April 7, 1964 G. B. SMITH 3,127,894

METHOD OF MEDICINE ADMINISTRATION AND DEVICE THEREFOR

Filed Sept. 26, 1960

Fig. 1.

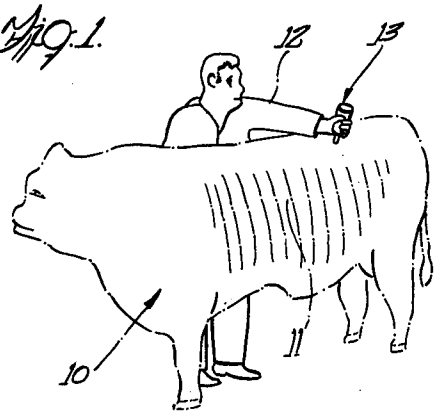


Fig. 2.

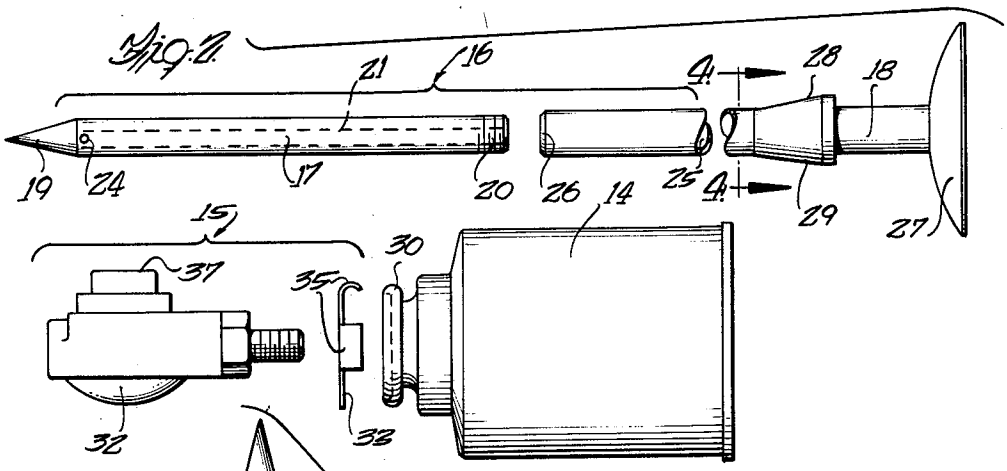


Fig. 3.

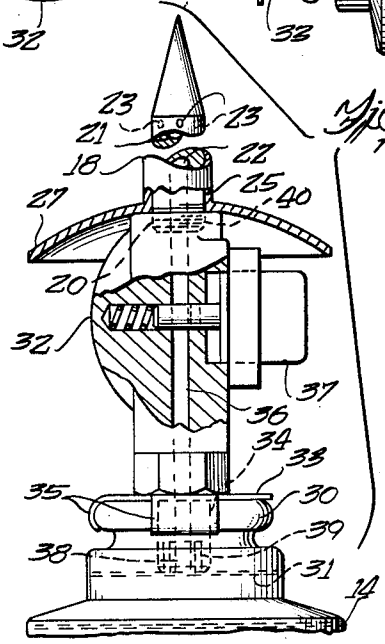
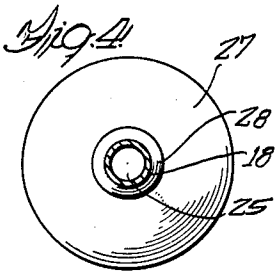


Fig. 4.



Inventor
Gail B. Smith
Dawson, Dillon, Dallow & Longmuir
Attorneys

United States Patent Office

3,127,894

Patented Apr. 7, 1964

3,127,894

METHOD OF MEDICINE ADMINISTRATION AND DEVICE THEREFOR

Gail B. Smith, 622 11th St., Ames, Iowa

Filed Sept. 26, 1960, Ser. No. 58,258
5 Claims. (Cl. 128—347)

This invention relates to a method of medicine administration and a device therefor, and, more particularly, a procedure and device which utilizes pressurized gas as a propellant for the medicine.

Exemplary of the utility of the invention is the treatment of bloat in ruminants. The bloat in ruminants, particularly the bovine species, usually occurs by the accumulation of gas or foam within the rumen or first stomach. The quantity of gas and/or foam that accumulates causes distention of the rumen, and the animal swells, most prominently on the left side. The degree of bloat can become severe and even result in death. Various intermediate conditions of bloat occur, but the seriousness of the condition is underscored by the fact that the conditions may become severe in short order, i.e., the amount of time elapsing between initial and terminal stages being less than an hour.

Several varieties of bloat are frequently encountered, one being the so-called "feed-bloat," which is characterized by a pocket of gas usually localized at the top of the rumen and which results from dry-lot feeding. Another variety is "frothy-bloat," which is characterized by the existence of more of a foam or froth in the rumen rather than a discrete gas pocket, this usually resulting from leguminous pasture feeding or new growth feed in general. Also encountered are combinations of the two varieties.

In the past, treatment of bloat has been laborious, requiring the use of syringes, stomach tubes, special medicines or detergents, etc., and further, unsatisfactory, since there was no guarantee that the treatment would be successful. Again, the importance of success in the treatment is underscored by the short time that elapses between various stages. It would, therefore, be desirable to provide a way of treating bloat, particularly bloat that is characterized by the presence of certain amounts of stable foam, that would be uniformly successful, and which would be effective in a short period of time. Such constitutes an object of this invention.

Another object of the invention is to provide a method and device for the administration of medicine, particularly a gas-propelled medicine such as would be initially provided in an aerosol-type container. Still another object is to provide a method and device for the administration of a therapeutic agent to be introduced into the body body of a mammal, i.e., a ruminant, which employs a trocar, or like penetrating instrument, coupled to an aerosol container providing the agent. Yet another object is to provide a method and device employable for introducing a therapeutic agent into the body of a mammal which utilizes a unique trocar. Other objects and advantages of the invention may be seen in the details of construction and operation set forth in this specification.

The invention will be explained in conjunction with an illustrative embodiment in the accompanying drawing, in which—

FIG. 1 is a perspective view of an animal being treated in accordance with the teachings of this invention;

FIG. 2 is an exploded side elevational view of a device embodying teachings of the invention and which is shown in use in FIG. 1;

FIG. 3 is an enlarged fragmentary cross-sectional view of the device seen in FIG. 2; and

FIG. 4 is an enlarged sectional view of a portion of the device of FIG. 2 and as would be developed by sighting along the line 4—4 of FIG. 2.

In the illustration given, the numeral 10 designates generally a ruminant, specifically a steer which is suffering from bloat as characterized by the distended paralumbar fossa 11. A veterinarian 12 is seen holding a device generally designated 13 which is adapted to administer a therapeutic agent for the relief of the bloat condition.

The device 13, as seen in FIG. 2, includes an aerosol container 14, an adapter generally designated 15, and a trocar generally designated 16. The trocar 16 includes as elements thereof the trocar knife 17 and the trocar cannula or sheath 18. The trocar knife 17 is equipped with a penetrating point 19 at the proximal end thereof and a threaded portion 20 at the distal end thereof, the terms "proximal" and "distal" being used in relation to the animal 10 being treated.

As can be seen in FIG. 3, the knife 17 is equipped with an elongated, longitudinally-extending passage 21 which opens into the distal end as at 22. The proximal end of the passage 21 terminates in radially-disposed branches 23, one of which is seen as an opening 24 in FIG. 2. Thus, a spray pattern of fluid issuing from the trocar knife 17 is achieved.

The trocar sheath or cannula 18 is seen to be essentially tubular in construction and, like the trocar knife 17, is equipped with a longitudinally-extending passage 25 (see FIG. 4). The proximal end of the cannula 18 is tapered as at 26 to tightly grip the trocar knife, and the distal end of the sheath 18 is equipped with a dished or cup-shaped annular flange 27. Intermediate the proximal and distal ends of the sheath 18, the sheath 18 is equipped with an annular hub 28. The hub 28 is smaller in diameter than the flange 27 and is gradually tapered toward the proximal end of the sheath, the taper being clearly seen in FIG. 2 and designated by the numeral 29. The hub 28 is spaced from the flange 27 a distance of the order of about one inch, so that the sheath 18 is substantially immobilized in position in the wall of the animal's rumen and is maintained in a given position irrespective of the wall distention and contraction.

The aerosol container 14, as seen in FIGS. 2 and 3, is of the conventional type and interiorly is filled with an aerosol gas or propellant such as nitrous oxide, carbon dioxide, etc. The mouth or discharge end of the container 14 is equipped with a ring or bead 30. Centrally of the ring 30, the container is closed by a top wall 31 which is puncturable to discharge the contents of the container 14.

The adapter fitting 15 is seen to include a valve-equipped portion 32 and a coupling portion 33. The coupling portion 33 is centrally apertured and threaded as at 34 and is equipped with curved prongs or gripping elements 35 (see FIG. 2). The gripping elements 35 are spaced apart to clamp the ring 30 at three positions after the portion 33 has been laterally slid or fitted thereon.

The valve-equipped portion 32 is seen to include a flow passage 36 which communicates at one end with the interior of container 14 and at the other end with the flow pass 21. A valve stem 37 is slidably mounted within the portion 32 and is spring-urged out of register with the passage 36. The passage 36, at its distal end, is equipped with a member 38 adapted to puncture the top wall 31 of the container 14. Disposed about the element 38 is a circular gasket 39 which effects a seal between the top wall 31 and the distal end of the portion 32. The proximal end of the portion 32 is equipped with female threads as at 40 for the threadable receipt of the trocar knife 17.

In the operation of the device, the coupling portion 33 is first applied to the ring 30 of aerosol container 14. The aerosol container 14 may include such therapeutic agents as a heavy alcohol, an oil, or a detergent-type agent for the treatment of bloat. Representative therapeutic agents currently employed include Pfizer's Blo-Trol and National Laboratories' Carmoil. With the lugs or gripping members 35 being installed under the ring 30, the adapter element 32 is threadedly received within the threaded aperture 34 to a point where puncture of the top wall of the aerosol container 14 is achieved. The valve stem 37 being in a non-depressed condition, prevents efflux of the medicine and propellant from the container 14. Thereafter, the trocar knife 17 may be threadedly engaged with the adapter element 32, and, if the same has not already been installed, the trocar sheath 18 mounted over the trocar knife 17.

Thereafter, the operation indicated in FIG. 1 is achieved, wherein the trocar 16 is inserted into the rumen of the animal 10, this usually being achieved at the high point so as to communicate with any pocket of entrapped gas. After the trocar has been inserted so that rumen wall is positioned between the hub 28 and the flange 27, the valve stem 37 is depressed to permit the propellant in the container 14 to expel the therapeutic agent into the rumen 11. Thereafter, the container 14, along with the intercommunicating and coupled adapter 15 and trocar knife 17, is removed from the site of administration, the trocar sheath 18 remaining in place. Thus, any entrapped gas rapidly issues from the rumen through the now-installed trocar sheath, and further the gas resulting from the breakdown of any froth or foam finds a convenient discharge outlet via the trocar sheath 18.

I have found that utilization of a propellant-fortified therapeutic agent is effective to breakdown a froth or foam in less than an hour, whereas previous treatments of similarly afflicted animals required a course of treatment extending over six hours, with administration being repeated several times. Helpful in achieving the speed and uniformity of the treatment is the dispersion of the agent achieved through the combination therewith of the aerosol propellant and the radial type exit passages 23. Thus, a thorough mixing of the medication in the ruminant's rumen contents is achieved, the sheath or cannula or the trocar being locked in place, which prevents it from being misplaced or discharged by normal rumen traction. The invention may also be used to advantage where it is desired to inject an agent into the peritoneum.

While, in the foregoing specification, I have set forth a detailed description of an embodiment of the invention for the purpose of explanation thereof, many variations in the details herein given may be made by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In a method of medicine administration for the treatment of bloat, the steps of providing medicine in a pressurized container containing a gaseous propellant to expel the medicine into the body of a mammal, affixing one end of a flow passage-equipped trocar knife having a removable cannula to said container, inserting the other end of the cannula equipped trocar into the body of a mammal to be treated, introducing gas and medicine into said mammal through said trocar knife, and removing said knife from said cannula.

2. The method of claim 1 in which the said trocar knife is inserted into the rumen of a steer.

3. In combination, an aerosol medicine container, an outlet fitting mounted on said container and having a flow passage communicating with the interior of said container, and an elongated puncturing member having one end coupled to said fitting, said member comprising a trocar knife and a trocar cannula slidably mounted on said trocar knife, said knife being coupled to said fitting and equipped with a longitudinally extending flow passage communicating with said fitting, the other end of said knife being equipped with a puncturing point and with opening means for discharge of fluid from said longitudinally-extending flow passage.

4. The structure of claim 3 in which said cannula at said one end is equipped with an annular flange, said cannula being additionally equipped with a hub adjacent to but spaced from said flange, the space between said hub and flange being of the order of about one inch whereby said sheath is adapted to be substantially immobilized in position in the rumen wall of a mammal.

5. In a method of administering medicine, the steps of providing medicine and a gaseous propellent in a pressurized container, affixing one end of a flow passage-equipped trocar knife having a removable cannula to said container, inserting the other end of the cannula-equipped trocar into the body of a mammal to be treated, introducing said gaseous propellent and medicine into said mammal through said trocar knife, and removing said knife from said cannula.

References Cited in the file of this patent

UNITED STATES PATENTS

2,256,942	Duffy	Sept. 23, 1941
2,662,523	Badan	Dec. 15, 1953
2,970,399	Frohlich et al.	Feb. 7, 1961
3,039,468	Price	June 19, 1962