

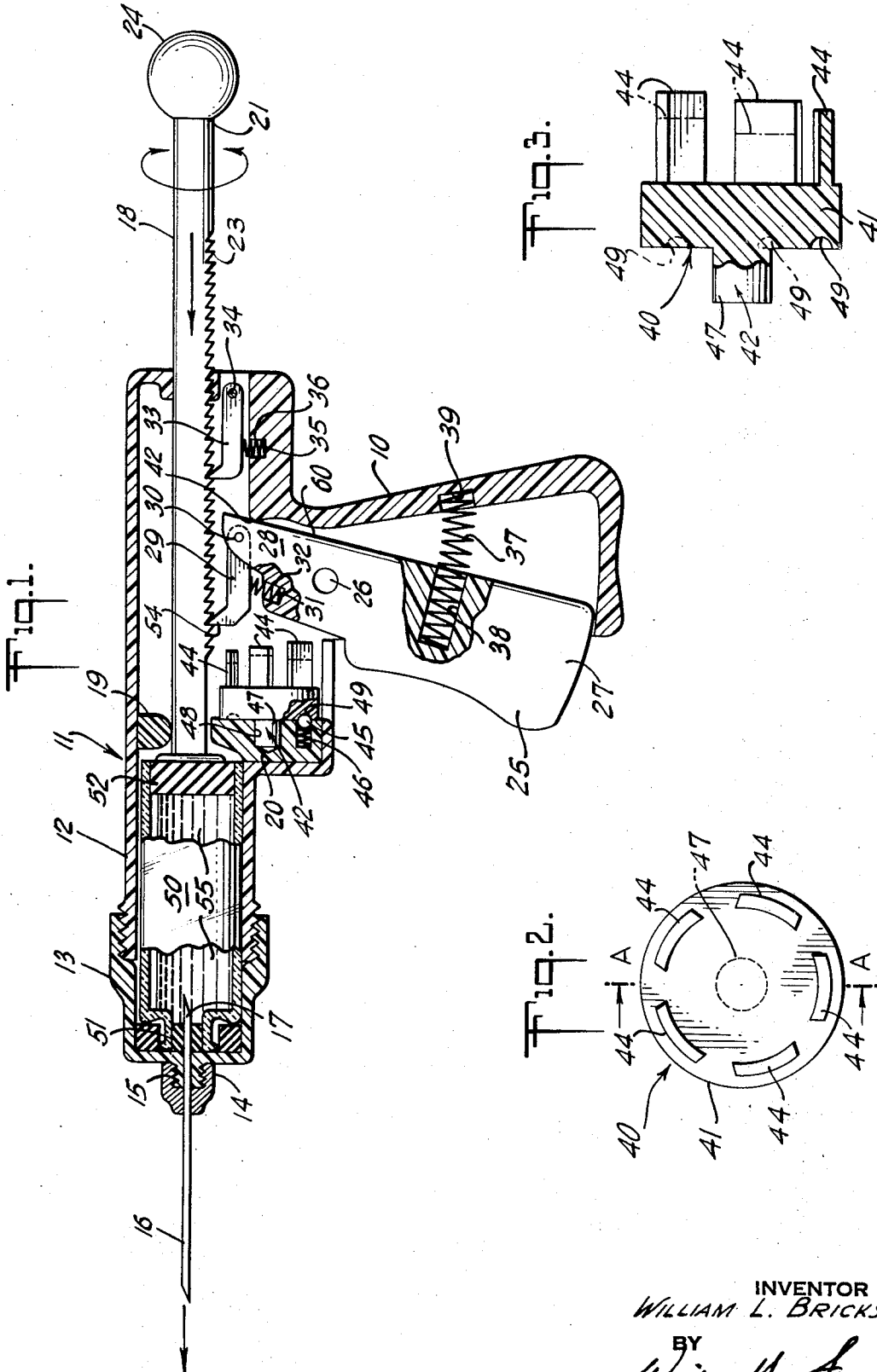
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MULTIPLE DOSAGE VETERINARY INJECTION GUN

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1

2

3,517,668 MULTIPLE DOSAGE VETERINARY INJECTION GUN

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1 Claim

ABSTRACT OF THE DISCLOSURE

A multiple, variable dosage veterinary injection device including a cartridge receiving barrel, a plunger means adapted to be advanced in a cartridge received in said barrel, intermittently operable trigger actuated mechanism to impose dispensing force on said plunger means to advance it in said cartridge, a variable rotatable annular stop means which controls and arrests the distance of forward advance of said trigger actuated means thereby controlling the distance of forward advance of said plunger means in said cartridge, and a mechanical holding means engageable with said plunger means to prevent retraction of said plunger means after advancement thereof by said trigger actuated mechanism even after disengagement and retraction of said trigger actuated mechanism from said plunger means.

This invention relates to a multiple dosage injection device, and more particularly to a multiple dosage injection gun especially adapted for the successive injection of flowable therapeutic or nutritional compositions into a plurality of domestic animals.

In the practice of modern commercial animal husbandry, it is frequently found necessary to administer accurate dosages of therapeutic and nutritional compositions to large groups of domestic animals, such as cattle, swine, sheep, etc. Many of these compositions must be parenterally administered to the animals being treated. Single dosage injection devices are not feasible for this purpose due to the great expense involved and also because of the variation in dosages which may be required by any individual animal as may be determined by the skilled worker upon examination of the animal being treated. Furthermore, many of the different compositions employed for these purposes require different dosages thereof to be administered.

Heretofore, devices capable of parenterally administering multiple dosages of flowable therapeutic or nutritional compositions have been employed without completely solving the problems faced. For example, the devices heretofore employed have been of unwieldy and expensive construction; have not been sufficiently versatile in accommodating all the compositions employed in the veterinary field; and have not been sufficiently accurate in the dispensing of the compositions here envisaged. All these devices employ a replaceable cartridge containing a reservoir of flowable therapeutic composition having a movable plunger means at one end, which when advanced longitudinally, dispenses the composition from the other end thereof. A primary object of this invention is to provide a substantially improved dispensing device particularly adapted for dispensing the flowable therapeutic and nutritional compositions contained in such cartridges and injecting them into animals in successive, accurate and variable doses.

Further objects of the present invention are to provide a dispensing device which is conveniently, easily and rapidly adjustable as to the amount of each dose dispensed; to provide a dispensing device capable of dis-

pensing successive, accurate doses of the flowable therapeutic or nutritional compositions without oozing of the compositions from the device between dispensing cycles; to provide a dispensing device of the foregoing character which is relatively simple and inexpensive in construction; and to provide an improved dispensing device of the above character adapted to receive a replaceable cartridge containing a multiple dosage quantity of the composition to be dispensed and in which the cartridges are readily and quickly replaceable as may be determined upon visual examination of the improved injection device.

Other and further objects and advantages of the present invention will become apparent from a further reading of the following specification and the detailed description set forth therein.

One general embodiment of the present invention comprises a dispensing gun including a cartridge receiving barrel, a plunger means adapted to be advanced in a cartridge received in said barrel, intermittently operable trigger actuated mechanism to impose dispensing force on said plunger means to advance it in said cartridge, a variable annular stop means which controls and arrests the distance of forward advance of said trigger actuated means thereby controlling the forward advance of said plunger means after advancement thereof by said trigger actuated mechanism even after disengagement and retraction of said trigger actuated mechanism from said plunger means to prevent retraction of said plunger means after advancement thereof by said trigger actuated mechanism, even after disengagement and retraction of said trigger actuated mechanism from said plunger means.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

FIG. 1 is a vertical longitudinal section of a dispensing gun embodying the present invention.

FIG. 2 is a rear elevation of the annular stop member forming part of FIG. 1.

FIG. 3 is side elevation along line AA, of a rotatable annular stop member of FIG. 2, and forming part of FIG. 1.

For the purpose of promoting an understanding of the principles of the invention, references will now be made to the embodiment illustrated in the drawing and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to the drawings, there is illustrated a dispensing gun which has a downwardly extending grip 10, and a forwardly extending barrel 11, having a cylindrical member 12, and a removable cap 13 mounted thereon. The manner of mounting the cap 13 is within the purview of the knowledge of the skilled worker and can be accomplished for example, by a bayonet type coupling or a screw thread arrangement, as is seen fit.

At the forward end of the cap 13 there is mounting means 14 and an opening 15, for accepting and securing a double ended hypodermic needle 16, one end of which 17 communicates with the interior portion of the barrel 11. It has been found that the most efficient manner of securing said hypodermic needle 16 is by a screw thread mounting means 14, although other means may also satisfactorily be employed by the skilled worker.

A plunger means 18, is mounted for longitudinal movement within the barrel 11 by means of fixed guide members 19 and 20 which may be preformed in the manufacture of the barrel 11 or securely attached therein by any means practical, for example, by bolts.

A lever 25 is pivotally mounted upon the grip 10 at pin 26. The lever 25 has a long lever arm 27 positioned for manual squeezing into the body of the grip 10, and a short lever arm 28, which projects upward into the barrel 11. A driving pawl 29 is permanently, pivotally mounted at 30 within the upper end of the lever 25, and is urged into engagement with the teeth of rack 23 on the plunger means 18 by means of a compression spring 31 seated in a depression 32 within the lever 25, directly below the underside of the pivotally mounted driving pawl 29. The teeth of rack 23 are equally spaced and are so constructed as to face rearward in the direction away from the cap 13. The spring 31 is mounted in such a manner as to maintain continual upward pressure against the underside of pawl 29, thereby keeping the said pawl 29, in continual contact with the plunger means 18, and always in position for engagement with the surfaces thereof.

To the rear of driving pawl 29, and in a horizontal plane therewith a smaller holding pawl 33 is permanently, pivotally mounted within the barrel 11 with a pivotal pin means 34. The holding pawl 33 is maintained in the same horizontal plane as driving pawl 29 by means of a compression spring 35, seated in a depression 36 within the internal body of the barrel 11. This compression spring 35 is mounted in such a manner as to exert continual upward pressure against the underside of holding pawl 33, thereby urging said pawl 33 into continual contact with the surface of plunger means 18.

The long lever arm 27 of the lever 25 is yieldably held forwardly in the position shown in FIG. 1 by means of a compression spring 37 received within holding bores 38 and 39 in the lever and grip wall respectively, whereby the short lever arm 28 is yieldably held in contact with the surface of interior wall of the grip 10. Mounted forward of the driving pawl 29 is a rotatable annular stop member 40, which is more fully detailed in FIGS. 2 and 3.

Referring now to FIGS. 2 and 3, the rotatable annular stop member 40 is comprised of a cylindrical body 41 having an axially oriented means 42 for being rotatably mounted within the barrel 11, for example by a pin extension or bolt providing the axis about which the annular stop member may be rotated. On the posterior surface 43 of said cylindrical body 41, which surface is always mounted facing the driving pawl 29, are circumferentially constructed rigid non-yielding projections 44 of various lengths. As shown in the drawings, the annular stop member may be constructed with a preformed pin means 47, which may then be rotatably mounted in a preformed depression 48 within the gun body. The annular stop means 40 is so mounted in the gun body that the outer periphery thereof extends slightly beyond the outer surface of the gun body, as by the presence of an aperture therein for such purpose on either side thereof. The periphery of the stop member may be adapted for manual rotation by the gun operator, as can be easily perceived by the skilled worker. Although this feature is not here shown, the skilled worker can easily apply the foregoing teachings in accordance with his desires. Returning now to FIG. 1, the annular stop member 40 is rotatably mounted within the interior of the gun body in such a manner as to be manually rotatable by the operator from the exterior surface of the gun. The annular stop member is preferably constructed in such a manner as to have around its interior surface a plurality of apertures 49 equidistant from the rotation axis of the stop member 40, and positioned in such a manner as to provide proper positioning thereof, as will be further explained. Upon mounting

within the gun, the annular stop member's rotation may be controlled by a ball 45 and a compression spring 46, whereby the stop member is freely rotatable until the ball 45 is urged into the aperture 49 as they become aligned. The annular stop member 40 is designed and mounted in such a manner as to present one of the variable length projections 44 directly in line with the forward horizontal plane of movement of driving pawl 29. Thus, the projection 44 actually becomes a stop member controlling the line of forward travel of the driving pawl 29, by coming into contact with the forward surface of said driving pawl 29 and preventing further forward movement thereof. It is of course obvious, that the skilled worker may provide an annular stop member with projections of variable lengths to control the distance of forward travel of said driving pawl 29, as will be more fully discussed hereinafter. The variation in the length of these projections act to control the dosage of the composition being dispensed from the injection device. Generally speaking, it has been found satisfactory to dispense dosages of from about 0.5 cc. to about 5.0 cc. of the compositions here sought to be employed. These compositions may be antibiotics, vitamins, steroids and other like therapeutic or nutritional compositions usually employed for such purposes.

Thus, one limit of the travel of the lever 25 is the engagement of the rear surface 42 of the short lever arm 28, with the interior surface 60 of the grip 10, and the other limit of travel is the engagement of the forward surface 54 of the driving pawl 29, with the surface of the variable length projection 44 of the annular stop member 40. The spacing of these two limiting surfaces may be easily controlled in manufacture thus making possible a controlled length of forward driving pawl 29 travel. More particularly, in actual operation of the gun by the operator, the length of the driving pawl's forward travel and thus the dosage, is controlled by the rotation of the annular stop member 40, and the length of the arresting projection placed in the line of travel of and caused to come into contact with the driving pawl 29.

The plunger means 18 includes a generally cylindrical body 21 having a plurality of teeth 23 thereon. The plunger means 18, further includes a ball 24 fixed to the extending end of the plunger and facilitating withdrawal of the plunger means when desired. In order to withdraw the plunger means, it is rotated until the pawls 29 and 33 no longer engage the teeth 23. The plunger is then free to be fully retracted, until further retraction is halted by engagement thereof with guide member 19.

In order to more fully and clearly describe the instant invention and the operation thereof the following detailed description of the operation of the injection device by the operator is set forth:

Initially, the operator will rotate the plunger means 18, by manipulation of ball 24, until the pawls 29 and 33 no longer engage teeth 23, and the plunger 18 will then be withdrawn its full length. Cap 13 will then be removed and a filled cartridge 50, containing a flowable therapeutic composition will be inserted in the barrel 11; the cartridge being of the type ordinarily employable for the purposes here envisaged, for example the cartridge disclosed in prior filed U.S. Pat. application 639,193, filed May 17, 1967 in the names of William L. Brickson and Henry Tamagni may be thus employed. The cap 13 having securely mounted thereon a double ended hypodermic needle 16 is then securely remounted on the gun, thus causing the inner needle 17 to pierce the cap 51 of the cartridge 50. The plunger means 18, on which is now seated the slidable plunger 52 of the cartridge 50 is rotated by means of manipulation of the ball 24 until the pawls 29 and 33 are in full contact with the teeth 23. The amount of each dose to be dispensed is pre-set by rotating the annular stop member 40 to the proper pre-determined setting so as to place the proper pawl arresting projection 44 in line of travel of the forward surface

5

54 of driving pawl 29. The gun is now loaded and ready for parenterally dispensing a plurality of measured, accurate doses to the animals sought to be treated.

The dispensing end of needle 16 is inserted into the animal sought to be treated. The operator then squeezes the lever 27 which causes the driving pawl 29 to engage the rack 23 and to drive the plunger means 18 forwardly, causing the stopper 52 to move forwardly and force the flowable therapeutic composition 55 through the needle 16. The driving pawl 29 will thus travel forwardly until its forward surface 54 engages the arresting surface of the arresting projection 44 of the annular stop member 40. By adjusting the forwardly travel of the driving pawl 29, by rotation of the annular stop member 40, the amount of the flowable composition dispensed for given squeeze can be accurately adjusted. While the driving pawl 29 is forwardly advanced, the holding pawl 33 remains stationary in continual frictional engagement with the teeth 23 of the plunger 18. As the plunger 18 is forwardly advanced by the driving pawl 29, the teeth 23, which face rearwardly, ride over holding pawl 33. However, as each tooth passes, it is prevented from retracting by being opposed by the non-yielding holding pawl 33, which is continually held engaged to said teeth 23 by compressed spring 35. Thus, in the event of back pressure buildup in the cartridge due to continued dispensing of successive doses, or upon retraction of the driving pawl 29 in preparation for the dispensing of a successive dose, the plunger means 18 is held stationary by the holding pawl 33, causing the full accurate dose to be dispensed through the needle 16. The forward motion of the driving pawl 29 is limited by its engagement with the arresting surface of the arresting projection of the rotatable annular stop member. In order to prepare for dispensing successive doses of the therapeutic composition from the gun, the pressure on the longer lever arm 27 is released, compressed spring 37 returns said lever arm 27 to its original position thus retracting driving pawl 29 into position for dispensing a successive dose, while holding pawl 33 prevents any retraction of the plunger 18. The dispensing needle 16 is withdrawn from the animal being treated after the entire dose is administered, and is then injected into a successive animal for administration of a subsequent dose as described above.

The material employed in the construction of the multiple dosage injection device may be such as desired by the skilled worker. However, it has been found most preferable to have the body, barrel, lever arm and annular stop member constructed of heavy duty light weight plastic material and the plunger and pawls constructed of durable, light weight metal for example, aluminum alloys. More particularly, it has been found most preferable to employ transparent plastic for the body and barrel of the gun, to allow the operator to visually check the operation of the gun. However, other materials are also satisfactory for the purposes and results here set forth as may be determined by the skilled worker.

It will be evident from the above description that the present invention provides an improved dispensing device which is particularly adapted for dispensing the contents of replaceable multiple shot cartridges in an accurate and non-wasteful manner. It will also be evident that the present invention provides a dispensing device which is conveniently, easily and rapidly adjustable as to the amount of each dose dispensed. It should be understood that the amount of each dose can be controlled not only by rotating the annular rotatable stop member, but also by changing the cartridge size. Thus, for example, five different stop projections plus five cartridge sizes could provide twenty-five different dosage levels. It will further be evident that the present invention provides a

6

dispensing device of the above character which is relatively inexpensive and simple in construction.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention and the scope of the claims are also desired to be protected.

What is claimed is:

1. A multiple variable dosage veterinary injection device comprising a pistol like body having a downwardly extending grip and having a forwardly projecting barrel to receive a cartridge, a plunger means movable longitudinally of the barrel and into a cartridge contained therein to dispense the contents thereof from the said barrel, equally spaced rearward facing ratchet teeth on said plunger means, a driving pawl below said plunger means in engagement with said teeth, a lever pivoted in said body and having a short lever arm having said driving pawl vertically pivotally mounted thereon and a long lever arm extending downward into position to be manually squeezed toward said grip, a spring, one end of which is received within said short lever arm and the other end of which acts between said short lever and driving pawl to urge said driving pawl against said teeth, a horizontally stationary, non-yielding holding pawl vertically pivotally mounted rearwardly to said driving pawl and within said body on the same general horizontal plane as said driving pawl, said holding pawl in engagement with said ratchet teeth, a spring, one end of which is received within said body and the other end of which acts between said body and holding pawl to urge said holding pawl against said teeth, an annular stop member mounted on said body in advance of said driving pawl for rotation about a forwardly extending axis, said stop member having a plurality of rearwardly projecting, spaced variable length projections culminating in stop surfaces on the posterior surface of said stop member, said stop member capable of rotation to bring the rearwardly projecting stop surface of each said projection into a horizontal plane with the forward surface of said driving pawl, a spring acting between said grip and long lever arm to yieldably retain the rearward surface of said short lever arm in engagement of a fixed immovable means positioned forwardly from said holding pawl for limiting the rearward travel of said short lever arm, said stop surface of said projection of said annular stop member in a horizontal plane with said forward surface of said driving pawl limiting the forwardly travel of said driving pawl whereby the forward travel of said short lever arm and said plunger means for a given squeeze of said short lever arm can be adjusted by rotation of said annular stop member.

References Cited

UNITED STATES PATENTS

2,119,028	5/1938	Schmidt et al.	254—133
2,624,338	1/1953	Moore et al.	
2,748,767	6/1956	Wright	128—218
2,750,943	6/1956	Dann.	
2,776,075	1/1957	Etter	222—391 XR
3,141,583	7/1964	Mapel et al.	222—391 XR

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222—309