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(54) **ADJUSTING DRUM FOR PRODUCT-DELIVERING SPIRAL**

EINSTELLTROMMEL FÜR PRODUKTABGABESPIRALE

TAMBOUR D'AJUSTEMENT POUR SPIRALE DE DISTRIBUTION DE PRODUIT

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Description

[0001] The present invention refers to an adjusting drum aimed in particular to allow adjusting the rotation of delivering spirals used in product-dispatching machines.

[0002] As known, product-dispatching machines or vending machines have been used for years, and, for delivering the products, they use delivering spirals substantially arranged in a horizontal position that, by rotating around their symmetry axis under the action of an actuating system, make the products inserted between their coils translate up to a delivering opening, through which the product selected by the purchaser falls down, typically by gravity, going out of the respective spiral coil.

[0003] When manufacturing the above dispatching machines, the position of each spiral must be carefully adjusted so that its free end, namely the end through which the products to be delivered are released in succession when the spiral is brought to rotate, is correctly oriented in order to avoid that the products gets restrained.

[0004] In order to allow adjusting each spiral, the prior art proposed adjusting drums typically interposed between spiral and respective actuating system and rotating coaxially with the spiral itself under the action of the actuating system. Such known adjusting drums are generally composed of a first plate integral with the drive shaft of the actuating system and of a second plate axially integral with the spiral, at least one elastic element being arranged between the above two plates in such a way that these latter ones can be mutually moved away by applying a traction force along the spiral rotation axis: once having moved away the plates enough, it is then possible to rotate the spiral in order to take it to the desired position: once having released the spiral, the plates, under the return action of the spring, go back to be mutually integral, keeping the relative position of the spiral set with respect to the drive shaft of the actuating system. US3840147 discloses such a prior art solution Such known adjusting drums however have some inconveniences: in fact, due to the presence of the elastic element, very often it is relatively fatiguing to exert an enough traction on the spiral, making the spiral adjusting operation difficult, slow and scarcely practical; moreover, should the exerted traction be excessive, the complete detachment between the plates could occur, if not even the elastic element brakage,

[0005] implying a long and difficult maintenance work in order to restore the functionality of the damaged spiral. Moreover, the use of known adjusting drums is extremely uncomfortable when an adjustment has to be made of the orientation of a spiral in which products to be delivered have already been placed: in such case, in fact, by axially pulling the spiral, it is highly likely that at least the products nearest to the spiral end fall by gravity in the delivering room of the dispatching machine, then requiring the following reloading by the operator, with obvious losses of time and efficiency.US-A-2961125 discloses a conveyor mechanism for indexing a vertically-elongated spiral on which products are arranged to be dispensed by a dispatching machine.

[0006] Therefore, object of the present invention is solving the above prior art problems, by providing an adjusting drum for a delivering spiral in which the adjustment of its relative position does not require an axial traction along the rotation axis of the spiral itself, resulting more easily and practically usable with respect to what has been proposed by the prior art.

[0007] Another object of the present invention is providing an adjusting drum for a delivering spiral that lacks inside the elastic traction means, thereby resulting more reliable with respect to what has been proposed by the prior art.

[0008] The above and other objects and advantages of the invention, as will result from the following description, are obtained with an adjusting drum for a delivering spiral as claimed in claim 1. Preferred embodiments and non-trivial variations of the present invention are the subject matter of the dependent claims.

[0009] It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes, arrangements and parts with equivalent functionality) could be made to what is described, without departing from the scope of the invention, as appears from the enclosed claims.

[0010] The present invention will be better described by some preferred embodiments thereof, provided as a nonlimiting example, with reference to the enclosed drawings, in which:

- FIG. 1a shows a perspective view of a preferred embodiment of the adjusting drum for a delivering spiral according to the present invention;
- FIG. 1b shows an exploded perspective view of the adjusting drum of FIG. 1a;
- FIG. 2a shows another perspective view of the adjusting drum for a delivering spiral according to the present invention; and
- FIG. 2b shows an exploded perspective view of the adjusting drum of FIG. 2a.

[0011] With reference then to the Figures, it is possible to note that the adjusting drum 1 according to the present invention comprises at least one first plate 3 equipped with first fastening means 5 to at least one product-delivering spiral (not shown), and at least one second plate 7 equipped with second fastening means 9 to a rotor of at least one actuating system (not shown). The adjusting drum 1 according to the present invention is therefore aimed to be interposed between actuating system and spiral and to rotate, during the normal operation of the dispatching machine, coaxially, for example around the rotation axis R-R of FIG. 1a and 1b, with the spiral itself under the action of the actuating system. In a preferred and example embodiment thereof, the first fastening

means 5 comprise at least one bayonet-type connection clamp 6 (or another clamping system) preferably arranged on the circumference of the second plate 3, adapted to cooperate with the respective clamp arranged next to an end of the spiral. In a preferred and example embodiment thereof, the second fastening means 9 instead comprise at least one fastening pin 10 having a first end axially secured to the second plate 7 and a second end equipped with restraining means 11 axial to the actuating system rotor.

[0012] Between the first and the second plate, respectively 3 and 7, angular orienting means 13 of the spiral are interposed. In a preferred embodiment thereof, the angular orienting means 13 of the spiral comprise at least one ring nut 15, preferably integral with the first plate 3 and equipped, externally, circumferentially and radially, with a plurality of ratchet gear means 17 adapted to unilaterally engage a corresponding plurality of radial engagement seats 19, internal and integral with the second plate 7.

[0013] The unilateral action of the radial ratchet gear means 17 of the ring nut 15 therefore allows rotating, around the rotation axis R-R, the first plate 3 related to the second plate 7 only along a first spiral adjusting direction (designated, for example, by arrow V_R in FIG. 1a and 2a), at the same time preventing a relative rotation between first and second plates 3, 7 along a second rotation direction (designated, for example, by arrow V_F of FIG. 1a and 2a) around the rotation axis R-R opposite to the first rotation direction V_R. The radial arrangement of the ratchet gear means 17 in cooperation with the respective radial engagement seats 19 therefore allows step-wise rotating, along the first adjusting direction V_R, the first plate 3 with respect to the second plate 7 by multiples of the angle defined by the arc of circle C imposed by the radial distances between each ratchet gear means and the following one. Therefore, during the rotation of the first plate 3 with respect to the second plate 7 along the first adjusting direction V_R, each ratchet gear means 17 engages engagement seats 19 progressively in succession, depending on the relative rotation imposed, for example, by an assembling or maintenance operator, to the first plate 3 (for example by operating on the spiral delivering end, taking this latter one manually to rotate around the rotation axis R-R along the first adjusting direction V_R) with respect to the second plate 7, this latter one instead kept in a substantially fixed position by the actuating system to which it is connected. For such purpose, it must be noted that the second rotation direction V_F coincides with the rotation direction in which the spiral normally operates for delivering the products, during which the first and second plates 3, 7, therefore the whole adjusting drum 1 according to the present invention, instead integrally rotate around the rotation axis R-R.

[0014] In a preferred embodiment thereof, each one of the ratchet gear means 19 is preferably made as at least one tongue made of an elastic material, having substantially the shape of a "L", an end of which is radially secured to the external surface of the ring nut 15. In parallel, each one of the engagement seats 19 is preferably composed of at least one ramp-shape facilitating member 20 on which the respective tongue can slide when the first plate 3 is brought to rotate with respect to the second plate 7 around the rotation axis R-R along the first adjusting direction V_R, and of at least one abutment surface 22 that prevents the tongue from sliding, and therefore the first plate 3 from rotating with respect to the second plate 7 around the rotation axis R-R along the second rotation direction V_F.

[0015] In order to allow an easy removal of a spiral, for example in case of breakage or necessary replacement with another spiral with different sizes, the first plate 3 and the second plate 7 can be mutually joined by coupling means: by operating on such coupling means, it is therefore possible to separate the first plate 3, and the related spiral connected thereto, from the second plate 7 and join another first plate 3, and the respective spiral, to the same second plate 7. In a preferred and example embodiment thereof, the coupling means comprise at least one central pin 23, therefore coaxial with the rotation axis R-R, integral to the second plate 7, having an end equipped with at least two radial wings (or another system) 25 adapted to be inserted in respective slits 27 of a through-opening 29 of the first plate 3, also coaxial with the rotation axis R-R, adapted to receive inside it part of the central pin 23 of the second plate 7. Therefore, once having passed the wings 25 inside the respective slits 27, it is enough to rotate the first plate 3 with respect to the second plate 7 around the rotation axis R-R along the first adjusting direction V_R in order to uncouple the wings 25 from the slits 27 and make the two plates 3, 7 mutually integral.

[0016] Should the dispatching machine require the use of two flanked and counter-rotating spirals, as typically occurs for delivering particularly bulky products, the adjusting drum 1 according to the present invention could be externally, radially and circumferentially equipped, for example around the second plate 7, with mechanical clamping means, such as for example gearing teeth, with similar clamping means of an adjacent and cooperating adjusting drum 1: in this case, in order to take the two spirals to counter-rotate, it will be enough to connect to the actuating system only one of the two adjusting drums 1, since the other one is taken to rotate by the clamping means of the first one with which it is meshed; the second fastening means 9 of the second drum could then be connected to an idle rotation pin, instead of to their own actuating system.

[0017] Therefore, due to the adjusting drum 1 according to the present invention, in order to adjust the angular orientation of the delivering spiral with respect to the related actuating system, it is enough to rotate the spiral itself around its rotation axis R-R along the first adjusting direction V_R till the desired position is reached. Obviously, the pitch between the respective possible orientation

positions, and obviously the number of possible positions, will depend on the angular distances, defined by the arc of circle C, between each ratched gear means and the following one: for example, in the example embodiment of the orienting means 13 shown in the figures, since the ratchet gear means 17 (and obviously the respective engagement seats 19) are eight, the possible different radial orientation positions will be eight, each one of which is arranged at an angle of 45° with respect to the previous and the following ones. Obviously, by changing the number of ratchet gear means 17 and/or their radial arrangement around the ring nut 15, it will be possible to define other different spiral orienting positions without departing from the scope of the present invention.

Claims

1. Adjusting drum (1) for adjusting a rotation of a horizontally-arranged delivering spiral of a product-dispatching machine, comprising at least one first plate (3) equipped with first fastening means (5) to at least one product-delivering spiral, and at least one second plate (7) equipped with second fastening means (9) to at least one actuating system, **characterised in that** between said first plate (3) and said second plate (7) angular orienting means (13) of said spiral are arranged, said angular orienting means (13) allowing a unilateral rotation of said first plate (3) with respect to said second plate (7), and **in that** said angular orienting means (13) of said spiral comprise at least one ring nut (15) integral with said first plate (3) and externally, circumferentially and radially equipped with a plurality of ratchet gear means (17) adapted to engage a corresponding plurality of radial engagement seats (19) internal and integral with said second plate (7), said unilateral rotation allowing rotating said first plate (3) with respect to said second plate (7) around a rotation axis (R-R) only along a first adjusting direction (V_R) of said spiral, preventing a relative rotation between said first plate (3) and said second plate (7) along a second rotation direction (V_F) around said rotation axis (R-R) opposite to said first rotation direction (V_R).

2. Adjusting drum (1) according to claim 1, **characterised in that** said first fastening means (5) comprise at least one bayonet-type connection plug (6), or another clamping system, of a corresponding clamp of an end of said spiral.

3. Adjusting drum (1) according to claim 1, **characterised in that** said second fastening means (9) comprise at least one fastening pin (10) having a first end axially fastened to said second plate (7) and a second end equipped with restraining means (11) axial to a rotor of said actuating system.

4. Adjusting drum (1) according to claim 1, **characterised in that** each one of said ratchet gear means (19) is at least one elastic tongue having a shape of a "L", an end of which is radially secured to an external surface of said ring nut (15) and each one of said engagement seats (19) is composed of at least one ramp-shaped facilitating member (20) on which a respective tongue can slide, and of at least one abutment surface (22) that prevents said tongue from sliding.

5. Adjusting drum (1) according to claim 1, **characterised in that** said first plate (3) and said second plate (7) are mutually joined by coupling means.

6. Adjusting drum (1) according to claim 5, **characterised in that** said coupling means comprise at least one central pin (23) integral with said second plate (7) having an end equipped with at least two radial wings (25), or another system, adapted to be inserted into respective slits (27) of a through-opening (29) of said first plate (3).

7. Adjusting drum (1) according to claim 1, **characterised in that** it is externally, radially and circumferentially equipped with mechanical clamping means with similar clamping means of an adjacent and cooperating adjusting drum (1).

8. Adjusting drum (1) according to claim 7, **characterised in that** said mechanical clamping means are gearing teeth.

Patentansprüche

1. Einstellungsscheibe (1) für die Dreheinstellung einer Ausgabespirale, die horizontal angeordnet ist, von einer Produktverteilungsmaschine, die mindestens einen ersten Teller (3), der mit den ersten Befestigungsvorrichtungen (5) an mindestens einer Produktausgabespirale ausgestattet ist, und mindestens einen zweiten Teller (7) einschließt, der mit zweiten Befestigungsvorrichtungen (9) an mindestens einem Antriebssystem ausgestattet ist, und **dadurch gekennzeichnet ist, dass** zwischen dem genannten ersten Teller (3) und dem genannten zweiten Teller (7) Winkelausrichtungsvorrichtungen (13) der genannten Spirale angeordnet sind, die genannten Winkelausrichtungsvorrichtungen (13) ermöglichen eine einseitige Drehung des genannten ersten Tellers (3) gegenüber dem genannten zweiten Teller (7), und **dadurch gekennzeichnet ist; dass** die genannten Winkelausrichtungsvorrichtungen (13) der genannten Spirale mindestens eine Nutmutter (15) einschließen, die ein Stück mit dem genannten ersten Teller (3) bildet und außen, am Kreisumfang und radial mit mehreren Rastvorrichtungen (17) ausge-

stattet ist, die dazu dienen, entsprechende mehrere interne radiale Aufnahmesitze (19) zu spannen, die ein Stück mit dem genannten zweiten Teller (7) bilden, die genannte einseitige Drehung ermöglicht es, den genannten ersten Teller (3) gegenüber dem genannten zweiten Teller (7) nur gemäß einer ersten Einstellungsrichtung (V_R) der genannten Spirale um eine Drehachse (R-R) zu drehen, sodass eine entsprechende Drehung zwischen dem genannten ersten Teller (3) und dem genannten zweiten Teller (7) gemäß einer zweiten Drehrichtung (V_F) um die genannte Drehachse (R-R) entgegen gesetzt zur genannten ersten Drehrichtung (V_R) verhindert wird.

2. Einstellungsscheibe (1) gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** die genannten ersten Befestigungsvorrichtungen (5) mindestens eine Greifverbindung mit einem Bajonettverschluss (6) oder ein anderes Greifsystem einer entsprechenden Aufnahme an einem Endstück der genannten Spirale einschließen.

3. Einstellungsscheibe (1) gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** die genannten zweiten Befestigungsvorrichtungen (9) mindestens einen Befestigungsbolzen (10) einschließen, der ein erstes Endstück, das axial am genannten zweiten Teller (7) befestigt ist, und ein zweites Endstück hat, das mit axialen Einspannvorrichtungen (11) an einem Rotor des genannten Antriebssystems ausgestattet ist.

4. Einstellungsscheibe (1) gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** jede der genannten Rastvorrichtungen (19) mindestens eine "L-förmige" elastische Zunge ist, eins ihrer Endstücke ist radial an einer Außenfläche der genannten Nutmutter (15) befestigt, und jeder der genannten Aufnahmesitze (19) besteht aus mindestens einer Rampenöffnung (20), auf der eine entsprechende Zunge gleiten kann, und aus mindestens einer Anschlagfläche (22), die ein Gleiten der genannten Zunge verhindert.

5. Einstellungsscheibe (1) gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** der genannte erste Teller (3) und der genannte zweite Teller (7) durch Verankerungsvorrichtungen miteinander verbunden sind.

6. Einstellungsscheibe (1) gemäß Patentanspruch 5, die **dadurch gekennzeichnet ist, dass** die genannten Verankerungsvorrichtungen mindestens einen mittleren Bolzen (23) einschließen, der ein Stück mit dem genannten zweiten Teller (7) bildet, welcher ein Endstück hat, das mit mindestens zwei radialen Lamellen (25) oder einem anderen System ausgestattet ist, die dazu dienen, sich in die entsprechenden Schlitze (27) einer durchgehenden Öffnung (29) des genannten ersten Tellers (3) einzufügen.

7. Einstellungsscheibe (1) gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** sie außen, radial und am Kreisumfang mit mechanischen Greifvorrichtungen mit den gleichen Greifvorrichtungen wie eine daneben und mit ihr zusammenarbeitenden Einstellungsscheibe (1) ausgestattet ist.

8. Einstellungsscheibe (1) gemäß Patentanspruch 7, die **dadurch gekennzeichnet ist, dass** die genannten mechanischen Greifvorrichtungen Radzähne sind.

Revendications

1. Tambour de réglage (1) pour la régulation en rotation d'une spirale de distribution, disposée horizontalement, d'une machine de distribution de produits, comprenant au moins un premier plateau (3) doté de premiers moyens de fixation (5) à une spirale de distribution de produits au moins et un second plateau au moins (7) doté de second moyens de fixation (9) à un système d'actionnement au moins, **caractérisé en ce qu'**entre le premier plateau (3) et le second plateau (7) se trouvent des moyens d'orientation angulaire (13) de la spirale, ces moyens d'orientation angulaire (13) permettent une rotation unilatérale du premier plateau (3) par rapport au second plateau (7), et **en ce que** ces moyens d'orientation angulaire (13) de la spirale comprennent au moins une bague (15) solidaire du premier plateau (3) dotée à l'extérieur, sur la circonférence et sur le rayon d'une pluralité de moyens d'encliquetage (17) en mesure d'engager une pluralité correspondante de logements radiaux (19) internes et solidaires du second plateau (7) ; la rotation unilatérale permet de faire tourner le premier plateau (3) par rapport au second plateau (7) autour d'un axe de rotation (R-R) uniquement vers un premier sens de régulation (V_R) de la spirale, en empêchant une rotation relative entre le premier plateau (3) et le second plateau (7) dans un second sens de rotation (V_F) autour de l'axe de rotation (R-R) opposé au premier sens de rotation (V_R).

2. Tambour de réglage (1), selon la revendication 1, **caractérisé en ce que** les premiers moyens de fixation (5) comprennent au moins une prise de connexion à baïonnette (6), ou un autre système de prise, d'une prise correspondante d'une extrémité de la spirale.

3. Tambour de réglage (1), selon la revendication 1, **caractérisé en ce que** les seconds moyens de fixation (9) comprennent au moins un goujon de fixation

(10) ayant une première extrémité fixée axialement au second plateau (7) et une seconde extrémité dotée de dispositifs d'encastrement (11) axiaux à un rotor du système d'actionnement.

4. Tambour de réglage (1), selon la revendication 1, **caractérisé en ce que** chaque moyen d'encliquetage (19) est composé au moins d'une languette élastique en forme de "L", dont une extrémité est fixée radialement à une surface externe de la bague (15) et chaque logement (19) est composé au moins d'une entrée à rampe (20) sur laquelle peut glisser la languette relative et au moins une surface de butée (22) qui ferme le glissement de la languette.

5. Tambour de réglage (1), selon la revendication 1, **caractérisé en ce que** le premier plateau (3) et le second plateau (7) sont unis par des moyens d'accrochage.

6. Tambour de réglage (1), selon la revendication 5, **caractérisé en ce que** les moyens d'accrochage comprennent au moins un goujon central (23) solidaire du second plateau (7) dont une extrémité est dotée au moins de deux ailettes radiales (25) ou un autre système, en mesure d'entrer dans les fentes respectives (27) d'une ouverture passante (29) du premier plateau (3).

7. Tambour de réglage (1), selon la revendication 1, **caractérisé en ce qu'**il est doté à l'extérieur, sur le rayon et sur la circonférence, de moyens de prise mécanique avec des moyens de prise analogues d'un tambour de réglage (1) adjacent et coopérant.

8. Tambour de réglage (1), selon la revendication 7, **caractérisé en ce que** les moyens de prise mécanique sont des dents d'engrenages.

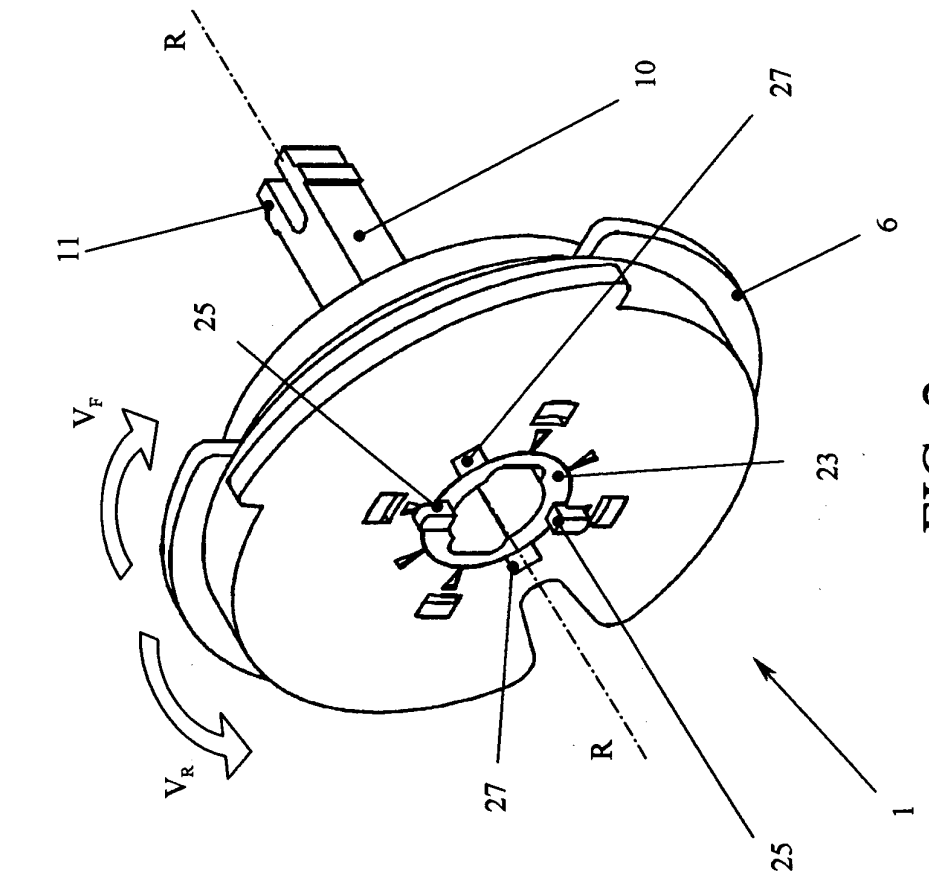


FIG. 2a

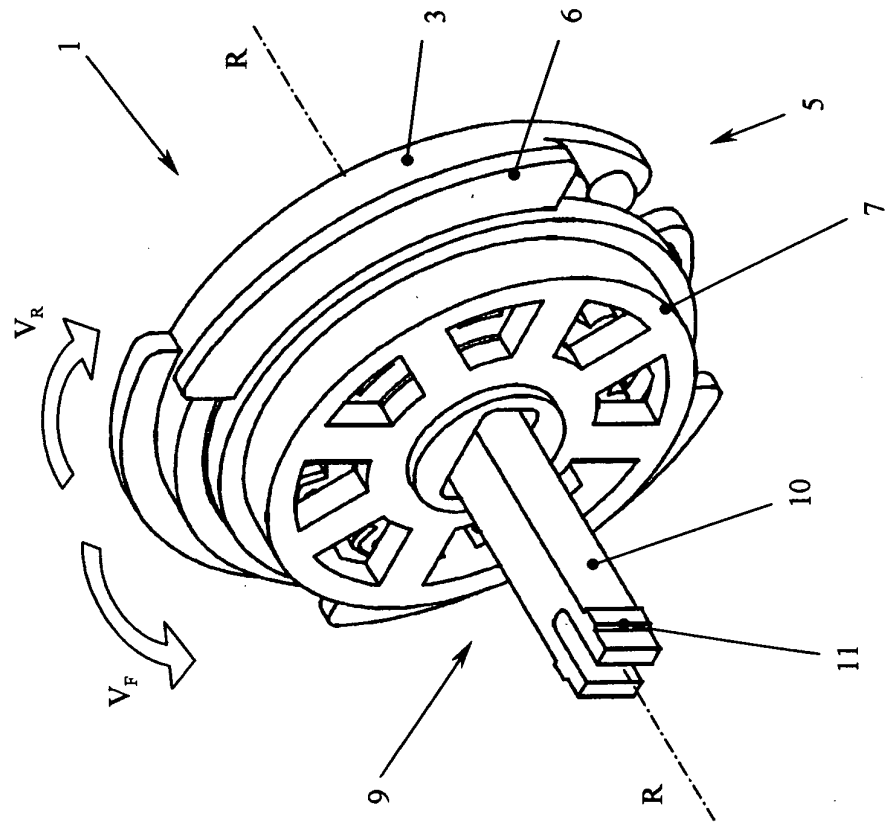


FIG. 1a

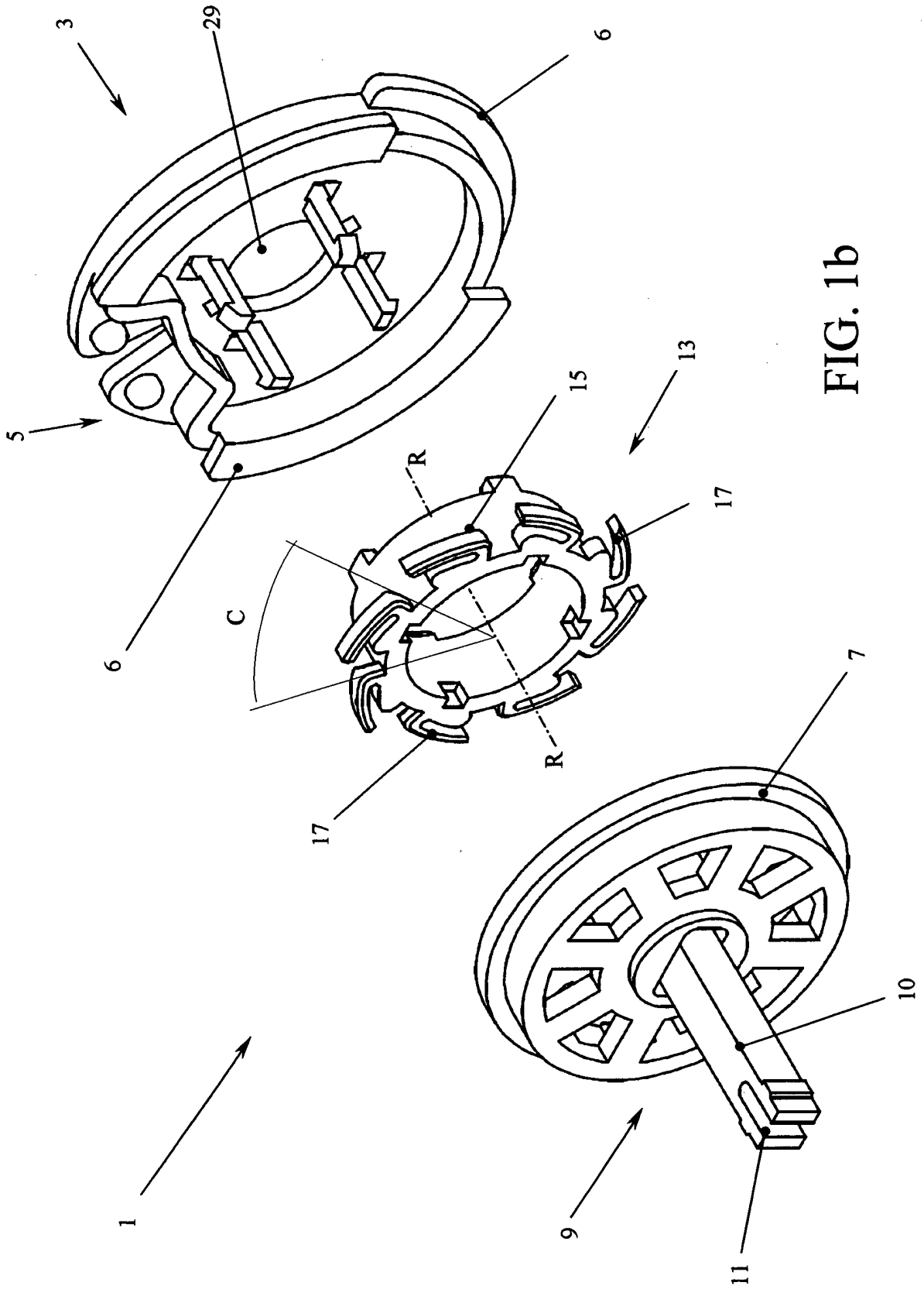


FIG. 1b

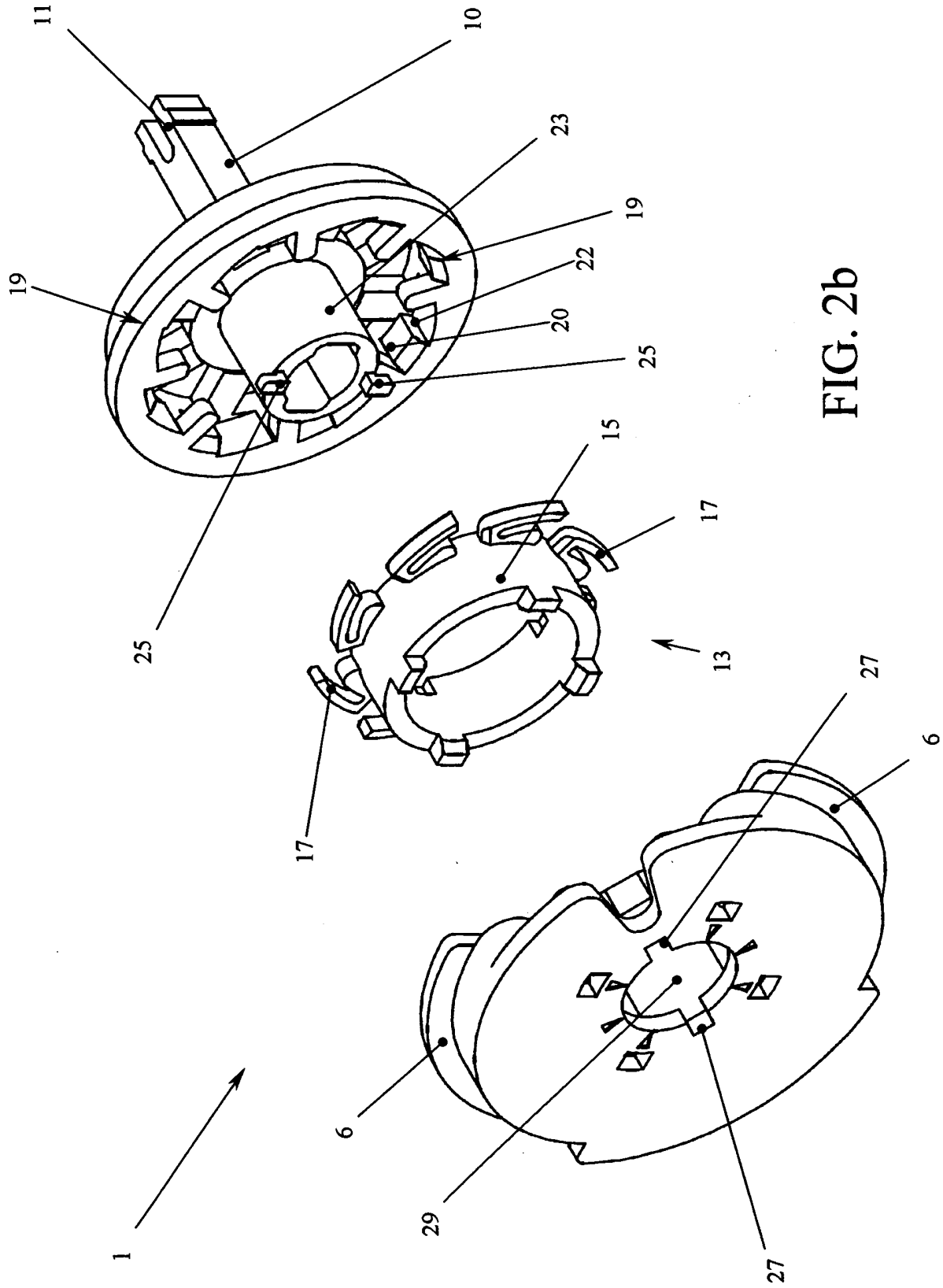


FIG. 2b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 3840147 A **[0004]**
- US 2961125 A **[0005]**