Sept. 13, 1938. S. M. LEWIS 2,130,305

APPLICATOR

Filed Feb. 20, 1937

Fig. 1.

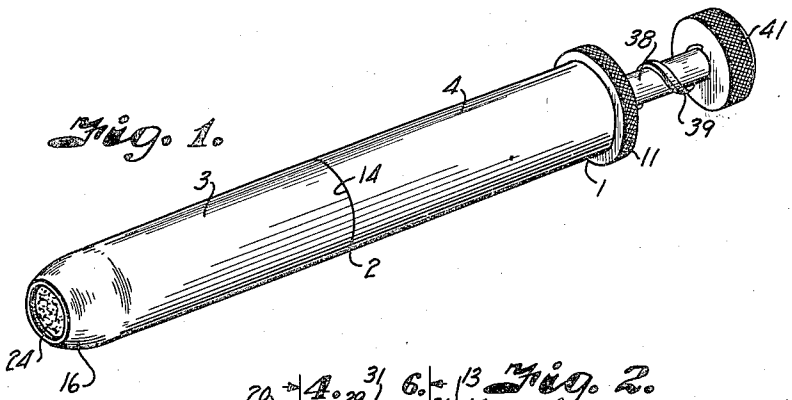


Fig. 2.

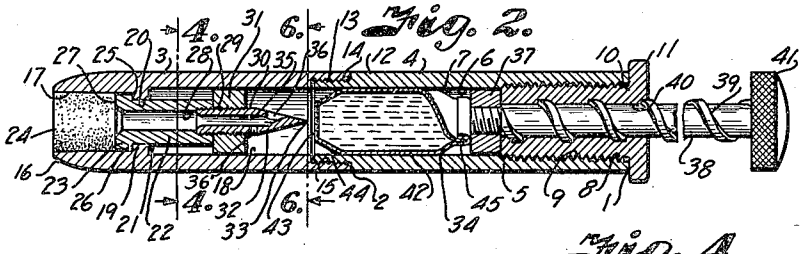


Fig. 4.

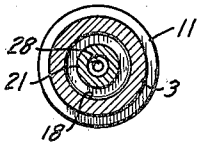


Fig. 3.

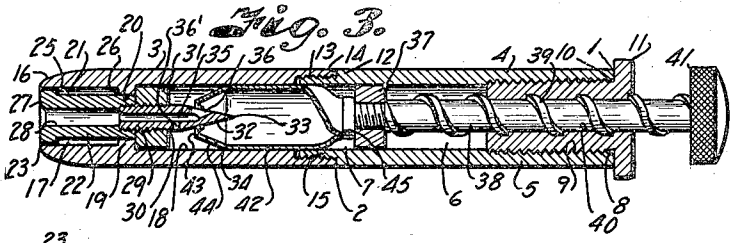


Fig. 5.

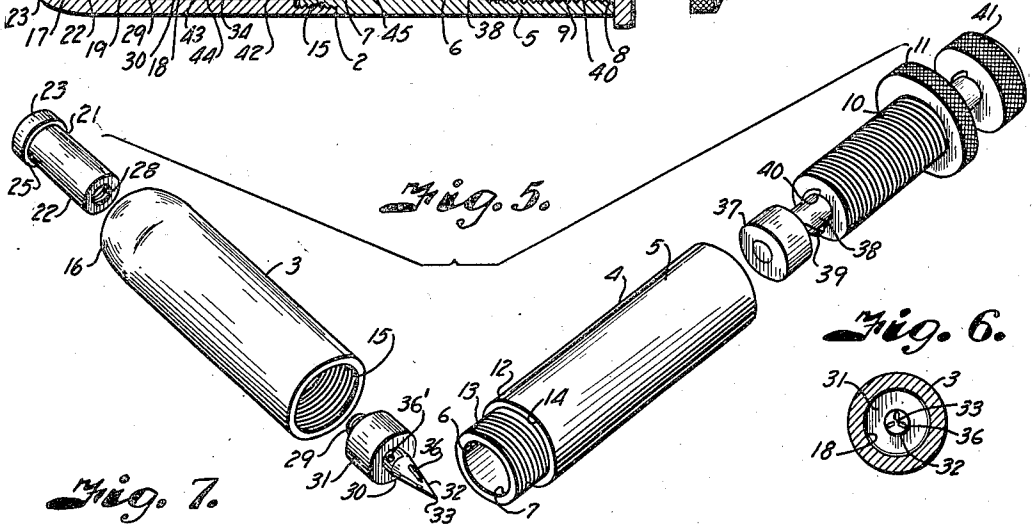


Fig. 6.

Fig. 7.

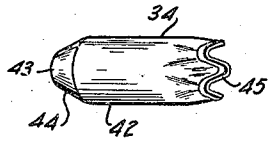


Fig. 8.



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APPLICATOR

Sidney M. Lewis, St. Joseph, Mo.

Application February 20, 1937, Serial No. 126,816

11 Claims. (Cl. 128—260)

This invention relates to applicators, and particularly to those for injecting separate medicaments into body cavities wherein the medicaments are rendered effective incidental to their chemical union or interdecomposition.

It is the principal object of the invention to provide an applicator of this character constructed for substantially simultaneous injection of the separate medicaments so that reaction takes place immediately upon introduction into a body cavity to be treated.

Other objects of the invention are to provide a simple and relatively inexpensive applicator construction; to provide an applicator which is of compact form and relatively small dimensions; to provide an applicator capable of injecting separate chemicals, one in tablet or capsule form, and the other in capsule form to contain sufficient fluid to effect desired reaction of the chemicals; to provide an applicator which is readily loaded with the separate chemicals and kept ready for use; to provide against accidental discharge of the applicator when loaded; and to provide an applicator that is readily cleaned and kept in sanitary condition.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective view of an applicator constructed in accordance with the present invention.

Fig. 2 is a longitudinal sectional view through the applicator, which is loaded with separate medicaments or chemicals preparatory for use.

Fig. 3 is a similar sectional view showing the applicator after the tablet has been ejected and just prior to collapse of the capsule.

Fig. 4 is a cross-section through the applicator on the line 4—4 of Fig. 2.

Fig. 5 is a detail perspective view of the parts of the applicator, shown in disassembled spaced relation to better illustrate their construction.

Fig. 6 is a cross-section through the applicator on the line 6—6 of Fig. 2.

Fig. 7 is a detail perspective view of a capsule element adapted for use in the applicator.

Fig. 8 is a perspective view of the tablet element used in the applicator.

Referring more in detail to the drawing:

1 designates an applicator constructed in accordance with the present invention, and which is shown as including a barrel 2, consisting of nozzle and body portions 3 and 4. The body portion 4 of the barrel includes a tube 5, having an axial bore 6 forming a capsule containing compartment 7 at one end thereof. The opposite end 8 of the bore is internally threaded, as at 9, to accommodate a threaded plug 10 for closing that end of the barrel. The threaded plug 10 has a flanged head 11 that is adapted to seat against the end of the tube to form a substantially fluid-tight joint. The opposite end 12 of the tube has a reduced threaded neck 13 forming an annular stop shoulder 14 to mount the nozzle portion 3 of the barrel. The nozzle 3 includes a cylindrical section, conforming to the outer diameter of the body portion 4, and has an internally threaded socket 15 to engage the threaded neck. The forward end of the nozzle is slightly rounded, as indicated at 16, to permit ready entrance of the barrel into a body cavity.

Formed at the forward end of the nozzle is a cylindrical socket 17, having a slightly tapering annular wall, flaring outwardly toward the end of the nozzle. The opposite end of the nozzle has a cylindrical bore 18 of slightly larger diameter than the socket 17, and terminating short thereof to provide an internal, annular rib or stop flange 19 forming a bearing or guide opening 20 for an ejector 21. The ejector 21 includes a cylindrical body 22 of suitable diameter to be freely slidable in the opening 20 and has a flanged head 23 on its forward end to slidably engage in the socket 17 to expel a medicament, which in the illustrated instance is in the form of a tablet. The head 23 cooperates with the body portion of the ejector to form a stop 25 adapted to engage the outer face 26 of the internal stop flange 19. The body portion of the ejector is of sufficient length to project within the bore 18 a distance substantially equal to the length of the tablet 24, so that when the ejector is moved to its forward most position the face 27 of the head aligns with the forward end of the nozzle. The body portion of the ejector is provided with an axial bore or drainage channel 28, extending therethrough, and threaded in the rear end thereof is a threaded shank 29 of a puncturing device 30.

The puncturing device 30 is of sufficient length to mount a washer-like guide 31 that is threaded on the shank 29, and is of sufficient outer diameter to be freely slidable in the bore 18. The guide is threaded against the end of the body portion of the ejector to lock the puncturing device against relative rotary movement in the ejector. The guide forms a stop for engagement with the inner face of the flange 19 to prevent displacement of the ejector from the open end of the

nozzle. The puncturing device has a cone-shaped forward end 32 to provide a point 33 that is adapted to puncture the end of the capsule 34, as later described. The puncturing device has a central channel 35, communicating with the channel 28, and has inlet ports 36 formed in the periphery of the cone adjacent the point thereof and through which liquid in the capsule drains for discharge through the channel of the ejector after expulsion of the tablet. The base portion of the cone is provided with side ports 36' leading into the channel 35. These openings are located at approximately the point where the end of the capsule engages the pin when the capsule has been pushed thereover to its fullest extent, thereby allowing for complete drainage of the capsule. The ports 36' are relatively small so that the tube will not catch upon the edges thereof. For these reasons two or more of these ports may be provided to permit quick emptying of the capsule.

Slidable in the bore 6 is a piston type plunger 37, having a shank or stem 38 equipped with a spiral thread 39 that is engageable in a threaded opening 40 of the plug 10. When the plunger is in retracted position, or engaging the plug 10, the stem projects from the end of the plug a sufficient distance to provide the desired movement of the plunger in the barrel to effect puncture and partial collapse of the capsule and displacement of the tablet. The outer end of the stem carries a knob 41 whereby the stem may be rotated to reciprocate the plunger. The tablet 24 conforms in shape to the socket 17 and has a slightly tapered peripheral surface to wedge slightly within the socket.

The capsule 34 is best illustrated in Fig. 7, and includes a tube 42 formed of a relatively thin, soft material capable of being readily punctured by the point 33 of the puncturing device. The bottom or forward end of the capsule includes a central flat portion 43 that is engaged by the point 33, and the periphery thereof is slightly bevelled, as at 44. The opposite or fill end of the capsule is crushed together and closed by a clip 45, and the clip is shaped as shown in Fig. 7, so that the ends thereof are brought within the confines of the cylindrical portion of the tube as clearly shown in Fig. 7.

In using an applicator constructed as described, the nozzle portion 3 is unscrewed from the body portion 4, and the plunger is retracted to its innermost position by rotating the knob 41 in a counter-clockwise direction. A filled capsule 34 is then inserted in the chamber 7, with the clipped end thereof abutting against the plunger 37. The nozzle, carrying the ejector, is then screwed onto the body portion, after which a tablet is inserted in the socket 17. When the medicaments are thus inserted they are located in tandem and separated by the ejector. The device is then inserted in the body cavity and the knob 41 rotated in a clockwise direction to cause the capsule to be moved against the point of the puncturing device to effect penetration of the point into the body of the capsule and partial collapse thereof. The tablet provides sufficient resistance to support the ejector in puncturing position, however, as soon as the point has entered the interior of the capsule, the ejector is moved in a forward direction incidental to continued rotation of the knob to expel the tablet. The puncturing device enters the capsule a sufficient distance so that the ports 36' in the cone 32 thereof are in direct communication with the interior of the capsule. The liquid in the capsule then drains through the openings 36 and ports 36' and through the channels 35 and 28 into the body cavity. The liquid, upon contacting the tablet, reacts therewith to produce the desired chemical reaction directly at the point where they are introduced.

After use of the applicator, the parts are in the position shown in Fig. 3, with the empty capsule lying partly within the bore 18 and partly within the chamber 7. The nozzle is then unscrewed from the body portion to permit removal of the empty capsule. After use the device is readily cleansed, and refilled preparatory to subsequent use.

From the foregoing it is obvious that I have provided an applicator which is effective in substantially simultaneous injection of the separate medicaments, so that reaction takes place immediately upon introduction into a body cavity. It is also obvious that the applicator is of compact form, and is adapted to be loaded with separate chemicals or medicaments and kept ready for use without danger of accidental discharge owing to the threaded engagement of the rod with the plug closing the rear end of the barrel. It is also obvious that the ejector not only provides for positive displacement of the tablet, but also provides for drainage of the liquid contained in the capsule.

What I claim and desire to secure by Letters Patent is:

1. A device of the character described, including a barrel having a medicament containing socket, an ejector slidable in the barrel to effect ejection of medicament contained in said socket, a compartment in the barrel for housing a frangible capsule containing a fluid adapted to react with the medicament, and means in the barrel for effecting disruption of the capsule and ejection of the medicament by the ejector.

2. A device of the character described, including a barrel having a medicament containing socket and a capsule containing compartment, an ejector slidable in the barrel to effect ejection of the medicament contained in said socket, a puncturing device on the ejector, and a plunger in the barrel for effecting movement of the capsule against the puncturing device to effect puncture of the capsule and ejection of the medicament contained in said socket.

3. A device of the character described, including a barrel comprising interconnected body and nozzle portions, said nozzle portion having a socket for containing a tablet, means in the nozzle portion for ejecting the tablet from the socket, puncturing means in the barrel, said body portion having a capsule containing compartment, and means in the body portion for moving the capsule in said compartment against the puncturing means to effect drainage of the capsule and expulsion of the tablet.

4. A device of the character described, including a barrel comprising interconnected body and nozzle portions, said nozzle portion having a socket for containing a tablet, an ejector slidable in the nozzle portion for ejecting the tablet from the socket, a puncturing device on the ejector and having a port communicating with a port in the ejector, said body portion having a capsule containing compartment, and a plunger in the body portion for moving a capsule in said compartment against the puncturing device to effect drainage of the capsule through said ports and expulsion of the tablet by said ejector.

5. A device of the character described, includ-

ing a barrel having a medicament containing socket, an ejector slidable in the barrel to effect ejection of medicament contained in said socket, a compartment formed in the barrel in axial alignment with said socket for housing a frangible capsule containing a fluid adapted to react with the medicament, a plunger in the barrel for effecting disruption of the capsule and ejection of the medicament by the ejector, and an actuator for the plunger having threaded engagement with the barrel.

6. A device of the character described, including a barrel having a medicament containing socket and a capsule containing compartment, an ejector slidable in the barrel to effect ejection of the medicament contained in said socket, a cone-shaped puncturing device on the ejector having a drainage channel communicating with a channel in the ejector, and a plunger in the barrel for effecting movement of the capsule against the puncturing device to effect puncture of the capsule and ejection of the medicament contained in said socket.

7. A device of the character described, including a barrel comprising interconnected body and nozzle portions, said nozzle portion having a socket for containing a tablet, an ejector movable in the nozzle portion for ejecting the tablet from the socket, a puncturing device on the ejector and having ports communicating with a port in the ejector, said body portion having a capsule containing compartment in alignment with the socket, a plunger in the body portion for moving the capsule against the puncturing device to effect drainage of the capsule through said ports and expulsion of the tablet by said ejector, and means for limiting movement of the ejector.

8. A device of the character described, including a barrel for supporting in tandem a medicament in tablet form and a capsule containing a medicament adapted to react with the tablet, an ejector movably supported in said barrel between the tablet and capsule, capsule puncturing means in the barrel, and means in the barrel for effecting puncture of the capsule and movement of the ejector to effect expulsion of the tablet.

9. A device of the character described, including a barrel for supporting in tandem a medicament in tablet form and a capsule containing a liquid adapted to react with the medicament, an ejector interposed between the tablet and capsule, means on the ejector for puncturing the capsule, and means movable in the barrel for moving the capsule in puncturing relation with the puncturing means and for moving the ejector in the barrel to eject the tablet.

10. A device of the character described, including a barrel having a medicament containing socket, an ejector slidable in the barrel to effect ejection of the medicament contained in the socket, a puncturing device on the ejector having a cone-shaped point provided with a port adjacent said point and a side port adjacent the base of the cone, means supporting a capsule in the barrel in puncturing relation with said point, and a plunger slidable in the barrel and engageable with the capsule to effect puncture of the capsule, ejection of the medicament, and drainage of the capsule through said ports.

11. A device of the character described, including a barrel for supporting in tandem a medicament in tablet form and a capsule containing a medicament adapted to react with the tablet, an ejector movable in the barrel between the tablet and capsule, a cone-shaped puncturing device on the ejector having a drainage channel communicating with an aligning drainage channel in the ejector and provided with ports adjacent the point and base of the cone respectively communicating with said channels, and means in the barrel for effecting puncture and collapse of the capsule including expulsion of the tablet by said ejector.

SIDNEY M. LEWIS.