Aug. 29, 1933. A. E. DRAKE 1,924,916

APPLICATOR

Filed March 17, 1931

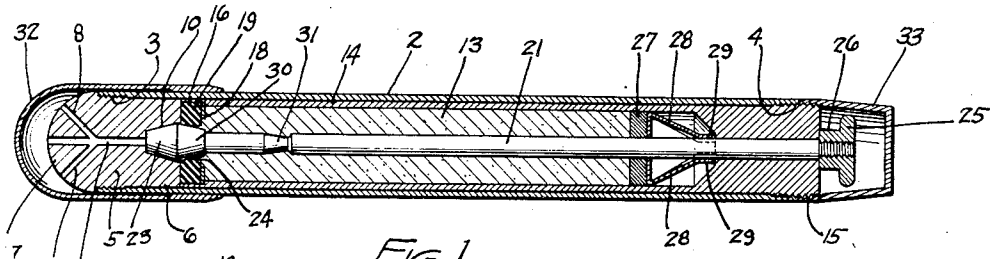

FIG. 1

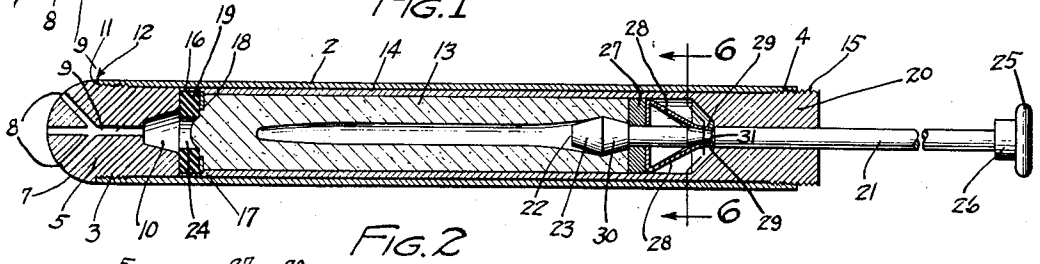

FIG. 2

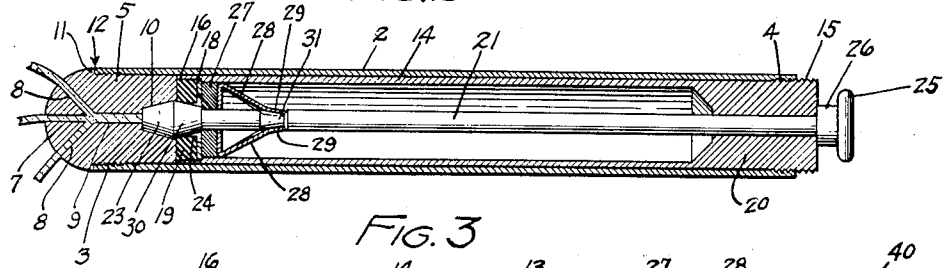

FIG. 3

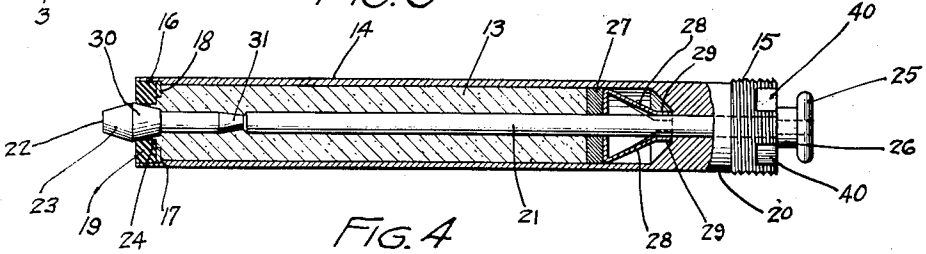

FIG. 4

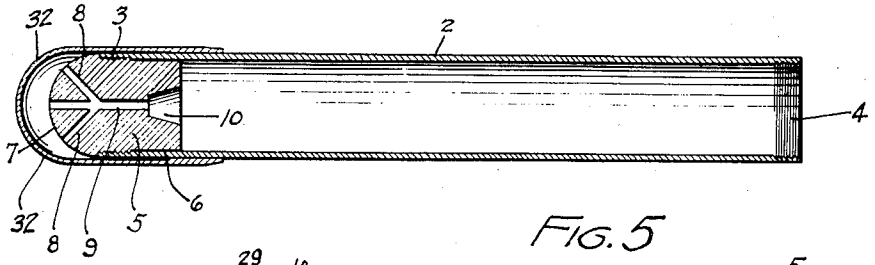

FIG. 5

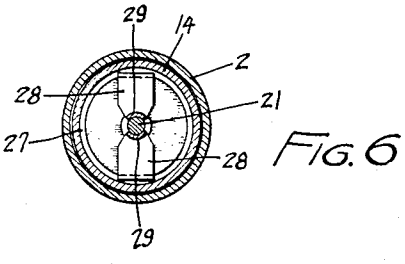

FIG. 6

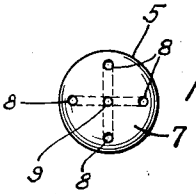

FIG. 7

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APPLICATOR

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Application March 17, 1931. Serial No. 523,218

14 Claims. (Cl. 128—226)

This invention relates to new and useful improvements in applicators or instruments of the general character adapted for use in the treatment of diseases and other ailments of various organs of the human body.

An object of the invention is to provide an applicator comprising a hollow body portion adapted to receive a cartridge filled with a suitable medicament, preferably of a gelatinous nature, said cartridge being provided with means for expelling the medicament therefrom and projecting it through a plurality of perforations provided at one end of said body portion whereby when the latter has been inserted into an opening or a canal of the human body, and said expelling means is actuated, the medicament will be discharged from the cartridge into said opening or canal.

A further object is to provide an instrument of the class described, comprising a sealed cartridge adapted to contain a suitable germicidal, jelly-like medicament, and having embodied in the construction thereof, a device whereby the medicament may be expelled from the cartridge.

A further object is to provide an applicator comprising a cartridge having a piston mounted therein and normally loosely connected with an actuating rod disposed within the cartridge, said actuating rod having one end protruding from the cartridge whereby it may be operated, and the cartridge being filled with a suitable medicament and having its discharge end normally closed and sealed to the atmosphere, and said actuating rod and piston being provided with co-operating means for automatically permanently securing the piston to the rod, when the rod is axially moved in one direction, and, whereby when the rod is moved in the opposite direction, the medicament in the cartridge will be expelled therefrom.

A further object is to provide an applicator comprising a hollow body provided at one end with a perforated closure or head, and adapted to receive a non-refillable, sealed cartridge containing a suitable medicament, said cartridge having means therein for expelling the medicament therefrom and forcing it through the passages in said perforated closure and into an opening in the human body into which the instrument may have been inserted, and the construction of the cartridge being such that when once it has been emptied of its contents, it is rendered useless for further use, and is therefore discarded, thereby making it necessary to use a new fresh cartridge each time the applicator is used.

Other objects of the invention reside in the simple and inexpensive construction of the instrument whereby it may be manufactured at small cost, and whereby it may be readily and easily cleaned after use; in the construction of the sealed cartridge which positively prevents leakage of the contents therefrom when handling; in the arrangement of the piston and operating rod within the cartridge, whereby the latter may be loaded and sealed with the operating rod positioned in the position assumed when it has been actuated to expel the medicament from the cartridge; in the means provided for sealing the discharge end of the cartridge; in the unitary structure of the cartridge and its unloading mechanism; in the means provided at the end of the operating rod for retaining it in normal inoperative position; and in the construction of the tubular body whereby a loaded cartridge may be carried therein, when the instrument is not in use, and said body being provided with suitable end caps adapted to completely conceal the cartridge supported therein, and whereby the instrument may be conveniently carried about in a pocket or a small case.

Other objects of the invention will appear from the following description and accompanying drawing and will be pointed out in the annexed claims.

In the accompanying drawing, there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawing:

Figure 1 shows the improved instrument with a loaded cartridge positioned therein, and the enclosing caps secured to each end of the cylindrical body;

Figure 2 shows the instrument with the caps removed and the operating rod retracted to cause the piston to automatically become connected therewith;

Figure 3 shows the operating rod pushed forwardly and the medicament expelled from the cartridge and projected from the multiple orifices provided at one end of the instrument;

Figure 4 shows a loaded cartridge before being inserted into the casing or tubular body, and the condition in which the cartridges are supplied to the patient or user;

Figure 5 is a view showing the casing only, one cap and the cartridge having been removed therefrom;

Figure 6 is a cross sectional view on the line 6—6 of Figure 2, showing the means for connecting the piston with the operating rod; and

Figure 7 is an end view of Figure 2.

The novel applicator or instrument featured in this invention comprises an outer cylindrical casing or body portion 2, provided with suitable

internal threads 3 and 4 at its ends, as shown. A suitable head 5 has a cylindrical portion 6 inserted into the front end of the casing 2, and the head is secured thereto by means of the threads 3, the head being provided with corresponding threads adapted to engage the threads 3 in the casing.

The tip or forward face 7 of the head 5 is preferably semi-spherical in conformation, as shown, and a plurality of radially disposed ducts 8 are provided in said tip which communicate with a central passage 9 connecting said ducts with a frustum-shaped counterbore 10, provided at the inner end of the head 5. The diameter of the tip of the spherical head 5 is substantially equal to the outside diameter of the casing 2 so as to provide on the head 5, an annular shoulder 11 adapted to engage the end of the casing 2, as shown at 12. It will thus be seen that the joint 12 between the shoulder 11 of the head and the end of the casing 2, will be substantially flush and smooth, as clearly shown in Figures 2 and 3.

An important feature of this invention resides in the construction of the cartridge in which the medicament 13 is contained, as shown in Figures 1, 2, and 4. This medicament is preferably of a jelly-like, gelatinous nature. The cartridge comprises a shell 14, cylindrical in cross section and of a diameter adapted to be slidably received within the casing 2, as shown in Figures 1, 2, and 3, and a breech portion 20. Suitable external threads 15 are provided in the breech 20 of the cartridge adapted to engage the threads 4 at the rear end of the casing 2, whereby the cartridge may be secured in position within the casing. The rear portion of the breech 20 may be provided with a plurality of flat faces 40 to facilitate screwing it into and out of the casing 2. The overall length of the cartridge is such that when the forward end thereof engages the inner face of the head 5, the breech will protrude from the rear end of the casing 2, as shown in Figures 2 and 3.

The forward end of the cartridge shell 14 is provided with a counter bore 16, the diameter of which is relatively larger than the inside diameter of the shell 14, whereby an annular shoulder 17 is provided against which an annular washer or ring member 18 is adapted to be seated. A suitable flexible packing 19, preferably of rubber, and in the shape of a relatively thick washer, is inserted into the counterbore 16 of the shell 14 and seats against the ring 18, as shown.

An operating rod 21 is mounted for reciprocal movement within the cartridge 14 and has at its forward end, an enlarged tip 22 which preferably is shaped as shown in Figures 1, 2, 3, and 4, or as two opposed frustums. The terminal portion 23 of the tip 22 is adapted to traverse an aperture 24 provided in the packing washer 19. The tip 22, however, passes through and projects beyond the washer 19 so as to be received in the frustum-shaped counterbore 10 of the head 5, as shown in Figures 1 and 3. The diameter of the tip 22 at its greatest dimension is slightly more than the diameter of the aperture 24 in the packing 19, so that when the tip 22 is forced through the packing, the aperture 24 must slightly expand, whereby the joint between the tip 22, and the walls of the aperture 24 of the packing 19 is sealed against leakage, when the operating rod 21 is in the position shown in Figures 1, 3, and 4. The operating rod is provided at its opposite end with a finger grip 25, here shown having a hub 26, the inner face of which is adapted to seat against the breech of the cartridge, when the operating rod is in the position shown in Figures 3 and 4. When thus positioned, the rear tapered portion 30 of the tip 21 will, because of its engagement with the walls of the bore 24, cause a slight axial pull to be exerted upon the rod 21 in a direction towards the head 5 of the casing 2, which will thereby cause the rod to be firmly held in the position shown in Figure 4. The above described action also operates to retain the packing washer 19 in the position shown in Figures 1 and 4.

The means for expelling the medicament from the cartridge consists of a piston 27, of a suitable material, having a snug sliding fit within the bore of the cartridge shell 14. The piston 27 has secured thereto, a pair of rearwardly extending flexible arms 28, preferably of spring metal, having their terminals 29 bent inwardly and curved to substantially fit the periphery of the rod 21, as shown in Figure 6. An annular groove 31 is provided in the operating rod 21 towards the forward end thereof adapted to receive the terminals 29 of the arms 28, when the operating rod 21 is retracted or drawn rearwardly to the position shown in Figure 2. The rear ends of the arms 28 are normally seated against the breech or bottom of the bore of the cartridge 14, so that when the operating rod 21 is pulled backwardly, it will slide through the piston and between the terminals 29 of the arms 28, until the inner end of the tip 22 of the rod engages the front face of the piston 27, at which time the annular groove 31 will also register with the terminals 29 of the arms 28 so that they will snap into position in said groove as shown in Figures 2 and 3. When the arms 28 of the piston thus become engaged with the operating rod 21, the piston 27 will be secured thereto and cannot again be disconnected therefrom without destroying or ruining the cartridge. It will thus be seen that each time the instrument has been used to expel the contents from a cartridge, a new cartridge must be used before the instrument can again be used. The cartridge cannot be refilled and must be discarded after use.

Suitable enclosing caps 32 and 33 are provided at the front and rear ends of the instrument, respectively, as shown in Figure 1, the front cap 32 preferably being secured to the casing 2 by friction, and the rear cap 33 being secured in position by reason of its threaded engagement with the protruding rear end portion or breech 20 of the cartridge, as shown in Figures 2 and 3. When the caps 32 and 33 are secured to the ends of the cylindrical casing 2, the instrument, as a whole, including a loaded cartridge, provides a very neat and compact instrument which may be conveniently carried about in a pocket or hand bag.

When the instrument is assembled as shown in Figure 1, the forward portion 23 of the tip 22 of the operating rod 21, will be seated in the correspondingly shaped counterbore 10 provided at the inner end of the head 5, thereby closing the central passage 9 in the head 5. When thus positioned, the tip 22 of the rod will also cooperate with the packing washer 19 to positively prevent leakage of the medicament from the interior of the cartridge. It will thus be seen that a double seal is provided for preventing leakage of the medicament from the instrument when the latter is not in use. The engagement of the rear tapered portion 30 of the tip 22 with the walls of the packing washer 19, also prevents leakage of the medicament from the cartridge when the latter is not supported within the casing 2, as shown in Figure 4.

The instrument as sold, will consist of the outer cylindrical casing 2, including the head 5 and enclosing caps 32 and 33, and perhaps several cartridges, it being understood that each cartridge is used but once, and is thereafter discarded. The outer casing 2 and caps 32 and 33 are constructed from a suitable material such, for example, as bakelite or hard rubber, which is light in weight and provides a very neat appearance.

When the instrument is to be used, the caps 32 and 33 are removed from the cylindrical casing or body 2, and the forward end thereof inserted into the opening of the human body, requiring treatment. The operating rod 21 is then withdrawn or pulled backwardly from the position shown in Figure 1 to that shown in Figure 2, whereupon the arms 28 of the piston will, because of the resilient nature of the material from which they are made, snap into engagement with the annular groove 31 of the rod, and thus automatically operatively secure the piston to the rod, so that the rod cannot be longitudinally translated without imparting a similar movement to the piston. The rod 21 is then pushed gently forwardly in a direction towards the head 5 of the casing 2, whereby the medicament is expelled from the cartridge and is forced through the multiple passages 8 of the head 5, and into the opening or canal of the human body, in which the instrument may be inserted. When the piston reaches the position shown in Figure 3, the cartridge will have been emptied of its contents, and may then be removed from the casing 2, and thrown away or discarded, as it cannot be refilled by the user for further use.

It will readily be seen from the construction of the cartridge, that once it has been emptied of its contents by use, it cannot again be refilled by the user and carried in a closed or sealed position, because of the fact that the resilient arms of the piston permanently secure the piston to the operating rod 21 in such a manner that it cannot be detached from the rod without destroying either the cartridge shell or the operating rod. This provides a very desirable construction in that a physician will be in a position to advise the use of any one of several set formulas, which will be compiled for the treatment of specific diseases and other ailments, with the knowledge that the prescribed dosage will be absolutely uniform and standard. It also makes it practically impossible for a patient to experiment with the use of other medicaments in this device. The instrument is neat, compact, small in size, and is leak-proof, and may therefore be conveniently carried about by the user or patient, in a pocket or small hand bag, as will be readily understood by reference to Figure 1.

I claim as my invention:

1. An instrument of the class described, comprising a casing provided at one end with a suitable discharge passage, a cartridge adapted to be fitted into said casing and having a discharge opening adapted to register with the discharge passage of the casing, a member for normally sealing the discharge opening of said cartridge whereby the latter may contain a suitable gelatinous medicament, a piston normally positioned within one end of the cartridge, and means for automatically and inseparably connecting said piston to said member, when the latter is moved in one direction, whereby the medicament in the cartridge may be expelled therefrom through the passage provided at the end of said casing.

2. An instrument of the class described comprising a casing having a head at one end thereof provided with a plurality of discharge passages, a cartridge adapted to contain a suitable medicament independently of said casing, means for securing the cartridge within said casing, a piston within said cartridge for expelling the medicament therefrom, a member also mounted in said cartridge for actuating said piston to cause it to expel the medicament from the cartridge, and resilient means for operatively connecting the member to the piston.

3. An instrument of the class described comprising a casing having a head at one end thereof provided with a discharge passage, a cartridge adapted to contain a suitable medicament independently of said casing, means for securing the cartridge within said casing, a piston within said cartridge for expelling the medicament therefrom, a member also mounted in said cartridge for operating said piston to cause it to expel the medicament from the cartridge, resilient means for operatively connecting the member to the piston, when the member is moved in one direction, and means at one end of said member adapted to form a closure for the discharge end of the cartridge before use.

4. An instrument of the class described, comprising a casing adapted to receive a cartridge, said cartridge including a shell adapted to contain a suitable medicament, said shell having a discharge opening at the end thereof, a piston mounted in the cartridge at the opposite end thereof, an operating rod for the piston having a portion received in said discharge opening to provide a closure therefor, and means for inseparably securing said piston to said rod, when the latter is moved in a direction to open the discharge opening of the cartridge and whereby, when the rod is moved in the opposite direction, the piston will be operated to expel the medicament from the cartridge and said casing.

5. An instrument of the class described, comprising a casing adapted to receive a cartridge, said cartridge including a shell adapted to contain a suitable medicament, a packing at one end of the shell provided with a discharge opening, a piston mounted in the cartridge, an operating rod for the piston having an enlarged tip adapted to be received in the aperture in said packing to provide a closure therefor, and means for automatically inseparably securing said piston to said rod, when the latter is moved in a direction to open the discharge opening of the cartridge and whereby, when the rod is moved in the opposite direction, the piston will be operated to expel the medicament from the cartridge and said casing.

6. An instrument of the class described comprising a hollow tubular body provided at one end with a head having a discharge passage therein and provided with a frustum-shaped socket communicating with said passage, a cartridge adapted to be inserted in said hollow body and having a chamber therein adapted to contain a suitable medicament, a flexible element at one end of the cartridge having a discharge opening therein registering with the socket in said head, a piston mounted in the chamber of the cartridge at the opposite end thereof, an operating rod for the piston traversing the breech of the cartridge and said piston and extending lengthwise through said chamber, an enlarged tip on said operating rod having oppositely disposed inclined faces, one of which is adapted to be positioned in the discharge opening in said flexible

element to seal the chamber in said cartridge, and the other of said inclined faces projecting beyond said element and adapted to be received in said tapered socket to seal the passage through the head.

7. An instrument of the class described comprising a hollow tubular body provided at one end with a head having a discharge passage therein provided with a frustum-shaped socket communicating with said passage, a cartridge adapted to be inserted in said hollow body and having a chamber therein adapted to contain a suitable medicament, a flexible element at the discharge end of the cartridge having a discharge opening therein registering with the socket in said head, a piston mounted in the chamber of the cartridge at the opposite end thereof, an operating rod for the piston traversing the breech of the cartridge and said piston and extending lengthwise through said chamber, an enlarged tip on said operating rod having oppositely disposed inclined faces, one of which is adapted to be positioned in the discharge opening in said flexible element to seal the chamber in said cartridge, and the other of said inclined faces normally projecting beyond said element and adapted to be fitted into said tapered socket to seal the passage through the head, and means for automatically permanently securing the piston to the rod, when the latter is moved in one direction, such movement of the rod also opening the discharge of the chamber to the atmosphere whereby, when the operating rod is moved in the opposite direction, the piston will be actuated to expel the medicament from the chamber and project it from the passage in said head.

8. A cartridge having a chamber therein, provided at one end with a discharge opening and adapted to contain a suitable medicament, a member mounted in said chamber and normally positioned adjacent to the opposite end thereof, a stem traversing said member and chamber and having a portion adapted to be positioned in said discharge opening to seal the chamber, and resilient means for automatically securing said member to the stem when the latter is moved in one direction.

9. A cartridge having a chamber therein, provided at one end with a discharge opening and adapted to contain a suitable medicament, a member mounted in said chamber and normally positioned adjacent to one end thereof, a stem traversing one end of the cartridge and said member and extending lengthwise through said chamber, an enlarged tip on the stem adapted to be received in said discharge opening to seal the chamber, and cooperating spring elements on said member engageable with a shoulder on said stem for securing the member to the stem, when the latter is moved in one direction, and whereby the member may be actuated to expel the medicament from said chamber.

10. A non-refillable cartridge having a chamber therein, provided at one end with a discharge opening and adapted to contain a suitable medicament, a piston mounted within said chamber adjacent to the opposite end thereof, an operating rod mounted within the chamber and traversing said piston and the breech of the cartridge, the terminal of said rod being adapted to be received in said discharge opening to seal the chamber, an annular groove in the rod, and resilient means on said piston adapted to engage said groove and permanently secure the piston to the rod, when the latter is moved in one direction, and whereby the piston may be actuated to expel the medicament from the chamber.

11. A non-refillable cartridge having a chamber therein adapted to contain a suitable medicament, a flexible packing provided at one end of the chamber and having a discharge opening therein, a member mounted in said chamber and normally positioned adjacent to the opposite end thereof, a stem traversing said member and chamber and having an enlarged tip adapted to be engaged with the walls of said discharge opening to seal the chamber, and means for automatically permanently securing said member to the stem when the latter is moved in one direction.

12. A non-refillable cartridge having a chamber therein provided at one end with a discharge opening and adapted to contain a suitable medicament, a member mounted in said chamber and normally positioned adjacent to one end thereof, a stem traversing one end of the cartridge and said member and extending lengthwise through said chamber, an enlarged tip on the stem adapted to be received in said discharge opening to seal the chamber, said tip extending beyond the end of said cartridge, and cooperating means on said member and said stem for securing the member to the stem when the latter is moved in one direction, whereby the member may be actuated to expel the medicament from said chamber, said means including a pair of oppositely disposed resilient arms having portions adapted to grip said stem.

13. A cartridge comprising a cylindrical hollow body open at one end, a flexible packing inserted in the open end of said hollow body and having a discharge opening therein through which a material contained in said hollow body may be discharged, a piston mounted in said hollow body and normally positioned adjacent to the opposite end thereof, and an operating rod traversing the breech of the cartridge and said piston and having an enlarged terminal tip provided with oppositely disposed inclined faces, the diameter of said tip at the juncture of said inclined faces being slightly greater than the diameter of the discharge opening in said packing whereby, when the tip is inserted in said discharge opening to seal the chamber, the walls of said opening will yield.

14. A cartridge comprising a cylindrical hollow body open at one end, a flexible packing inserted in the open end of said hollow body and having a discharge opening therein through which a material contained in said hollow body may be discharged, a piston mounted in said hollow body adjacent to the opposite end thereof, an operating rod traversing the breech of the cartridge and said piston and having an enlarged terminal tip adapted to be received in the discharge opening in said packing, said tip being provided with oppositely disposed inclined faces, one of which is normally positioned in said discharge opening to seal the chamber, the engagement of said inclined face with the walls of said discharge opening tending to secure the rod in its normal position.

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