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HYPODERMIC SYRINGE FOR VETERINARIANS

Filed Nov. 15, 1955

2 Sheets-Sheet 1

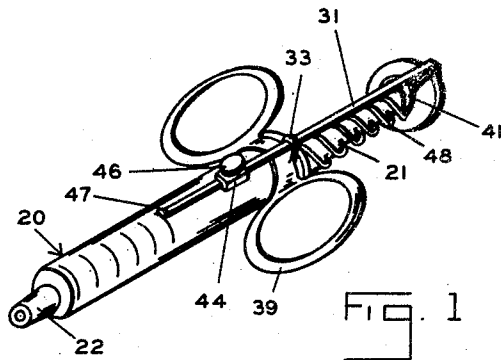


FIG. 1

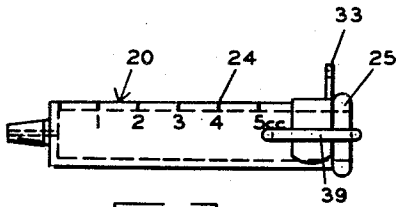


FIG. 2

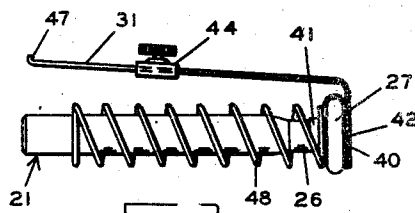


FIG. 3

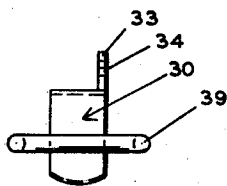


FIG. 4

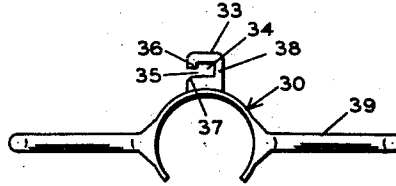


FIG. 5

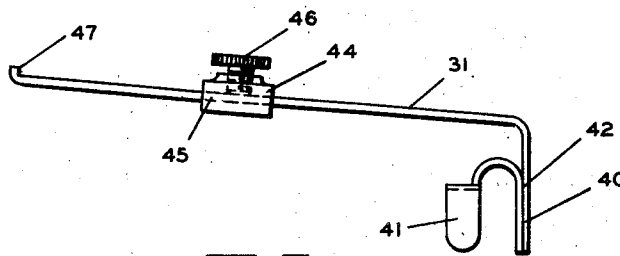


FIG. 6

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2 Sheets-Sheet 2

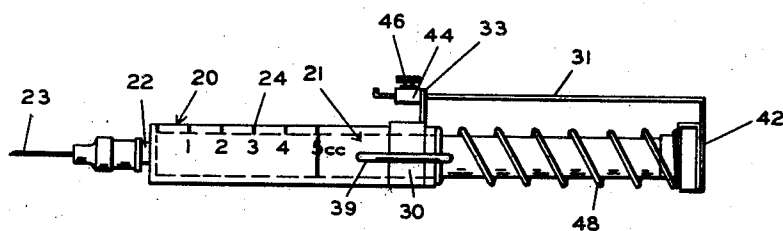


Fig. 7

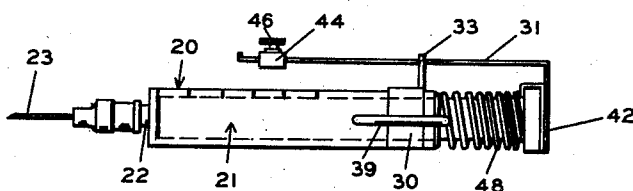


Fig. 8

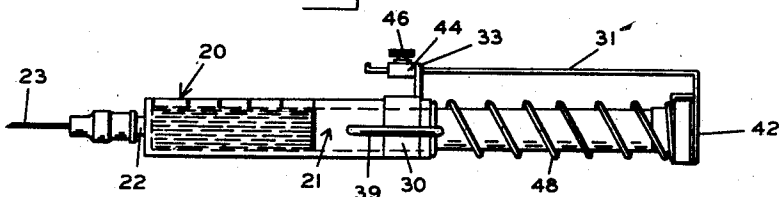


Fig. 9

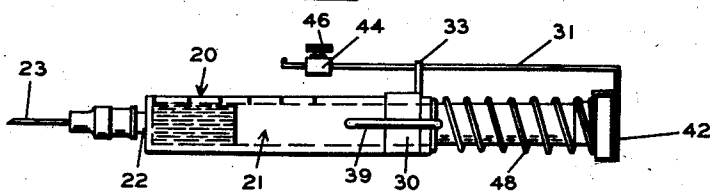


Fig. 10

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HYPODERMIC SYRINGE FOR VETERINARIANS

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13 Claims. (Cl. 128—218)

My invention relates to a hypodermic syringe for veterinarians. It has to do, more specifically, with a hypodermic syringe which is so designed that it can be handled easily for filling and for the injection operation with one hand so that the veterinarian can hold an animal with the other hand.

There are hypodermic syringes on the market which are designed especially for veterinarians so that they can be manipulated with one hand. However, they are usually very complicated having a number of complicated parts which are difficult to disassemble for cleaning or sterilizing, and to reassemble. Prior art syringes of this type have been provided with means for predetermining the dosage but this means has also been very complicated. The complicated nature of these prior art hypodermic syringes for veterinarians not only makes them difficult to use and keep clean but also makes them expensive.

It is the main object of my invention to provide a hypodermic syringe which is especially designed for use by veterinarians since it can be manipulated for filling and ejection with one hand, which is of simple structure and is composed of a minimum number of parts that can be readily disassembled and assembled and when assembled can be manipulated easily, which is provided with simple means for predetermining the dosage, and which because of its simplicity is relatively inexpensive.

In the accompanying drawings I have illustrated an example of my invention. In these drawings:

Figure 1 is an isometric view of a hypodermic syringe for veterinarians which is provided with a control arrangement for predetermining the dosage.

Figure 2 is a side view of the barrel of the syringe with the combined finger grip and guide clasp of the control arrangement clasped thereto.

Figure 3 is a side view of the plunger of the syringe with the control bar applied thereto and with the actuating spring thereon.

Figure 4 is a side view of the combined finger grip and guide clasp.

Figure 5 is an end view of the member shown in Figure 4.

Figure 6 is a side view of the control bar.

Figure 7 is a diagrammatic view of the syringe with the dosage control set at a selected point and with the plunger held in retracted position.

Figure 8 is a similar view with the plunger pushed forwardly preparatory to withdrawing a liquid medicament from a container.

Figure 9 is a similar view showing the plunger withdrawn into filling position with a predetermined amount of the liquid pulled thereinto.

Figure 10 shows the plunger being pushed forwardly to eject the liquid therefrom.

With reference to the drawings, in Figure 1 I have illustrated a complete hypodermic syringe designed for use by a veterinarian. This syringe is preferably made of

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glass and comprises the barrel 20 and the plunger 21 mounted for reciprocation therein.

The barrel 20 is provided on its forward end with the needle stem 22 which removably receives the usual hypodermic needle 23 (Figures 7 to 10). The barrel is calibrated in the usual way, being provided with the calibrations 24 which indicate dosage or units. The rear end of the barrel is provided with the usual laterally extending flange 25.

The plunger 21 comprises a body which slidably fits into the barrel 20 and which is provided with a narrowed neck 26 at its rear end which projects from the barrel 20 in the usual way even when the plunger is moved into its forwardmost position. On the extreme rear end of the plunger there is provided the knob or head 27. The head 27 serves as pushing means for pushing the plunger 21 into the barrel 20.

My dosage control arrangement which is applied to the syringe, consists of two main parts, the combination finger grip and guide clasp 30 which is applied to the barrel 20 and the control bar 31 which is applied to the plunger 21 and which cooperate with each other as shown in Figure 1.

The combination finger grip and guide clasp 30 comprises a clamping body which is of arcuate form being greater than a semi-circle and of proper size to fit tightly around the barrel 20. The finger grip and guide clasp 30 will tightly embrace the barrel 20 but can be slipped axially thereof. When the clasp 30 is mounted on the barrel 20, as shown in Figures 1 and 2, it is moved axially rearwardly thereon until it engages the flange 25. The clasp 30 also includes the radially extending arm 33 which is provided with a guide opening 34, the axis of which is spaced from but parallel to the axis of the barrel 20 when the clasp is mounted thereon. One side-wall of this opening is notched or slotted at 35 to provide the depending upper lug 36 and the lower rounded corner 37. As will be understood more fully later, the slot 35 is provided for facilitating insertion or removal of the control bar 31 in the clasp 30 to thereby permit easy insertion of the plunger 21 in the barrel 20, and quick removal from the barrel for the usual cleaning and sterilization without changing the adjustment or setting of the control. The slot 35 (Figure 5) is of greater height than the thickness of the bar 31 to permit the bar to pass laterally therethrough. The clasp 30 is provided with the radially disposed finger grips 39 extending from opposite sides thereof. These are shown of closed oval form but could be of open semi-circular form. They are in a plane at right angles to the upstanding guide arm 33.

The control bar 31 is a flat bar of suitable spring metal which is provided at its rear end with a plunger-engaging yoke 40. This yoke 40 has a spring clasp yoke portion 41 which will straddle and clasp around the neck 26 of the plunger 21, as shown in Figure 3. It is also provided with a flat disk-like portion 42 which will engage the flat rear side of the head 27 of the plunger. It will be noted that yoke 40 is connected integrally with the bar 31 and that the connection is made by spring means integral with the bar and yoke so that the forward end of the bar 31 will tend to swing outwardly (Figures 3 and 6) so that the bar will normally be angularly disposed relative to the axis of the plunger 21, as shown in Figure 3.

Adapted to be mounted on the control bar 31 ahead of the clasp arm 33, when my control arrangement is assembled, is a stop member 44 which is adjustable along the control bar. This stop member 44 is provided with an opening 45 through which the end of the control bar may be passed. A set screw 46 carried by the stop member 44 and extending into the opening 45 is used for

setting the stop in any selected position along the control bar 31. To prevent slipping of the stop 44 off the end of the bar 31, it is upturned at its extreme end to form a stop 47. It will be understood that the stop member 44 will be mounted on the bar 31 before its end is upturned at 47.

It will be apparent from the above description that the combination finger grip and guide clasp 30 can be mounted on the barrel 20 merely by slipping it axially inwardly over the barrel from its forward end with a twisting action until it engages the barrel flange 25 at the rear end thereof. The control bar 31 is clasped to the rear end of the plunger 21 by similarly forcing the yoke structure 41 radially inwardly around the neck 26 while positioning the disk portion 42 in juxtaposition with the outer surface of the head 27 of the plunger. Thus, at this time the guide clasp 30 will be on the barrel as shown in Figure 2 and the control bar 31, with the stop member 44 thereon, will be on the plunger 21 as shown in Figure 3. An operating spring 48 of the compression type is also mounted in surrounding relationship to the plunger 21 in engagement with the head 27 thereof and it will be noted from Figure 3 that even in its extended position the spring is somewhat shorter than the plunger.

The two parts of the syringe with the control parts thereon may now be assembled. The forward end of the plunger 21 is slipped slightly into the rear end of the barrel 20 until stopped by the outer end of the uncompressed spring 48. The control bar 31 at this time is located so that it extends forwardly beyond the arm 33 and at the side of the slot 35. Then, by pressing downwardly on the control bar 31 and turning the plunger 21 (clockwise as viewed from the rear end of the syringe), it can be slipped laterally through the slot 35. It will be understood that the bar 31 will swing in a slight arc and the lower corner of the slot 35 is provided with the radius 37 to prevent binding of the bar 31 when it is slipped laterally through the slot 35. When the lateral swinging movement is stopped by the full sidewall 38 of the opening 34, the downward pressure on the bar 31 is released and it is allowed to spring out into contact with the upper edge of the opening 34, at which time it will be positioned between the lug 36 and the opposite wall 38. The control bar 31 now rides against the uppermost part of guide opening 34. It will be understood that the width of the bar 31 is slightly less than the width of the opening 34 and that its thickness is substantially less than the height of this opening. Also, at this time the stop 44 will be ahead of the guide arm 33 of the clasp 30 and the spring 48 will still be uncompressed provided the stop member 44 is positioned near the end of control bar 31.

As previously indicated, the provision of the slot 35 in the one sidewall of the guide opening 34 will permit quick and easy removal of the control bar 31 therefrom, so as to permit removal of the plunger 21 from the barrel 20, for the usual cleaning and sterilizing, and without changing the setting or adjustment of the gauge. Ordinarily, the bar 31 will be positioned in the opening 34 between the depending lug 36 and the other wall 38, of the opening 34. However, to remove the bar 31 from the guide clasp, it is merely necessary to press down on the bar with the index finger until it is below the lower end of the lug 36 at which time the plunger 21 is turned in the proper direction in the barrel 20 (counter-clockwise as viewed from the rear end of the syringe) so that the control bar 31 will swing outwardly through the slot 35. As the bar 31 swings outwardly, it again swings in an arc but the radius 37 prevents binding. The plunger 21 can now be slipped completely from the barrel 20. Reinsertion of the plunger 21 into the barrel 20 can be made as indicated above and without disturbing the setting of the stop 44 on the bar 31.

The assembled syringe will appear as shown in Figures 1 and 7. The dose control is then set by the veterinarian by first moving the plunger 21 in the barrel 20 until the

forward end of the plunger aligns with the calibration 24 of the barrel indicating the proper dose for that particular animal. He then moves the stop 44 on the bar 31 until the rear edge of the stop contacts the forward surface of the arm 33 of the clasp 30. He then tightens the set screw 46 to hold the stop member 44 in a fixed adjusted position so that withdrawal of the plunger 21 from the barrel 20 is limited to the position set and, therefore, filling of the syringe is limited to the exact dosage prescribed. He then grasps the syringe by inserting the index and middle fingers into finger grips 39 and engages the disk portion 42 on the plunger head with the thumb. The next step is to insert the needle 23 into the rubber cap of the vial or container for the liquid medicament, and force the plunger 21 inwardly with the thumb as far as possible into the barrel 20 as shown in Figure 8. At this time the spring 48 is compressed. This forces substantially the same volume of air into the sealed vial as the volume of liquid to be withdrawn. This prevents a vacuum or pressure in the vial and thereby avoids suction or pressure against the plunger. As soon as pressure on the plunger with the thumb is relaxed, the plunger 21 will be forced rearwardly by expansion of the spring 48 as shown in Figure 9 until the rear edge of the stop 44 engages the forward surface of the arm 33 of the guide clasp 30. At this time, the predetermined prescribed supply of liquid will have been drawn into the barrel 20 of the syringe. The needle 23 is now withdrawn from the container and inserted for injection, which is accomplished by pushing forwardly on the plunger 21, as indicated in Figure 10, against the action of the spring 48. All of these operations can be performed with one hand while the veterinarian has the other hand free to hold an animal.

It will be apparent that this syringe can be manipulated with one hand and the correct dose can be administered even though the veterinarian is distracted by movement of the animal since it will be dependent upon the setting of the stop 44 on the control bar 31. The clasp 30 will cooperate with the stop member 44 to limit the amount of liquid medicament pulled into the syringe barrel, prior to the injection, to the exact dose previously decided upon by him. The rearwardmost position of the clasp 30 on the barrel 20 is determined by the flange 25 of the barrel. This insures that the arm 33 of the clasp 30 will always be so positioned that when it is engaged by the stop 44, the bar 31 will be stopped at the proper position as the plunger 21 is withdrawn. This makes certain that the exact dose for which the control is set will be administered. The upper edge of the guide hole 34 in the radially extending arm 33 of the clasp 30 is located radially beyond the outermost edge of the barrel flange 25 to allow the control bar 31 to function without binding on the barrel flange 25 regardless of the circumferential position of the arm 33. The clasp 30 is made of metal of sufficient springing qualities that it is adaptable to a wide range of syringe barrels even though the diameter of the barrels may vary considerably. The control bar 31 is so constructed as to have an outward tension to cause the proper amount of friction on the upper edge of the guide hole 34. This prevents the plunger 21 from moving too freely, but permits easy operation of the plunger. Loss of liquid, due to accidental forward movement of the plunger while preparing for an injection, is prevented by the spring 48. The guide arm 33 also cooperates with stop member 44 to prevent farther backward movement of the plunger 21, thereby precluding the withdrawal of air into the syringe barrel while preparing to make the injection. Furthermore, because of the provision of the stop 44 and the clasp 30, it will be impossible for the plunger 21 to accidentally fall from the barrel 20 which might cause breakage of the plunger. The yoke 40 is so constructed and of metal of sufficient springing qualities that it is adaptable to the plungers of a wide range of

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syringes. The disk-like portion 42 of the yoke 40 fits against the head of the plunger 21 in such a manner that the proper relationship between the plunger 21 and the control bar 31 is maintained always which, in turn, will maintain the proper relationship between the plunger and the barrel. Thus, the proper dosage is maintained in accordance with the setting of the control. The construction of the yoke 40 with its disk 42 is such that any strain occurring during the operation of the plunger 21 is placed on the head of the plunger. Thus, the danger of breaking the neck 26 of the plunger, which is its weakest part, is eliminated.

Because the guide opening 34 in the arm 33 is slotted at 35, the quick disassembly and reassembly of the plunger and barrel of the syringe, for cleaning and sterilizing is possible without disturbing the dosage setting of the stop 44 on the bar 31 which eliminates the necessity of resetting the control when the same dosage is to be administered. My syringe device is relatively simple and inexpensive to make having a minimum number of parts and can be attached to or removed from the syringe with ease.

Various other advantages will be apparent from the preceding description, the drawings and the following claims.

Having thus described my invention, what I claim is:

1. A hypodermic syringe comprising a barrel and a plunger movable therein, a control on the syringe, said control comprising a guide member mounted on the barrel of the syringe and having a guide opening therein, a control member mounted on the plunger of the syringe and passing through the guide opening of said guide member longitudinally substantially parallel to the axis of said barrel, and a stop member on the control member positioned to engage the guide member adjacent said opening when the plunger is retracted relative to the barrel so as to predetermine the amount of liquid which can be pulled into the barrel of the syringe by the retracting movement of the plunger, a compression spring surrounding said plunger and engaging portions of said barrel and said plunger to normally retract said plunger, said stop member being adjustably mounted on the control member to permit setting of it at different positions longitudinally of the control member, said guide opening having a slot in one of its walls to permit lateral movement of the control member through the slot into or out of said opening, said guide member being provided with finger-engaging portions.

2. The combination of claim 1 in which the guide member has a portion engaging the barrel of the syringe and a radially disposed guide arm having said guide opening therein, and the said control member is in the form of a bar passing through said guide opening, said slot being of greater height than the thickness of the control bar to permit said bar to pass readily there-through.

3. The combination of claim 2 in which the control bar has its rear end connected to the plunger and its forward end free from the plunger, spring means tending to move the free end of the bar outwardly in frictional engagement with said opening, said stop member having an opening through which the bar extends, and a set screw extending into said opening, said slot providing a depending lug at the upper end of the opening and the bar being normally located between said lug and the opposed wall of the opening.

4. A hypodermic syringe according to claim 3 in which the control bar has a stop on its outer end to prevent movement of the adjustable stop member off such end.

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5. The combination of claim 4 in which the lower end of the slot is rounded to permit lateral passage of the bar through the slot without binding when said plunger is rotated in said barrel.

6. The combination of claim 5 in which the portion of the guide member which engages the barrel includes an arcuate arm portion which yieldingly engages the barrel and contacts a flange at the rear end of the barrel to prevent further rearward movement on the barrel.

7. The combination of claim 6 in which the rear end of the gauge bar has a spring clasp portion which removably engages the head of the plunger.

8. The combination of claim 7 in which the spring clasp portion engages the neck of the plunger and has a disk-like portion that engages the rear surface of the head on the plunger.

9. A hypodermic syringe comprising a barrel and a plunger movable therein, a control on the syringe, said control comprising a guide member mounted on the barrel of the syringe and having a guide opening therein, a control member mounted on the plunger of the syringe and passing through the guide opening of said guide member longitudinally substantially parallel to the axis of said barrel, and a stop member on the control member positioned to engage the guide member adjacent said opening when the plunger is retracted relative to the barrel so as to predetermine the amount of liquid which can be drawn into the barrel of the syringe by the retracting movement of the plunger, a compression spring surrounding said plunger and engaging portions of said barrel and said plunger to normally retract said plunger, said stop member being adjustably mounted on the control member to permit setting of it at different positions longitudinally of the control member, and finger-engaging portions on the barrel, said guide member having a portion engaging the barrel of the syringe and a radially disposed guide arm having said guide opening therein, and the said control member being in the form of a bar passing through said guide opening.

10. The combination of claim 9 in which the control bar has its rear end connected to the plunger and its forward end free from the plunger, spring means tending to move the free end of the bar outwardly in frictional engagement with said opening, said stop member having an opening through which the bar extends.

11. A hypodermic syringe according to claim 10 in which the control bar has a stop on its outer end to prevent movement of the adjustable stop member off such end.

12. The combination of claim 11 in which the portion of the guide member which engages the barrel includes an arcuate arm portion which yieldingly engages the barrel and contacts a flange at the rear end of the barrel to prevent further rearward movement of the barrel.

13. The combination of claim 12 in which the rear end of the gauge bar has a spring clasp portion which removably engages the head of the plunger, and the spring clasp portion has a disk-like portion that engages the rear surface of the head on the plunger.

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