

[54] **POWERED BOVINE STOMACH PUMP AND TUBE**

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[51] Int. Cl.² **A61M 1/00**

[58] Field of Search **128/278, 223, 356; 417/320; 415/73, 72, 5, 122, 163**

[56] **References Cited**

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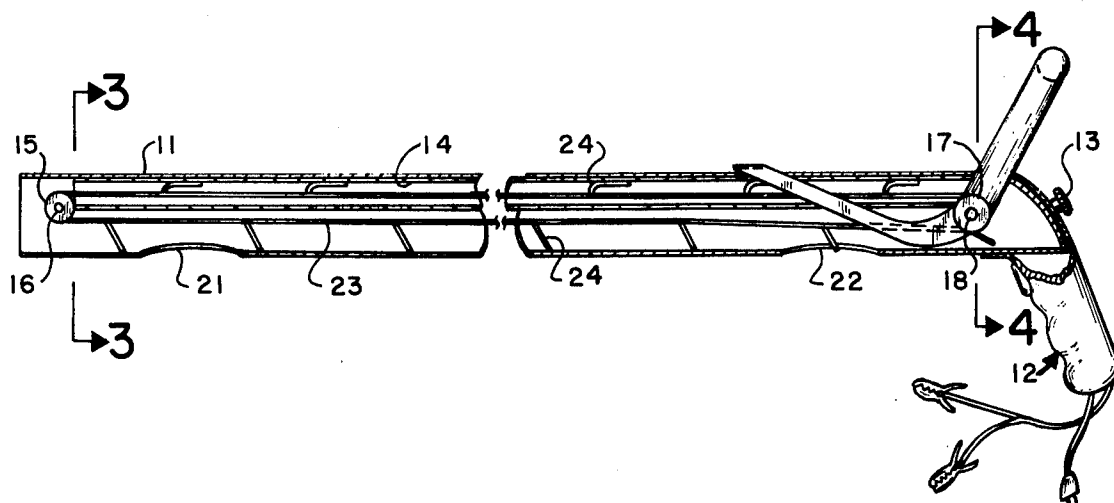
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[57] **ABSTRACT**

A bovine stomach tube and pump electrically driven by internal batteries and/or an external power supply. The device comprises an elongated flexible tube having an intake opening at one end and an outlet opening at the other end. The device incorporates an electrical motor and drive mechanism at one end powering a loop endless belt internal of the stomach tube for evacuating the rumen of bovines. An alternative embodiment may employ a flexible auger-type conveyor mounted for rotation in the stomach tube. The electrical drive motor may comprise an adaptation of hand-held drills utilizing rechargeable batteries or an external electrical power source. The device is designed for rapid evacuation of the rumen of a bovine.

6 Claims, 8 Drawing Figures



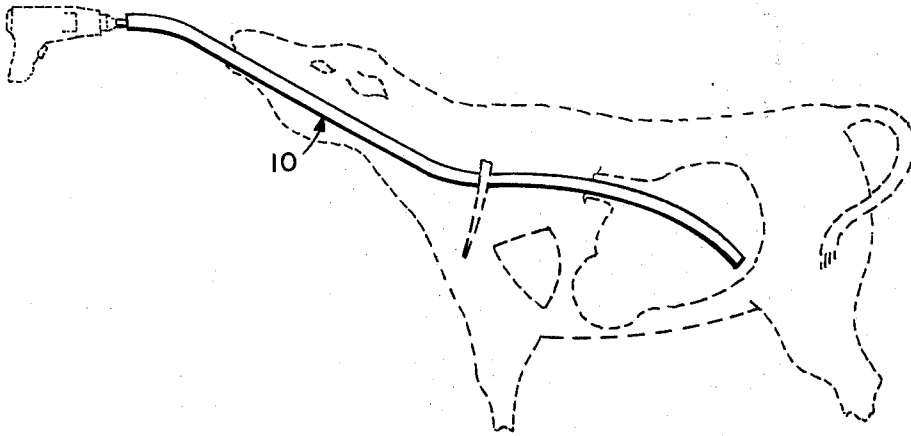


FIG. 1

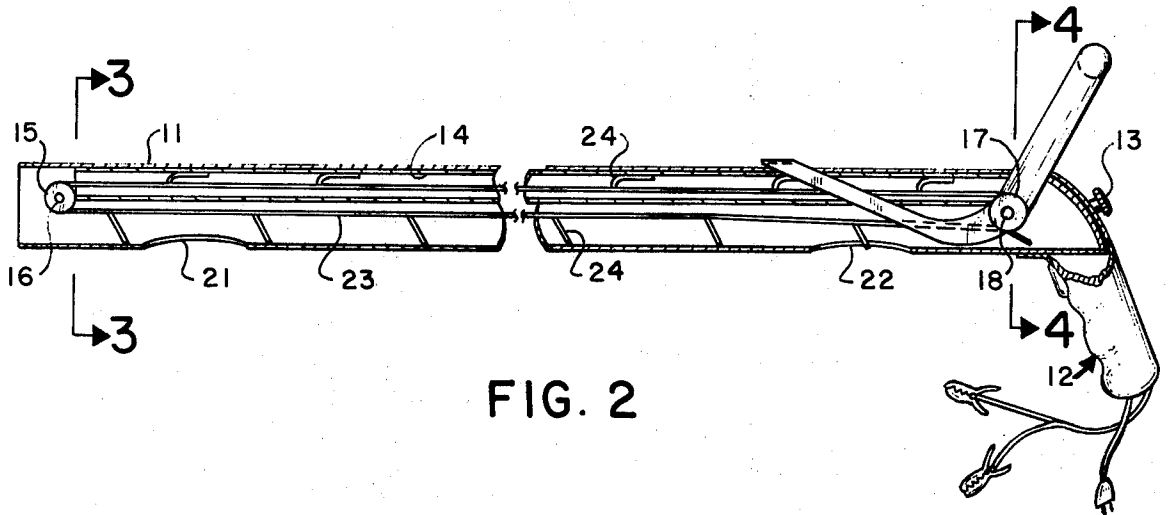


FIG. 2

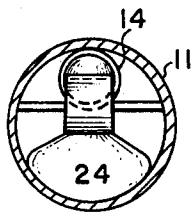


FIG. 3

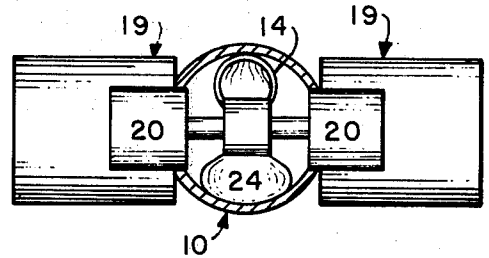


FIG. 4

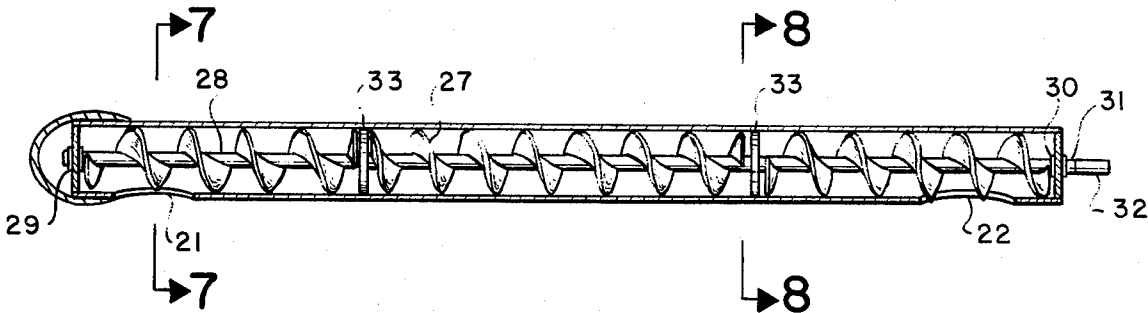


FIG. 5

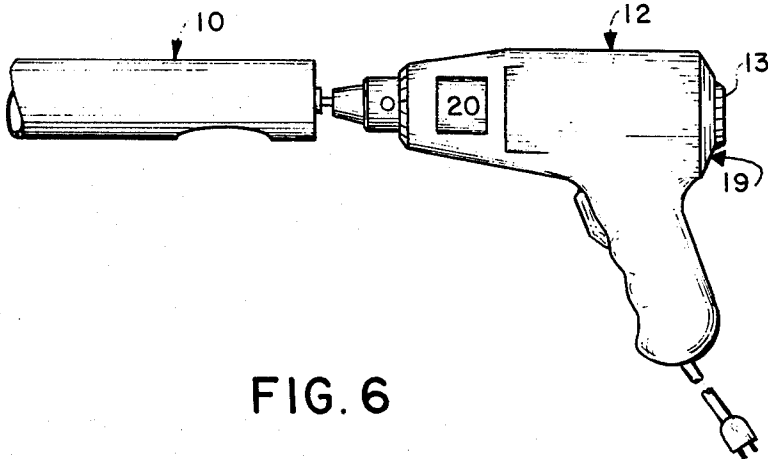


FIG. 6

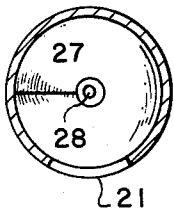


FIG. 7

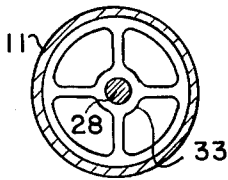


FIG. 8

POWERED BOVINE STOMACH PUMP AND TUBE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a veterinary instrument for treating the stomach of ruminants which have ingested poison or toxic substances creating a critical digestive condition. The device might also be used for relieving overloading by ingesting excessive grain in feed lots. The device of this invention is an improvement on and closely related to existing flexible plastic or rubber stomach tubes widely used by veterinarians in treating of bovines and other large animals.

2. Description of Prior Art

The basic instrument used by veterinarians has been a rubber or plastic tube approximately one inch in diameter and seven to ten feet long useful in forceful releasing of gas from or rumens of bovines or in treating other large animals applying medication to the stomach to kill parasites or relieve other conditions in the animal. Examples of devices which have previously been developed and patented are U.S. Pat. No. 1,508,288, to Nuesch, comprising principally a tube for deflating the stomach of ruminants. Eisenhut, U.S. Pat. No. 2,799,274, pertains to a veterinary evacuation probe for use on cattle designed for removing metal objects from the rumens of bovines. The later U.S. Pat. No. 3,774,608 to Wohler incorporates a stomach tube and pump for drenching the stomach of ruminants.

SUMMARY OF THE INVENTION

The device of this invention varies from the prior art in that it is primarily designed for evacuating the stomach of ruminants. The device of this invention incorporates a flexible, rubber or plastic tube approximately seven to ten feet in length. In one species of the invention this tube comprises a double wall structure with a small tube secured to the interior wall of the larger tube. This embodiment comprises a drive roller at one end of the tube and an idler roller at the intake end of the tube. A looped endless belt carrying small buckets project through the device in a miniature bucket-like conveyor configuration. The empty buckets move through the small tube around the idle roller and open and flare taking the substance to be extracted through the larger tube. The drive mechanism of this device may be a self-contained electric motor resembling a hand-held drill which may contain a rechargeable battery for driving the electrical motor or an extension cord might be incorporated attached to an external power supply. The drive mechanism must incorporate a very low ratio drive gear to move the belt slowly or the device should be constructed with an electrical motor of very low rpm.

The second embodiment of the device is visualized to be constructed with an elongated tube approximately one inch in diameter which incorporates an internally mounted auger conveyor. The flexible drive shaft extending the length of the device propels the auger conveyor in rotation. Suitable bearing means are secured internal of the tube to maintain the auger conveyor in a freely rotating position. This species of the device might be made with the stomach tube auger conveyor in a detachable configuration permitting the driving of tubes of various sizes and lengths by a detachable hand drill-like drive motor incorporating self-contained power supply or an extension cord. Wide varieties of

power requirements might be incorporated including a 6 or 12 volt DC power supply or the configuration might be constructed to utilize 110 volt AC house current.

For a detailed description of the construction of the device of this invention reference is made to the attached drawings and the following detailed description wherein identical reference characters are utilized to refer to identical or equivalent components throughout the drawings and the detailed description.

FIG. 1 is a simulated illustration of the utilization of the device on a bovine.

FIG. 2 is a sectional view partially fragmented of the species of the device employing a looped endless belt type conveyor.

FIG. 3 is a sectional view taken on line 3—3 of FIG. 2 looking in the direction of the arrows.

FIG. 4 is a sectional view of the device of FIG. 2 taken on line 4—4 of FIG. 2 looking in the direction of the arrows, illustrating some of the detail of the drive mechanism.

FIG. 5 is an elongated sectional view partially fragmented of the species of the device employing an auger-type conveyor stomach tube suitable for utilization in combination with a detachable rotary drive means.

FIG. 6 is a fragmented view of the auger-type stomach tube secured to hand drill-type drive mechanism.

FIG. 7 is a sectional view of the device taken on line 7—7 of FIG. 5 looking in the direction of the arrows.

FIG. 8 is a sectional view of the device of FIG. 5 taken on line 8—8 of FIG. 5 illustrating an intermediate bearing support looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a detailed description of the construction and utilization of the device, reference is made to the attached drawings. FIG. 1 illustrates a simulated use of the stomach tube 10 in a bovine. Stomach tube 10 is approximately one inch in diameter and seven to ten feet long. These dimensions are optional and for utilization on younger cattle a shorter tube of smaller diameter might well be employed. The loop belt-type species of the device is illustrated principally in FIG. 2. This device is constructed with an outer case 11 comprising a rubber or plastic flexible tube one inch in diameter. Each species of the device is driven by electrical power supply means 12 which includes an integral speed control mechanism 13. The speed control 13 is an important element of the device in that the speed at which the evacuating mechanism is operated must be adjusted to a satisfactory level while evacuating the stomach of a bovine to accomplish the desired results and avoid injury to the animal. Speed control 13 may be of any variety of speed controls used in conjunction with electric motors. Speed control mechanism of the type utilized with electrical drills or electrical mixers might be employed. The stomach tube 10 of the endless belt species of the device is constructed with an outer case 11 and a small diameter belt tube 14 secured to the interior surface of the outer case 11. At the forward or left end of the device as illustrated in FIG. 2 adjacent the end of belt tube 14 is mounted an idle pulley 15 rotatably mounted on an idle pulley shaft 16 which is secured to outer case 11. Adjacent the discharge end or right end of the device as illustrated in FIG. 2 is mounted a drive pulley 17 which is secured to a drive pulley shaft 18. This drive pulley shaft 18 is interconnected to electrical

drive motor 19 through a reduction drive gear 20. An intake opening 21 is formed in outer case 11 generally adjacent outer pulley 15. The opposite end of the device in the vicinity of drive pulley 17 is constructed a discharge opening 22. Belt 23 may be constructed of rubber or other plastics reinforced with nylon filaments to reduce stretching; mounted on this belt 23 is a series of belt cups 24 comprising a device resembling a miniature bucket conveyor. These cups 24 should be of soft plastic or rubber material having flexible characteristics. This quality is necessary to permit the moving of belt 23 carrying cups 24 through belt tube 14 in the direction of the forward end of the tube. As the belt moves around idle pulley 15 the cups open and flare conveying liquid and material from intake opening 21 toward discharge opening 22.

For a description of the construction and operation of the species of the device employing an auger-type conveyor reference is specifically made to FIGS. 5-8. With specific reference to FIG. 5 in this embodiment stomach tube 10 is constructed with an outer case 11 substantially of the diameters and configuration previously stated. This species of the device is constructed with an intake opening 21 and a discharge opening 22 in a manner quite similar to species of the device illustrated in FIG. 2. Mounted for rotation inside outer case 11 of the species of the device in FIG. 5 is an auger conveyor 27. This device comprises a spiral-like conveyor constructed of semi-stable rubber or plastic secured to and spiralling around an auger conveyor shaft 28. This conveyor shaft 28 is rotatably mounted in a forward bearing 29 adjacent intake opening 21. To the drive or discharge end 22 of this structure there is secured a rear bearing 30 in which the auger conveyor shaft 28 is mounted for rotation. Conveyor shaft 28 projects through outer case 11 by means of a short rigid drive shaft 31 terminating in a drive member 32. This species of the device might preferably be constructed with intermediate bearing members 33 at one or more points intermediate for forward bearing 29 and rear bearing 30. The purpose of these intermediate bearing members is to support the auger conveyor shaft 28 at the center of the outer case 11 to minimize the contact by the auger conveyor 27 with the interior surface of outer case 11. The drive mechanism of the device of FIG. 5 is substantially as illustrated in fragmented view of FIG. 6. A hand held detachable drill-like mechanism is employed. This power supply means 12 might well comprise either a direct current or alternating current motor. It can be self-contained, utilizing a rechargeable storage battery as used in portable drills and lawn clippers. The device is preferably constructed with a very low ratio reduction drive gear 20 to reduce the rotation of the output to drive member 32. This device should also be constructed with an adjustable speed control 13 permitting the revolutions per minute (rpm) to be varied to accomplish optimum rotation of the auger conveyor shaft 28 to protect the animal being treated as well as insure the desired rate of evacuation of the stomach of a bovine.

OPERATION

In the operation of the device of this invention the primary veterinary application is to evacuate the stomach of ruminants who have ingested excessive amounts of food causing a bloated, distressed condition of the animal. The device of this invention also is particularly suited for evacuation of the stomach of an animal hav-

ing ingested poison or toxic substances. A wide variety of stomach tubes 10 have been developed and utilized by veterinarians. The primary advantage of this device is the powered rapid evacuation of the contents of the stomach of the animal. In utilization of stomach tube 10 reference is made to FIG. 1. The animal is forcibly restrained or tranquilized and the tube is inserted through the esophagus utilizing accepted veterinary procedures. Pressure is applied to tube 10 projecting the forward end or intake end 21 into the animal a sufficient distance to project into the stomach of the animal. When this is accomplished the activation of power drive means 12 of the species of the invention illustrated in FIGS. 1-4 and drive pulley 17 rotates belt 23 carrying belt cups 24 moving fluids or grain from the intake opening 21 and discharging it through discharge opening 22.

A similar result is obtained in utilizing the device of FIG. 5. The animal is secured or restrained and tube inserted through the esophagus into the stomach of the animal. A rotation of conveyor shaft 28 through the drive member 32 will again evacuate the stomach of the animal being treated. In this regard it is pertinent to note that after an evacuation of the stomach of the animal fluids can be injected into the stomach of the animal through reversing the procedures through discharge opening 22 and intake opening 21 fluids can be placed in the stomach of the animal and repeated evacuated to purge or remove toxic substances from the animal's stomach.

Having described the construction and operation of the device in detail in two species what is desired to be claimed is all embodiments or adaptations of the device not departing from the equivalence of the appended claims.

I claim:

1. An electric motor driven bovine stomach pump and tube, said tube having an overall diameter of approximately one inch, comprising:
 - a. an elongated flexible outer case having an intake end and a discharge end adapted to project into the esophagus of an animal,
 - b. an intake opening constructed in the outer case adjacent the intake end,
 - c. a discharge opening constructed in the outer case adjacent the discharge end,
 - d. a conveyor means movably mounted internal of said outer case extending substantially the length of said outer case, said conveyor means further comprising:
 1. a drive roller rotatably mounted in said outer case adjacent the said discharge opening,
 2. an idle roller rotatably mounted in said outer case adjacent the said intake opening,
 3. an endless flexible looped belt mounted for rotation on said drive roller and said idle roller, and
 4. flexible, flared belt cups secured to said flexible looped belt, the flexible, flared belt cups being of such a configuration as to urge a fluid substance from the said intake opening to the said discharge opening,
 - e. a bearing means supporting said conveyor means for movement in said outer case, and
 - f. a drive means interconnected to said conveyor means for operably moving said conveyor means internal of said outer case operably moving the work product of said conveyor means from said intake opening to said discharge opening.

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2. The invention of claim 1 including a belt tube mounted internal of the said outer case, one side of said looped belt projecting through said belt tube, said belt tube contracting said flexible, flared belt cups as they move through said belt tube, and one side of said looped belt projecting through said outer case external of said belt tube, said flexible, flared belt cups flaring to an extended dimension as they move through said outer case.

3. The invention of claim 1 wherein said drive means comprises:

- a. an electrical drive means incorporating,

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- b. a variable speed control mechanism.

4. The invention of claim 1 including a reduction gear intermediate said electric drive motor and said drive roller.

5. The invention of claim 1 wherein said drive means is:

- a. an electrical drive means incorporating,
- b. a self-contained power supply.

6. The invention of claim 5 wherein said self-contained power supply is a rechargeable storage battery.

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