

Jan. 20, 1959

K. A. RATCLIFF ET AL

2,869,543

INJECTOR

Filed Aug. 23, 1957

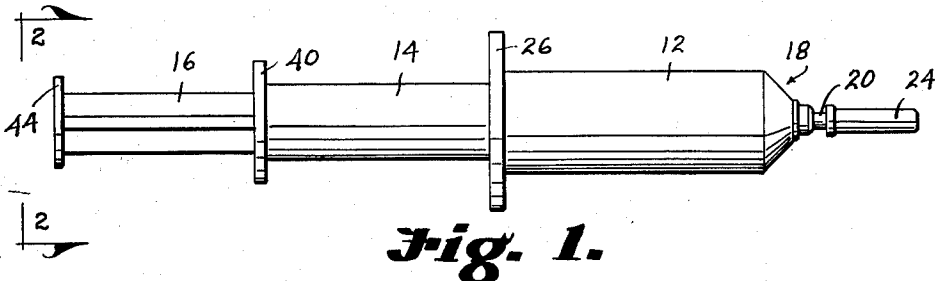


Fig. 1.

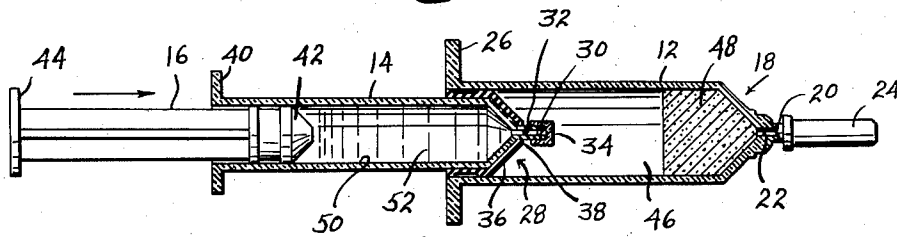


Fig. 3.

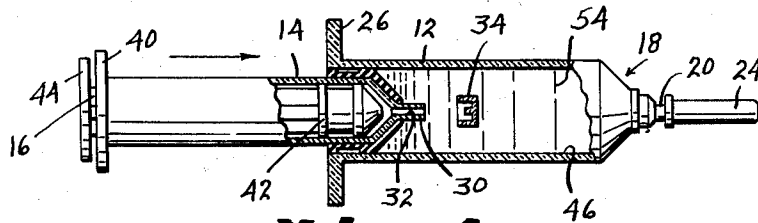


Fig. 4.

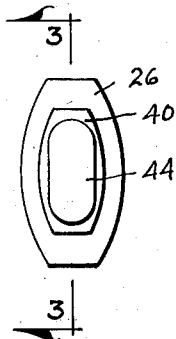


Fig. 2.

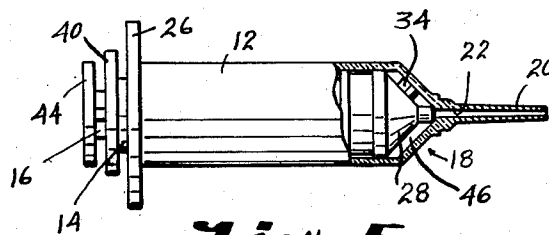


Fig. 5.

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1

2,869,543

INJECTOR

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Application August 23, 1957, Serial No. 679,869

5 Claims. (Cl. 128—218)

Our invention relates to improvements in injectors used in the administration of medicaments and while it was particularly designed for treatment of mastitis in cows requiring injection into the udder, its use is not limited thereto as will later appear.

As presently practiced in the treatment for mastitis in cows a prepared powder compound is packaged ready for use in a syringe or injector type apparatus. Such compound not being stable in a water solution is suspended in an oil solution to properly maintain it for use over a reasonable period of storage or shelf life. Experience has demonstrated that the use of an oil solution has certain undesirable effects relative to the cow's milk which are not here material but which is mentioned to better understand the nature and purpose of this invention.

Having made the above observation over a long period of time it is one of the important objects of this invention to provide an injector for medicaments which includes means to store a medicinal compound in powder form, a reservoir for holding a suitable diluent or solvent for the powder, means to mix the powder and diluent when desired and means for ejecting the same.

Another object contemplated by this invention is the provision of an improved injector of the above class that is compactly formed, easy to use, and sufficiently economical in construction so that it can be discarded after being used.

Other objects and advantages of this invention reside in the details of construction and correlation of the various parts and will be apparent as the description proceeds.

This invention consists of novel parts and combination of parts to be hereinafter described whereby the objects set forth are attained, as pointed out in the claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view showing this injector ready for use,

Fig. 2 is an end view thereof taken from the line 2—2 of Fig. 1,

Fig. 3 is a longitudinal section view taken on the line 3—3 of Fig. 2,

Fig. 4 is a side elevational view of this injector showing one plunger moved to position for causing the admixture of powder and diluent as indicated by the part of this view in section,

Fig. 5 is a side elevational view partly in section showing the final position of the plunger units after the solution has been ejected.

Referring to the drawings and describing first the injector shown in Figs. 1-5 inclusive, our invention includes a first cylindrical barrel 12, a second cylindrical barrel 14 concentrically smaller than barrel 12 and slidably disposed therein and a plunger rod 16 slidably disposed in barrel 14. The outlet end 18 of barrel 12 is tapered to a funnel shape as shown and terminates in a projecting hollow needle member 20 which communicates with the interior of barrel 12 by the bore 22. A

2

removal cap 24 is provided for needle 20. The other end of barrel 12 is formed with a flange 26 projecting perpendicularly from the perimeter thereof in at least two opposite directions to provide a suitable finger gripping means in the use of this injector as is well known in the art.

Barrel 14 is formed generally similarly to barrel 12 including the funnel like outlet end 28 which terminates in the relatively short or stub hollow discharge spout 30 that communicates with the interior of barrel 14 by passageway 32. A removable cap 34 is provided for the end of spout 30 (Fig. 2) and a suitable flexible gasket or washer of rubber or the like 36 shaped to conform with the outlet end 28 of barrel 14 is mounted on such end as shown. Such gasket has a central opening 38 through which spout 30 extends and the purpose of such gasket is to provide a sealing contact between end portion 28 of barrel 14 and the inner wall surface of barrel 12. A flange 40 on the other end of barrel 14 is provided as shown in Fig. 2.

Plunger rod 16 (Fig. 3) is slidably disposed in barrel 14 in the same relationship thereto as barrel 14 is relative to barrel 12 and carries means 42 on its lower end or head for sealing engagement with the inner wall surface and outlet end of barrel 14. Such means 42 may be in the form of a rubber washer or cap or circumscribing ribs or the like as is well known in the art and no invention is claimed therefor per se. On the other end of rod 16 is the flange like push plate 44.

This injector as disclosed and described is used in the following manner. It is packaged prepared for use and in such form will be substantially as shown in Fig. 3 where barrel 14 is partially inserted into barrel 12 so as to provide the closed chamber 46 therein. Cap 34 is in place on spout 30, cap 24 is on needle member 20 and a supply of the medicament to be used in powder form 48 is placed within chamber 46 within the outlet end 18 of barrel 12. Plunger rod 16 is partially inserted into barrel 14 forming the closed chamber 50 therein in which is placed a supply of the diluent 52 for powder 48. For our particular use in treating mastitis in cows we have used an aqueous diluent for the reasons above mentioned, but it will be understood that the particular use for which we have designed this injector is merely illustrative and accordingly the diluent to be used may be of any type suitable to the particular medicament employed. In this form this injector is loaded ready for use which is accomplished by first pushing plunger rod 16 to its full depth within barrel 14 as shown in Fig. 4, whereby the compression of the diluent 52 under the head of the piston forcibly ejects cap 34 from spout 30 and at the same time expels the diluent 52 from chamber 50 of barrel 14 into chamber 46 of barrel 12 where it mixes with powder 48 and places it in solution 54. While such action will generally mix the powder 48 and diluent 52 satisfactorily, the injector at this point can be further shaken by hand, if desired. Cap 24 is then removed, needle 20 inserted as the circumstances require and barrel 14 plunged into barrel 12 in a well known manner to forcibly move the solution 54 through the needle 20. Cap 34 will remain within chamber 46 as shown in Fig. 5.

It is submitted that the invention shown and described is aptly suited to achieve the purposes intended and is characterized by a combination of highly useful and mutually cooperating elements that combine their respective and proportionate functions in accomplishing the objects sought to be obtained.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made

3

within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

We claim:

1. An injector device for administering a medicament, comprising a first cylindrical barrel, a hollow needle member projecting from one end thereof and in communication with the interior of said barrel, a second cylindrical barrel slidably disposed within said first barrel and positionable so as to form a chamber within said first barrel designed to hold a supply of a powdered medicament, a removable cap on said second barrel within said chamber to close communication between said chamber and the interior of said second barrel, a plunger rod slidably disposed within said second barrel and positionable therein to form a chamber designed to hold a supply of a diluent, said plunger rod movable within said second barrel to compress said diluent whereby said cap on said second barrel is forcibly ejected into the chamber of said first barrel and causing the diluent to be injected into the chamber of the first barrel to become admixed with the medicament powder, and said second barrel serving as a plunger member movable into said first barrel to eject the mixed solution from both barrels through said needle member.

2. An ejector device for administering a medicament, comprising a first cylindrical barrel having a reduced outlet end, a second cylindrical barrel slidably disposed within said first barrel and positionable so as to form a chamber within said first barrel designed to hold a supply of a powdered medicament, a removable cap on said second barrel within said chamber to close communication between said chamber and the interior of said second barrel, a fluid sealing means on said second barrel engaging the inner wall of said first barrel, a plunger rod slidably disposed within said second barrel and positionable therein to form a chamber designed to hold a supply of a diluent, a fluid sealing means on said plunger rod engaging the inner wall of said second barrel, said plunger rod movable within said second barrel to compress said diluent whereby said cap on said second barrel is forcibly ejected into the chamber of said first barrel and causing the diluent to be ejected into the chamber of the first barrel to become admixed with the medicament powder, and said second barrel serving as a plunger member movable into said first barrel to eject the mixed solution from both barrels through said needle member.

3. An injector device for administering a medicament, comprising a first and second cylindrical barrel in telescopic relationship, said second barrel being movable within the first, each barrel having a reduced outlet end with such end for said second barrel being disposed within said first barrel, a removable cap for each respective outlet end, each barrel defining a chamber for storage of

4

separate parts of a medicament to be administered, a plunger in said second barrel movable to compress the contents thereof sufficient to eject the cap therefrom into said first barrel and thus ejecting the contents of said second barrel into said first barrel for admixture with the contents of said first barrel, and said second barrel serving as a plunger movable in said first barrel to eject the admixed contents of both barrels through the outlet end of said first barrel.

4. An injector device for administering a medicament, comprising a first and second cylindrical barrel in telescopic relationship, said second barrel being movable within the first, each barrel having a reduced outlet end with such end for said second barrel being disposed within said first barrel, a removable cap for each respective outlet end, each barrel defining a chamber with the chamber in said first barrel designed for storage of a powdered medicament and the chamber in said second barrel designed for storage of a suitable diluent for said powder, a plunger in said second barrel movable to compress the diluent therein sufficiently to eject the cap from the outlet of said barrel and thus ejecting said diluent into said first barrel for admixture with the powder therein, and said second barrel serving as a plunger movable in said first barrel to eject the admixed contents of both barrels through the outlet end of said first barrel.

5. An injector device for administering a medicament of the type consisting of a compound in powder form to be placed in solution with a suitable diluent, said device designed to store said powder and diluent separately until ready for use and to be capable of admixing and ejecting the same and including in combination a barrel for storage of the medicament in powder form, said barrel having an outlet end, a hollow plunger movable in said barrel and provided with an outlet end disposed within said barrel, a removable cap on the outlet end of said hollow plunger, said plunger designed for storage of a suitable diluent, a second plunger slidably disposed in said hollow plunger and serving to seal the other end thereof, said second plunger slidable in said hollow plunger toward the outlet end to compress the contents of said hollow plunger sufficiently so as to eject said cap into said barrel and thereby ejecting the contents of said hollow plunger into said barrel for admixing with the contents therein, and said second plunger movable into sealing engagement with the outlet end of said hollow plunger whereby said hollow plunger is movable in said barrel to eject the admixed contents through the outlet end thereof.

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