

(19)



(11)

EP 3 318 219 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
14.04.2021 Bulletin 2021/15

(51) Int Cl.:
A61D 19/02 (2006.01)

(21) Application number: **17197160.9**

(22) Date of filing: **18.10.2017**

(54) DEVICE FOR INSEMINATING ANIMALS

VORRICHTUNG ZUM BESAMEN VON TIEREN

DISPOSITIF POUR INSÉMINER DES ANIMAUX

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **02.11.2016 ES 201631305 U**

(43) Date of publication of application:
09.05.2018 Bulletin 2018/19

(73) Proprietors:
 • **Asociacion para la seleccion y mejora genetica del ovino y caprino de Castilla y Leon (OVIGEN) 49800 Toro (ES)**
 • **Reyes Avila, Luis Ernesto 24192 Vilecha (ES)**

(72) Inventors:
 • **REYES AVILA, Luis Ernesto 24192 Vilecha (ES)**
 • **ALVARO JIMENEZ, Abraham Sergio 49008 Zamora (ES)**
 • **MARTIN CALVO, Alfonso Ignacio 49002 Zamora (ES)**

(74) Representative: **Hernández Hernández, Carlos InterAlia Patentes & Marcas Calle Fernando de la Peña 29, 3° 37005 Salamanca (ES)**

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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-men-

tioned 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.

[0006] US 5,392,764 (Swanson et al), 28 February 1995, describes a gynecological speculum comprising a tubular element (22) with a decreasing outer section and a constantly circular inner section, hollow across all its length, and having a chamfered front end (20). Its outer surface is not smooth since it is provided with an annular lip (26) to retain the speculum within the vaginal cavity (column 3, lines 60-65). Its inner section is circular.

[0007] US 2004/0162461 A1 (Christine et al), 19 August 2004, teaches an apparatus useful for artificial insemination of mammals, including a conical chamber 12 with decreasing outer section and constantly circular inner section, hollow across its length and with a chamfered front end (16). Its outer surface is not smooth since it is provided with an exterior spiral formation (18) configured for penetrating the passageway of a cervix [0036].

[0008] FR 1.011.271 (Jean-Blain et al), 20 June 1952, describes a speculum for artificial insemination of animals comprising a grip (9) and a bulb (10) to light the interior of a tube (7), outer and inner sections of said tube (7) being uniform.

[0009] JP 2884060 (Tamayamamura Nogyo Kyodo), 19 April 1999, refers to a coating cover for livestock conception injector, the injector comprising a tube (5) with uniform sections and straight ends.

[0010] US 2006/0217590 A1 (Tack Dong-Soo), 28 September 2006, refers to an artificial insemination device for domestic animals comprising an insert tube (200) formed as a hollow cylindrical shape with constant inner and outer sections, coupled to a body (100) comprising a handle (110) and with lighting means (13,115).

Summary of invention

[0011] The subject matter of this invention is a device for inseminating animals as defined in claim 1. Preferred embodiments are defined in the dependent claims. The device consists basically of a tubular element (1) with a decreasing outer section, said section being broader at its rear end.

[0012] The tubular element (1) is hollow across all its length and its front end (2) is chamfered. According to the invention, the chamfered front end has rounded edges (3) to facilitate insertion of the device and avoid damage to vaginal walls or cervix.

[0013] 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.

[0014] Change from the circular inner section (5) to the elliptical inner section (6) is gradual, as the tubular element's (1) external section diminishes.

[0015] 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.

[0016] 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.

[0017] Additionally, the grip (7) comprises means (8) to attach a lamp to light up the interior of the tubular element (1).

[0018] 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

[0019] To complement this description, a set of draw-

ings 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

[0020] 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.

[0021] 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).

[0022] 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.

[0023] Plastic is an appropriate material for the manufacturing of the device.

[0024] 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).

[0025] 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).

[0026] 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.

[0027] 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).

[0028] 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.

[0029] 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) of decreasing outer section, said tubular element (1) being hollow across all its length, **characterized in that** the tubular element (1) has a chamfered front end (2) with rounded edges (3) and **in that** the outer surface of the tubular element (1) is smooth.
2. 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.

3. The device of claim 2, **characterized in that** in the device's use position the major axis of the elliptical inner section (6) is substantially parallel to the ground.

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

5. The device of claim 4, **characterized in that** the grip (7) comprises means (9, 10, 11) for its attachment to and release from the tubular element (1).

6. The device of claim 5, **characterized in that** the means provided in the grip (7) for its attachment to and release from the tubular element (1) comprise a vertical channel (9) and a release button (10).

7. The device of claim 4, **characterized in that** the grip (7) comprises means (8) for attaching a lamp to it.

Patentansprüche

1. Vorrichtung zur Besamung von Tieren, bestehend aus einem rohrförmigen Element (1) mit einem kleiner werdenden äußeren Querschnitt, wobei das genannte rohrförmige Element (1) auf seiner gesamten Länge hohl ist, **gekennzeichnet dadurch, dass** das rohrförmige Element (1) ein abgeschrägtes vorderes Ende (2) mit abgerundeten Kanten (3) hat und dadurch, dass die Außenfläche des rohrförmigen Elements (1) glatt ist.
2. Die Vorrichtung aus Patentanspruch 1, **gekennzeichnet dadurch, dass** der innere Querschnitt des rohrförmigen Elements (1) einen ersten Abschnitt enthält, der vom hinteren Ende des rohrförmigen Elements (1) bis ungefähr zur Hälfte der Länge des rohrförmigen Elements (1) geht, und bei dem der genannte innere Querschnitt rund (5) ist; und einen zweiten Abschnitt, der von ungefähr der Hälfte der Länge des rohrförmigen Elements (1) bis zum abgeschrägten vorderen Ende (2) des rohrförmigen Elements (1) geht, und bei dem der genannte innere Abschnitt Ellipsenform hat (6); dabei erfolgt der Übergang von einem Abschnitt zum anderen nach und nach.
3. Die Vorrichtung von Patentanspruch 2, **gekennzeichnet dadurch, dass** in der Benutzungsposition der Vorrichtung die größere Achse des ellipsenförmigen Innenabschnitts (6) im Wesentlichen parallel zum Boden verläuft.
4. Die Vorrichtung von Patentanspruch 1, **gekennzeichnet dadurch, dass** die Vorrichtung einen Griff

(7) enthält und dadurch, dass das rohrförmige Element (1) Mittel (4) für die Befestigung des genannten Griffs (7) enthält.

5. Die Vorrichtung von Patentanspruch 4, **gekennzeichnet dadurch, dass** der Griff (7) Mittel (9, 10, 11) zur Befestigung am und Loslösung vom rohrförmigen Element (1) enthält.
6. Die Vorrichtung von Patentanspruch 5, **gekennzeichnet dadurch, dass** die im Griff (7) vorgesehenen Mittel zur Befestigung am und Loslösung vom rohrförmigen Element (1) einen senkrechten Kanal (9) und einen Löseknopf (10) enthalten.
7. Die Vorrichtung von Patentanspruch 4, **gekennzeichnet dadurch, dass** der Griff (7) Mittel (8) zur Befestigung einer Lampe enthält.

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Revendications

1. Dispositif d'insémination animale, comprenant un élément tubulaire (1) de section extérieure décroissante, ledit élément tubulaire (1) étant creux sur toute sa longueur, **caractérisé en ce que** l'élément tubulaire (1) possède une extrémité antérieure biseautée (2) avec des bords arrondis (3) et **en ce que** la surface extérieure de l'élément tubulaire (1) est lisse.
2. Dispositif selon la revendication 1, **caractérisé en ce que** la section intérieure de l'élément tubulaire (1) comprend un premier tronçon, allant de l'extrémité postérieure de l'élément tubulaire (1) jusqu'à la moitié de la longueur de l'élément tubulaire approximativement (1), où ladite section intérieure est circulaire (5) ; et un deuxième tronçon, allant approximativement du milieu de la longueur de l'élément tubulaire (1) jusqu'à l'extrémité antérieure biseautée (2) de l'élément tubulaire (1), où ladite section intérieure est elliptique (6), le passage d'un tronçon à l'autre étant progressif.
3. Dispositif selon la revendication 2, **caractérisé en ce que**, dans la position d'utilisation du dispositif, l'axe principal de la section intérieure elliptique (6) est sensiblement parallèle au sol.
4. Dispositif selon la revendication 1, **caractérisé en ce que** le dispositif comprend une poignée (7) et **en ce que** l'élément tubulaire (1) comprend des moyens (4) de fixation de ladite poignée (7).
5. Dispositif selon la revendication 4, **caractérisé en ce que** la poignée (7) comprend des moyens (9, 10, 11) permettant de la fixer à l'élément tubulaire et de la libérer de celui-ci (1).

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6. Dispositif selon la revendication 5, **caractérisé en ce que** les moyens prévus sur la poignée (7) pour sa fixation à l'élément tubulaire et sa libération de celui-ci (1) comprennent une rainure verticale (9) et un bouton de libération (10).

7. Dispositif selon la revendication 4, **caractérisé en ce que** la poignée (7) comprend des moyens (8) de fixation d'une lampe.

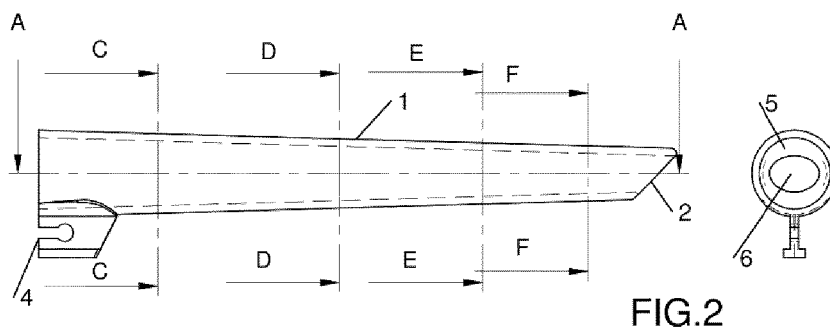
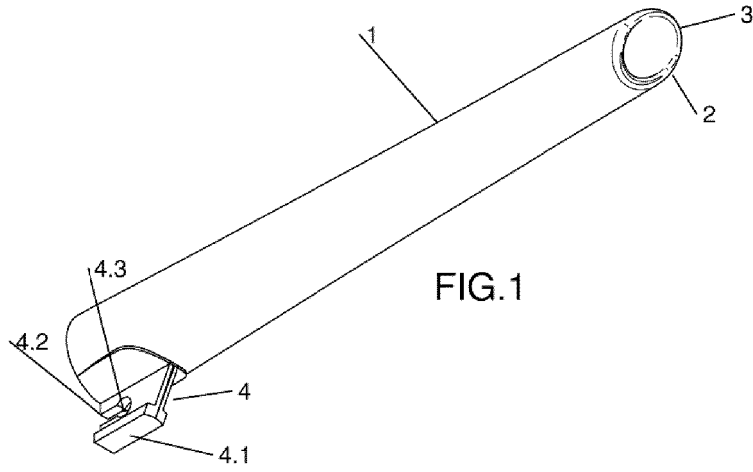


FIG. 2B



FIG. 2C



FIG. 2D



FIG. 2E

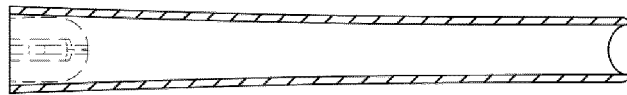
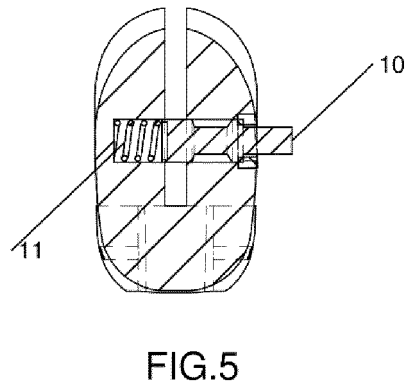
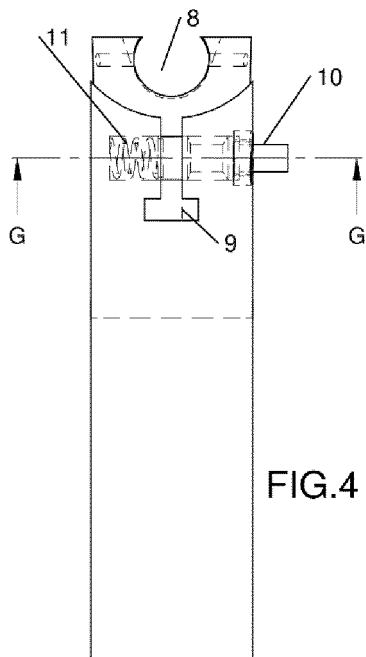
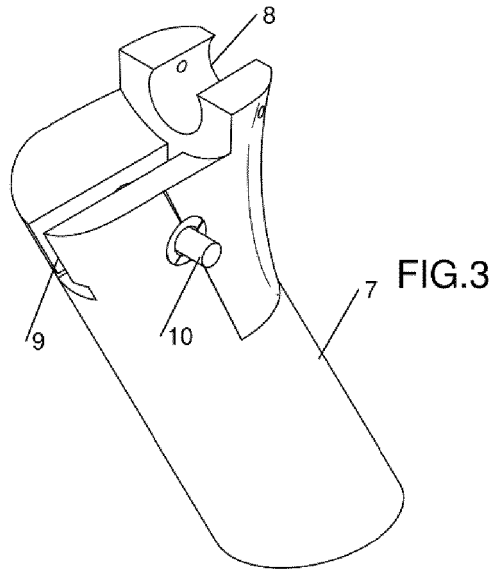


FIG. 2A



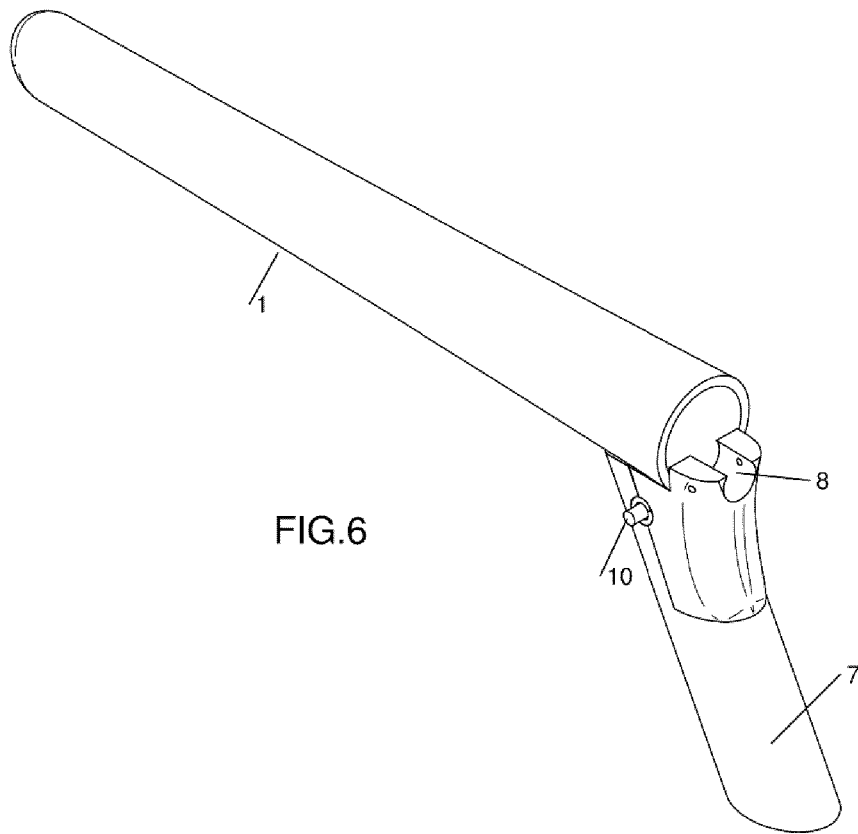


FIG.6

REFERENCES CITED IN THE DESCRIPTION

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