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(54) DEVICE FOR INSEMINATING ANIMALS

(57) Device for inseminating animals comprising a tubular element (1) with a decreasing outer section broader at its rear end, hollow across all its length and with a chamfered front end (2) with rounded edges (3). The inner section of the tubular element (1) is circular (5) on a first stretch and elliptical (6) on a second stretch. The tubular element (1) has a removable grip (7) and the grip has a removable lamp. The device can be introduced in the vagina without having to lift the animal by its hind legs, avoiding the associated stress. The injection of the semen is efficient and does not traumatize the mucosa or cervix.

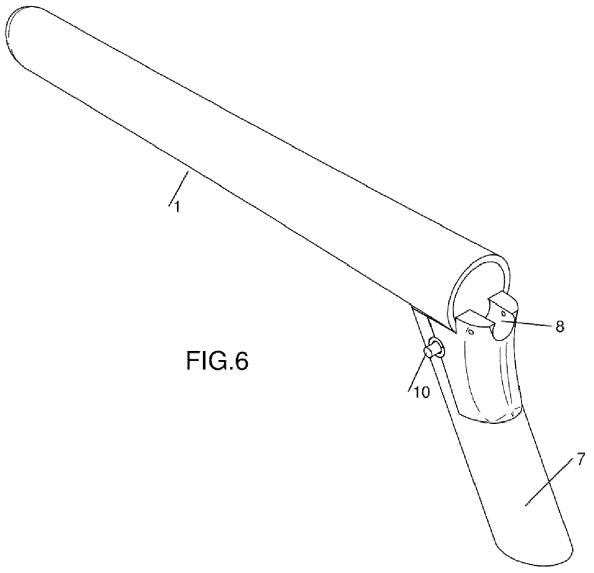

FIG.6

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Description

Technical Field

[0001] The subject matter of this patent is a device for inseminating animals, comprising a tubular element which, once introduced in the animal's vagina, makes it possible to locate the cervix of the uterus and to reach it with an insemination gun which is inserted through said tubular element. The invention pertains to the field of devices used in the veterinary science, more specifically to those used for artificially inseminating animals.

Background Art

[0002] Artificial insemination of animals is an increasingly widespread practice, particularly in livestock farming. However, fecundation rates are not satisfactory, if account is taken of time required and intervening costs of specialized personnel and materials.

[0003] A commonly used insemination instrument, especially for sheep and goats, is known as "duck beak" of which there are several versions, for instance the one described at patent document WO 99/12466 A1. It consists basically of two superposed valves articulated at one end. Once the instrument is inserted in the animal's vagina, its valves are pulled apart by activating a trigger-like mechanism and an insemination gun is introduced through the opening. Location of the cervix by the operator requires that the animal's abdominal and pelvic organs are displaced towards the cranium, otherwise they would cause the vaginal walls to get stuck in between the instrument's valves. This means that two people lift the animal by its hind legs, with consequent personal exertion and considerable animal stress, the animal having to bear its weight on its front legs and with its neck restrained whilst the operation last (and it can take longer than one minute). Besides, the opening and closure of the valves inside the vagina causes trauma to its mucosa. With big-sized animals, the tip of the speculum may not reach the cervix and this makes it difficult to adequately position the insemination gun. All these circumstances have a negative impact in fecundation rate.

[0004] Patent document WO 2016/066962 A1 (HERRITECH) 06 May 2016 (06.05.2016) discloses an "Appliance for vaginal penetration of animals, comprising a viewing system, especially for locating the cervix of the uterus" having a grip (2), designed to receive an insemination gun (4) and a guiding tube (8) extending the grip (2). The guiding tube (8) has a uniform outer section. Guiding tube and insemination gun form a "compact assembly" (page 2, line 6). The subject-matter of present patent is different in that the device's guiding tube (tubular element) does not have a uniform outer section but a decreasing outer section, the broader section being at the rear end, where the insemination gun is introduced, this configuration allowing the operator to move the gun not only forward and backwards as in the above-mentioned state-of-the-art device, but laterally, upwards and downwards, with absolute freedom of operation in all directions. This makes it possible to locate the most convenient point to inject the semen with the insemination gun. Besides, movements of insemination gun do not disturb the animal, because such movements take place within the tubular element, in respect of which the insemination gun is a separated and independent element. By contrast, in the mentioned state-of-the-art device such movements must be made with the guiding tube (8) because the insemination gun is an integral part to said guiding tube (8), the tube being thus liable to touch the vaginal walls disturbing the animal. Besides, the existing device's integrated vision system could be damaged by washing or disinfecting the device in a liquid element, whereas in the invention herein proposed the lighting means are located at one end of the tubular element, attached to an easy-to-remove grip which does not get in contact with water during washing or disinfection.

[0005] Patent document ES 2260324T3 (CONTINENTAL PLASTIC CORP) 28 April 2004 (28.04.2004) discloses a "Device for transcervical artificial insemination and embryo transfer" comprising a conical chamber 12 with an outer spiral formation 18 designed to penetrate the cervix channel and with obturation rings 18a. A tubular deposition chamber 30 inside a wrapping 20 is inserted through the conical chamber 12 (col. 4, lines 44 to 55 and figs. 1, 6 and 7). By contrast, the device proposed in present patent comprises a smooth tubular element, in the sense that its outer surface has no protuberances, such as spiral formations, obturator rings or guides; ergonomics and easy handling inside the vagina being paramount in its design.

Summary of invention

[0006] The subject matter of this invention is a device for inseminating animals which consists basically of a tubular element (1) with a decreasing outer section, said section being broader at its rear end.

[0007] The tubular element (1) is hollow across all its length and its front end (2) is chamfered. In a preferred embodiment, the chamfered front end has rounded edges (3) to facilitate insertion of the device and avoid damage to vaginal walls or cervix.

[0008] In a preferred embodiment, the inner section of the tubular element (1) is as follows: on a first stretch, going from the rear end - i.e. the end with broader external section - to roughly half the length of the tubular element (1), the inner section is circular (5). On a second stretch, going from roughly half the length of the tubular element to the front end - i.e. the end with narrower external section - the inner section is elliptical (6), to ease the introduction of the tube through the vulva.

[0009] Change from the circular inner section (5) to the elliptical inner section (6) is gradual, as the tubular element's (1) external section diminishes.

[0010] In the device's use position, i.e. when it is held

by the operator with its tubular element (1) substantially parallel to the ground, the major axis of said elliptical inner section is substantially parallel to the ground.

[0011] In addition, the tubular element (1) comprises means (4) for attaching a grip (7) thereto. Correspondingly, the grip (7) has means (9, 10, 11) of attachment to the tubular element (1). Respective attachment means (4, 9, 10, 11) allow for easy removal of the tubular element (1), for instance to submerge it in disinfecting liquid after each individual insemination or to clean and disinfect it after finishing an insemination batch.

[0012] Additionally, the grip (7) comprises means (8) to attach a lamp to light up the interior of the tubular element (1).

[0013] The device is introduced in the vagina without in any way altering the animal's natural position, most importantly without having to lift the animal by its hind legs, avoiding the associated stress. Besides, the injection of the semen is efficient and does not traumatize the mucosa or cervix, because the operator will be able to reach the cervix with the device's front end (2).

Brief description of drawings

[0014] To complement this description, a set of drawings is herein included, representing the following:

FIG. 1, a general view of the insemination device's tubular element and means of attachment to the grip.
FIG. 2, side view of tubular element indicating the transverse planes CC, DD, EE, FF.
FIGS. 2A, 2B, 2C, 2D and 2E, different cross sections obtained by cutting the tubular element across transverse planes A-A, C-C, D-D, E-E, F-F respectively.
FIG. 3, perspective view of the grip, with means of attachment to the tubular element and means to house the lamp.
FIG. 4, front view of grip, indicating transverse plane G-G.
FIG. 5, cross section obtained by cutting grip across G-G plane.
FIG. 6, a perspective view of the assembled device.

Description of embodiments

[0015] With reference to FIG. 1, the device for inseminating animals comprises a tubular element (1) with decreasing outer section, hollow all along and with a chamfered front end (2) whose edges are rounded (3). The outer surface of tubular element (1) is smooth, in the sense that there is no kind of protuberant elements.

[0016] The chamfered front end (2) forms an inclination angle preferably between 45° and 50°. The front end (2) of the tubular element (1) is chamfered in such a way that, in the device's use position, the longer endpoint is in the upper position with respect to the shorter endpoint of the tubular element (1).

[0017] Dimensions of the tubular element (1) are not limitative, because they will depend on which type of livestock the device is to be used for. Where the device is used for the insemination of sheep, dimensions of the tubular element (1) could be: 296 mm length, 288 mm axis, 33 mm rear opening diameter, 23 mm front elliptical opening's (2) major axis, 16.76 mm front elliptical opening's (2) minor axis. A device for the insemination of lamb could have 245 mm length and 236 mm axis, the other measures being the same.

[0018] Plastic is an appropriate material for the manufacturing of the device.

[0019] FIG. 1 shows that the rear end of the tubular element (1), i.e. the end with the broader outer section, is provided with means (4) for the attachment of a grip (7). In a preferred embodiment, these means (4) consists of a protrusion (4.1) with projects itself downwards substantially perpendicular to the tubular element (1) and whose cross section has an inverted-T shape. Said protrusion (4.1) has a channel (4.2) leading to a round indentation (4.3).

[0020] FIGS. 2A, 2B, 2C, 2D and 2E represent the different cross sections obtained by cutting the tubular element (1) across transverse planes A-A, C-C, D-D, E-E, F-F respectively, thus showing the transition from a circular inner section (5) towards an elliptical inner section (6).

[0021] The circular inner section (5) encompasses a first stretch going from the rear end of the tubular element (1) up to roughly half the length of the tubular element (1), whereas the inner elliptical section (6) encompasses a second stretch going from roughly half the length of the tubular element (1) up to the chamfered front end (2) of the tubular element (1) - i.e. the end with narrower external section.

[0022] FIG. 3 represents the grip (7) having a recess (8) for attaching a lamp. Means for attachment and release of the grip (7) to and from the tubular element (1) are also shown, said means comprising in a preferred embodiment: (i) a vertical channel opening (9) with an inverted-T cross section, to receive protrusion (4.1) and (ii) a release button (10), housed in a cavity within the grip (7), which is pushed against an elastic element such as a spring (11, v. figs. 4 and 5).

[0023] With reference to FIG. 4 and FIG. 5 the release button (10) is coupled to a spring (11) housed in an opposing cavity. When the release button (11) is activated, it gets across the vertical channel (9), pushing the spring (11) into its cavity. At this moment, the tubular element (1) can be inserted all through the vertical channel (9) in the grip (7) without interfering with the release button (10) thanks to the channel (4.2) in the protrusion (4.1) of the tubular element (1). Once the tubular element (1) has been inserted to the end, the operator stops pushing the release button (10) whereby the spring (11) will push the release button (10) back to its original position and will stay put across the round indentation (4.3), thus fixing the tubular element (1) in its position and preventing it from slipping forward.

[0024] Finally, FIG. 6 shows the grip (7) fitted to the tubular element (1), forming an easy-to-handle assemblage.

Claims

1. Device for inseminating animals, comprising a tubular element (1), **characterized in that** the tubular element (1) has a decreasing outer section and a chamfered front end (2).

2. The device of claim 1, **characterized in that** the tubular element (1) is hollow across all its length.

3. The device of claim 1, **characterized in that** the outer surface of the tubular element (1) is smooth.

4. The device of claim 1, **characterized in that** the edges (3) of the chamfered front end (2) are rounded.

5. The device of claim 1, **characterized in that** the inner section of the tubular element (1) encompasses a first stretch, going from the rear end of the tubular element (1) up to roughly half the length of the tubular element (1), where said inner section is circular (5); and a second stretch, going from roughly half the length of the tubular element (1) up to the chamfered front end (2) of the tubular element (1), where said inner section is elliptical (6); the change from one stretch to another being gradual.

6. The device of claim 5, **characterized in that** in the device's use position the major axis of the elliptical inner section (6) is substantially parallel to the ground.

7. The device of claim 1, **characterized in that** the tubular element (1) comprises means (4) for the attachment of a grip (7).

8. The device of claim 7, **characterized in that** the grip (7) comprises means (9, 10, 11) for the attachment and release of the tubular element (1).

9. The device of claim 8, **characterized in that** the means for the attachment and release of the tubular element (1) comprise: a vertical channel (9) and a release button (10).

10. The device of claim 7, **characterized in that** the grip (7) comprises means (8) for attaching a lamp.

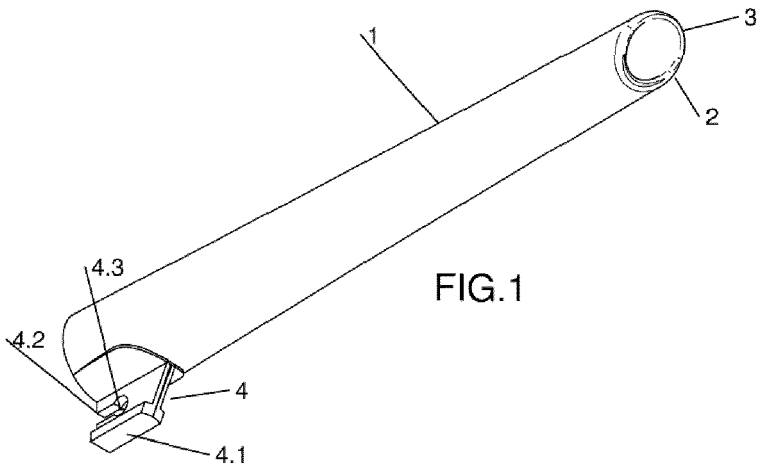

FIG.1

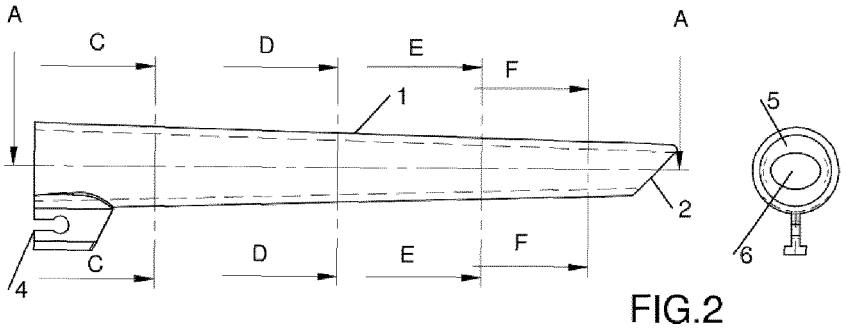

FIG.2

FIG.2B FIG.2C FIG.2D FIG.2E

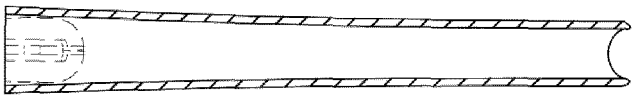

FIG.2A

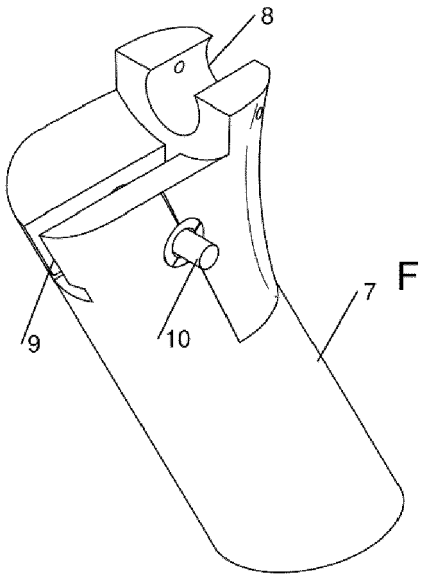

FIG.3

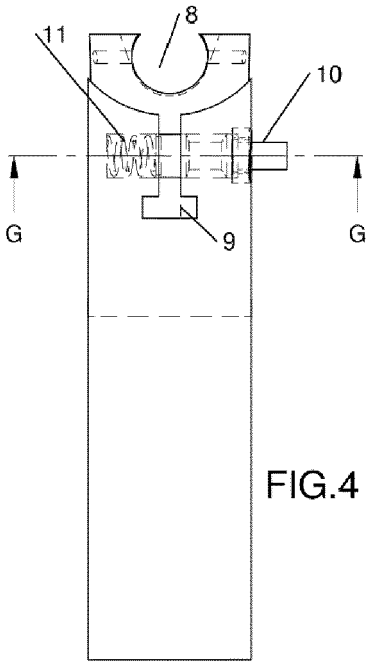

FIG.4

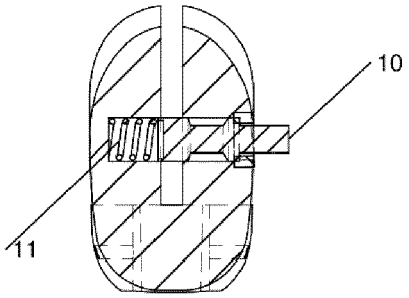

FIG.5

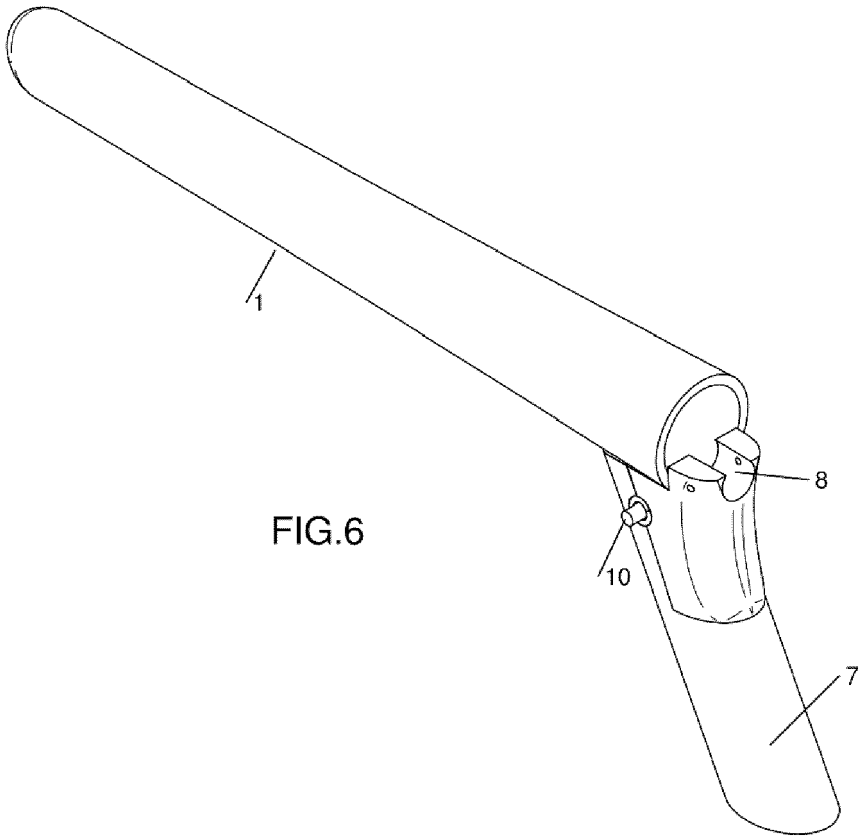

FIG.6

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 7160

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 5 392 764 A (SWANSON LARRY S [US] ET AL) 28 February 1995 (1995-02-28) * column 2, lines 41-54 * * column 3, lines 46-57 * * figures 1-4 *	1-4,7 8-10 5,6	INV. A61D19/02
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A	JP 2 884060 B2 (TAMAYAMAMURA NOGYO KYODO KUMIA) 19 April 1999 (1999-04-19) * abstract; figures 1, 2a-2c *	1,5	
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TECHNICAL FIELDS SEARCHED (IPC)

A61D
A61B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 March 2018	Chabus, Hervé

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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21-03-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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