

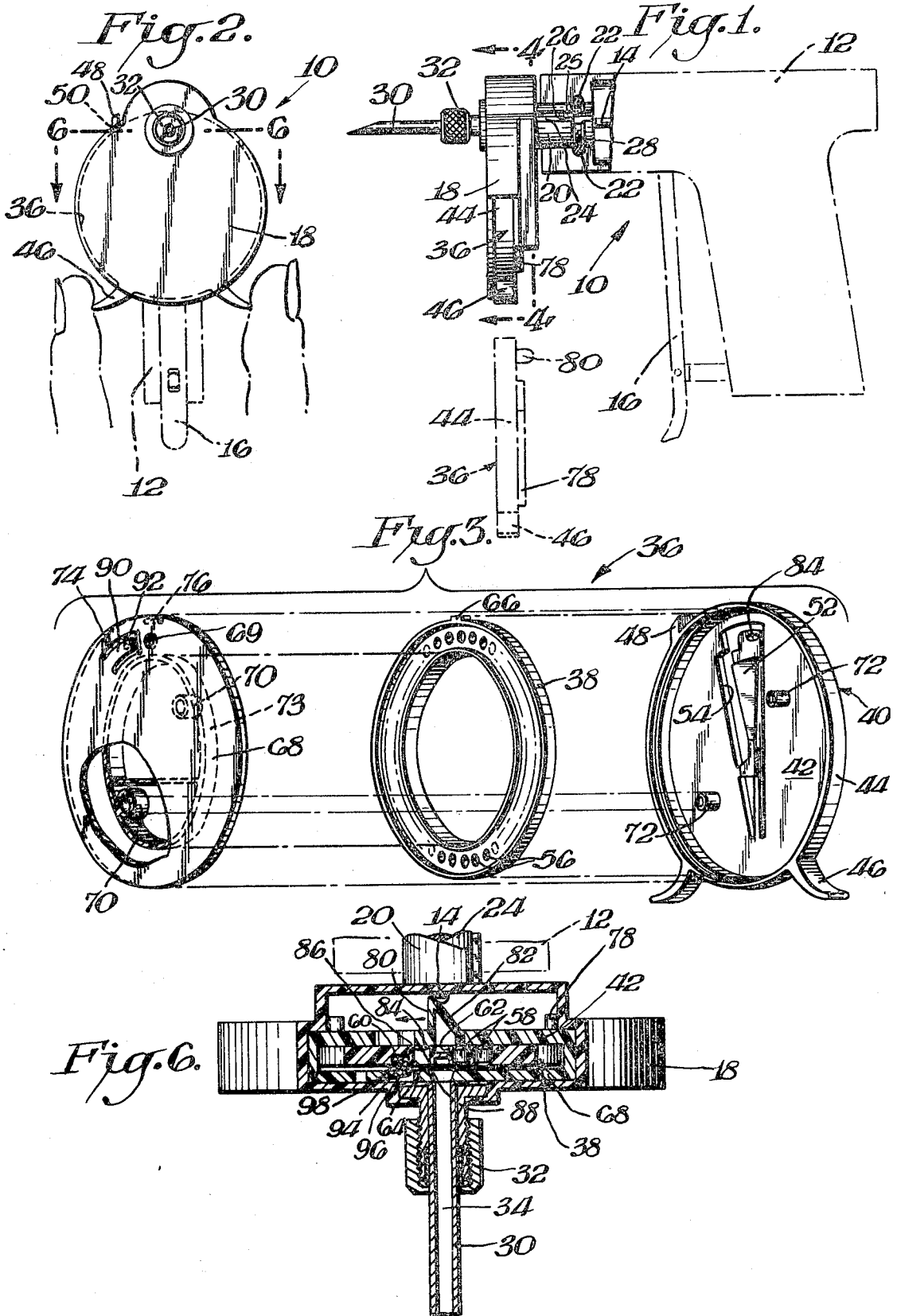
July 14, 1970

J. A. LOTT ETAL
IMPLANT GUN ASSEMBLY

3,520,299

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3 Sheets-Sheet 1



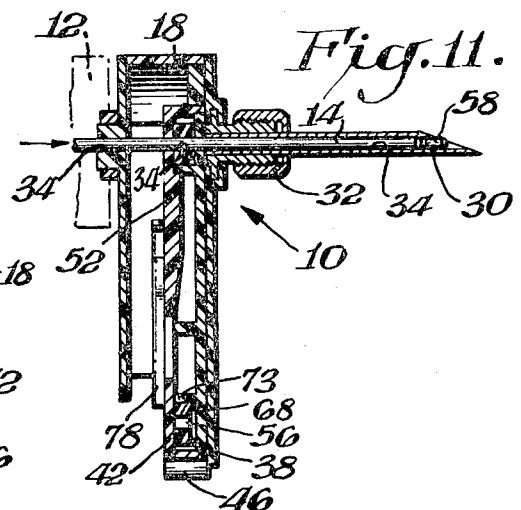
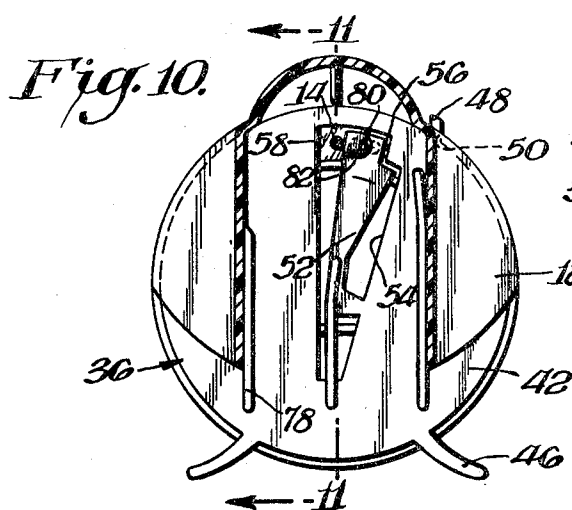
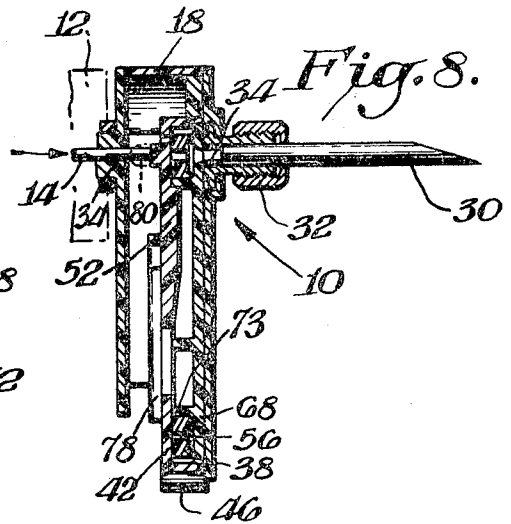
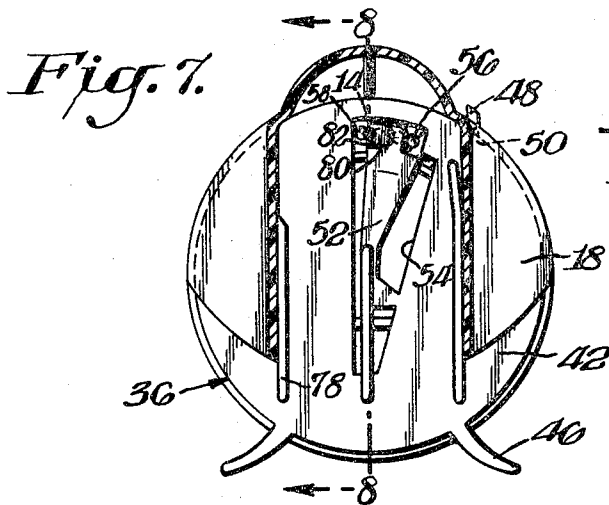
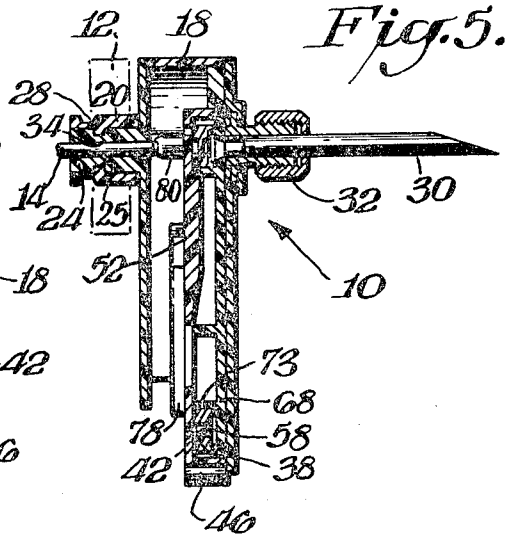
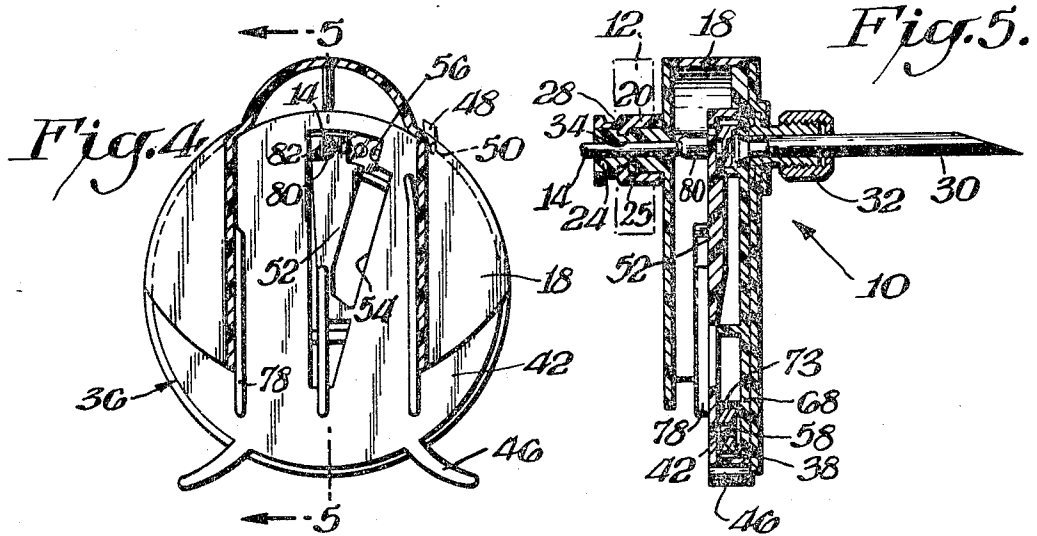
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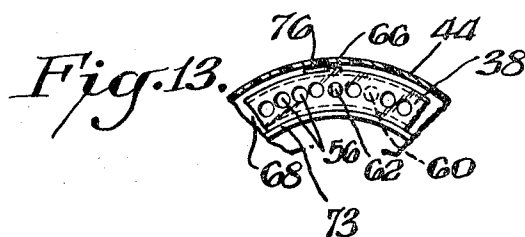
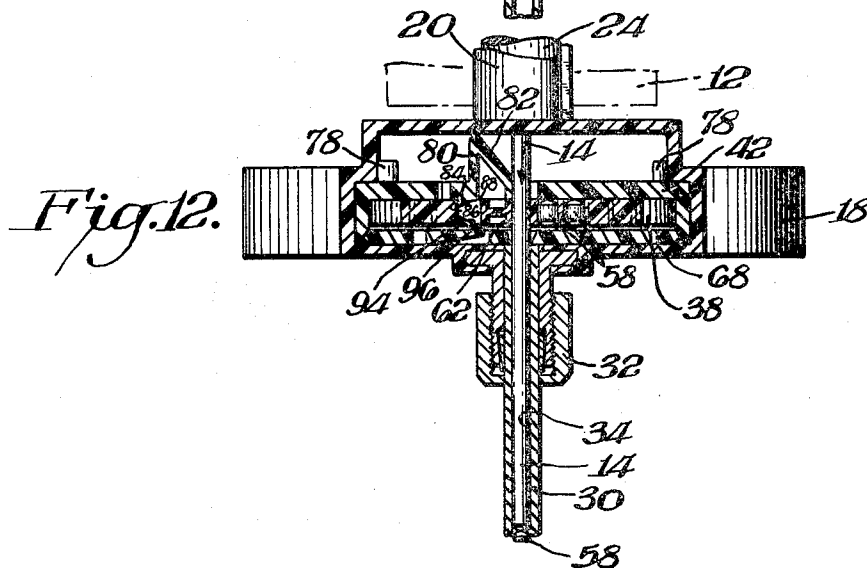
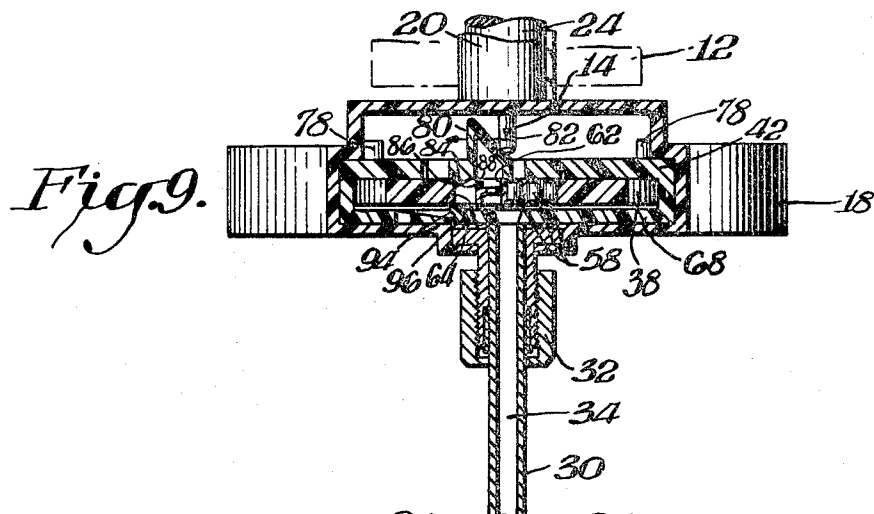
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IMPLANT GUN ASSEMBLY

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10 Claims

ABSTRACT OF THE DISCLOSURE

A dispenser cartridge including a case and a magazine mounted within the case having spaced apertures for releasably supporting implant pellets. An activator element on the cartridge case releasably engages the magazine and an inclined surface on the element is adapted to be engaged by a reciprocable plunger whereby movement of the plunger against the inclined surface shifts the activator element to advance the magazine so that successive magazine apertures are aligned with the reciprocating plunger. A detent on the cartridge case prevents movement of the magazine in the direction opposite to its advancing direction.

BACKGROUND OF THE INVENTION

The present invention relates to an implant gun assembly and more particularly to a dispenser cartridge for such an assembly having a magazine for releasably supporting implant pellets.

Prior to the present invention, several constructions have been proposed for dispensing implant pellets. For the most part these arrangements are characterized by the large number of parts needed to construct them as well as their complicated and inefficient mode of operation.

Accordingly, it is an object of the present invention to provide a simple, efficient and easy-to-use cartridge for holding and dispensing implant pellets.

Another object of the present invention is to provide a simple and easy-to-use implant gun assembly for injecting implant pellets into animals.

SUMMARY OF THE INVENTION

In accordance with the present invention, a dispenser cartridge is provided having a case within which a magazine is mounted. The magazine has spaced apertures for releasably supporting implant pellets. Openings are provided on opposite sides of the case in alignment with each other as well as at least one of the magazine apertures. An activator element on the case has connecting structure on one side engaging the magazine and an incline on the other side thereof adapted to be engaged by a reciprocable plunger so that movement of the plunger against the incline shifts the activator element to advance the magazine. Successive magazine apertures are thereby aligned with the openings in the case. A detent is also provided on the case for preventing movement of the magazine relative to the case in the direction opposite to its advancing direction.

The connecting structure on the activator element of the dispenser cartridge can be a lug that rests within successive magazine apertures so that movement of the element in the advancing direction causes the magazine to travel with it. In this regard, the lug includes a shoulder portion that provides abutting engagement between the element and the magazine when the element is advancing the magazine. An inclined portion on the lug provides sliding contact between the activator element and the magazine when the element is moving in a direction opposite to its advancing direction to thereby

allow movement of the element relative to the magazine in that direction. Preferably, the activator element is a lever integrally hinged to the cartridge case and the lever and hinge are constructed of resilient material that operates to return the element to its starting position at the end of its advancing motion.

The detent on the cartridge case also has an inclined portion that provides sliding contact between the magazine and the case when the magazine moves relative to the case in the advancing direction. A shoulder portion on the detent provides abutting engagement between the magazine and the case when the activator element is moving in a direction opposite to its advancing direction to thereby prevent movement of the magazine relative to the case in that direction.

The magazine may be rotatably mounted with the case and can have a ring-shaped configuration with pellet holding apertures equally spaced from the axis of rotation of the ring. Additionally, a stop element may be provided on the magazine for abutting a portion of the cartridge case when the magazine is empty so that further movement of the magazine in the advancing direction is prevented.

The dispenser cartridge according to the present invention is arranged to cooperate with the dispensing gun of a subcutaneous implantation assembly. The gun has a reciprocating plunger and an housing connected to the gun has a passageway through which the plunger travels as it reciprocates. The dispenser cartridge is releasably positioned within the housing and movement of the plunger through the passageway dispenses the implant pellets held by the cartridge magazine. The plunger strikes the incline on the activator element to shift the element and thereby advance the magazine so that the plunger passes through successive magazine apertures as it reciprocates to dispense the implant pellets within the apertures.

BRIEF DESCRIPTION OF THE DRAWING

Novel features and advantages of the present invention in addition of those mentioned above will become apparent to one skilled in the art from a reading of the following detailed description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a side elevational view of an assembly according to the present invention with parts broken away to show detail;

FIG. 2 is a front elevational view of the assembly illustrated in FIG. 1;

FIG. 3 is an exploded view of a dispenser cartridge according to the present invention;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 2;

FIG. 7 is a sectional view similar to FIG. 4 with the activator element of the dispenser cartridge in a different position;

FIG. 8 is a sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a sectional view similar to FIG. 6 with the activator element of the dispenser cartridge positioned as illustrated in FIGS. 7 and 8;

FIG. 10 is a sectional view similar to FIGS. 4 and 7 with the activator element of the dispenser cartridge in another position;

FIG. 11 is a sectional view taken along line 11—11 as shown in FIG. 10;

FIG. 12 is a sectional view similar to FIGS. 6 and 9

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with the activator element of the dispenser cartridge positioned as illustrated in FIGS. 10 and 11; and

FIG. 13 is a fragmentary view of the stop arrangement within the dispenser cartridge.

DETAILED DESCRIPTION OF THE INVENTION

Referring in more particularity to the drawing, an assembly 10 is provided for the subcutaneous or intramuscular administration of implant pellets into animals. Implant pellets of female hormone such as diethyl stilbesterol can be injected into beef cattle, calves, and lamb, for example, by utilizing this assembly. The assembly includes a dispenser gun 12 having a reciprocating plunger 14 connected to a trigger 16 so that movement of the trigger to the right, as viewed in FIG. 1, causes the plunger to move outwardly through the muzzle portion of the gun. A housing 18 is connected to the gun by a locking collar or sleeve 20 fixed to the muzzle portion by a pair of fasteners 22. In this regard, the housing has a hollow shaft portion 24 fixed to one side thereof and the locking collar 20 surrounds that portion. The collar is fixed to the shaft by an annular bead 25 on the collar that rests within an annular groove 26 in the shaft. Thus, the shaft is locked to the collar and can only rotate relative thereto. The locking collar 20 has an external annular groove 28 and the fasteners 22 are disposed within the groove, as shown in FIG. 1, to lock the housing 18 to the muzzle portion of the gun.

The front side of the housing carries a needle cannula 30 fixed thereto by the fastening arrangement 32. As shown in the drawing, the needle cannula as well as the hollow shaft portion 24 of the housing are in alignment with each other and define a passageway 34 through which the plunger 14 moves as the trigger 16 is depressed.

The housing 18 is arranged to receive a dispenser cartridge 36. This cartridge is shown in exploded view in FIG. 3 and includes a two-piece case in which a ring-shaped magazine 38 is rotatably mounted. The case includes a first portion 40 having a side wall closure 42 surrounded by a peripheral flange 44. Wings 46 may be connected to the flange portion 44 to facilitate insertion and ejection of the assembled dispenser cartridge into the housing on the gun. A projection 48 may also be connected to the flange, as shown in FIG. 3, to aid in removing the cartridge from the housing. In this regard, when the cartridge is positioned within the housing the projection 48 extends through an opening 50 in the housing and force applied to the projection urges the cartridge outwardly of the housing. The first section 40 of the cartridge case also carries an activator element or lever 52 for advancing the magazine 38, as explained more fully below. The element is integrally hinged to the first case section 40 and an open portion 54 in the side wall 42 of the case enables the arm to move slightly about its hinge point. As shown in the drawing, the open portion 54 is in alignment with the passageway 34.

The rotatable magazine 38 of the dispenser cartridge 36 has a plurality of peripherally arranged apertures 56 for holding implant pellets 58. Two blind apertures 60, 62 are also provided separated from each other by an aperture 64. The ring-shaped cartridge magazine 38 also has a stop element 66 integrally connected to its exterior. This element operates to prevent rotation of the ring relative to the cartridge case when the magazine is empty, as explained more fully below.

The second half 68 of the cartridge case is disc-shaped and arranged to snap within the peripheral flange portion 44 of the other case half. An opening 69 is provided in the disc so that the plunger can travel through the cartridge case, as explained below. Small tubular members 70 are provided on the interior surface of the disc 68 and these members receive lugs 72 on the interior surface of the other case half when the case is assembled. One of the tubular member and lug combinations is spaced a further distance from the center of the case

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than the other so that the case halves can only be assembled at one position. The closure 68 of the case also has a guide ring 73 that accurately positioned the magazine within the case when the cartridge is assembled. Additionally, the case closure 68 carries a detent 74 that engages the apertures of the cartridge magazine to prevent rotation of the magazine in the direction opposite to its advancing direction. An abutment 76 on the closure 68 is provided to prevent rotation of the magazine ring 38 when the cartridge is empty. In this regard, the stop 66 on the magazine engages the abutment to prevent further rotation of the magazine relative to the case after the implant pellets within the magazine are dispensed.

As mentioned above, the first section 40 of the cartridge case carries the activator element 52 for advancing the rotatable magazine 38. The element is integrally hinged to the first section of the case and moves about its hinge point in the open portion 54 in the side wall of the case. The magazine and the cartridge case including the activator element and hinge can be molded of resilient plastic material, such as polypropylene for example. The element is arranged to spring back to its approximate starting position, illustrated in FIG. 4, after it reaches the end of its advancing stroke, shown in FIG. 10. In order to impart sufficient springiness to the activator element it can be deliberately deformed somewhat after molding. In this regard, it can be pulled to the left, as viewed in FIG. 4, until it contacts the molded rib 78 on the case. Thus, the activator element is biased to the left, as viewed in FIG. 4, or in other words in a direction opposite to the direction it is moved to advance the magazine ring. This has the effect of causing the element to spring back to its starting position at the end of its advancing motion.

The activator element 52 includes a button portion 80 having an inclined surface 82. The button is normally in the path of plunger travel so that movement of the plunger through the passageway 34 causes the end of the plunger to strike the inclined surface of the button. After the plunger strikes the button continued movement of the plunger causes the activator element to move to the left, as viewed in FIG. 6, to thereby cause the magazine to rotate about the guide ring 73 so that the next implant pellet is in alignment with the passageway 34 and the plunger traveling through that passageway.

The activator element 52 also carries a connector in the form of a lug 84 that operates to releasably connect the element to the rotatable magazine so that movement of the element in its advancing direction also causes the magazine to rotate in that direction. The lug 84 has a shoulder portion 86 which provides abutting engagement between the activator element and the magazine when the element is moved by the plunger to advance the magazine. An inclined portion 88 on the lug provides sliding contact between the activator element and the magazine when the element is moving in a direction opposite to its advancing direction. This occurs after an implant pellet has been dispensed and enables the element to return to its starting position without causing the magazine to move with it. As mentioned above the activator element is constructed of resilient material so that movement of the element in the direction opposite to its advancing direction enables the lug 84 to move outwardly of the magazine which in turn allows the element to return to its starting position.

Alternatively, lugs may be provided on the magazine for engaging an aperture or recess in the activator element. Positive abutting engagement can be provided between the lugs on the magazine and the recess in the activator element so that the magazine moves with the element when the plunger causes the activator element to move in the advancing direction. Sliding contact can also be provided between the lugs on the magazine and the recess in the activator element so that the element can spring back to its starting position at the end of its advancing motion without moving the magazine with it.

The detent 74 on the second section 68 of the cartridge case engages the apertures of the magazine to prevent rotation of the magazine in the direction opposite to its advancing direction. The detent may comprise a flexible flap 90 disposed within an opening 92 in the second section of the cartridge case. The flap is integrally connected at one end thereof to the case and the free end of the flap carries a protrusion 94 that rests within the apertures of the magazine ring. The protrusion 94 has an inclined portion 96 with a slope opposite to the slope of the inclined portion 88 on the activator element. Thus, as can readily be understood, as the magazine is caused to rotate in its advancing direction sliding contact between the magazine and the inclined portion of the protrusion 94 is provided. This enables the ring to rotate in its advancing direction relative to the detent. However, when the activator element is returning to its starting position after an implant pellet has just been dispensed, abutting engagement between a shoulder 98 on the protrusion 94 and one of the apertures of the magazine ring is established. This prevents rotation of the ring in the direction opposite to its advancing direction.

In operation the subcutaneous implantation assembly 10 operates to dispense implant pellets into animals in the following manner. First, the pistol grip of the dispensing gun 12 is grasped by the operator and the needle cannula 30 inserted into the animal to be injected. The operator then depresses the trigger 16 which causes the plunger 14 to move through the passageway 34 defined by the needle cannula and the shaft 24 of the housing 18. As shown in FIGS. 4-6, the plunger 14 strikes the inclined surface 82 of the button 80 on the activator element 52. At this position, the lug 84 on the activator element is located within the aperture 64 between the blind apertures 60, 62, and the protrusion 94 on the flap 90 of the detent 74 is located in the first blind aperture 60.

Continued movement of the plunger through the passageway 34 causes the end of the plunger to urge the activator element to the left, as illustrated in FIGS. 7-9. The shoulder 86 on the lug 84 of the activator element abuts the magazine ring to thereby connect the element to the ring so that movement of the element to the left, as viewed in FIG. 9, or in other words in its advancing direction, causes the magazine ring to rotate within the cartridge case about the guide ring 73. During this movement of the magazine, sliding contact is established between the detent 74 and the magazine, the flap 90 being urged slightly outwardly of the magazine ring to enable the ring to rotate. At the end of its advancing motion the activator element is positioned as illustrated in FIGS. 10-12. The lug on the activator element 52 and the protrusion on the flap of the detent 74 are then positioned within the same magazine aperture, this aperture being aperture 64 between the blind apertures 60 and 62. At this position of the magazine ring the implant pellet 58 within the first filled aperture 56 is aligned with the reciprocating plunger of the dispensing gun. Continued movement of the plunger through the passageway 34 then forces the pellet out of its associated aperture, into the needle cannula 30 and finally out of the cannula into the animal being injected.

When the trigger 16 is released the plunger moves back into the gun under the influence of a spring or a similar arrangement (not shown). As the plunger moves passed the inclined surface of the button 80 on the activator element, the element is free to return to its starting position illustrated in FIGS. 4-6. The element, as described above, is biased to this position by the resilient characteristic of the material from which it is constructed. The shoulder 98 of the detent 74 operates to prevent the magazine ring from moving with the activator element as the element springs back to its starting position.

The next implant pellet in the magazine ring is dispensed by simply depressing the trigger of the gun a second time. The activator element rotates the magazine ring 75

in the same manner as described above to align the next implant pellet with the reciprocating plunger. The detent 74 prevents the ring from moving with the activator element when the element returns to its starting position. This procedure is repeated until the magazine ring is emptied of its implant pellets. When this occurs the stop 66 on the magazine ring engages the abutment 76 on the closure disc 68, as shown in FIG. 13, to thereby prevent further rotation of the ring. In this position of the magazine ring the activator element is prevented from flexing in its advancing direction which in turn prevents the plunger from traveling through the passageway 34. This condition signals to the operator that the magazine is empty.

The spent dispenser cartridge 36 is then removed by grasping the wings 46 on the case and pushing the projection 48 through the opening 50 in the housing 18. Once the cartridge is removed a new cartridge can be inserted for additional dispensing operations. Alternatively, the spent dispenser cartridge can be disassembled and the empty magazine ring substituted by a new magazine filled with implant pellets. The cartridge is then assembled and positioned within the housing 18.

What is claimed is:

1. A dispenser cartridge comprising a case, a magazine mounted within the case having spaced apertures for releasably supporting implant pellets, openings on opposite sides of the case in alignment with each other as well as at least one of the magazine apertures, an activator element integrally hinged to the case for shifting motion about an axis normal to the plane defined by the motion of the magazine whereby the activator element moves in a plane substantially parallel to the plane defined by the motion of the magazine, connecting means on one side of the activator element engaging the magazine and inclined means on the other side thereof adapted to be engaged by a reciprocable plunger whereby movement of a plunger against the inclined means shifts the activator element to advance the magazine so that successive magazine apertures are aligned with the openings in the case, and detent means on the case for preventing movement of the magazine relative to the case in the direction opposite to the advancing direction of the magazine.

2. A dispenser cartridge as in claim 1 wherein the connecting means on the activator element is a lug that rests within the magazine apertures, the lug having a shoulder portion that provides abutting engagement between the element and the magazine when the element is advancing the magazine, and an inclined portion that provides sliding contact between the activator element and the magazine when the element is moving in a direction opposite to the advancing direction.

3. A subcutaneous implantation assembly comprising a dispensing gun having a reciprocable plunger, a housing connected to the gun having a passageway through which the plunger travels as it reciprocates, a dispenser cartridge releasably positioned within the housing, the cartridge including a case, a magazine mounted within the case having spaced apertures for releasably supporting implant pellets, openings on opposite sides of the case in alignment with each other as well as at least one of the magazine apertures, an activator element integrally hinged to the case having a lug on one side in engagement with the magazine and inclined means on the other side normally in the path of plunger travel whereby movement of the plunger through the passageway in the housing shifts the activator element to advance the magazine so that successive magazine apertures are aligned with the passageway in the housing, the plunger passing through successive magazine apertures as it reciprocates to thereby dispense the implant pellets within the apertures and detent means for preventing movement of the magazine relative to the case in the direction opposite to the advancing direction of the magazine.

4. An assembly as in claim 3 wherein the detent means

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has an inclined portion that provides sliding contact between the magazine and the case when the magazine moves relative to the case in the advancing direction, and a shoulder portion that provides abutting engagement between the magazine and the case when the activator element is moving in a direction opposite to the advancing direction to thereby prevent rotation of the magazine relative to the case in that direction.

5. An assembly as in claim 3 wherein the activator element is integrally hinged to the case for shifting motion in a plane substantially normal to the path of travel of the reciprocable plunger.

6. An assembly as in claim 5 wherein the lug on the activator element includes a shoulder portion that provides abutting engagement between the element and the magazine when the element is advancing the magazine, and an inclined portion that provides sliding contact between the activator element and the magazine when the element is moving in a direction opposite to the advancing direction.

7. An assembly as in claim 3 wherein the activator element and hinge are constructed of resilient material that operates to urge the element to its starting position at the end of its advancing motion.

8. A subcutaneous implantation assembly comprising a dispensing gun having a reciprocable plunger, a housing connected to the gun having a passageway through which the plunger travels as it reciprocates, a dispenser cartridge releasably positioned within the housing, the cartridge including a case, a magazine mounted within the case having spaced apertures for releasably supporting implant pellets, openings on opposite sides of the case in alignment with each other as well as at least one of the magazine apertures, an activator element integrally hinged to the case having a lug on one side in engagement with the magazine and inclined means on the other side normally in the path of plunger travel whereby movement of the plunger through the passageway in the housing

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shifts the activator element to advance the magazine so that successive magazine apertures are aligned with the passageway in the housing, the plunger passing through successive magazine apertures as it reciprocates to thereby dispense the implant pellets within the apertures and detent means for preventing movement of the magazine relative to the case in the direction opposite to the advancing direction of the magazine, the lug on the activator element including a shoulder portion that provides abutting engagement between the element and the magazine when the element is advancing the magazine, and an inclined portion that provides sliding contact between the activator element and the magazine when the element is moving in a direction opposite to the advancing direction.

9. An assembly as in claim 8 wherein the activator element and hinge are constructed of resilient material that operates to urge the element to its starting position at the end of its advancing motion.

10. An assembly as in claim 8 wherein the activator element is integrally hinged to the case for shifting motion in a plane substantially normal to the path of travel of the plunger.

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