PISTON TYPE ARTIFICIAL INSEMINATION SYRINGE HAVING STROKE ADJUSTING MEANS

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ABSTRACT OF THE DISCLOSURE

This invention relates to a syringe comprising a reservoir, a piston and adjusting means, said adjusting means predetermining the quantity of material to be drawn into said reservoir and predetermining the quantity of material which may be discharged from said reservoir with each stroke of said piston and said adjusting means discriminating between the intake and discharge strokes of said piston.

This invention relates to improvement in a device for performing artificial insemination particularly in connection with fowl and more particularly in connection with turkeys.

It is an object of the invention herein to provide a device in the form of a syringe for performing artificial insemination.

It is another object of the invention herein to provide a device of the type indicated having intake and discharge actions whereby the intake action is arranged and constructed to draw into an injection element of the device a predeterminable amount of material for insemination.

It is a more specific object of the invention herein to provide a device of the type indicated comprising a piston adapted to draw insemination material into the device, an ejection element forming a reservoir receiving said material, means adjusting the stroke of said piston to predetermine the quantity of said material drawn in.

It is a more specific object of the invention herein to provide a device of the type indicated comprising a spring loaded piston for drawing insemination material into said device and for ejecting or discharging said material, adjusting means to predetermine the length of the intake stroke to predetermine the quantity of said material drawn into said device, means to discriminate between the intake stroke and the discharge stroke, and means providing for adjustment of the ejection stroke of said device.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a view of the device herein in front elevation with a portion thereof being shown in vertical section;

FIG. 2 is a view of the device herein on an enlarged scale in vertical section taken on line 2—2 of FIG. 1, as indicated, showing the operating mechanism of the device in one position and with dotted lines in this and in the following views showing the handle portion thereof in alternate position;

FIG. 3 is a view similar to that shown in FIG. 2 illustrating another operating position of the mechanism of the device;

FIG. 4 is a view similar to that shown in FIG. 3 showing a third operating position of the mechanism of the device; and

FIGS. 5 and 6 are views similar to that shown in FIG. 4 with some elements of the device having been omitted and these views show different arrangements of the device.

Referring to the drawings, the invention herein relating to a syringe for artificial insemination is indicated generally by the reference numeral 10. A preferred embodiment of a device disclosing the operating principles of the invention is here illustrated and described.

Said syringe 10 comprises a barrel 12 which is the main body or housing portion and which may be variously formed as to its specific configuration and is shown here cylindrical in form as a matter of design. Said barrel may be readily formed of plastic material. Said barrel comprises a forward tapered end portion 13 having a projecting neck or nozzle portion 15 of reduced diameter having an outer end wall 16.

Extending axially somewhat centrally longitudinally within said barrel is a cylindrical chamber 17 having a forward end wall 18. Forming a forward extension of said chamber through said neck portion 15 to communicate with the atmosphere is a passage 19 of reduced diameter.

Forming a rearward extension of said chamber 17 of increased diameter in the form of a counterbore is an internally threaded passage 22 opening to the atmosphere having a shoulder 23 formed at its inner end.

Disposable within said barrel 12 is a plunger type of operating member indicated generally by the reference numeral 25 and shown in the form of a stepped rod or shaft. Said shaft comprises a main body portion 26 having a rearwardly extending end portion 28 of reduced diameter. Formed at the inner end of said portion 28 is a shoulder 30.

Extending forwardly of said main body portion 26 is a first stepped portion 32 of somewhat reduced diameter forming a shoulder 33 with reference to said main body portion 26. Extending forwardly of said first forwardly stepped portion of said shaft 25 is a second forwardly extending stepped portion 35 of still further reduced diameter having a shoulder 37 formed at its inner end. Forming an extension of said second stepped portion and shown being somewhat reduced in diameter is a piston 38 formed of a relatively friction free type of material such as a suitable plastic material. Said piston 38 normally extends partially into said passage 19 and is adapted to have an effective sealing engagement with the walls of said passage. Said operating member 25 may be conveniently formed as a casting or may be milled out of bar stock either of a suitable metal or plastic material.

Carried on said end portion 28 of said operating member in the form of an internally threaded cup-shaped collar is a retaining member 39. Said shoulder 30 forms a stop member for said collar 39. Secured to the free end of said end portion 28 is a button type of handle 40.

Carried on the main body portion of said operating member 25 is a stroke adjusting member 42 connecting the collar 39 with the body portion 12 for axial adjustment thereof as will be described. Said member 42 is shown having a body portion 43 cylindrical in form having a bore 44 therethrough. Said member 42 has externally threaded end portions 46 and 47. Said end portion 46 is adapted to be threaded into said collar 39 and said end portion 47 is adapted to be threaded into said passage 22. Carried on said member 42 are locking nuts 49 and 50, and centrally thereof and integral therewith in the form of a ring is an operating member 53.

Secured on said stepped portion 32 and bearing against said shoulder 33 is a circular stop member 55.

Carried on said stepped portions 32 and 35 and extending over a portion of said piston 38 are resilient means to provide for a double stroke action of the operating
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member 25. As will hereinafter be described, the operating member will be used for an intake stroke and for an ejection stroke. These strokes are of different lengths and the operator will readily distinguish between the two strokes. The intake stroke will be adapted to predetermine the quantity of insinuation material it draws into the device. The insinuation material is indicated by the reference character A in FIGS. 2 and 3 and comprises semen milked from a tom. A container of said material is indicated generally by the reference character B.

Distinguishable strokes may be provided in various ways. They are here provided in the preferred embodiment of the invention herein by the use of a pair of coiled springs 57 and 58. The spring 57 will have a sufficiently tight engagement at one end about the stepped portion 32 to be removable secured thereto and to be carried thereby. The spring 58 is of smaller transverse dimension than said spring 57 and is disposed over the stepped portion 35 and over a portion of the piston 38 to have free axial movement thereof within said coiled spring 57. As indicated in FIG. 3, spring 58 is a fiber less compressive strength and having a somewhat greater effective length by extending beyond the forward end of said spring 57.

Removably secured to the neck portion 15 of said barrel 12 is an elongated tubular member 60 conveniently formed of 3 mm. clear rigid tubing and having a passage 61 therethrough forming an outward extension of the passage 19 and is shown secured by a resilient cup-shaped sealing member 63 seated over the neck portion 15 and having a projecting neck portion 64 to hold said tubular member 60 in annigreight engagement.

Operation

The device comprising the invention herein is particularly adapted to insinuate turkey hens. A tom is milked and the semen secured is contained in a reservoir from which individual doses are withdrawn by the device herein for application to the hens. The device herein embodies the use of a disposable tubular ejection member used to receive and retain a dose of semen for injection into a hen. The use of such a disposable member for each application prevents the spread of diseases from one hen to another which represents an improvement over commonly used insinuating devices.

The disposable injection member comprises the tubular member 60 which is removably held by the holding member 63 and which is readily removed by simply pulling it away from said holding member and replacing it with a new member. Said member 63 provides good frictional airtight engagement.

The dosage injected into a hen may be varied by the operator, as will be described. The device herein is adjustable to permit the operator to predetermine the dosage to be administered. Thus there is provided an adjustable filling stroke with which semen A is drawn into the tubular member 60 from a reservoir or container B of such material, as indicated in FIGS. 2 and 3. There is a second stroke which is the discharge or ejection stroke by means of which the hen is insinuated. This is a longer stroke than the filling stroke to assure a complete discharge of the material A from the tubular member 60.

With reference to FIG. 5, it is noted that the spring 57 is the coiled spring 58 of a certain greater effective length than the spring 57 in extending forwardly thereof on the piston 38. Said spring 58 is seated between the shoulder 37 and the end wall 18. The spring, as shown in FIG. 3. In moving the operating member 25 axially of the barrel 12 by pushing on the handle 40, the operator will readily sense the end of the filling stroke with the compression of the spring 58 to the point where the spring 57 is moved to engage the shoulder 37. To this point only the spring 58 is compressed. This stroke requires light pressure on the handle 40. Downward movement of the stroke beyond this point is immediately sensed by the operator because of the increase in pressure required to compress both springs. The reference character G therefore indicates the length of filling stroke with regard to the arrangement of the device as herein illustrated. The length of the stroke determines the amount of semen A drawn into the tubular member 60. The semen is drawn in on the return of the stroke which is caused by the compressed spring 58 upon release of the handle.

The filling stroke may be shortened by adjustment of the threaded portion 46 relative to the collar or retaining member 39. This is indicated in FIG. 5. The locknut 49 will be loosened by moving it away from the retaining member 39. The threaded portion 46 is then moved inwardly. The barrel and the member 42 are locked together by the locknut 50. This repositions the retaining member 39. The barrel 12 and the as the portion 46 is threaded inwardly at the retaining member 39, the barrel 12 and the member 42 are moved upwardly axially of the operating member 25 which in effect moves the end wall 18 to compress the spring 57 which shortens the distance between the reference character G and thus the filling stroke is shortened. The shortened length of the filling stroke is indicated by the character G'. The locknut 49 is then threaded to engage the retaining member 39 to lock the same in position.

With reference to FIG. 6, another arrangement for the adjustment of the filling stroke is indicated. Here the portion 47 is threaded further into the passage 22 to shorten the distance between the shoulder 33 and the end wall 18. Thus the spring 58 is readily compressed into a certain desired shortened length to predetermine the extent of the filling stroke, which length in this figure is indicated by the character G".

No indicia is here provided to indicate exact measurement. It has been found in actual practice that the operator through his experience can readily determine the proper adjustment of the device as to the length of the filling stroke with relation to the amount of the semen A that it is desired to draw into the tubular member 60 for the insinuation of any particular flock of hens.

It is quite obvious from the above description that a combination of the adjustments indicated in connection with FIGS. 5 and 6 may be made.

It will be understood that an air column is present in the passage 19 and within the passage 61 of the tubular member 60. In drawing the material A into the tube 60, the free end of the tube will be placed within a body of semen A and on the outward portion of the filling stroke the piston 38 will force out just that sufficient amount of air which will be replaced by the quantity of the semen A to make up a single dose.

The discharge stroke is a longer stroke than the filling stroke. The purpose here is to have the piston 38 move the air column within the passage 19 and 61 sufficiently to completely eject the semen 9 in the process of insinuation. As the handle 40 is depressed for the discharge stroke, the shoulder 37 will first compress the spring 58, and when the spring 57 engages the end wall 18 it will be compressed by the stop member 55.

The maximum discharge stroke length is the travel distance between the handle 40. It may be desired to shorten the discharge stroke. The travel distance of the handle is shortened by threading the portion 47 further into the passage 22 to the point where the distance between the stop member 55 and the shoulder 23 is less than the maximum travel distance of the handle 40. The experience of the operator will readily dictate the most desirable length for this stroke. To avoid shortening or changing the filling stroke, the portion 46 is withdrawn from the collar 39 the same distance that the
portion 47 is threaded further into the passage 22. Thus the distance between the shoulder 37 and the end wall 18 remains unchanged and it is this distance which determines the length of the spring 58 and the length of the filling stroke.

The applicant's device has proved to be very successful in commercial use. The tubular member 60 is discarded after the insemination of each hen whereby artificial insemination is performed without the risk of transmitting any infection from one hen to another. Thus it is seen that I have provided a very simply constructed device in the form of a syringe for performing artificial insemination in connection with fowl, and more particularly in connection with turkeys. This device is readily adjustable to provide an accurate predetermined dosage of inseminating material.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention which, generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

A device for artificial insemination having in combination,

a barrel,
a cylindrical chamber within said barrel having a forward end wall,
a restricted passage running forwardly from said chamber to the atmosphere,
a threaded passage running rearwardly from said chamber to the atmosphere,
a plunger disposed into said barrel comprising a shaft,
said shaft having at the rear end thereof an end portion of reduced width forming a shoulder at its inner end, a threaded cup-shaped collar disposed on said end portion, a handle secured to the free end of said end portion,
said shaft having a first forwardly extending portion of somewhat reduced width having a shoulder formed therebetween,
a second forwardly extending portion of reduced width being at least partially disposed within said restricted passage having sealing engagement with the walls thereof,
a circular stop member disposed over said shaft abutting said shoulder of said first forwardly extending portion and being spaced from said end wall,
a supporting member comprising a cylindrical portion having a bore therethrough disposed over said shaft, said cylindrical portion having each end thereof provided with a threaded portion, one of said threaded portions being threaded into said collar and the other of said threaded portions being threaded into said threaded passage of said barrel,
a coiled spring disposed in said chamber carried on said forwardly extending portions of said shaft and being disposed between said end wall and said circular stop member,
a second coiled spring within said chamber disposed over said first mentioned coiled spring, and
one of said coiled springs being of a certain greater length within said chamber than the other of said coiled springs.

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