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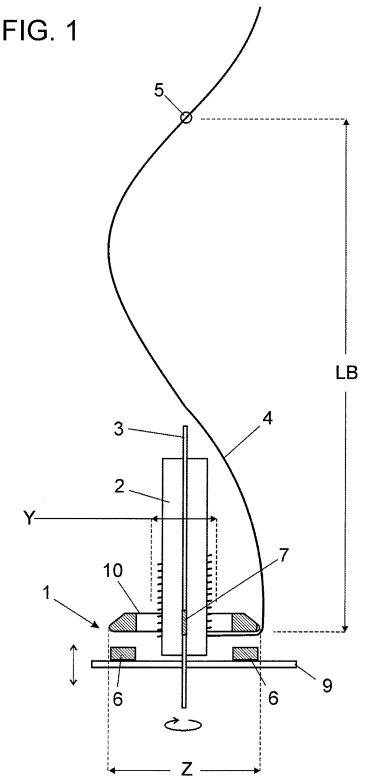
(54) TWISTING OR SPINNING MACHINE WITH MORE THAN ONE BALLOON

(57) The invention relates to a twisting or spinning machine (1) with more than one balloon, which comprises feeding means, guiding means (5), a reel (2) with a yarn take-up diameter (Y) and a ring (10) that serves as means for twisting and tensioning the yarn, the ring (10) being placed between the feeding means and the reel (2), inside the inner zone of the balloons and concentric with the reel (2), with a diameter (Z), and moving along the axis of the reel (2) in order to distribute the yarn over same, wherein the distance between the guiding means (5) and the ring (10) is LB, wherein the diameter (Z) of the ring (10) is 1.1 to 10 times the yarn take-up diameter (Y), wherein the distance LB is at least twice the diameter of the ring (Z), and wherein the twisting or spinning machine (1) does not comprise a balloon limiter or any additional tension means. The ring (10) can be a magnetic ring or a bell.

FIG. 1



EP 3 812 492 A1

Description

OBJECT OF THE INVENTION

[0001] The invention, as stated in the title of this specification, refers to a twisting or spinning machine having more than one balloon that comprises feeding means, guiding means, a bobbin in which the yarn to be twisted or spun is wound and a ring acting as a twisting means and as thread tension where the ring diameter is ranging from 1.1 to 10 times the yarn pick up diameter, where the distance between the guiding means and the ring is at least twice the ring diameter, and where the twisting or spinning machine does not comprise any balloon limiter or any additional tensioning means. The invention object of the invention provides, to the function to which is designed, with advantages and characteristics, that are described in detail thereafter and that means a noteworthy novelty in the current state-of-the-art.

[0002] The object of this invention is to constitute as an alternative to the twisting or spinning machines with additional tensioning means such as the cursor that is located on the ring that tenses the yarn perpendicular to its winding in twisting and spinning machines that provoke a yarn wear produced by friction rubbing produced by these additional tensioning means.

FIELD OF APPLICATION OF THE INVENTION

[0003] The field of application of the invention is within the sector of the industry engaged in the manufacture of twisting or spinning machines, focusing namely in the field of the guiding and tensioning systems of the yarn for its winding.

BACKGROUND OF THE INVENTION

[0004] In the yarn twisting or spinning sector, continuous ring machines or ring twisting ring machines exists, in which a cursor, in which the yarn is guided varying its vertical position from which it goes down from the feeding means to its horizontal position before its winding on the bobbin perpendicularly to the surface thereof, it slides guided on a un cursor that is moving in a ring at a significant speed, from 35m/sec to 45m/sec, a friction existing between the said cursor and the ring that, even when applying lubricating means to provide a higher durability to the cursor, makes that this later is a consumable element due to the wear it sustains, which, in addition, creates the yarn rubbing and limits the working speed.

[0005] The objective of the cursor is not only changing the yarn orientation but also to consist of an additional tensioning means that allows, by means of its weight regulation, changing the tension generated on the yarn and consequently the diameter of the balloon generated.

[0006] As an alternative to the ring-cursor set by other guiding elements, normally funnel-shaped or flared cap elements that, placed on the bobbin, guide the yarn, internally or externally, to correctly place it facing and stretched in front of the rotatory bobbin on which it is being wound, always in combination with additional tensioning means in order to control the diameter of the balloon generated.

[0007] It shall be stated that the additional tensioning element, in addition to the mentioned drawbacks, is a factor limiting the working speed of the twisting or spinning machine because at high speeds the possibility of the yarn breakage increases.

[0008] In the twisting or spinning machines having a single balloon, an additional tensioning means is always necessary, such as a cursor, to regulate the system tension and thus avoid that too wide balloons are generated, that could provoke the yarn breakage due to the centrifugal force, when working at high speeds.

[0009] In parallel, spinning machines having more than one balloon are known, that allow to work with speeds much higher than those of the spinning machines having a single balloon. The said machines require very low additional tensioning means in order that the multiple balloons are formed and that such balloon is stable.

[0010] The objective of this invention, therefore, is to develop a spinning machine having more than one balloon that suppresses the need to use additional tensioning means and, consequently, reduces the yarn rubbing wear.

[0011] On the other hand, and as reference to the current state-of-the-art, it shall be pointed out that, although multiple documents are known describing different solutions for the described issues, the existence of any showing technical and structural characteristics equal or similar to those of the ring spinning device that is claimed herein is not known.

EXPLANATION OF THE INVENTION

[0012] The twisting or spinning machine having more than one balloon that the invention proposes is therefore configured as a noteworthy novelty within its field of application, the characterizing details that distinguish it duly appearing in the final claims attached to this description.

[0013] Concretely, what the invention proposes, as above stated, is a twisting or spinning machine (1) having more than one balloon that comprises

- feeding means
- guiding means
- a bobbin having a yarn pick up diameter and
- a ring acting as the yarn twisting and tensioning means, the ring being located between the feeding means and the bobbin, within the internal area of the balloons and concentric to the bobbin, with a diameter, and moving along the bobbin shaft to distribute the yarn on the bobbin

where the diameter (Z) of the ring (10) is ranging from 1.1 to 10 times the yarn (Y) picking up diameter, where

the distance between the guiding means and the ring (LB) is at least twice the ring (Z) diameter, and where the twisting or spinning machine (1) does not comprise any balloon limiter or any additional tensioning means.

[0014] The relation between the ring (Z) diameter and the yarn picking up diameter or folding diameter (Y) is that determined by the working tension. The higher the ring (Z) diameter is with relation to the yarn picking up diameter or folding diameter (Y), the higher will be the spinning tension.

[0015] The spinning tension is also related to the relation between the distance between the guiding means and the ring (LB) and with the ring diameter (Z).

[0016] In order to generate multiple stable balloons, it is necessary to find a relation between the height LB, the yarn (Y) picking up diameter and the ring (Z) diameter so that the tension generated keeps the spinning system in balance. In addition, if a relation is reached between the previous distances, no additional tensioning elements are required as it is the ring itself that generates the suitable balance tension.

[0017] Based on an experiment, it was detected if the ring (Z) diameter is ranging from 1.1 to 10 times the yarn (Y) picking up diameter, and the distance (LB) is at least twice the ring (Z) diameter, it is possible to twist or spin with multiple balloons in a stable manner.

[0018] A first embodiment of the guiding element is a magnetic ring that levitates around that of a bobbin that avoids the use of a cursor as additional tensioning means thus avoiding the use of a consumable element that provokes the yarn rubbing wear.

[0019] More specifically, the said device comprises a magnetic ring that, made of a ferromagnetic metal or magnet having a given polarization, is kept surrounding the bobbin, thanks to the repellent effect of elements having a polarized charge of the same sign, strategically arranged to stay facing it, separating the yarn from the bobbin at a constant distance to achieve the necessary tensioning thereof and moving it upwards and downwards depending on how the winding up is going on, orienting it perpendicularly to its winding surface, for which the said yarn is arranged on the external part of the ring, to which it has access from the yarn feeding means located at the top part of the bobbin.

[0020] It is important to point out that the said ring possesses the vertical upwards and downwards movement that keeps the yarn at the necessary height of the bobbin as the winding is occurring on the surface thereof, by means of the existence of a first group of magnetized elements, polarized in the same direction as those of the ring, provided at a given distance, above or under it to provoke a repulsion force, which, preferably, are incorporated in a ring rail located under the bobbin that, in the same manner as the ring rail does, that is incorporated in the conventional machines with cursor, automatically and in a synchronized manner rises and goes down with the winding of the yarn on the bobbin, through a mechanism that, as already known, it is not deemed necessary to explain with more details.

[0021] On the other hand, to keep the spinning ring perfectly centered with respect to the bobbin shaft, it is also contemplated to incorporate a second group of magnetized and polarized elements in the same direction as the ring, in this case located close to it on the horizontal plane, preferably, incorporated in the bobbin shaft itself or on the ring rail.

[0022] In order to provoke the ring vertical travel without the ring rail is required, it is foreseen that the first group of magnetized elements is an electromagnet so that the repulsion force can be regulated by means of the control of the electricity applied to the first group of magnetized elements.

[0023] An alternative embodiment to the preceding one is the use of a bell without additional tensioning means as guiding element. The bell vertical travel with respect to the bobbin can be achieved by lifting the bell through a spear located within the bobbin.

[0024] The described twisting or spinning machine consists, therefore, of an innovating structure having characteristics unknow until now for the purpose to which it is designed, reasons that together with its practical utility, provides it with sufficient ground to obtain the privilege of exclusivity that is applied for.

DESCRIPTION OF THE DRAWINGS

[0025] To complement the description that is being carried out and in order to assist to a best understanding of the characteristics of the invention, attached to this specification, as an integral part thereof, there is a drawing in which, for illustration and not limitation purpose, the following has been represented:

The figure number 1.- It shows a very schematic representation in an elevation and sectional view of the twisting or spinning machine having more than one balloon with a spinning magnetic ring for a twisting or spinning machine, object of the invention, where the second group of polarized elements (7) is located within the bobbin.

[0026] The figure number 2.- It shows a very schematic representation in an elevation and sectional view of the twisting or spinning machine having more than one balloon with a magnetic spinning ring for a twisting or spinning machine, object of the invention, where the second group of polarized elements (7) is located in the ring rail (9).

[0027] The figure number 3.- It shows a very schematic representation in an elevation and sectional view of the twisting or spinning machine having more than one balloon with the ring forming part of a bell.

PREFERRED EMBODIMENT OF THE INVENTION

[0028] At the sight of the described figures, and according with the numerals adopted, a not limiting example of embodiment can be seen of the magnetic spinning ring device for twisting or spinning machine of the invention,

which comprises the stated and described in detail below.

[0029] An embodiment of the invention, as it can be seen in the figure 1, consists in a twisting or spinning machine having more than a balloon (1) that comprises a rotating bobbin (2) around a vertical shaft (3) on which is wound the yarn (4) to be twisted or spun, coming from feeding means located above the said bobbin (2), that vertically goes down from a first guiding point (5), and a guiding element that comprises a magnetic ring (10) the function of which is to modify the orientation of the yarn (4), from a vertical to an horizontal orientation and vertically moving it on the surface of the bobbin (2) to remain perpendicularly facing the said surface as its winding is going on. The twisting or spinning machine (1) also comprises magnetized elements (6, 7) having a polarized charge of the same sign as that of the ring (10) and that are arranged so that they remain facing the ring (10) and repel it, keeping it stable in its position around the bobbin. In this embodiment of the invention the ring (10) diameter (Z) is ranging from 1.1 to 10 times the yarn (Y) picking up diameter, the distance LB between the guiding means (5) and the ring (10) is at least twice the ring (Z) diameter, and the twisting or spinning machine (1) does not comprise any balloon limiter or any additional tensioning means.

[0030] More specifically, it is a ring (10) made of a ferromagnetic material or magnet having a given polarization, that is kept stable surrounding the rotating bobbin (2), by means of magnetized elements having a polarized charge (6,7) of the same sign, arranged so as to stay facing it, separating it from the bobbin (2) at a constant distance, to achieve the necessary tensioning of the yarn (4) that is externally placed on the surface of the ring (10) and moving it upwards and downwards as the winding is going on in order it remains horizontally and perpendicularly oriented to the said surface of the bobbin (2).

[0031] Preferably, the vertical upwards and downwards movement of the ring (10) that keeps the yarn at the bobbin (2) necessary height as the winding is going on, on its surfaces, occurs by means of a first group of polarized elements (6) with the same sign as the ring (10), set at a given distance, above or under it, to provoke repulsion, which, preferably, are incorporated in a ring rail (9) having an automatic movement synchronized with the winding and located under the bobbin (2).

[0032] In a preferred embodiment as it is shown in the figure 2, to keep the spinning ring (10) centered with respect to the bobbin (2) shaft (3), it is also contemplated to incorporate a second group of polarized elements (7) in the same direction as the spinning ring, in this case located close to it on the horizontal plane, preferably, incorporated in the bobbin (2) shaft (3) itself or incorporated in a ring rail (9) as it can be seen in the figure 2.

[0033] In an even more preferred embodiment of the first group of polarized elements (6) having the same sign as the ring (10) located in the twisting or spinning machine that provoke repulsion, there is an electromagnet so that it is possible to regulate the vertical upwards and downwards movement of the ring (10) by means of the control of the electricity applied to the first group of polarized elements (6).

[0034] In an alternative embodiment of the preceding ones, as it can be seen in the figure 3, the ring (10) of the twisting or spinning machine having more than one balloon (1) forms part of a bell (11) located around the bobbin (2).

[0035] In this embodiment of the invention the ring (10) diameter (Z) is ranging from 1.1 to 10 times the yarn (Y) picking up diameter, the distance LB between the guiding means (5) and the ring (10) is at least twice the ring (Z) diameter, and the twisting or spinning machine (1) does not comprise any balloon limiter or any additional tensioning means.

[0036] The nature of this invention being sufficiently described, as well as the manner to implement it, it is not deemed necessary to extend any longer its explanation for any skilled person of the art to understand its extent and advantages arising from it, and it is stated that, within its essence, it can be implemented in other embodiments that differ in detail of those stated for example purpose and that will be also covered by the protection that is sought, provided that its fundamental principle is not altered, changed or modified.

Claims

1. Twisting or spinning machine (1) having more than one balloon that comprises:

   - feeding means
   - guiding means (5)
   - a bobbin (2) having a yarn (Y) pick up diameter and
   - a ring (10) acting as a yarn twisting and tensioning means, the ring (10) being located between the feeding means and the bobbin (2), within the internal area of the balloons and concentric to the bobbin (2), with a diameter (Z), and moving along the bobbin (2) shaft to distribute the yarn on the bobbin

   where the distance between the guiding means (5) and the ring (10) is LB **characterized in that** the ring (10) diameter (Z) is ranging from 1.1 to 10 times the yarn (Y) picking up diameter, **in that** the distance LB is at least twice the ring (Z) diameter, and **in that** the twisting or spinning machine (1) does not comprise any balloon limiter or any additional tensioning means.

2. Twisting or spinning machine (1) having more than one balloon, according to claim 1 **characterized in that** the ring (10) that comprises at least a ferromagnetic material or magnet having a given polarization and the twisting or spinning machine (1) comprises

in addition magnetized elements (6, 7) having a polarized charge of the same sign as the ferromagnetic metal or material of the ring (10) arranged so that the said magnetized elements (6,7) remain facing the ferromagnetic metal or magnet of the ring (10) and repel it keeping the ring (10) stable in its position surrounding the rotating bobbin (2) at a distance associated to the magnetic field.

3. Twisting or spinning machine (1) having more than one balloon , according to the claim 2, **characterized in that ,** for the vertical upwards and downwards movement of the ring (10) that keeps the yarn at the necessary height of the bobbin (2) as the winding is going on, on its surface, it comprises a first group of polarized elements (6) having the same sign as the ring (10) located at a given distance, above or under it, that provoke repulsion or attraction.

4. Twisting or spinning machine (1) having more than one balloon , according to the claim 3, **characterized in that** the first group of polarized elements (6) with the same sign as the ring (10) that provoke repulsion and vertical upwards and downwards movement of the ring (10) are incorporated in a ring rail (9) located under the bobbin (2).

5. Twisting or spinning machine (1) having more than one balloon , according to any of the claims 2 to 4, **characterized in that,** to keep the spinning ring (10) centered with respect to the bobbin (2) shaft (3) it comprises a second group of polarized elements (7) in the same direction as the spinning ring located close to it on the horizontal plane.

6. Twisting or spinning machine (1) having more than one balloon, according to the claim 5, **characterized in that** the second group of polarized elements (7) in the same direction as the spinning ring located close to it on the horizontal plane to keep the spinning ring (10) centered with respect to the bobbin (2) shaft (3) are incorporated to the bobbin (2) shaft (3) itself.

7. Twisting or spinning machine (1) having more than one balloon, according to the claim 5, **characterized in that** the second group of polarized elements (7) in the same direction as the spinning ring located close to it on the horizontal plane to keep the spinning ring (10) centered with respect to the bobbin (2) shaft (3) are incorporated in a ring rail (9) located under the bobbin (2).

8. Twisting or spinning machine (1) having more than one balloon, according to any of the claims 2-7, **characterized in that** the first group of the polarized elements (6) having the same sign as the ring (10) that provoke repulsion is an electromagnet so that it is possible to regulate the vertical upwards and downwards movement of the ring (10) by means of the control of the electricity.

9. Twisting or spinning machine (1) having more than one balloon, according to the claim 1 **characterized in that** the ring (10) is associated to the machine (1) by mechanical means.

10. Twisting or spinning machine (1) having more than one balloon, according to the claim 9 **characterized in that** the ring (10) forms part of a bell (11) located around the bobbin (2) that is moving along the bobbin (2) by means of the action of a spear.

FIG. 1

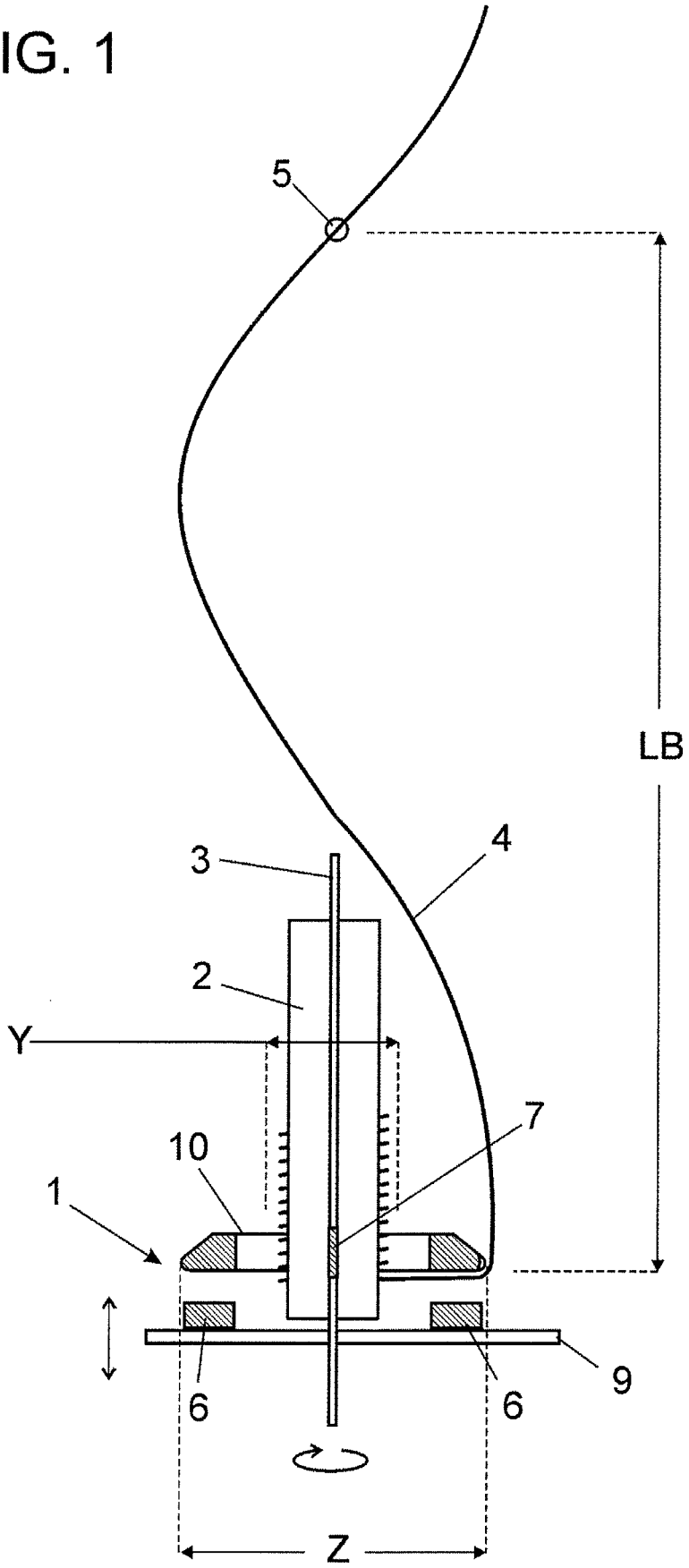


FIG. 2

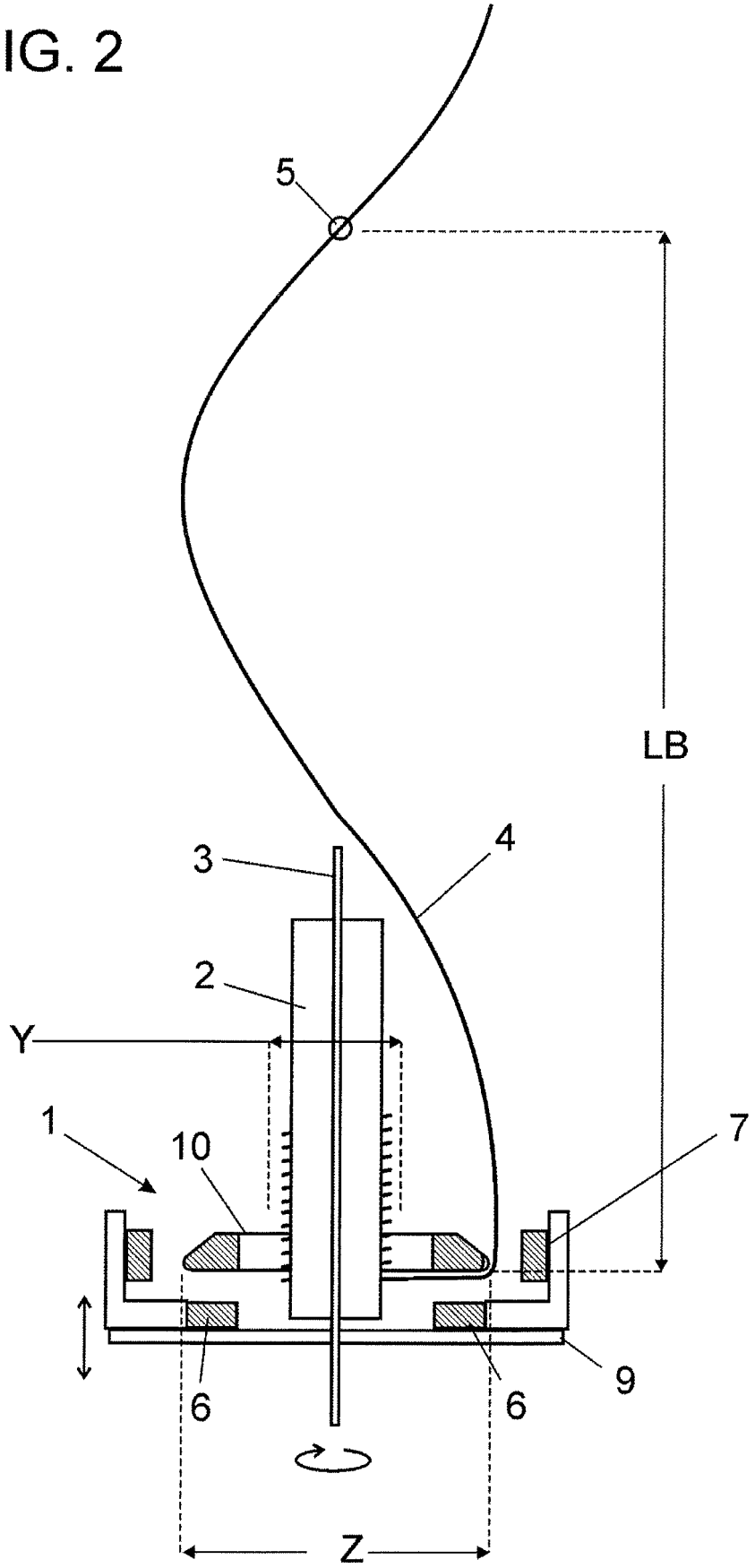
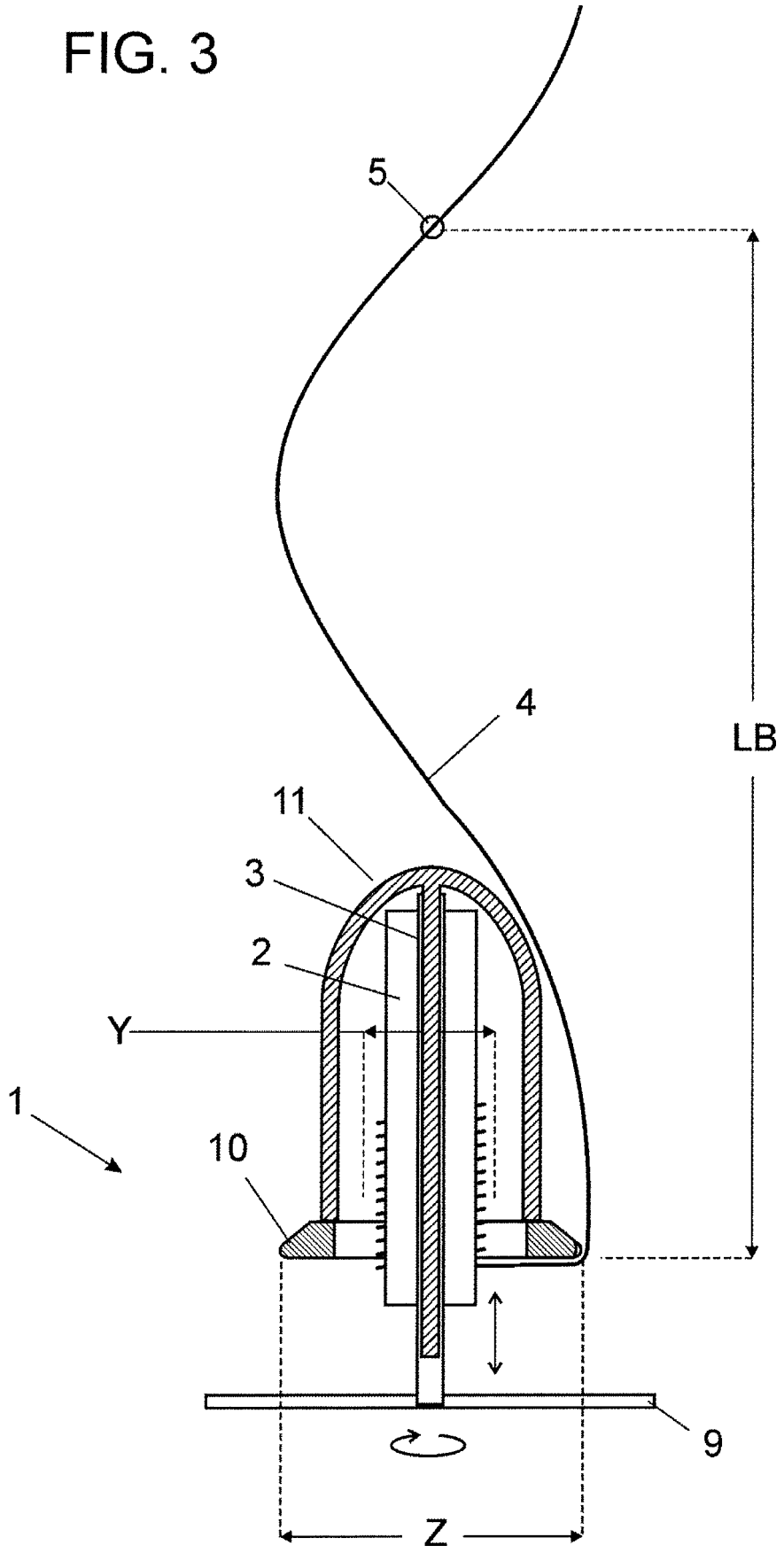


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070345

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
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Date of the actual completion of the international search	Date of mailing of the international search report
31/07/2019	**(06/08/2019)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer C. Alonso de Noriega Muñiz Telephone No. 91 3493023

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070345

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

International application No.

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CLASSIFICATION OF SUBJECT MATTER

D01H7/00 (2006.01)
D01H7/60 (2006.01)
D01H1/02 (2006.01)
D01H1/14 (2006.01)
D01H13/00 (2006.01)

Form PCT/ISA/210 (extra sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
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