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AMPOULE SYRINGE

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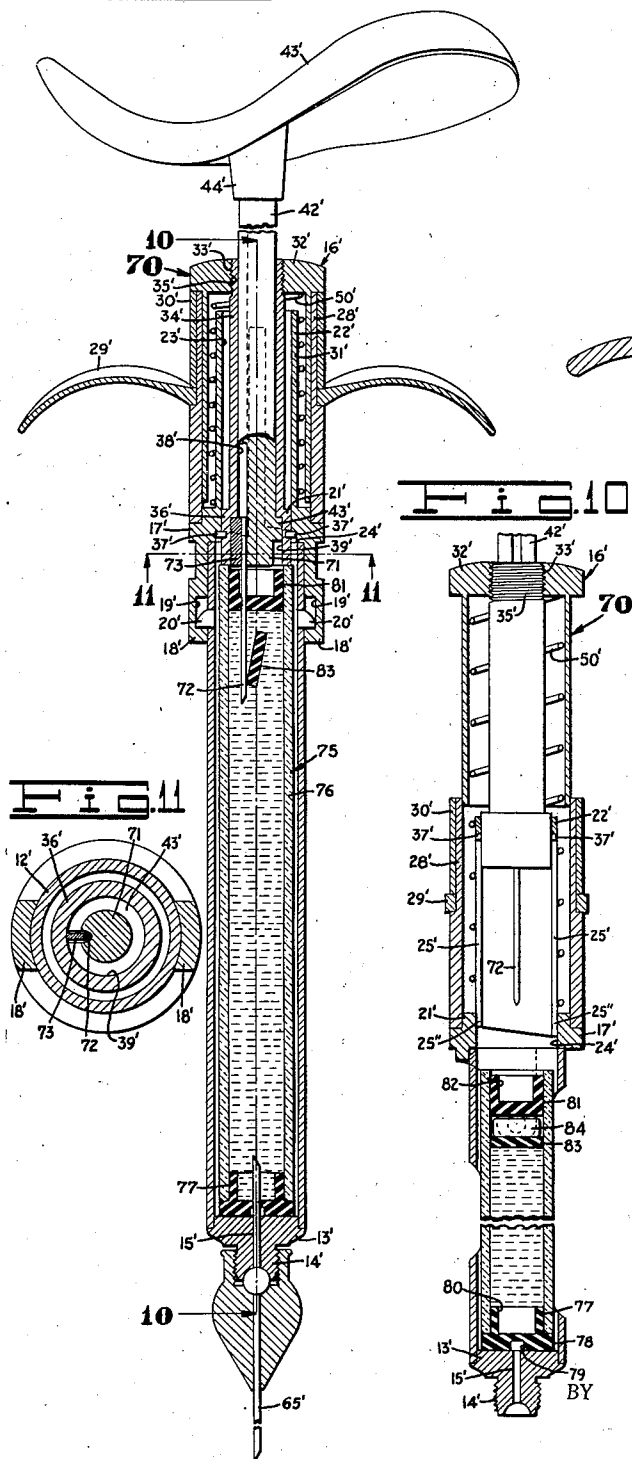


Fig. 12

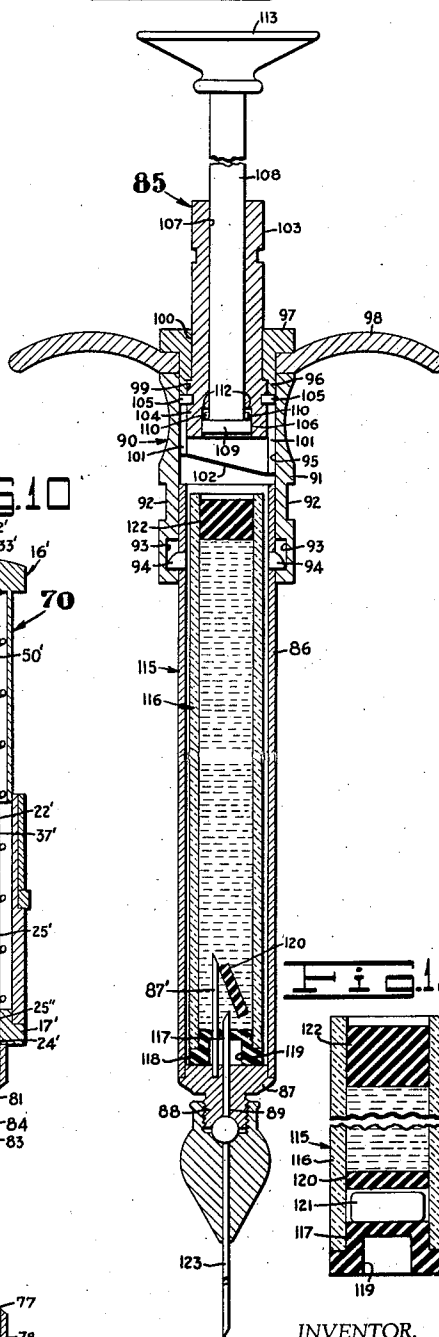


Fig. 12



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AMPOULE SYRINGE

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9 Claims. (Cl. 128—218)

This invention relates to syringes.

The general object of the invention is to provide a novel syringe of the ampoule type which is adapted for making fresh solution prior to injection.

A more specific object of the invention is to provide a novel syringe barrel closure member.

A further object of the invention is to provide a novel plunger construction for an ampoule syringe.

Another object of the invention is to provide a novel rear member for a syringe wherein a portion of the rear member is normally urged outwardly.

A further object of the invention is to provide a novel hand grip for use on an ampoule.

Other objects and the advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a central longitudinal sectional view showing my improved syringe member and ampoule;

Fig. 2 is a reduced fragmentary side elevation of the syringe shown in Fig. 1 showing the head member in open position;

Fig. 3 is a fragmentary section taken on line 3—3, Fig. 1 showing the head member in an extended position and before it is turned;

Fig. 4 is an enlarged section taken on line 4—4, Fig. 1;

Fig. 5 is a fragmentary section similar to Fig. 1 showing the plunger rod forcing the ampoule topper forwardly;

Fig. 6 is an enlarged fragmentary section through the upper end of the plunger rod and palm grip;

Fig. 7 is an enlarged fragmentary central section through an ampoule such as used in connection with the syringe shown in Fig. 1;

Fig. 8 is a section taken on line 8—8, Fig. 7;

Fig. 9 is a view similar to Fig. 1 showing a modified form of syringe and ampoule.

Fig. 10 is a fragmentary section, with part shown in full lines and with the needle removed, taken on line 10—10, Fig. 9;

Fig. 11 is an enlarged section taken on line 11—11, Fig. 9;

Fig. 12 is a central longitudinal sectional view showing a further modified form of syringe and ampoule;

Fig. 13 is an enlarged fragmentary central section through an ampoule such as used in connection with the syringe shown in Fig. 12.

Referring to the drawings by reference characters I have indicated my improved syringe

generally at 10. As shown the syringe 10 includes a barrel portion 12 the lower portion of which includes a tip member 13. The tip 13 includes a reduced threaded portion 14 and has a reduced aperture 15 therethrough.

The syringe 10 further comprises a head member 16 which includes a base portion 17 (see Fig. 2) having depending ears 18 thereon which are recessed as at 19 to receive pivot pins 20 on the barrel 12. The base 17 further includes a short reduced hub portion 21 (Fig. 1) and an elongated reduced tubular portion 22 having an aperture 23 therein opening into a recess 24 (Fig. 4) in the lower end of the base. The portion 22 has opposed slots 25 therein which extend to recessed portions 25' in the hub and base and open into the recess 24.

The top of the recess 24 is inclined upward from the side of one recess 25 to the side of another recess to provide cam surfaces as indicated at 26.

Mounted on the base 17 and surrounding the hub 21 I provide a sleeve member 27 which includes a reduced upper portion 28.

Surrounding the reduced portion 28 I provide a finger grip member 29 and surrounding the portion 28 above the grip member I provide a sleeve 30.

Slidably mounted within the sleeve 27 I provide a tubular member 31, the interior diameter of which is greater than the external diameter of the portion 22. The tubular member 31 includes a head portion 32 which extends over the ends of the reduced portion 28 and the sleeve 30 and has a central threaded aperture 33 therein.

Positioned in the portion 22 I provide a shank member 34 the upper portion of which is threaded as at 35 to engage the threads 33 in the head 32. At the opposite end the shank 34 includes an enlarged head portion 36 which has opposed extending pins 37 thereon which in one position engage the cam surfaces 26 as shown in Fig. 1 and in another position are positioned in the slots 25 of the portion 22.

The shank 34 has a coaxial aperture 38 therein which opens into an enlarged recess 39 in the head 36. Coaxial with the aperture 38 I provide a small bar or pin 40 which is secured to the head 36 by a thin web member 41.

Positioned in the shank aperture 39 I provide a plunger rod 42 having at the lower end an enlarged plunger head 43 thereon of a size to fit within the recess 39 of the head 36. The opposite end of the rod 42 has a palm grip member 43 thereon which includes a depending hub portion 44.

As shown in Fig. 6 the hub portion 44 has an open bottomed recess 45 therein in which the rod 42 is positioned. Within the recess 45 the rod 42 has a groove 46 therearound and a plurality of 5 opposed upwardly extending recesses 47.

The hub 44 has a pair of opposed pins 48 therein which extend into the recess 45 and are adapted in one position to be positioned in the groove 46 and in another position to be positioned in the recesses 47. The upper end of the rod 42 is spaced from the top of the recess 45 and therebetween I provide a coiled spring 49.

Positioned within the tubular member 31 and surrounding the reduced portion 22 I provide a 10 coiled spring 50 which at the lower end engages the reduced portion 21 of the base 17 and at the upper end engages the head portion 32 and resiliently urges the tubular member 31 and the shank 34 upwardly.

In Fig. 7 I have indicated generally at 51 an ampoule such as is adapted to be used in the syringe 10. As shown the ampoule 51 includes an elongated hollow cylindrical glass body portion 52 closed at the lower end by a rubber stopper 53 which includes an enlarged flange portion 54 extending over the lower end of the body 52. Opening through the bottom thereof the stopper 53 has a coaxial recess 55 therein and opening through the top it has a coaxial recess 56 therein 30 the recesses 55 and 56 being spaced apart.

The upper end of the ampoule body 52 is closed by a rubber stopper 57 positioned therein. Opening through the bottom thereof the stopper 57 has a recess 58 therein which is closed by a trap door 59 integrally connected to the body of the stopper as at 60 (see Fig. 8). Opening through the top thereof the stopper 57 includes a coaxial recess 61 the bottom of which is spaced from the top of the recess 58. Positioned in the recess 40 58 I provide a medicinal tablet 62 and in the ampoule body 52 between the plug 53 and the stopper 57 I provide a liquid vehicle.

To load the syringe 10 an operator rotates the palm grip 43 so that the pins 48 enter the recesses 47 and continues to rotate the member 43 45 until the pins 37 enter the slots 25 whereupon the spring 50 moves the tubular member 31 and the shank 34 upward to the position shown in Fig. 3. Thereafter the head member 16 is swung 50 about the pivots 20 to one side as shown in Fig. 2.

An ampoule 51 is then positioned in the syringe barrel 12 and the head member 16 is swung upward to a position coaxial with the barrel as shown in Fig. 3. Thereafter the operator grasps the head 55 portion 32 and moves it downward and then rotates it whereupon the engagement of the pins 37 with the cam surfaces 26 move the head 36 into firm engagement with the upper end of the ampoule body 52 as clearly shown in Fig. 1.

As the shank 34 is moved downward the pin 60 40 enters the recess 61 of the ampoule stopper 57 and punctures the partition between the recesses 61 and 58 and engages the medicinal tablet 62 and passes through it or forces it downward thereby forcing the trap door 58 to swing downward and causing the tablet 62 to pass into the liquid vehicle wherein it dissolves.

Thereafter the operator places a double ended 70 needle 65 on the tip 13 with the hub portion of the needle engaging the threads 14 on the tip. The upper portion of the needle 65 is positioned in the tip aperture 15 and extends through the partition between the plug recesses 55 and 56.

To inject the liquid in the ampoule the operator 75 moves the palm grip member 43 towards the

syringe barrel whereupon the head 43 of the rod 42 engages the stopper 57 and moves it downward as shown in Fig. 5 whereupon the stopper 51 acts as a piston and forces the liquid out through the double ended needle 65.

To unload the syringe the plunger is withdrawn from the ampoule and the palm grip is rotated as previously described. The pins 48 enter the recesses 47 thus turning the plunger to thereby release the member 27.

In Fig. 9 I have indicated a syringe generally at 70 which is similar in most respects to the syringe 10 and like portions thereof are indicated by similarly primed reference numbers. The plunger rod head 43' includes a reduced extended 15 portion 71 the purpose of which will be more fully explained hereinafter.

In place of the centrally located rod 40 of the syringe 10 the syringe 70 includes an offset rod 72 which is connected to the plunger rod head 20 43' by a web 73.

In Figs. 9 and 10 I have indicated generally at 75 an ampoule such as is adapted to be used in the syringe 70. As shown the ampoule 70 includes an elongated hollow cylindrical glass body 25 portion 76 closed at the lower end by a rubber stopper 77 which includes an enlarged flange 78 extending over the lower end of the body 76.

Opening through the bottom thereof the stopper 77 includes a coaxial recess 79 therein and opening through the top it has a coaxial recess 80 30 therein, the recesses 79 and 80 being spaced apart. The upper end of the ampoule body 76 is closed by a rubber stopper 81 having an open topped recess 82 therein.

Within the ampoule body 76 and spaced below the stopper 81 a predetermined distance I provide a rubber disk-like partition 83 and positioned between the stopper and the disk I provide a medicinal tablet 84. 40

The space within the ampoule body 76 between the disk 83 and the stopper 77 is filled with a liquid vehicle.

The loading and unloading of the syringe 70 is similar to that previously described in connection with the syringe 10.

After the ampoule 75 has been positioned in the syringe barrel 12' as the head member 32' is moved towards the ampoule, the rod 72 enters the stopper recess 82 and passes through the lower 50 portion thereof and contacts the medicinal tablet 84 either puncturing it or pushing it towards the opposite end and in so doing on one side of the center of the disk 83 and swings the disk downward thereby allowing the liquid vehicle to contact and dissolve the medicinal tablet.

In Fig. 12 I have indicated generally at 85 a syringe which includes a barrel portion 86 the lower end of which includes a tip member 87. The tip includes a reduced threaded portion 88 60 and has a reduced aperture 89 therein. The tip 87 further includes an upwardly extending bar 87' which is positioned to one side of the aperture 89.

The syringe 85 further includes a head member 65 90 which includes a base portion 91 having depending ears 92 thereon which are recessed as at 93 to receive pivot pins 94 on the barrel 86.

The head member 90 has a coaxial aperture 95 therethrough in which a sleeve member 96 is 70 positioned.

The sleeve member 96 includes an enlarged flange portion 97 which is spaced a predetermined distance above the top of the head member and positioned in the space between the flange 97 and 75

the head member I provide a finger grip member 98.

The sleeve 96 has a coaxial recess 99 therein opening through the bottom thereof and a reduced aperture 100 communicating with the recess and opening through the top. The side walls of the sleeve have a pair of opposed elongated apertures 101 therein opening into the recess 99 and through the bottom of the sleeve. The lower end of the sleeve 96 is inclined from the side of one recess 99 to the side of the other recess to provide cam surfaces as indicated at 102.

Positioned in the aperture 100 I provide a shank member 103 which includes an enlarged head 104 positioned in the recess 99.

The head 104 has opposed extending pins 105 therein which in one position of the head 104 are positioned in the apertures 101 and in another position of the head engage the cam surfaces 102.

The head 104 has a coaxial open bottomed recess 106 therein and the shank 103 has a coaxial aperture 107 therein which opens through the top thereof and communicates with the head recess 106.

Positioned in the aperture 107 I provide a plunger rod 108 the lower end of which includes an enlarged head portion 109 which in one position of the plunger rod 108 is positioned in the recess 106. Above the head 109 the plunger rod 108 has a pair of opposed extending pins 110 therein which in one position of the plunger rod are positioned in opposed recesses 112 in the head 104. The end of the plunger rod 108 opposite the head 109 has an enlarged head 113 thereon.

In Fig. 13 I have indicated my improved ampoule generally at 115, an ampoule such as adapted to be used in syringe 85. As shown the ampoule 115 includes an elongated hollow cylindrical glass body portion 116 closed at the lower end by a rubber stopper 117 which includes an enlarged flange portion 118 extending over the lower end of the body 116. Opening through the bottom thereof the stopper 117 has a coaxial recess 118 therein.

Within the ampoule body 116 and spaced above the stopper 117 a predetermined distance I provide a rubber disk-like partition 120 and positioned between the stopper and the disk I provide a medicinal tablet 121.

The upper end of the ampoule body 116 is closed by a rubber stopper 122 positioned within the body adjacent the upper end of the ampoule. The space in the ampoule body between the disk 120 and the stopper 122 is filled with a liquid vehicle.

To load the syringe 85 an operator rotates the plunger rod 108 so that the pins 110 enter the recesses 112 and continues to rotate the plunger rod until the pins 105 enter the apertures 101 and then pulls the plunger rod and shank 103 upward to the position shown in Fig. 12. Thereafter the head member 90 is swung about the pivots 94 to one side.

An ampoule 115 is then placed in the syringe barrel 86 with the stopper 118 directed towards the tip 87. The ampoule is moved towards the tip 87 until it engages the upper face of the tip. As the ampoule is thus moved the bar or pin 87' enters the stopper recess 119, then punctures the stopper and either engages or punctures the tablet 121 and with the pressure on one side of the disk swings the disk 120 to one side allowing the liquid vehicle to contact and dissolve the medicinal tablet 121.

After the ampoule is positioned in the syringe barrel the head member 90 is again swung to an

aligned position with the barrel 86 and then the shank 103 is moved downward until the pins 105 move out of the apertures 101 and then rotates it whereupon the engagement of the pins 105 with the cam surfaces 102 move the head 104 into firm engagement with the upper end of the ampoule body.

Thereafter the operator places a double ended needle 123 on the tip 87 with the hub portion of the needle engaging the threads 88 on the tip. The upper portion of the needle 123 is positioned in the tip aperture 89 and extends through the stopper 117 into the ampoule body.

To inject the liquid in the ampoule the operator moves the plunger rod 108 towards the ampoule until the plunger rod head 109 engages the ampoule stopper 122 whereupon continued similar movement of the plunger rod forces the stopper 122 towards the tip 87 and forces the liquid in the ampoule out through the needle 123.

From the foregoing description it will be apparent that I have provided a novel hypodermic syringe which is simple in construction and highly efficient in use.

Having thus described my invention, I claim:

1. In a hypodermic syringe, a barrel having a front portion and a rear member thereon, a head member slidable on the rear member into and out of the barrel, a plunger slidable through the rear member and through said head member, a pin mounted on said head member and independent of the plunger, said plunger being grooved to slidably receive the pin and means normally urging said head member outwardly along the barrel and away from the front portion.

2. In a hypodermic syringe, a barrel having a front portion and a rear member thereon, said rear member having a slidable head member thereon and movable into the barrel, a plunger slidable through the rear member and through said head, a pin mounted on said head and independent of said plunger, said pin being disposed at one side of the axis of said plunger, said plunger being grooved to slidably receive the pin, and means normally urging said head member outwardly in the barrel and away from the front portion.

3. In a hypodermic syringe, a barrel having a front portion and having a rear member thereon, a head member slidable on the rear member into and out of the barrel, a plunger slidable through the rear member and through said head member, said plunger having a flange thereon, a pin mounted on said head member and independent of the plunger, said pin being disposed at one side of the axis of said plunger, said plunger and said flange being grooved to slidably receive the pin and means normally urging said head member outwardly along the barrel and away from the front portion.

4. In a syringe, a barrel including a front portion adapted to receive a hypodermic needle, a rear member mounted on said barrel, a head member slidable in said rear member, said head member including a portion adapted to engage the end of an ampoule, rotatable cam means for forcing said head member against the ampoule, a plunger member slidable through said head member, a pin mounted on said head member and movable with the head member, said plunger having a slot therein receiving said pin, and resilient means normally urging said head member away from said ampoule.

5. In a syringe, a barrel including a front portion adapted to receive a hypodermic needle, a

rear member pivotally mounted on said barrel and movable from a closed position where it is across the end of the barrel to ampoule loading position at one side of the barrel, a head member 5
 5 slidable in said rear member, said head member including a portion adapted to engage an ampoule in the barrel, means to force said head member against the ampoule, a plunger member slidable through said head member, a pin mounted on 10
 10 said head member and movable with the head member, said plunger having a slot therein receiving said pin, and resilient means normally urging said head member away from said ampoule.

15 6. In a syringe, a barrel including a front portion adapted to receive a hypodermic needle, a rear member mounted on said barrel and movable from a closed position across the end of the barrel to an ampoule loading position at one 20
 20 side of the barrel, a head member slidable in said rear member, said head member including a portion adapted to engage the end of an ampoule, rotatable cam means for forcing said head member against an ampoule, a plunger member 25
 25 slidable through said head member, a pin mounted on said head member and movable with the head member, said plunger having a slot therein receiving said pin, resilient means normally urging said head member away from said ampoule 30
 30 and a hand grip member on the plunger for rotating the plunger and head member.

7. In a syringe, a barrel including a front portion adapted to receive a hypodermic needle, an ampoule in the barrel, said ampoule including a 35
 35 cork having a portion adapted to be pierced by the needle when the latter is placed on the front portion, a rear member mounted on said barrel, a head member slidable in said rear member, said head member including a portion adapted to 40
 40 engage the end of the ampoule, means operable to urge said head member against the ampoule, said ampoule having a cork therein and having a partition forming member associated with the cork to form a drug holding chamber, a plunger mem-

ber slidable through said head member, a pin mounted on said head member and movable with the head member to unseat the partition forming member to thereby free the drug from the chamber, and resilient means urging said head member 5
 5 away from said ampoule when the urging means is released.

8. In a syringe, a barrel including a front portion adapted to receive a hypodermic needle, an ampoule in the barrel, said ampoule including a 10
 10 cork having a portion adapted to be pierced by the needle when the latter is placed on the front portion, a rear member pivotally mounted on said barrel and movable from a closed position where 15
 15 it is across the end of the barrel to an open ampoule loading position at one side of the barrel, a head member slidable in said rear member, said head member including a portion adapted to 20
 20 engage the end of the ampoule, coacting cam means on said end member and said head member for urging said head member against the ampoule, 25
 25 said ampoule having a cork therein and having a partition forming member associated with the cork to form a drug holding chamber, a plunger member slidable through said head member, a 30
 30 pin mounted on said head member and movable with the head member to unseat the partition forming member to thereby free the drug from the chamber, said plunger having a slot therein 35
 35 receiving said pin, and resilient means urging said head member away from said ampoule when the cam means is released.

9. In a hypodermic syringe including a plunger rod, a grip member on said plunger rod, said 40
 40 member including a hub portion having a recess therein, said plunger rod being positioned in said recess, said plunger rod having a groove there-around within said recess and having a plurality of slots opening into said groove, pins in said 45
 45 hub extending into said groove, and being adapted when the grip is rotated to enter said slots, and a spring in said recess between the bottom of said recess and the adjacent end of said plunger rod.

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