushing means towards the point of minimum eccentricity, finger gripping means affixed with respect to said body.

7. An aspirating hypodermic syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end; a hypodermic needle attached with respect to said hypodermic needle end; an eccentric radial groove on the inside diameter of said open end of said body; said cartridge chamber being cooperable for receiving long and short cartridges; longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means having an open end and an enlarged head opposite said open end; a plunger cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve; a chuck cooperable for engaging the piston of a cartridge, said lock bushing means having a groove on the outside diameter thereof; a bearing mounted between said groove of said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means; gripping means affixed with respect to said body.

8. As aspirating hypodermic syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end; a hypodermic needle attached with respect to said hypodermic needle end; an eccentric radial groove on the inside diameter of said open end of said body; said cartridge chamber being cooperable for receiving different size cartridges; longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means being substantially cylindrical and having an open end and an enlarged head opposite said open end; a spring biased plunger having a thumb engaging ring at one end and detent means at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with said plunger being slidably mounted within said sleeve, said sleeve having an open end and a flange at the opposite end; an expandable chuck, attached with respect to said sleeve, having a plurality of flexible wedge-shaped terminals which are cooperable for removably gripping the piston of a cartridge; said lock bushing means having a longitudinal groove on the outside diameter thereof; a bearing mounted between said longitudinal groove of said lock bushing means and said eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means upon rotation of said lock bushing means towards the point of minimum eccentricity; finger gripping means affixed with respect to said body.

9. An aspirating hypodermic syringe, comprising: a body having an open cartridge chamber, a hollow open end, and a hypodermic needle end; a hypodermic needle attached with respect to said hypodermic needle end; a recessed eccentric radial groove on the inside diameter of said open end of said body; said cartridge chamber being cooperable for receiving long and short cartridges; rotatably lockable and longitudinally slidable, hollow lock bushing means cooperable for adjustably locking a cartridge within said cartridge chamber, said lock bushing means being substantially cylindrical and having an open end and an enlarged head opposite said open end; a spring biased plunger having a thumb engaging ring at one end and a detent screw at the other end and cooperable for aspirating and injecting; a slidable hollow sleeve mounted within said lock bushing means and with

said plunger being slidably mounted within said sleeve, said sleeve having an open end, adjacent said detent means, and a flange at the opposite end which is cooperable for abutment with said enlarged head of said lock bushing means; an expandable chuck, attached with respect to said open end of said sleeve, having a plurality of longitudinally sectioned, flexible wedge-shaped terminals which are cooperable for removably gripping the outside diameter of the piston of a cartridge; said lock bushing means having a longitudinal groove on the outside diameter thereof; a bearing mounted between said longitudinal groove of said lock bushing means and said

eccentric radial groove, said bearing being cooperable for frictionally locking said lock bushing means upon rotation of said lock bushing means towards the point of minimum eccentricity; twin finger gripping means affixed with respect to said body.

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