Nov. 14, 1950 H. S. DARLINGTON 2,529,836

APPLICATOR FOR TREATMENT OF DISEASES OF THE UDDER

Filed Feb. 20, 1950

Fig. 1.

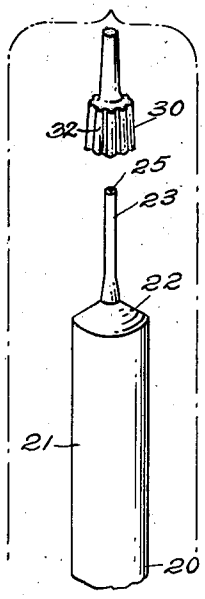


Fig. 2.

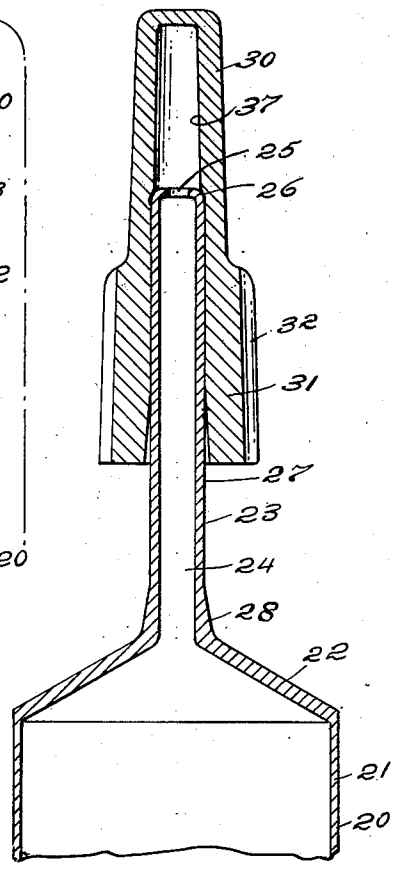


Fig. 3.

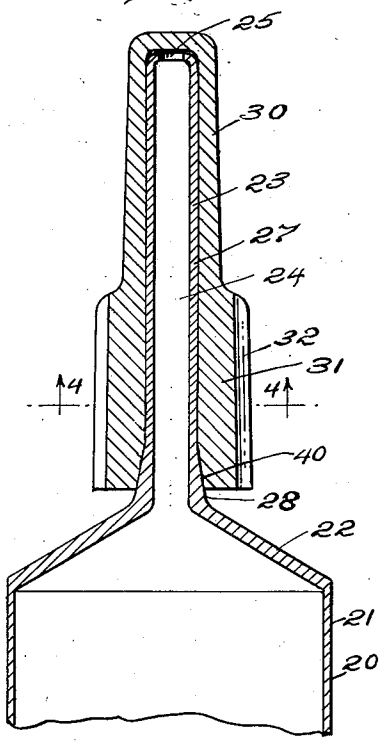


Fig. 5.

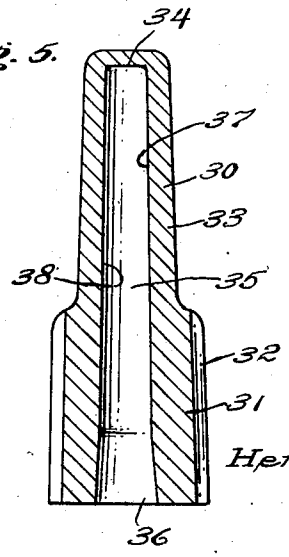
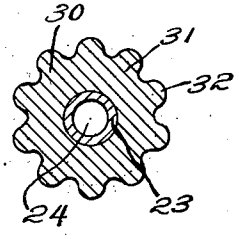


Fig. 4.



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APPLICATOR FOR TREATMENT OF DISEASES OF THE UDDER

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Application February 20, 1950, Serial No. 145,241

3 Claims. (Cl. 128—261)

1

The present invention relates to applicators for treating mastitis and other diseases of the udder in cattle.

A purpose of the invention is to avoid injury to the udder of a cow in injecting through the teat penicillin ointment, or amycin ointment, or other medicines for treatment of mastitis or other diseases of the udder.

A further purpose is to close the tip of an applicator without employing threads or other sharp or rough surfaces which could abrade or irritate the teat.

A further purpose is to seal the applicator effectively when not in use by frictional engagement of an elastomeric cap to the tip, preferably by a taper of the inside of the cap converging toward the closed end.

A further purpose is to make a dust seal around the end of the cap adjacent the shoulder of the tube to protect the tip against contamination.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate one only of the numerous embodiments in which my invention may appear, selecting the form shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a fragmentary perspective showing the applicator tube and the cap removed therefrom.

Figure 2 is an enlarged fragmentary axial section of the applicator with the cap partially applied thereto.

Figure 3 is a view corresponding to Figure 2 with the cap fully applied.

Figure 4 is a section of Figure 3 on the line 4—4.

Figure 5 is an axial section of the cap free from the tip.

Describing in illustration but not in limitation and referring to the drawings:

Diseases of the udder in cattle, particularly mastitis, have become very prevalent, so much so that it is estimated that one-third of the cattle in the United States are infected with mastitis. The teat canal has a very tight constriction near the outer end, extending for a length of from ¼ to ¾ inch, depending on the breed of cattle, and then enlarging into a cavity in which the infection is likely to be present. Penicillin ointment, or amycin ointment and other ointments have been successfully used in treating mastitis by injecting the ointment through the teat into the cavity beyond the teat. The application of the ointment has, however,

2

been a serious problem as the dose required is large, often being 7.5 grams for each teat. Efforts have been made to use collapsible tube applicators having elongated tips, provided with threaded ends which receive a cap. These have caused irritation and abrasion of the teat canal and this effect appears to be due to the comparatively sharp nature of the threads on the tip of the applicator.

The present invention is designed to overcome this difficulty by providing an applicator which is smooth and free from abrading surfaces, and which nevertheless can be adequately sealed by a cap and kept sterile. The present invention offers the further advantage that the applicator can be inserted reliably to the shoulder or to the taper which is ahead of the shoulder without danger of damage to the cow and thus the extent of insertion is self-limiting and does not require special care to avoid contact between the udder and threads or the like on the applicator.

The cap arrangement tightly conforms to the tip, and thus reliably insures clean and sterile conditions on the tip when the cap is removed.

The applicator of the invention comprises a collapsible tube 20 of any suitable material such as tin base alloy, lead base alloy or aluminum. The collapsible tube is preferably made of a size which will hold the required dosage of penicillin or other ointment for injection into one teat. The collapsible tube is provided with a skirt or side wall 21, a shoulder 22 and a tip 23 integral with the tube and extruded therewith.

The tip has an interior bore 24 terminating at the forward end in a discharge opening 25. Immediately around the discharge opening the tip has an external gradually curved or filleted portion 26 which is smooth and will not mar the teat canal.

The forward portion of the tip is externally a straight tubular portion 27 desirably of uniform outside diameter which in practice is desirably of the order of 1/8 to ⅛ of an inch in the preferred embodiment. (In a typical example the outside diameter is approximately 0.099 plus or minus 0.001 inch.) At the very end, the outside diameter may permissibly be increased slightly by 0.0005 to 0.001 inch, for example, if desired. Close to the shoulder, the straight portion 27 joins an outwardly tapering portion 28, which strengthens the tip where it joins the shoulder.

In the preferred embodiment the length of the entire tip is of the order of ¾ of an inch to 1 inch and the tapered portion extends over about the last ¼ inch of the tip toward the shoulder. The taper should be reasonably grad-

ual and in the preferred embodiment is at an angle of about 10° per side.

The tip is closed by a cap 30 of elastomeric material, preferably polyethylene, although it can be permissibly made from polyvinyl chloride, polyvinyl chloride-acetate, rubber or synthetic rubber. The resilient expansion and gripping of the cap is relied upon to hold it in place. The cap comprises a relatively thick hub 31 desirably fluted at 32 on the outside to aid in gripping, a relatively thin sleeve portion 33 and an end closure 34. An internal bore 35 runs through the cap and comprises a tapered mount 36 desirably tapering less steeply than the taper at 28 on the top (preferably tapering about 3° on a side for ¼ inch) and a more gradually tapering main bore portion 37, for example tapering 0.5° per side, from a diameter larger than the tip to a diameter smaller than the tip (where the tip outside diameter at 27 is approximately 0.099 inch the large inside diameter will desirably be about 0.107 inch and the small inside diameter at the closed end is desirably about 0.0915 inch). Thus interference between the cap and the tip will occur at some location 38 along the length of the cap and the cap must expand beyond that point. The amount of interference will vary with the design, but it has been found that good results are obtained if the inside diameter of the gripping portion of the cap is between 0.005 and 0.010 inch less than the outside diameter of the straight portion 27 of the tip. Thus it is seen that the gripping portion causes expansion of the relatively thin sleeve of the cap and tends to hold the cap in place. At the same time the mouth 36 makes a dust seal at 40 on the tapered portion of the tip when the cap is in place, keeping the entire tip sterile until the cap is removed.

As soon as the cap is removed, the applicator is ready for use as the tip is maintained clean by the cap.

In operation, when the cap is applied to the tip, it slips on rather readily until the interference at the forward end of the bore of the cap encounters the forward end of the tip. Further longitudinal force applied by the user on the cap then results in slightly expanding the sleeve portion 30 of the cap, which grips the straight portion of the tip over a length of at least ⅜ of an inch, holding the cap quite firmly in place and preventing the possibility of leakage inwardly or outwardly to the end of the cap, which might serve to contaminate the tip.

When the cap is fully in place, as shown in Figure 3, the slightly enlarged mouth of the bore of the cap engages the taper 28 on the tip and makes a dust seal.

When it is desired to use the applicator, and immediately before the applicator is to be used, the cap is taken off by pull, or pull combined with rotation. The tip is then inserted into the udder canal of the cow until it is stopped by the contact of the tapered portion 28 of the tip or the shoulder 22 of the tube with the mouth of the teat. The user then merely collapses the tube to extrude the ointment into the udder canal for the treatment of the cow. This operation is desirably repeated for each teat, a separate applicator and tube being employed for each treatment, thus avoiding the possibility of carrying infection from one teat to another and thus permitting accurate measuring of dosage, since the full contents of each tube are applied to each teat.

The tube and cap are normally thrown away after a single use.

The tube and cap of the invention, while primarily intended for udder injection, may be used for other purposes as required.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An applicator for treatment of diseases of the udder in cattle comprising a collapsible tube, a tip on the collapsible tube of unbroken smooth exterior having an externally tapered portion adjoining the collapsible tube and an elongated smooth tubular extension of uniform outside diameter from the forward end of the tapered portion clear to the end of the tip and a cap on the tip of elastomeric material comprising a thickened hub, a relatively thinner sleeve extending forward of the hub and a closed end wall on the sleeve, the hub and sleeve having an internal bore substantially as long as the tip which closely conforms to the tip throughout the length and at least in part has a free inside diameter smaller than the outside diameter of the tip.

2. An applicator for treatment of diseases of the udder in cattle comprising a collapsible tube, a tip on the collapsible tube of unbroken smooth exterior having an elongated smooth tubular extension of uniform outside diameter from near the tube clear to the end of the tip and a cap on the tip of elastomeric material comprising a thickened hub, a relatively thinner sleeve extending forward of the hub and a closed end wall on the sleeve, the hub and sleeve having an internal bore substantially as long as the tip, which bore is tapered toward the closed end of the cap, the bore closely conforming to the tip throughout the length of the tip, and the bore at least in part having a free inside diameter smaller than the outside diameter of the tip.

3. An applicator for treatment of diseases of the udder in cattle comprising a collapsible tube, a taper on the collapsible tube of unbroken smooth exterior, having an elongated smooth tubular portion of uniform outside diameter extending from a point near the tube to the end of the tip and a cap on the tip of elastomeric material comprising a thickened hub, a relatively thinner sleeve extending forward of the hub and a closed end wall on the sleeve, the hub and sleeve having an internal bore substantially as long as the tip, the bore closely conforming to the tip throughout the length and the bore having inside the sleeve toward the end of the cap remote from the hub a free inside diameter which is slightly smaller than the outside diameter of the tip, whereby the cap is held in place by expansion of the sleeve.

HENRY SAULNIER DARLINGTON.

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