

(19)



(11)

**EP 3 375 320 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**20.11.2019 Bulletin 2019/47**

(51) Int Cl.:  
**A45D 26/00 (2006.01)**

(21) Application number: **18162220.0**

(22) Date of filing: **16.03.2018**

**(54) EPILATING DEVICE AND METHOD**

EPILIERVORRICHTUNG UND VERFAHREN

DISPOSITIF ET PROCÉDÉ D'ÉPILATION

(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: **17.03.2017 EP 17161627**

(43) Date of publication of application:  
**19.09.2018 Bulletin 2018/38**

(73) Proprietor: **Epilady 2000 LLC Hazor Haglilit 10351 (IL)**

(72) Inventor: **Yehuda, Poran 12466 Golan Heights (IL)**

(74) Representative: **Stellbrink & Partner Patentanwälte mbB Widenmayerstrasse 10 80538 München (DE)**

(56) References cited:  
**US-A1- 2012 035 621**

**EP 3 375 320 B1**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

### Field of invention

**[0001]** The invention is directed to an epilating head for an epilating device especially to an epilating head comprising a group of pincer assemblies.

### Background

**[0002]** Depilating devices use one of two methods for removing hair. In one method, the hair is cut, leaving the roots intact beneath the skin surface. In the other method, hair is removed by pulling it out from its roots.

**[0003]** There are several mechanisms for removing hair. Disc mechanisms are often used. In general, these mechanisms include discs and associated pincer-like elements. When two pincer-like elements are brought close together, hair is trapped between them. The discs, which rotate and produce a torque, then uproot the hair trapped between their associated pincers. The pincer-like elements and their associated discs move in unison and all pincer-like elements within a fixed distance move close to their adjacent pincer-like elements synchronously. The forces required in such mechanisms are multiples of the number of pincers. In some of these depilatory devices, the disc mechanisms have cylindrical shapes. Other depilating devices which use disc mechanisms employ a large spring with bearings connected to its ends. In such devices, the spring presses on the bearings producing a constant force that acts identically over all the discs and their associated pincer-like elements. The magnitude of the force is the same throughout the entire mechanism. The forces required in such mechanisms are relatively small and the energy required is not great.

**[0004]** Several of the proposed disc hair removal systems involve the use of tilted discs which come together at a point to grasp one or more strands of hair. Other disc mechanisms involve the use of cams to alternately bring the discs together and apart, thereby trapping strands of hair.

**[0005]** Various disc mechanisms are discussed in publication number US 2012/0035621 and in US Pat. Nos. 4,935,024 to Dolev; 5,057,115 to Dolev; 5,190,559 to Gabion et al.; 5,797,925 to Heintke; 5,857,903 to Ramspeck et al.; 5,312,419 to Garenfeld et al.; 5,196,021 to Kabla; 5,281,233 to Dolev and 5,462,557 to Jordan et al.

**[0006]** A depilatory device using a disc mechanism is subject to several constraints. The pincer-like elements associated with each disc must close quickly. The pressure exerted by each contacting pair of pincers must be neither too great nor too little. In the former case, the hair would be cut, while in the latter case, the hair would slide through without being pulled out at its roots. Typically, all the pincers associated with a row of discs must contact their adjacent pincers simultaneously. Lastly, the contacting mechanism must be simple, operate reliably over time, and be easy to maintain.

**[0007]** Presently, there is a need for an epilator and/or depilatory device that is easy and inexpensive to assemble and to maintain and which can uproot a greater number of hairs over a larger area than is possible using prior art devices. In addition, there is also an ongoing need for a depilating device that reduces discomfort associated with hair removal.

**[0008]** In WO 2009/010815 A1 an epilator is described comprising a head for trapping hair for removal. The head comprises a rotating body that has as an axis of rotation and is adapted to be rotated by a motor. At least one pair of pincers is arranged at or in the rotating body. The pair of pincers is able to rotate in accordance with the rotation of the rotating body. At least their outermost ends are adapted to move towards each other and away from each other depending on the location of the rotating body. According to an aspect, at least one intermediate member is provided which is arranged such that it is at least linearly moveable between the outermost ends of the pincers. The pair of pincers only extends on one side of the axis of rotation. One spring is located between the pair of pincers and is arranged to bias the pincers either away from each other or towards each other. At least one actuator is provided for the pair of pincers which can be supported to move along or parallel to the axis of rotation and engages a first pincer adjacent an end thereof being distal to the axis of rotation and a second pincer at or adjacent an end thereof being proximal to the axis of rotation.

**[0009]** The epilating device according to EP 0 950 365 includes a single housing that is shaped to be grasped by the hand of a user and which includes a drive source. The housing can carry a first epilation module provided at its top with a first plucking head that is driven by the drive source to effect the plucking of the body hairs. The first plucking head has a length defining there along a first epilation zone. Also provided is a second epilation module to be carried on the housing that is provided at its top with a second plucking head that is driven commonly by the drive source to effect plucking of the body hairs. The second plucking head has a length defining there along a second epilation zone.

**[0010]** EP 1 405 701 B1 relates to a linkage mechanism for a hair removal appliance, such as a powered or dry shaver or epilator, having a head rockably mounted on a body, and to such hair depilation apparatus. In order to better conform the head to a user's skin the device and method realizes a rocking about a virtual pivot axis.

**[0011]** WO 2005/063076 is directed to a depilator assembly for trapping hair for removal. The assembly includes a symmetric disc formed of two lobes and two pincers. At least two pressure-transferring protrusions and at least one rotation transferring protrusion are formed and positioned on a first face of said disc. Further at least two pressure-transferring protrusions and at least two spacer elements are formed and positioned on a second face of said disc. The spacer elements being operative to prevent the accumulation of debris between

adjacent discs and to allow for periodic tilting of the discs when pressure is provided to the depilator assembly. The second face of the disc further has formed therein at least one recess configured to accommodate said at least one rotation-transferring protrusions of a similar disc of an adjacent depilator assembly in force transferring engagement, such that, in response to a rotational force applied to said assembly at least one rotation-transferring protrusion is operative to transfer rotation to said adjacent assembly.

**[0012]** WO 2015/121851 relates to an epilator comprising a pair of corresponding and separable epilator heads for trapping hair for removal. Each head has an exposed portion for allowing at least one or more parts of each head to get in touch with a user's skin. Each head has a rotating body having an axis of rotation and being adapted to be rotated by a driving unit, wherein the rotating body is adapted to trap the hair for removal at the exposed portion, and wherein the axis of the rotating body is essentially concave relative to the exposed portion of each head.

**[0013]** All the above-mentioned documents are herewith incorporated by reference.

#### Summary

**[0014]** The present invention is directed to an epilating head according to claim 1, a pincer assembly according to claim 14 and a method according to claim 15.

**[0015]** The present invention is directed to an epilating head for an epilating device. It can comprise the following features or any subgroup thereof. There is at least a first disc with at least two first disc pincers. The first disc can be configured to be rotatable around an axle of rotation or around an axis of rotation. In the first case the axle does not rotate and the disc can rotate around the axle or can be arranged on an element rotating together with the disc around the axle. In the second case the axle can rotate itself. In the further case it is not curved, it could be made of segments or an elastic material in order to allow it to rotate. Then the disc can be arranged directly on the axle and rotate with axle.

**[0016]** Thus, also the pincers can rotate around the axle of rotation. There can be arranged at least a counter element or a second disc with at least two counterparts or second disc pincers. Also the counter element or second disc can be configured to be rotatable around the axle or the axis, as described before.

**[0017]** The term counter element or disc is not limited to a flat piece of material but can have a considerable thickness. Moreover, it can have any topography and not just two planes with protrusions, e.g. the protrusions being cold drawn or formed in a body.

**[0018]** The first and the counter element or second discs can be configured so that a first pair is composed of one of the first disc pincers and of one of the counterparts or second disc pincer to form a first tweezer. Thus, neighboring pincers of different discs can form a tweezer.

A second pair composed of one of the first disc pincers and one of the further counterparts or second disc pincer can form a second tweezer.

**[0019]** The pincers formed at the discs can be provided in any way, either by providing a flat material, punch it and then deform the parts thereof into different directions or planes.

**[0020]** The first and second tweezers can each be brought in an open condition over at least a first section of rotation around the axle or axis. The first and second tweezers each can be in a closed condition over a second section of rotation around the axle or axis. The opening of the tweezers is intended to happen when hair of a user is either brought into the tweezers or released from the tweezers once the hairs are plugged out. The closing is intended to primarily take place during the gripping of hair and the remaining in the closed position is intended to primarily take place when plugging or epilating/depilating of hair.

**[0021]** As the tweezers of cooperating discs are positioned at different locations at the respective discs the first and second tweezers can open and close at different times although they can open at similar or neighboring locations during rotation of the discs. The first tweezer and the second tweezer are at least one of axially offset, their envelopes of rotation are neighboring or their envelopes of rotation are side by side. Thus, they are offset and/or their envelopes of rotation do not coincide but are arranged in an axial neighborhood or side by side. This can ensure that the body or skin of a user will be depilated easier and more effectively as the device will treat a surface of the body or skin more equally and completely.

**[0022]** The first disc pincers can be formed by first disc protrusions radially extending at least in part from the first disc. The second disc pincers are formed by second disc protrusions radially extending at least in part from the second disc. Neighboring first disc pincers and/or neighboring second disc pincers can be axially offset to each other. This can ensure that the tweezers formed by the pincers become active not at the same location of the skin but at neighboring locations. Thus the surface of a user's skin is more equally and completely treated over a width of the epilating head without making it necessary for the user to considerably move the device during use.

**[0023]** The epilating device can also comprise a third disc with at least two third disc pincers. Also a further disc could be provided. Anyhow, the third disc can be rotatable around the axis or axle of rotation. In this case the first and the third discs can be configured that a third pair composed of one of the first disc pincers and one of the third disc pincers form a third tweezer and a fourth pair composed of one of the first disc pincers and one of the third disc pincers form a fourth tweezer.

**[0024]** The third and fourth tweezers can be in an open condition over at least a first section of rotation around the axis or axle. The third and fourth tweezers can each or in groups be in a closed condition over a second sec-

tion of rotation around the axis or axle. The third tweezer and the fourth tweezer can be at least one of axially offset, their envelopes of rotation are neighboring or their envelopes of rotation are side by side, as already further mentioned before.

**[0025]** The first disc can have from 4 to 8 pincers and each of the second disc and the third disc can have from 2 to 4 pincers so that from 4 to 8 tweezers are formed.

**[0026]** The first disc can have 6 pincers and each of the second disc and the third disc can have from 3 pincers so that 6 tweezers are formed.

**[0027]** The epilating head according to the present invention can comprise 4 to 12 sets of first, second and third discs, preferably 6-10 sets of first, second and third discs, more preferably 8 sets of first, second and third discs. Any other number of sets can also be realized. These numbers of sets of discs can ensure a harmonious and equal treatment of the user's skin by a head.

**[0028]** Moreover, a head drum can be formed by a plurality of hub units each supporting a set of discs rotating around the axis or axle.

**[0029]** At least one of the second disc and the third disc can have extensions formed at the pincers extending outwardly in the direction of rotation and adapted to assist in guiding hair into the tweezers, the extensions being inclined between 10-40° with respect to the plane of the pincers, preferably between 25-35°.

**[0030]** The axis or axle of rotation is formed concave with respect to a side of use. It can thus better be adapted to the generally skin of a user that is generally convexly shaped. The tweezers can be adapted to be in an open condition over the first section of circumference of rotation around the axis or axle and in a closed condition over the second section of circumference of rotation around the axis or axle.

**[0031]** Each of the first disc, the second disc and/or the third disc have an inner opening being adapted to support a coaxial support of the first disc, the second disc and/or the third disc. The opening can be round or can have any shape allowing a positively locking rotation with other elements or the axle. These can be slots, specific shapes of the holes etc. allowing for the engagement of correspondingly shaped elements.

**[0032]** At least two hub units each can be adapted to be supported on the axis or axle and to rotate on the axis or axle. Further the hub unit can support the first disc, the second disc and/or the third disc, so that they rotate together with the respective hub unit. Each hub unit can further be configured to bring the tweezers each in an open condition over at least a first section of circumference of rotation and in a closed condition over at least a second section of circumference of rotation around the axis or axle. This can cause a periodic movement, deformation and preferably tilting of one, more than one or all of the discs.

**[0033]** The axis or axle can be formed concave with respect to a side of use. At least two sets of hub units can be arranged on the axis or axle. In view of the con-

cave shape of the axis or axle the hub units can each being configured to cause the tweezers in an open condition over at least a first section of circumference of rotation and in a closed condition over at least a second section of circumference of rotation around the axis or axle, preferably in or close to the side of use.

**[0034]** A plurality of hub units can be arranged side by side on the axis or axle to form a rotating head drum. The hub units can have pressure-transferring protrusions on the side opposite to the side of the discs transferring pressure to the discs of the neighboring hub unit. This can further assist the tweezers of the neighboring hub unit to be in an open condition over the first section of circumference of rotation around the axis or axle and in a closed condition over the second section of circumference of rotation around the axis or axle.

**[0035]** The head drum can further comprise at one end a second hub unit driving the head drum and forming an end section of a head drum with pressure-transferring protrusions transferring pressure onto a set of discs of the neighboring hub unit. At the other end a third hub unit can form the opposite end section and comprising a set of discs.

**[0036]** At least two pressure-transferring protrusions can be formed and positioned on a side of the hub unit. The first to the third discs can be adapted to be positioned on one side of the hub unit. It can be further adapted for periodic tilting where in a first section of 360° rotational movement, the pressure-transferring protrusions from a similar adjacent pincer assembly are configured to press on at least one of the discs thereby to cause the discs to contact each other at their pincer surfaces trapping hair there between. In a second section, the contact between the pincer surfaces is adapted to be ceased releasing the trapped hair.

**[0037]** The axis or axle can be formed as an arcuate axis or axle. The hub unit can comprise at least one rotation-transferring protrusion formed and positioned on one side. Further, at least one recess can be adapted to accommodate a rotation-transferring protrusion of the similar adjacent pincer assembly for transferring rotational momentum or movement and stacking the similar adjacent pincer assembly to the hub unit.

**[0038]** The hub unit comprises at least three lower convex surfaces and at least three upper convex surfaces on the side of the hub unit hosting the discs. It can be adapted to elevate the second disc and the third disc from the one side of the hub unit respectively and result in a desired separation of the discs. It can further allow the periodic tilting of the units under the influence of the pressure transferring protrusions.

**[0039]** The at least three lower convex surfaces can be three lower convex surfaces which are positioned 120° apart and/or wherein the at least three upper convex surfaces can be three upper convex surfaces which are positioned 120° apart.

**[0040]** The upper convex surfaces can be adapted to be inserted through three slots that are comprised in the

second disc.

**[0041]** The at least two first pincers can be six first pincers which are positioned 60° apart. Three second pincers can be positioned 120° apart. The at least two third pincers can be three third pincers which are positioned 120° apart. This can also ensure a harmonious but nevertheless effective depilation of hair.

**[0042]** Six tweezers can be a combination of one of the first pincers and one of the second pincers or a combination of one of the first pincers and one of the third pincers. All of the tweezers are axially offset from each other during the rotation of the pincer assembly around the arcuate axis or axle.

**[0043]** A group of pincer assemblies can be mounted on the axis or axle and can be adapted to rotate around the axis or axle.

**[0044]** The axis or axle can be an arcuate axis or axle that is configured to be fixed to a head base and a back base.

**[0045]** The group of pincer assemblies can be adapted to be situated between a head gear and a backside unit that can be adapted to transfer an applied force to the group of pincer assemblies. The head gear can be further adapted to receive a rotational momentum or movement from an idler gear and transfer it to the group of pincer assemblies.

**[0046]** The epilating head can further comprise a spring that is adapted to provide pressure to the group of pincer assemblies. A substantial part of the pressure can be applied to the most curved edge of the group of pincer assemblies.

**[0047]** Further a driving unit can be provided. The driving unit can comprise a gear assembly, motor and/or a power source unit. The power source unit can comprise one or more batteries configured to supply the motor with power.

**[0048]** The gear assembly can comprise a motor gear receiving a rotational momentum from the motor and/or a face gear transferring the rotational momentum to an idler gear via intermediate gears.

**[0049]** The present invention is also directed to a method for operating an epilating head, especially an epilating head according to any of the relevant preceding claims. Thus, all features described before and specified in the claims with respect to a device are also embraced by the invention in terms of method steps, even without being explicitly mentioned.

#### Brief description of the drawings

**[0050]** The drawings, described below, are for illustration purposes only. The drawings are not intended to limit the scope of the present teaching in any way.

**Fig. 1** exemplifies a perspective view of an epilating device according to an embodiment of the invention;

**Fig. 2** exemplifies a perspective view of a part of an

epilating head and a drive with gear according to an embodiment of the invention;

**Fig. 3** exemplifies a perspective view onto an epilating head and a part thereof according to an embodiment of the invention;

**Fig. 4** exemplifies a perspective view onto a part of an epilating head and a top view and enlarged view of parts thereof according to an embodiment of the invention;

**Fig. 5** exemplifies a top view and cross-sections of a part of an epilating head according to an embodiment of the invention;

**Fig. 6** exemplifies different views onto an epilating head according to an embodiment of the invention;

**Fig. 7** exemplifies a top view and cross-sections of a part of an epilating head according to an embodiment of the invention;

**Fig. 8** exemplifies a side view onto parts of an epilating head and cross-sections thereof according to an embodiment of the invention; and

**Fig. 9** shows another embodiment of a subset of elements of an epilating head according to the present invention.

#### Detailed description

**[0051]** **Fig. 1** depicts an epilating device **1** comprising an epilating head **2** and driving unit **3**. The epilating head **2** is adapted to be attached to the driving unit **3** and to receive at least one of rotational movement or torque from it.

**[0052]** Also, the driving unit **3** comprises two buttons for detaching the epilating head **2** and a controlling circuitry. The buttons are placed on the narrow sides of the driving unit **3**. By pushing both buttons and shifting upwards the epilating head **2**, the head can be detached.

**[0053]** The controlling circuitry can be used to start, stop, and change a torque or speed of rotation of the driving unit and hence the epilating head **2**.

**[0054]** The epilating head comprises a substantially curved cylinder, arranged to epilate or tweeze user's hairs. The cylinder is situated on the upper part of the epilating head **2**. A plastic cover is used to prevent unwanted user's contact with moving gears covers the left and right sides of the cylinder. The central part of the cylinder is adapted to be open and exposed to a user. This part is a working part arranged to depilate/epilate hairs by contact with user's skin and interaction with the hairs.

**[0055]** **Fig. 2** depicts an epilating head **2** and a driving unit **3** without their plastic covers, exposing their internal

structure. The epilating head **2** comprises a gear assembly, arranged to transfer torque or a rotational movement from a motor **4** to the epilating head **2**. One or more batteries **9** can drive the motor **4**. Also, the motor **4** meshes with the gear assembly by a motor gear **5**, which in turn drive two small gears meshed with a face gear **6**. The face gear **6** transfers torque and a rotational movement to an idler gear **7**, which in turn meshes with a head gear **8**. The head gear **8** is firmly attached to an epilating cylinder, setting it in motion.

**[0056]** Fig. 3 depicts a more detailed view of an epilating head **2**. An epilating cylinder is driven by a head gear **8**, which is meshed with a gear assembly with an idler gear **7** that can be seen in the figure.

**[0057]** The head gear **8** is attached to the side of the cylinder, where the head gear **8** and cylinder together are adapted to be fixed on a curved axle (not shown), which is connected to mobile back parts **12**. The mobile back parts **12** are arranged to be a part of a head base **10**. They are placed on the side edges of the head base **10**. Also, the head base **10** comprises one or more, preferably four latches situated on the bottom side of the head base **10**.

**[0058]** The epilating cylinder is made in the form of a group or set of pincer or tweezer assemblies **13** that are packed and held on a curved axle (not shown). A biasing spring **11**, e.g., made of metal, or a frame is adapted to hold the group of the pincer assemblies **13**. Instead also a rigid structure to hold the elements in place can be used.

**[0059]** On the bottom of the figure, a single pincer assembly **13** is depicted. It comprises a hub unit **20**, a first disc **21**, a second disc **22**, and a third disc **23**. Each pincer assembly **13** is adapted to have six epilating tweezers, uniformly placed along the circumference of the cylinder but all or some of them having a different position to the axis of rotation.

**[0060]** Fig. 4 depicts a more detailed view of one pincer assembly **13** comprising a hub unit **20**, the first disc **21**, the second disc **22**, and the third disc **23**.

**[0061]** The third disc **23** comprises pincers **23A**, **23B**, **23C**, anvil or a second pincer **23B** being placed on a medium or same level regarding the level of a middle section of the third part, a first pincer **23A** on a level that is lower in the image shown or displaced to one side of the middle section of the third pincer **23**, and a third pincer **23C** on a level that is higher in the image shown or displaced to another side of the middle section of the third pincer **23**. The second disc **22** is shaped similarly with a second pincer **22B** on the same level, a first pincer **22A** on a lower level and a third pincer **22C** on a higher level than the respective middle section. The respective pincers **23A**, **23B**, **23C**, **22A**, **22B**, **22C** together provide a part of tweezers different in axial displacement to each other.

**[0062]** The first disc comprises six anvils or pincers **21A**, **21B**, **21C**, **21D**, **21E**, **21F**, which are displaced or axially offset according to the corresponding pincer of the second or third discs, respectively.

**[0063]** The hub unit **20** is adapted to regulate the distance of the first to third discs with respect to each other by controlling at least one of their axial displacements or their tilting on the axle.

**[0064]** The displacement of the third disc **23** is achieved by means of three upper ball-shaped surfaces **28**, which are placed on the top of upper ball-shaped surface supports **26**. Also, the supports **26** prevent the second disc **22** from rotation, going through three slots **25** for the upper ball-shaped surface supports.

**[0065]** The elevation of the slot unit **22** is achieved by means of three lower convex or ball-shaped surfaces **27**.

**[0066]** The hub unit **20** comprises topography with protrusions and indentations placed on the side of the hub unit **20** that keep the first disc **21** in the working position and prevent it from unwanted rotation. Moreover, the hub unit **20** comprises three protrusions **30** that engage a neighboring pack of hub unit and first to thirds discs in order to convey the rotational movement and torque. The protrusions **30** are formed at the base thereof additionally in order to prevent the third disc **23** from unwanted rotation. However, the rotation of the assembly comprising the hub unit **20** and the first to third discs **21** to **23** around the axle **36** is allowed.

**[0067]** The enlarged view in Fig. 4 shown in the lower right part shows the different convex elements **27** and **28** that are positioned to support the respective discs accordingly. The protrusion **28** is located on a protrusion **26** that is configured to engage the respective cut-outs or recesses **25** in the center hole of the second disc **22** in order to allow a positive engagement of the second disc **22**.

**[0068]** The bottom view of the hub unit **20** is depicted in the left bottom corner. The protrusions **30** can be inserted into three cavities or recesses **31** of the next hub unit **20** to form a respective assembly. Also, the hub unit **20** comprises six pressing protrusions **32**, adapted to squeeze the pincer assembly **13** from the top when it is desired to activate the tweezers.

**[0069]** Fig. 5 depicts an assembled single pincer assembly **13**. In the left top corner, the view from the top of a pincer assembly **13** can be seen. In the left bottom corner, the view from the side of the pincer assembly **13** can be seen.

**[0070]** The cross-section across line **B-B** is going through the centers of two assembled tweezers, two pressing protrusions **32**, upper ball-shaped surface of protrusion **28**, the center of the assembly, and lower ball-shaped surface **27**. The cross-section can be seen in the second row of drawings in a tilted manner. The left tweezer, which is squeezed, comprises a pincer **22C** of the second disc **22** and a pincer **21E** of the first disc **21**. The right tweezer, which is shown in an opened condition, comprises a lower pincer **21B** of the first disc **21** and an upper pincer of the third disc **23**.

**[0071]** It is further apparent that the protrusions **30** protrude beyond the rest of the pack of elements in order to engage the neighboring pack.

[0072] The cross-section **D-D** is going through the centers of two assembled tweezers, two pressing protrusions **32**, upper ball-shaped surface **28**, the center of the assembly, and lower ball-shaped surface **27**. The respective cross-section is depicted to the right in the first row of drawings. The upper tweezer, which is shown open for releasing hair, is composed of the pincer **22B** and pincer **21A**. The tweezer below which is shown in the closed position, is composed of the pincers **23C** and **21D**. The respective support and engagement of the first to the third discs can be further derived from these figures.

[0073] **Fig. 6** depicts an epilating head **2** without covers at the end. A front view is presented on the top of the page and the top view in the center. In the top view the two arrows each marked with a **P** show that a force or pressure is applied from the side onto the epilating head. As mentioned before, this could be realized by a dense packing of the elements in the head or even a biasing arrangement by metallic side supporting structures acting similar to springs.

[0074] The cross-section **A-A** is going through the center of an epilating cylinder. The respective cross-section can be seen on the bottom of the page.

[0075] The epilating cylinder is assembled by a number of hub units and discs or pincer assemblies. The right part of the cylinder is shown without hub units **20**, providing a detailed view of the internal structure, particularly of the arrangement of the discs.

[0076] The group of pincer assemblies is arranged on a curved axle **36**. The ends of the curved axle **36** are fixed in a head base **10** and mobile back part **12**. The curved axle **36** is adapted to be fixed but the group of pincer assemblies **13** to rotate around the curved axle **36** as a whole driven by a head gear **8** which is meshed with a gear assembly **7**.

[0077] The spring **11**, which made in the form of a metal frame, applies a squeezing force to both the head base **10** and mobile back part **12** in the **P** directions. Because of curvature, the upper part of the group of pincer assemblies exercises a maximal squeezing force but the opposite no pressure or less. Hence, the tweezers on the top site are squeezed and ones on the opposite site are opened or released. Therefore, the rotating group of pincer assemblies cause the trapping of hair, the epilating of user's hairs and the release thereof.

[0078] **Fig. 7** depicts an assembled single pincer assembly. The cross-section **B-B** has been made through the centers of two assembled tweezers being shown on top of the figure and the two pressing protrusions **32** and lower ball-shaped surface **27**. The imaginary cut can be seen at the bottom left corner. The left tweezer is closed and/or squeezed, the right tweezer is opened and/or released. The cross-section is passing along a slot unit **22** showing its cutting.

[0079] The cross-section **C-C** is going through the centers of two assembled tweezers, two pressing protrusions **32**, and upper ball-shaped surface **28**. The cross-section can be seen at the bottom right corner of **Fig. 7**.

The left tweezer is shown in the squeezed state, the right tweezer in the released state.

[0080] Line **33** is drawn between two adjacent upper ball-shaped surfaces **28**, showing two-point bending line of a top unit **23**. The line is situated outside the center area occupied by a curved axle **36**, hence its friction is reduced during the squeezing/releasing process.

[0081] The imaginary line **34** is drawn between two adjacent lower ball-shaped surfaces **27**, showing two-point bending line of a slot unit **22**. The line is situated outside the center area occupied by the curved axle **36**, hence its friction is reduced during the squeezing/releasing process.

[0082] **Fig. 8** depicts three adjacent pincer sets or assemblies **13** strung on a curved axle **36** and shown at the top left corner.

[0083] The cross-section **A-A** is going through the curved axle **36**. The cross-section can be seen at the bottom of the page, where the top tweezers are squeezed and the bottom ones released because of curvature of the curved axle **36** and squeezing force of a spring **11** (not shown).

[0084] The cross-section **B-B** in **Fig 8** shows the function of a generating protrusion **30** inserted into a recess or cavity **31**. As it can be seen, the generating protrusion **30** and cavity **31** still engage even in the status when neighboring sets are spaced from each other. In the opposite side they engage more clearly or deeply. The elevation of the generating protrusion **31** and the curvature of the curved axle **36** are designed to be high and big enough to allow the pincer assemblies **13** be substantially tightly squeezed on the top side and released on the bottom side.

[0085] **Fig. 9** shows perspective views of an assembly of elements **20** to **23** according to another embodiment of the invention. In this embodiment the hub unit **20** also takes the role of a counter element with counterparts **20A** to **20F**. These counterparts **20A** to **20F** cooperate with the pincers **22A** to **22C** as well as **23A** to **23C** to form tweezers. In such an assembly a third disc is not present but replaced by respective shapes of the hub unit's counterparts.

#### 45 Claims

1. An epilating head for an epilating device comprising:

- a. at least a first disc (21) with at least two first disc pincers (21A; 21C; 21E) the first disc being rotatable around an axis or axle (36) of rotation;
- b. at least a counter element (20; 22) with at least two counterparts (20A-F; 22A-C), the counter element (20; 22) being rotatable around the axis or axle (36);
- c. the first disc (21) and the counter element (20; 22) being configured that a first pair of tweezers (21A, 20A; 21A, 22A) is composed of one of the

first disc pincers (21A) and one of the counterparts (20A-F; 22A-C) and a second tweezer (21C, 20C; 21C, 22C) is composed of another one of the first disc pincers (21C) and another one of the counterparts (20A-F; 22A-C);

- i. the first and second tweezers (21A, 22A; 21C, 22C) each being in an open condition over at least a first section of rotation around the axis or axle (36) and
- ii. the first and second tweezers (21A, 22A; 21C, 22C) each being in a closed condition over a second section of rotation around the axis or axle (36);

d. wherein the first tweezer (21A, 22A) and the second tweezer (21C, 22C) are axially offset or their envelopes of rotation are neighboring or side by side.

2. An epilating head according to claim 1, wherein the counter element (22) is a second disc (22) and the counterparts (22A-C) are second disc pincers (22A, 22B, 22C) the first and the second discs (21, 22) being configured that a first pair composed of one of the first disc pincers (21A) and one of the second disc pincer (22A) form a first tweezer (21A, 22A) and a second pair composed of one of the second disc pincers (21C) and one of the second disc pincer (21C) form a second tweezer (21C, 22C).

3. Epilating head according to claim 2 wherein the first disc pincers (21A; 21C; 21E) are formed by first disc protrusions (21A; 21C; 21E) radially extending at least in part from the first disc (21) and the second disc pincers (22A, 22B, 22C) are formed by second disc protrusions (22A, 22B, 22C) radially extending at least in part from the second disc (22), and/or wherein neighboring first disc pincers (21A; 21C; 21E) and/or neighboring second disc pincers (22A, 22B, 22C) are at least one of axially offset to each other, their envelopes of rotation are neighboring or side by side.

4. Epilating head according to any one of the preceding claims further comprising:

- a. a third disc (23) with at least two third disc pincers (23A; 23B; 23C), the third disc (23) being rotatable around the axis or axle (36) of rotation;
- b. the first and the third discs (21, 23) being configured that a third pair composed of one of the first disc pincers (21B) and one of the third disc pincers (23A) form a third tweezer (21B, 23A) and a fourth pair composed of one of the first disc pincers (21F) and one of the third disc pincers (23B) form a fourth tweezer (21F, 23B);

i. the third and fourth tweezers (21B, 23A; 21F, 23B) each being in an open condition over at least a first section of rotation around the axis or axle (36) and

ii. the third and fourth tweezers (21B, 23A; 21F, 23B) each being in a closed condition over a second section of rotation around the axis or axle (36);

c. wherein the third tweezer (21B, 23A) and the fourth tweezer (21F, 23B) are axially offset or their envelopes of rotation are neighboring or side by side.

5. Epilating head according to any one of the preceding claims and the features of claim 4 wherein the first disc (21) has from 4 to 8 pincers (21A-F) and each of the second disc (22) and the third disc (23) have from 2 to 4 pincers, preferably 3 pincers, so that from 4 to 8 tweezers, preferably 6 tweezers, are formed.

6. Epilating head according to any one of the two preceding claims comprising 4 to 12 sets of first, second and third discs (21-23), preferably 6-10 sets of first, second and third discs (21-23), more preferably 8 sets of first, second and third discs (21-23).

7. Epilating head according to any one of the preceding claims further comprising a head drum (20, 21-23) being formed by a plurality of hub units (20) each supporting a set of discs (21-23) rotating around the axis or axle (36).

8. Epilating head according to any one of the four preceding claims wherein at least one of the second disc (22) and the third disc (23) have extensions formed at the pincers (22AC, 23A-C) extending outwardly in the direction of rotation and adapted to assist in guiding hair into the tweezers, the extensions being inclined between 10-40° with respect to the plane of the pincers (22A-C, 23A-C), preferably between 25-35°.

9. Epilating head according to any one of the preceding claims wherein the axis or axle (36) is formed concave with respect to a side of use and adapted to assist the tweezers (21A, 22A; 21C, 22C) to be in an open condition over the first section of circumference of rotation around the axis or axle (36) and in a closed condition over the second section of circumference of rotation around the axis or axle (36).

10. Epilating head according to any one of the six preceding claims further comprising at least two hub units (20) each adapted to be supported on the axis or axle (36) and to rotate on the axis or axle (36) and to further support the first disc (21), the second disc (22) and the third disc (23), so that they rotate to-

gether with the respective hub unit (20), each hub unit (20) further preferably being configured in bringing the tweezers (21AF; 22A-C, 23A-C) each in an open condition over at least a first section of circumference of rotation and in a closed condition over at least a second section of circumference of rotation around the axis or axle (36) by a periodic tilting of one, more than one or all of the discs (21-23).

11. Epilating head according to the preceding claim wherein the axis or axle (36) is formed concave with respect to a side of use, at least two sets of hub units (20) being arranged on the axis or axle (36) and in view of the concave shape of the axis or axle (36) the hub units (20) each being configured to cause the tweezers (21A-F; 22A-C, 23A-C) each in an open condition over at least a first section of circumference of rotation and in a closed condition over at least a second section of circumference of rotation around the axis or axle (36), preferably in or close to the side of use.

12. Epilating head according to any one of the preceding claims wherein a plurality of hub units (20) are arranged side by side on the axis or axle (36) to form a rotating head drum, the hub units having pressure-transferring protrusions (32) on the side opposite to the side of the discs (21-23) transferring pressure to the discs (21-23) of the neighboring hub unit (20) to further assist the tweezers (21A, 22A; 21C, 22C) of the neighboring hub unit (20) to be in an open condition over the first section of circumference of rotation around the axis or axle (36) and in a closed condition over the second section of circumference of rotation around the axis or axle (36).

13. Epilating head according to any one of the eight preceding claims further comprising at least two pressure-transferring protrusions (32) formed and positioned on a side (20B) of the hub unit (20) and/or wherein the first to the third discs (20-23) are adapted to be positioned on one side of the hub unit (20) and adapted for periodic tilting where in a first section of 360° rotational movement, the pressure-transferring protrusions (32) from a similar adjacent pincer assembly (13) are configured to press on at least one of the discs (21, 22, 23) thereby to cause the discs (21, 22, 23) to contact each other at their pincer surfaces trapping hair there between and where in a second section, the contact between the pincer surfaces is adapted to be ceased releasing the trapped hair.

14. The pincer assembly (13) according to any of the nine preceding claims wherein the hub unit (20) comprises at least three lower convex surfaces (27) and at least three upper convex surfaces (28) on the side of the hub unit (20) hosting the discs (21-23) adapted

to elevate the second disc (22) and the third disc (23) from the one side of the hub unit (20) respectively cause separation (120) between the discs (21, 22, 23) and allowing the periodic tilting of the units (22, 23) under the influence of the pressure transferring protrusions (32).

15. A method for operating an epilating head, comprising the steps of:

a. providing at least a first disc (21) with at least two first disc pincers (21A;21C; 21E), the first disc rotating around an axis or axle (36) of rotation;

b. providing at least a counter element (20; 22) with at least two counterparts (20A-F; 22A-C), the counter element rotating around the axis or axle (36);

c. configuring the first disc (21) and the counter element (20; 22) to form a first pair of tweezers (21A, 20A; 21A, 22A) that is composed of one of the first disc pincers (21A) and one of the counterparts (20A-F; 22A-C) and to form a second tweezer (21C, 20C; 21C, 22C) that is composed of another one of the first disc pincers (21C) and another one of the counterparts (20AF;22A-C);

i. the first and second tweezers (21A, 22A; 21C, 22C) each being in an open condition over at least a first section of circumference when rotating them around the axis or axle (36) and

ii. the first and second tweezers (21A, 22A; 21C, 22C) each being in a closed condition over a second section of circumference when rotating them around the axis or axle (36);

d. wherein the first tweezer (21A, 22A) and the second tweezer (21C, 22C) are axially offset or their envelopes of rotation are neighboring or side by side.

#### Patentansprüche

1. Epilierkopf für eine Epiliervorrichtung, aufweisend:

a. mindestens eine erste Scheibe (21) mit mindestens zwei ersten Scheibenzangenelement (21A; 21C; 21E), wobei die erste Scheibe um eine Drehachse oder Achse (36) drehbar ist;

b. mindestens ein Gegenelement (20; 22) mit mindestens zwei Gegenstücken (20A-F; 22A-C), wobei das Gegenelement (20; 22) um die Achse oder Achse (36) drehbar ist;

c. wobei die erste Scheibe (21) und das Gegen-

- element (20; 22) konfiguriert sind, dass eine erste Pinzette (21A, 20A; 21A, 22A) aus einem der ersten Scheibenzangenelemente (21A) und einem der Gegenstücke (20A-F; 22A-C) besteht und eine zweite Pinzette (21C, 20C; 21C, 22C) aus einem weiteren der ersten Scheibenzangenelemente (21C) und einem weiteren der Gegenstücke (20A-F; 22A-C) besteht;
- i. wobei die erste und zweite Pinzette (21A, 22A; 21C, 22C) jeweils über mindestens einen ersten Rotationsabschnitt um die Achse oder Achse (36) in einem offenen Zustand sind und
- ii. wobei die erste und zweite Pinzette (21A, 22A; 21C, 22C) jeweils über einen zweiten Drehabschnitt um die Achse oder Achse (36) in einem geschlossenen Zustand sind;
- d. wobei die erste Pinzette (21A, 22A) und die zweite Pinzette (21C, 22C) axial versetzt sind oder ihre Rotationshüllen benachbart oder nebeneinander liegen.
2. Epilierkopf nach Anspruch 1, wobei das Gegenelement (22) eine zweite Scheibe (22) ist und die Gegenstücke (22A-C) zweite Scheibenzangenelemente (22A, 22B, 22C) sind, wobei die erste und die zweite Scheibe (21, 22) konfiguriert ist, dass ein erstes Paar, das aus einer der ersten Scheibenzangenelemente (21A) und einer der zweiten Scheibenzangenelemente (22A) besteht, eine erste Pinzette (21A, 22A) und ein zweites Paar, das aus einer der zweiten Scheibenzangenelemente (21C) und einer der zweiten Scheibenzangenelemente (21C) besteht, eine zweite Pinzette (21C, 22C) bilden.
3. Epilierkopf nach Anspruch 2, wobei die erste Scheibenzangenelemente (21A; 21C; 21E) durch erste Scheibenvorsprünge (21A; 21C; 21E) gebildet werden, die sich zumindest teilweise radial von der ersten Scheibe (21) erstrecken, und die zweite Scheibenzange (22A, 22B, 22C) durch zweite Scheibenvorsprünge (22A, 22B, 22C) gebildet ist, die sich radial zumindest teilweise von der zweiten Scheibe (22) erstrecken, und/oder wobei benachbarte erste Scheibenzangenelemente (21A); 21C; 21E) und/oder benachbarte zweite Scheibenzangenelemente (22A, 22B, 22C) zumindest axial zueinander versetzt und/oder ihre Rotationshüllen benachbart oder nebeneinander liegen.
4. Epilierkopf nach einem der vorstehenden Ansprüche, ferner aufweisend:
- a. eine dritte Scheibe (23) mit mindestens zwei dritten Scheibenzangenelementen (23A; 23B; 23C), wobei die dritte Scheibe (23) um die Drehachse oder Achse (36) drehbar ist;
- b. wobei die erste und die dritte Scheibe (21, 23) konfiguriert sind, dass ein drittes Paar, das aus einer der ersten Scheibenzangenelemente (21B) und einer der dritten Scheibenzangenelemente (23A) besteht, eine dritte Pinzette (21B, 23A) bildet und ein viertes Paar, das aus einer der ersten Scheibenzangenelemente (21F) und einer der dritten Scheibenzangenelemente (23B) besteht, eine vierte Pinzette (21F, 23B) bildet;
- i. wobei die dritte und vierte Pinzette (21B, 23A; 21F, 23B) sich jeweils in einem offenen Zustand über mindestens einen ersten Drehabschnitt um die Achse oder Achse (36) befinden, und
- ii. wobei die dritte und vierte Pinzette (21B, 23A; 21F, 23B) jeweils in einem geschlossenen Zustand über einen zweiten Drehabschnitt um die Achse oder Achse (36) befinden;
- c. wobei die dritte Pinzette (21B, 23A) und die vierte Pinzette (21F, 23B) axial versetzt sind oder ihre Rotationshüllen benachbart oder nebeneinander liegen.
5. Epilierkopf nach einem der vorhergehenden Ansprüche und den Merkmalen des Anspruchs 4, wobei die erste Scheibe (21) 4 bis 8 Zangenelemente (21A-F) aufweist und die zweite Scheibe (22) und die dritte Scheibe (23) 2 bis 4 Zangenelemente, vorzugsweise 3 Zangenelemente, aufweist, so dass 4 bis 8 Pinzetten, vorzugsweise 6 Pinzetten, gebildet werden.
6. Epilierkopf nach einem der beiden vorhergehenden Ansprüche, aufweisend 4 bis 12 Sätze erste, zweite und dritte Scheiben (21-23), vorzugsweise 6-10 Sätze erste, zweite und dritte Scheiben (21-23), vorzugsweise 8 Sätze erste, zweite und dritte Scheiben (21-23).
7. Epilierkopf nach einem der vorhergehenden Ansprüche, ferner aufweisend eine Kopftrommel (20, 21-23), die durch eine Vielzahl von Nabeneinheiten (20) gebildet ist, die jeweils einen Satz von Scheiben (21-23) tragen, die sich um die Drehachse oder Achse (36) drehen.
8. Epilierkopf nach einem der vier vorhergehenden Ansprüche, wobei mindestens eine der zweiten Scheibe (22) und der dritte Scheibe (23) Verlängerungen aufweisen, die an den Zangenelementen (22AC, 23A-C) ausgebildet sind, die sich in Drehrichtung nach außen erstrecken und geeignet sind, das Führen von Haaren in die Pinzette zu unterstützen, wo-

bei die Verlängerungen zwischen 10-40° in Bezug auf die Ebene der Zangenelemente (22A-C, 23A-C), vorzugsweise zwischen 25-35° geneigt sind.

9. Epilierkopf nach einem der vorhergehenden Ansprüche, worin die Drehachse oder Achse (36) in Bezug auf eine Verwendungsseite konkav ausgebildet und angepasst ist, um die Pinzette (21A, 22A; 21C, 22C) zu unterstützen, in einem offenen Zustand über den ersten Abschnitt des Umfangs der Drehung um die Drehachse oder Achse (36) und in einem geschlossenen Zustand über den zweiten Abschnitt des Umfangs der Drehung um die Drehachse oder Achse (36) zu sein.
10. Epilierkopf nach einem der sechs vorhergehenden Ansprüche, ferner aufweisend mindestens zwei Nabeneinheiten (20), die jeweils geeignet sind, um auf der Achse oder Achse (36) abgestützt zu werden und sich auf der Drehachse oder Achse (36) zu drehen und die erste Scheibe (21), die zweite Scheibe (22) und die dritte Scheibe (23) weiter zu stützen, so dass sie sich zusammen mit der jeweiligen Nabeneinheit (20) drehen, wobei jede Nabeneinheit (20) ferner vorzugsweise zum Bringen der Pinzette (21AF, 22A-C, 23A-C) jeweils in einen geöffneten Zustand über mindestens einen ersten Abschnitt einer Rotation und in einen geschlossenen Zustand über mindestens einen zweiten Abschnitt einer Rotation über die Drehachse oder Achse (36) durch periodisches Kippen einer, mehrerer oder aller Scheiben (21-23) konfiguriert ist.
11. Epilierkopf nach dem vorstehenden Ansprüche, wobei die Achse oder Achse (36) in Bezug auf eine Verwendungsseite konkav ausgebildet ist, wobei mindestens zwei Sätze von Nabeneinheiten (20) auf der Achse oder Achse (36) angeordnet sind und die Nabeneinheiten (20) angesichts der konkaven Form der Drehachse oder Achse (36) jeweils konfiguriert sind, um die Pinzette (21A-F, 22A-C, 23A-C) jeweils in geöffneten Zustand über mindestens einen ersten Abschnitt der Drehung und in geschlossenen Zustand über mindestens einen zweiten Abschnitt der Drehung um die Drehachse oder Achse (36), vorzugsweise in oder nahe der Seite der Verwendung zu bringen.
12. Epilierkopf nach einem der vorhergehenden Ansprüche, wobei eine Vielzahl von Nabeneinheiten (20) nebeneinander auf der Drehachse oder Achse (36) angeordnet sind, um eine rotierende Kopftrommel zu bilden, wobei die Nabeneinheiten druckübertragende Vorsprünge (32) auf der Seite gegenüber der Seite der Scheiben (21-23) aufweisen, die Druck auf die Scheiben (21-23) der benachbarten Nabeneinheit (20) übertragen, um die Pinzette weiter zu unterstützen (21A, 22A; 21C, 22C) die benachbarte

Nabeneinheit (20) in einen geöffneten Zustand über den ersten Abschnitt der Drehung um die Drehachse oder Achse (36) und in einen geschlossenen Zustand über den zweiten Abschnitt der Drehung um die Drehachse oder Achse (36) zu bringen.

13. Epilierkopf nach einem der acht vorhergehenden Ansprüche, ferner aufweisend mindestens zwei druckübertragende Vorsprünge (32), die auf einer Seite (20B) der Nabeneinheit (20) ausgebildet und positioniert sind und/oder wobei die ersten bis dritten Scheiben (20-23) so ausgebildet sind, dass sie auf einer Seite der Nabeneinheit (20) positioniert werden können und für eine periodische Neigung in einem ersten Abschnitt einer 360°-Drehbewegung geeignet sind, wobei die druckübertragenden Vorsprünge (32) von einer ähnlichen benachbarten Zangenanordnung (13) konfiguriert sind, um auf mindestens eine der Scheiben (21, 22, 23) zu drücken, um dadurch zu bewirken, dass die Scheiben (21, 22, 23) einander an ihren Zangenflächen berühren und Haare greifen und wo in einem zweiten Abschnitt der Kontakt zwischen den Zangenoberflächen angepasst ist, um eingeschlossene Haare loszulassen.
14. Zangenanordnung (13) nach einem der neun vorhergehenden Ansprüche, wobei die Nabeneinheit (20) mindestens drei untere konvexe Oberflächen (27) und mindestens drei obere konvexe Oberflächen (28) auf der Seite der Nabeneinheit (20) aufweist, die die Scheiben (21-23) aufnehmen, die geeignet sind, die zweite Scheibe (22) und die dritte Scheibe (23) von der einen Seite der Nabeneinheit (20) anzuheben bzw. eine Trennung (120) der Scheiben (21, 22, 23) zu bewirken und das periodische Kippen der Einheiten (22, 23) unter dem Einfluss der druckübertragenden Vorsprünge (32) zu ermöglichen.
15. Verfahren zum Betreiben eines Epilierkopfes, aufweisend die Schritte von:
- Bereitstellen mindestens einer ersten Scheibe (21) mit mindestens zwei ersten Scheibenzangenelementen (21A; 21C; 21E), wobei die erste Scheibe um eine Drehachse oder Achse (36) dreht;
  - Bereitstellen mindestens eines Gegenelements (20; 22) mit mindestens zwei Gegenstücken (20A-F; 22A-C), wobei sich das Gegenelement um die Drehachse oder Achse (36) dreht;
  - Konfigurieren der ersten Scheibe (21) und des Gegenelements (20; 22), um eine erste Pinzette (21A, 20A; 21A, 22A) zu bilden, die aus einer der ersten Scheibenzangenelemente (21A) und einem der Gegenstücke (20A-F; 22A-C) besteht, und um eine zweite Pinzette (21C, 20C; 21C, 22C) zu bilden, die aus einer anderen der

ersten Scheibenzangenelemente (21C) und einem anderen der Gegenstücke (20AF; 22A-C) besteht;

- i. wobei die erste und zweite Pinzette (21A, 22A; 21C, 22C) jeweils in einem offenen Zustand über mindestens einen ersten Umfangsabschnitt sind, wenn sie um die Drehachse oder Achse (36) gedreht werden, und
- ii. wobei die erste und zweite Pinzette (21A, 22A; 21C, 22C) jeweils in einem geschlossenen Zustand über einen zweiten Umfangsabschnitt sind, wenn sie um die Drehachse oder Achse (36) gedreht werden;

d. wobei die erste Pinzette (21A, 22A) und die zweite Pinzette (21C, 22C) axial versetzt sind oder ihre Rotationshüllen benachbart oder nebeneinander liegen.

### Revendications

1. Tête d'épilation pour un dispositif d'épilation comprenant :

- a. au moins un premier disque (21) avec au moins deux premières pinces à disque (21A; 21C; 21E), le premier disque étant rotatif autour d'un axe ou d'un essieu (36) de rotation ;
- b. au moins un contre-élément (20 ; 22) avec au moins deux contre-parties (20A-F ; 22A-C), le contre-élément (20 ; 22) étant rotatif autour de l'axe ou de l'essieu (36) ;
- c. le premier disque (21) et le contre-élément (20 ; 22) étant configurés de sorte qu'une première paire de pincettes (21A, 20A ; 21A, 22A) soit composée d'une des premières pinces à disque (21A) et d'une des contre-parties (20A-F ; 22A-C) et une seconde pincette (21C, 20C ; 21C, 22C) soit composée d'une autre des premières pinces à disque (21C) et d'une autre des contre-parties (20A-F ; 22A-C) ;

i. les première et seconde pincettes (21A, 22A ; 21C, 22C) étant chacune dans un état ouvert sur au moins une première section de rotation autour de l'axe ou de l'essieu (36) et

ii. les première et seconde pincettes (21A, 22A ; 21C, 22C) étant chacune dans un état fermé sur une seconde section de rotation autour de l'axe ou de l'essieu (36) ;

d. dans laquelle la première pincette (21A, 22A) et la seconde pincette (21C, 22C) sont en déport axial ou leurs enveloppes de rotation sont contiguës ou côte à côte.

2. Tête d'épilation selon la revendication 1, dans laquelle le contre-élément (22) est un deuxième disque (22) et les contre-parties (22A-C) sont des deuxièmes pinces à disque (22A, 22B, 22C), les premier et deuxième disques (21, 22) étant configurés de sorte qu'une première paire composée d'une des premières pinces à disque (21A) et d'une de la seconde pince à disque (22A) forment une première pincette (21A, 22A) et une seconde paire composée d'une des deuxièmes pinces à disque (21C) et d'une de la seconde pince à disque (21C) forment une seconde pincette (21C, 22C).

3. Tête d'épilation selon la revendication 2, dans laquelle les premières pinces à disque (21A ; 21C ; 21E) sont formées par des premières saillies de disque (21A ; 21C ; 21E) s'étendant radialement au moins en partie depuis le premier disque (21) et les deuxièmes pinces à disque (22A, 22B, 22C) sont formées par des secondes saillies de disque (22A, 22B, 22C) s'étendant radialement au moins en partie depuis le deuxième disque (22), et/ou dans laquelle des premières pinces à disque (21A ; 21C ; 21E) contiguës et/ou des deuxièmes pinces à disque (22A, 22B, 22C) contiguës sont au moins une en déport axial les unes des autres, leurs enveloppes de rotation sont contiguës ou côte à côte.

4. Tête d'épilation selon l'une quelconque des revendications précédentes, comprenant en outre :

a. un troisième disque (23) avec au moins deux troisièmes pinces à disque (23A; 23B ; 23C), le troisième disque (23) étant rotatif autour de l'axe ou de l'essieu (36) de rotation ;

b. les premier et troisième disques (21, 23) étant configurés de sorte qu'une troisième paire composée d'une des premières pinces à disque (21B) et d'une des troisièmes pinces à disque (23A) forment une troisième pincette (21B, 23A) et une quatrième paire composée d'une des premières pinces à disque (21F) et d'une des troisièmes pinces à disque (23B) forment une quatrième pincette (21F, 23B) ;

i. les troisième et quatrième pincettes (21B, 23A ; 21F, 23B) étant chacune dans un état ouvert sur au moins une première section de rotation autour de l'axe ou de l'essieu (36) et

ii. les troisième et quatrième pincettes (21B, 23A ; 21F, 23B) étant chacune dans un état fermé sur une seconde section de rotation autour de l'axe ou de l'essieu (36) ;

c. dans laquelle la troisième pincette (21B, 23A) et la quatrième pincette (21F, 23B) sont en déport axial ou leurs enveloppes de rotation sont

contiguës ou côte à côte.

5. Tête d'épilation selon l'une quelconque des revendications précédentes et les propriétés de la revendication 4, dans laquelle le premier disque (21) présente de 4 à 8 pinces (21A-F) et chacun du deuxième disque (22) et du troisième disque (23) présentent de 2 à 4 pinces, de préférence 3 pinces, de sorte que de 4 à 8 pincettes, de préférence 6 pincettes soient formées. 5
6. Tête d'épilation selon l'une quelconque des deux revendications précédentes, comprenant 4 à 12 ensembles de premier, deuxième et troisième disques (21-23), de préférence 6 à 10 ensembles de premier, deuxième et troisièmes disques (21-23), de manière davantage préférée 8 ensembles de premier, deuxième et troisième disques (21-23). 10
7. Tête d'épilation selon l'une quelconque des revendications précédentes, comprenant un tambour de tête (20, 21-23) qui est formé par une pluralité d'unités de moyeu (20) supportant chacune un ensemble de disques (21-23) tournant autour de l'axe ou de l'essieu (36). 15
8. Tête d'épilation selon l'une quelconque des quatre revendications précédentes, dans laquelle au moins un parmi le deuxième disque (22) et le troisième disque (23) présente des extensions formées au niveau des pinces (22AC, 23A-C) s'étendant vers l'extérieur dans la direction de rotation et adaptées pour faciliter le guidage de poils dans les pincettes, les extensions étant inclinées entre 10 et 40° par rapport au plan des pinces (22A-C, 23A-C), de préférence entre 25 et 35°. 20
9. Tête d'épilation selon l'une quelconque des revendications précédentes, dans laquelle l'axe ou l'essieu (36) est formé de manière concave par rapport à un côté d'utilisation et adapté pour aider les pincettes (21A, 22A; 21C, 22C) à être dans un état ouvert sur la première section de circonférence de rotation autour de l'axe ou de l'essieu (36) et dans un état fermé sur la seconde section de circonférence de rotation autour de l'axe ou de l'essieu (36). 25
10. Tête d'épilation selon l'une quelconque des six revendications précédentes, comprenant en outre au moins deux unités de moyeu (20) adaptées chacune pour être supportées sur l'axe ou l'essieu (36) et pour tourner sur l'axe ou l'essieu (36) et pour supporter en outre le premier disque (21), le deuxième disque (22) et le troisième disque (23) de sorte qu'ils tournent conjointement avec l'unité de moyeu (20) respective, chaque unité de moyeu (20) étant en outre de préférence configurée pour amener les pincettes (21AF ; 22A-C, 23A-C) chacune dans un état ouvert sur au moins une première section de circonférence de rotation et dans un état fermé sur au moins une seconde section de circonférence de rotation autour de l'axe ou de l'essieu (36) par une inclinaison périodique d'un, plus d'un ou de tous les disques (21-23). 30
11. Tête d'épilation selon la revendication précédente, dans laquelle l'axe ou l'essieu (36) est formé de manière concave par rapport à un côté d'utilisation, au moins deux ensembles d'unités de moyeu (20) étant agencés sur l'axe ou l'essieu (36) et dans une vue de la forme concave de l'axe ou de l'essieu (36), les unités de moyeu (20) étant chacune configurée pour amener les pincettes (21A-F ; 22A-C, 23A-C) chacune dans un état ouvert sur au moins une première section de circonférence de rotation et dans un état fermé sur au moins une seconde section de circonférence de rotation autour de l'axe ou de l'essieu (36), de préférence dans ou près du côté d'utilisation. 35
12. Tête d'épilation selon l'une quelconque des revendications précédentes, dans laquelle une pluralité d'unités de moyeu (20) est agencée côte à côte sur l'axe ou l'essieu (36) pour former un tambour de tête rotatif, les unités de moyeu présentant des saillies de transfert de pression (32) sur le côté opposé au côté des disques (21-23) transférant une pression aux disques (21-23) de l'unité de moyeu (20) contiguë pour aider en outre les pincettes (21A, 22A; 21C, 22C) de l'unité de moyeu (20) contiguë à être dans un état ouvert sur la première section de circonférence de rotation autour de l'axe ou de l'essieu (36) et dans un état fermé sur la seconde section de circonférence de rotation autour de l'axe ou de l'essieu (36). 40
13. Tête d'épilation selon l'une quelconque des huit revendications précédentes, comprenant en outre au moins deux saillies de transfert de pression (32) formées et positionnées sur un côté (20B) de l'unité de moyeu (20) et/ou dans laquelle les premier au troisième disques (20-23) sont adaptés pour être positionnés sur un côté de l'unité de moyeu (20) et adaptés pour l'inclinaison périodique où dans une première section de 360° de mouvement de rotation, les saillies de transfert de pression (32) d'un ensemble (13) de pince adjacente similaire sont configurées pour presser contre au moins un des disques (21, 22, 23) ainsi pour amener les disques (21, 22, 23) à entrer en contact les uns avec les autres au niveau de leurs surfaces de pince piégeant des poils entre elles et où dans une seconde section, le contact entre les surfaces de pince est adapté pour être cessé en libérant les poils piégés. 45
14. Tête d'épilation (13) selon l'une quelconque des neuf revendications précédentes, dans laquelle l'unité de 50

moyeu (20) comprend au moins trois surfaces convexes inférieures (27) et au moins trois surfaces convexes supérieures (28) sur le côté de l'unité de moyeu (20) abritant les disques (21-23) adaptés pour élever le deuxième disque (22) et le troisième disque (23) de l'un côté de l'unité de moyeu (20) provoquent respectivement la séparation (120) entre les disques (21, 22, 23) et permettent l'inclinaison périodique des unités (22, 23) sous l'influence des saillies de transfert de pression (32).

**15.** Procédé de fonctionnement d'une tête d'épilation, comprenant les étapes de :

- a. la fourniture d'au moins un premier disque (21) avec au moins deux premières pinces à disque (21A ; 21C ; 21E), le premier disque tournant autour d'un axe ou d'un essieu (36) de rotation, 5
- b. la fourniture d'au moins un contre-élément (20 ; 22) avec au moins deux contre-parties (20A-F ; 22A-C), le contre-élément tournant autour de l'axe ou de l'essieu (36) ; 10
- c. la configuration du premier disque (21) et du contre-élément (20 ; 22) pour former une première paire de pincettes (21A, 20A ; 21A, 22A) qui est composée d'une des premières pinces à disque (21A) et d'une des contre-parties (20A-F ; 22A-C) et pour former une seconde pincette (21C, 20C ; 21C, 22C) qui est composée d'une autre des premières pinces à disque (21C) et d'une autre des contre-parties (20AF ; 22A-C) ; 15
- i. les première et seconde pincettes (21A, 22A ; 21C, 22C) étant chacune dans un état ouvert sur au moins une première section de circonférence lors de leur rotation autour de l'axe ou de l'essieu (36) et 20
- ii. les première et seconde pincettes (21A, 22A ; 21C, 22C) étant chacune dans un état fermé sur une seconde section de circonférence lors de leur rotation autour de l'axe ou de l'essieu (36) ; 25
- d. dans lequel la première pincette (21A, 22A) et la seconde pincette (21C, 22C) sont en déport axial ou leurs enveloppes de rotation sont contiguës ou côte à côte. 30

35

40

45

50

55

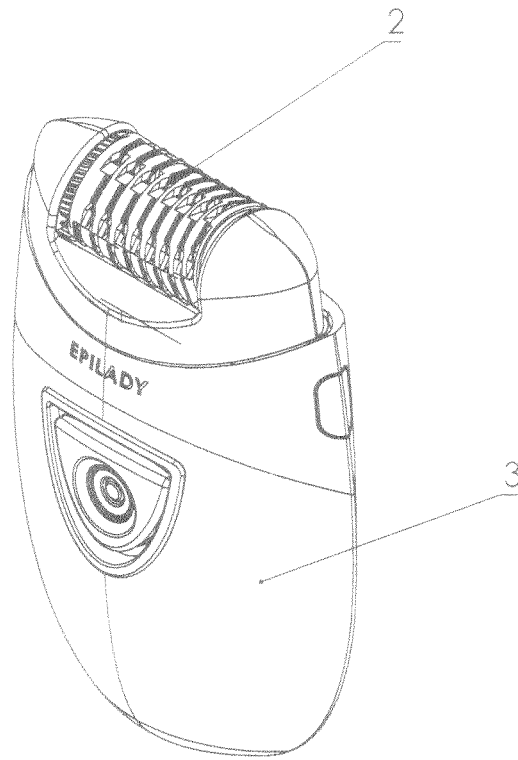


FIG 1

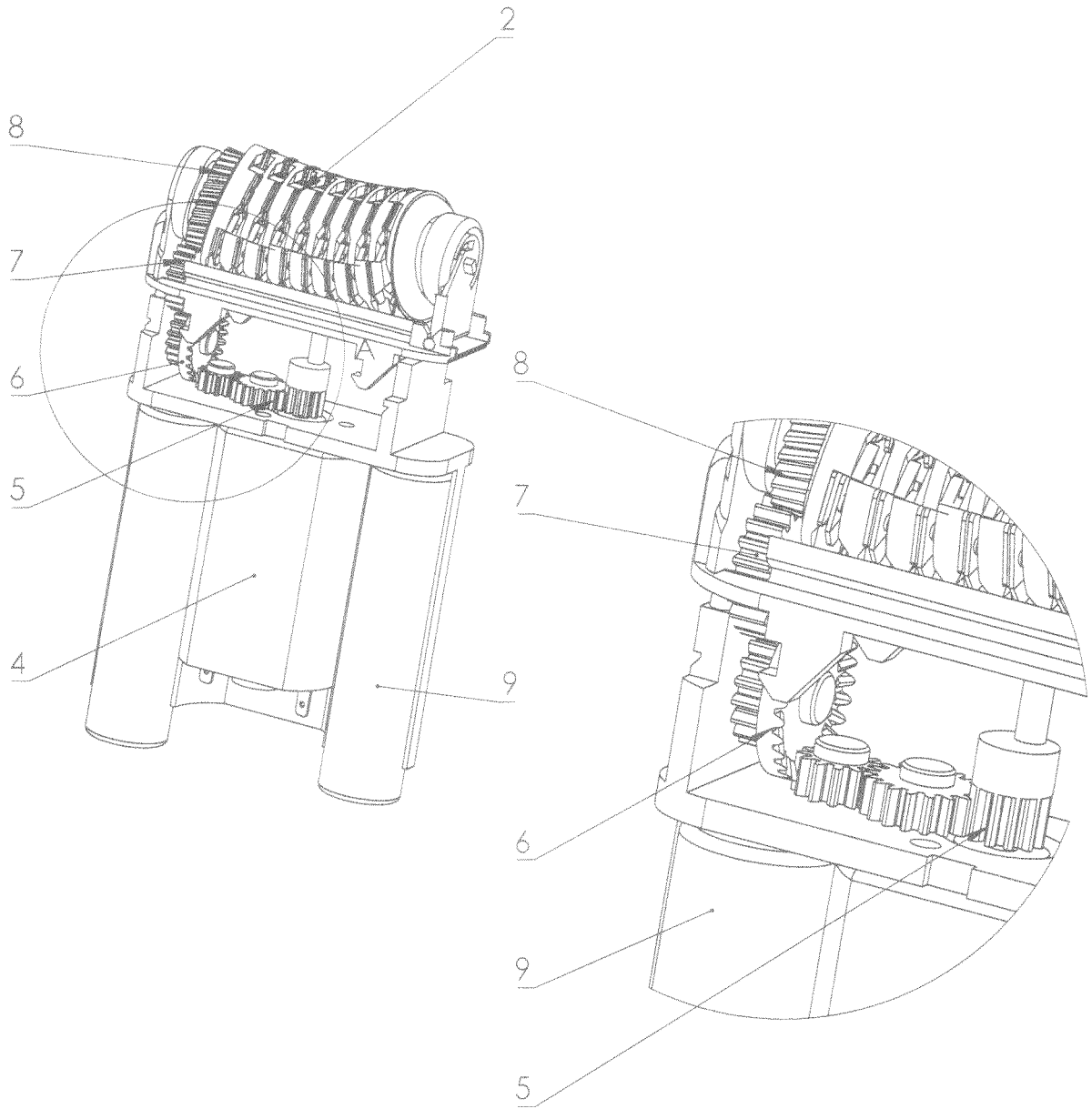


FIG 2

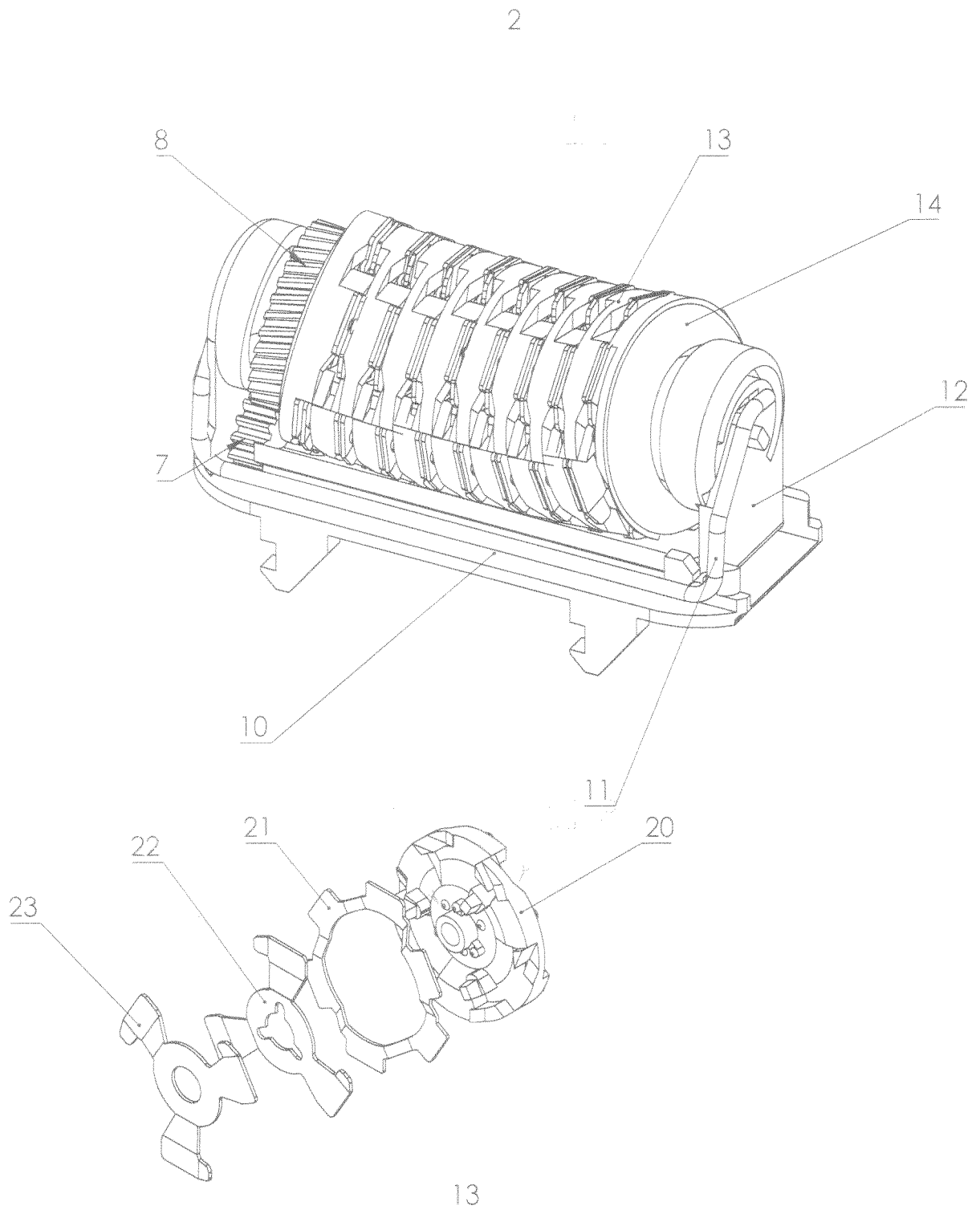


FIG 3

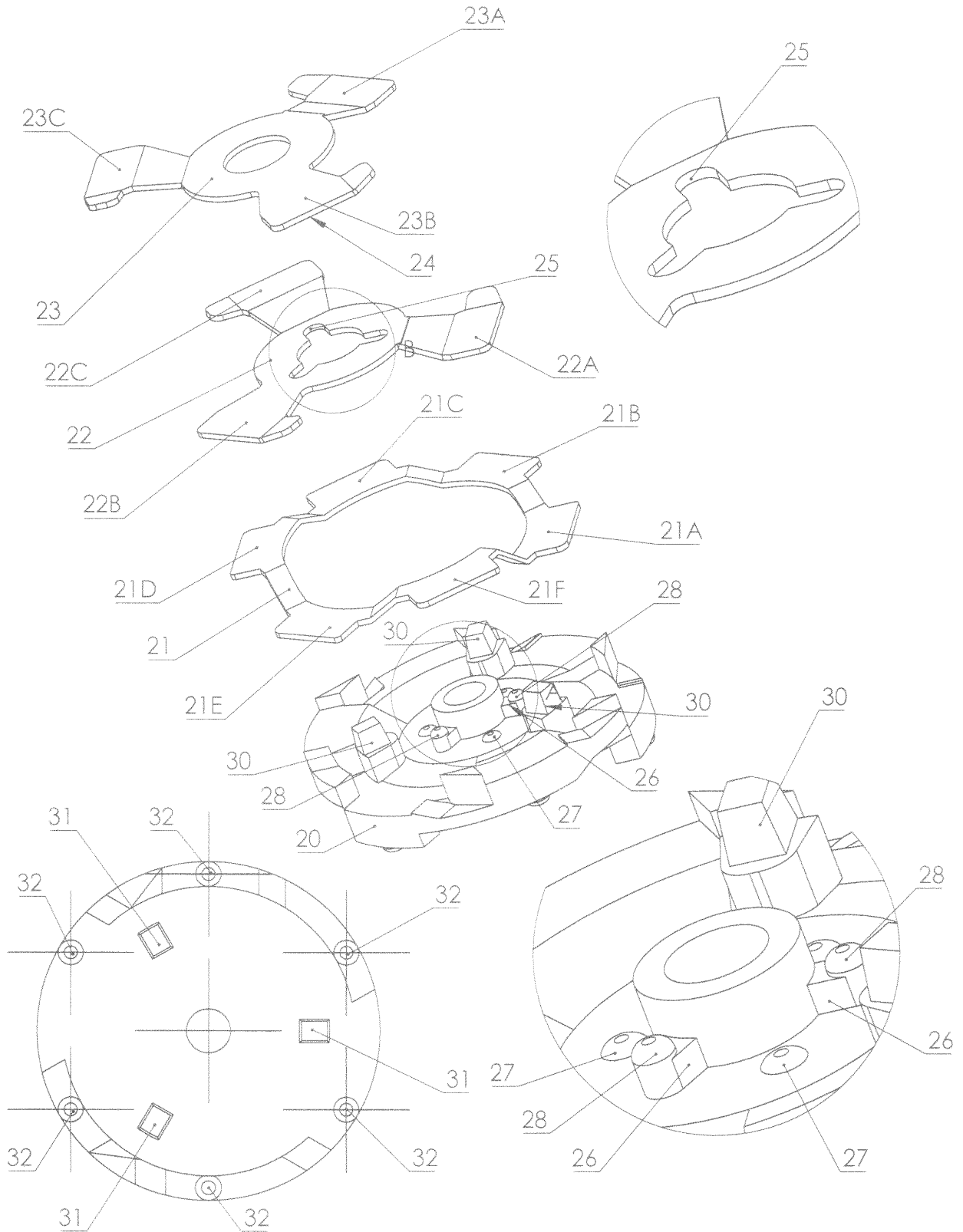


FIG 4



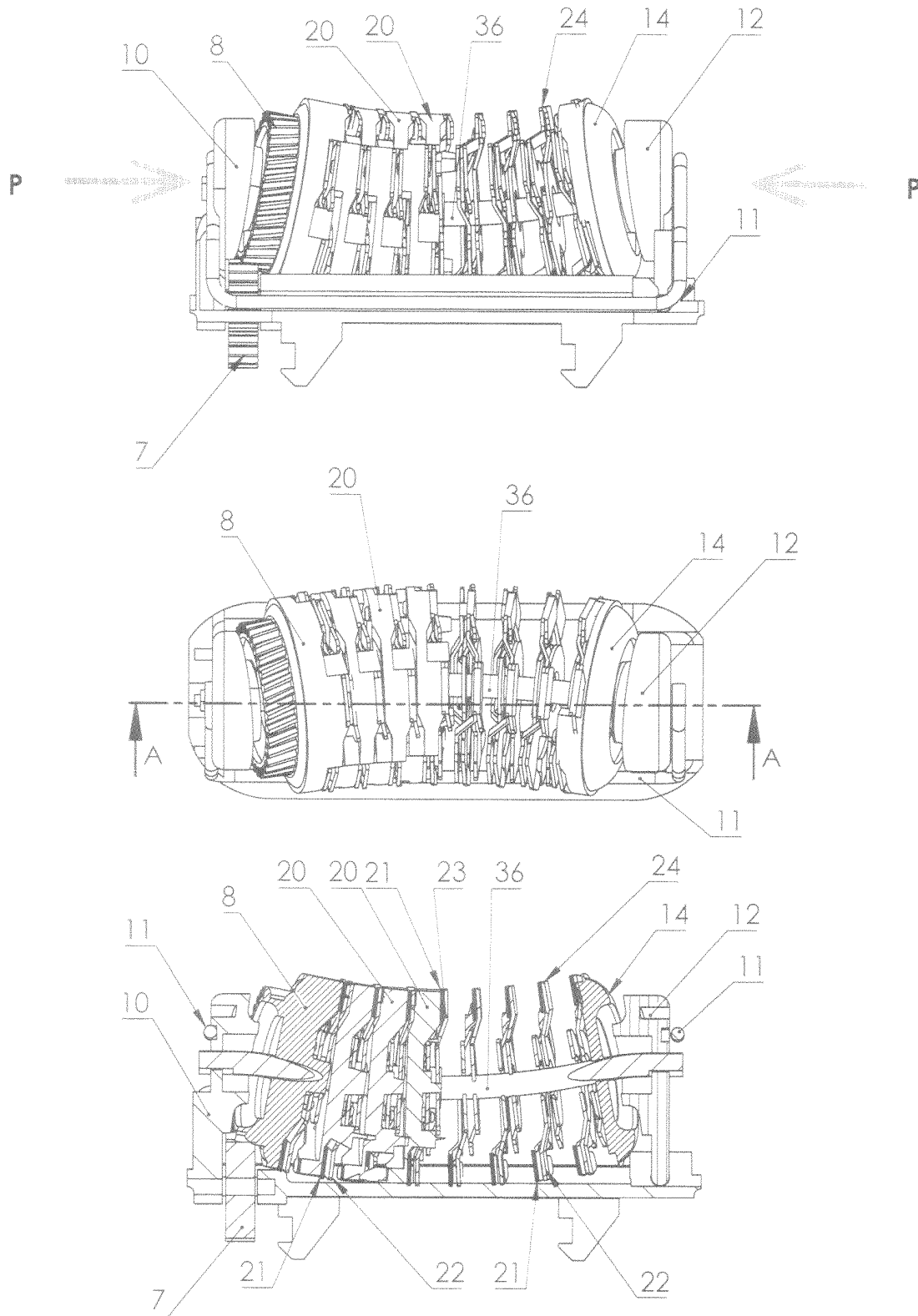


FIG 6

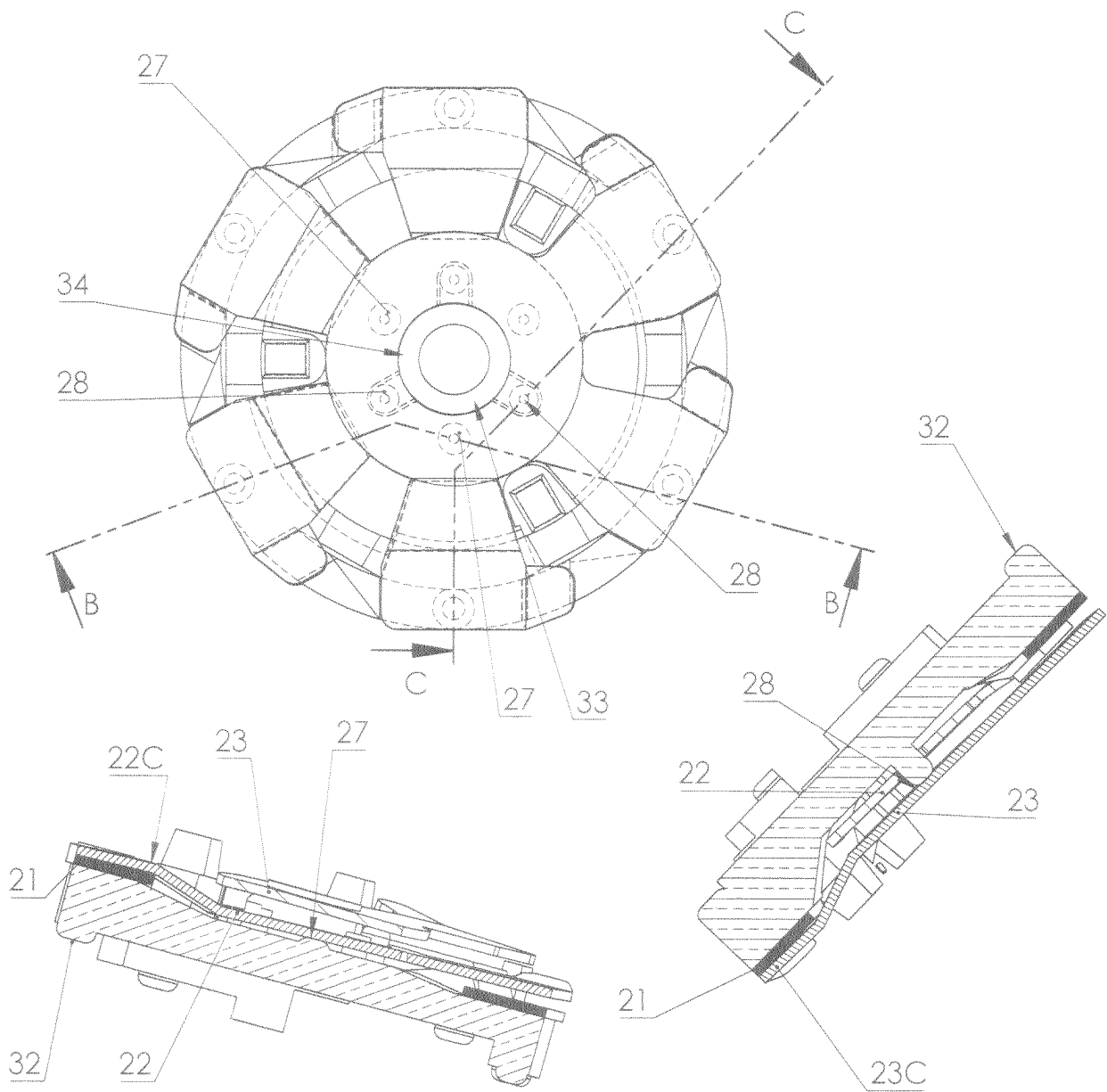


FIG 7

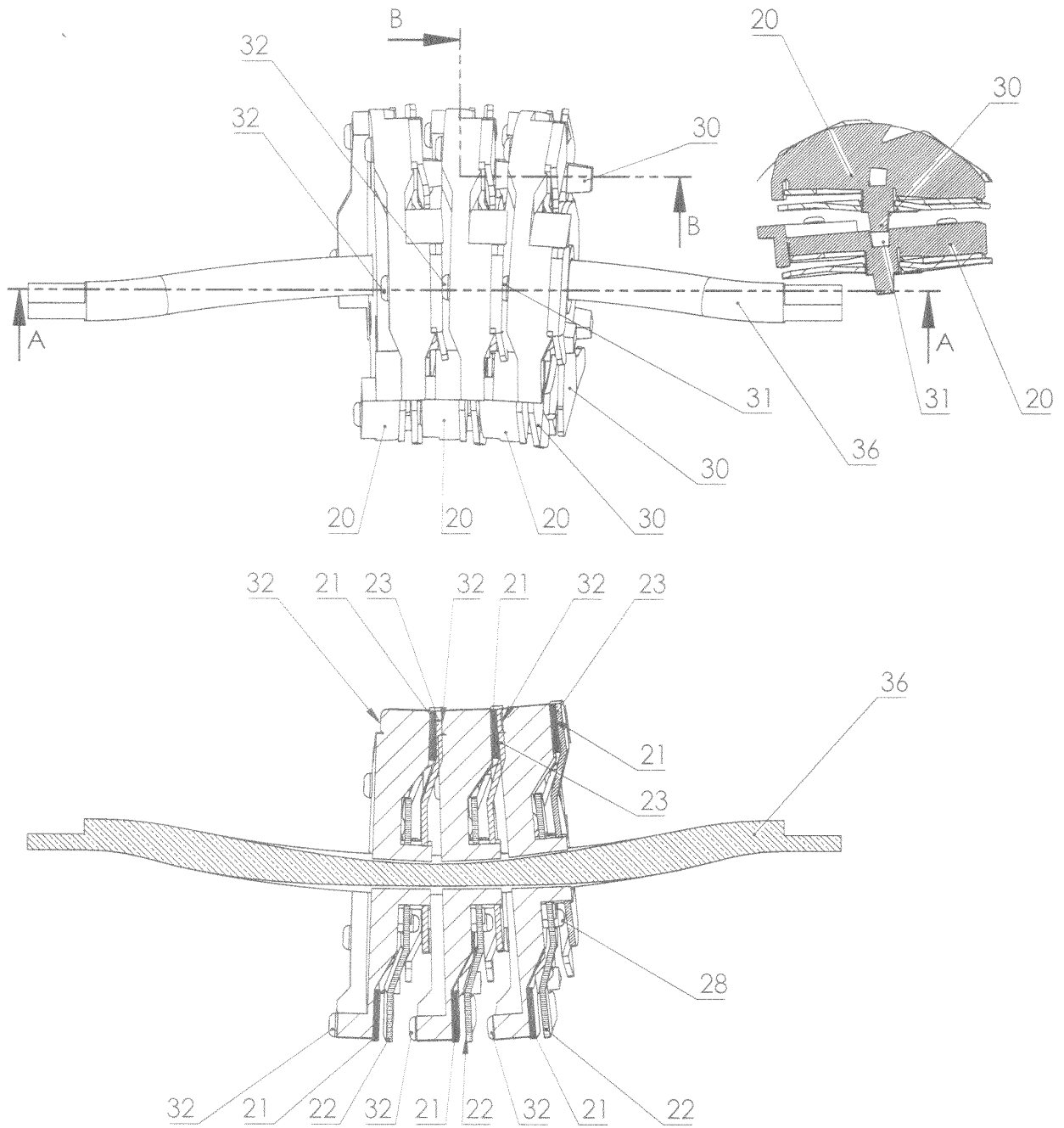


FIG 8

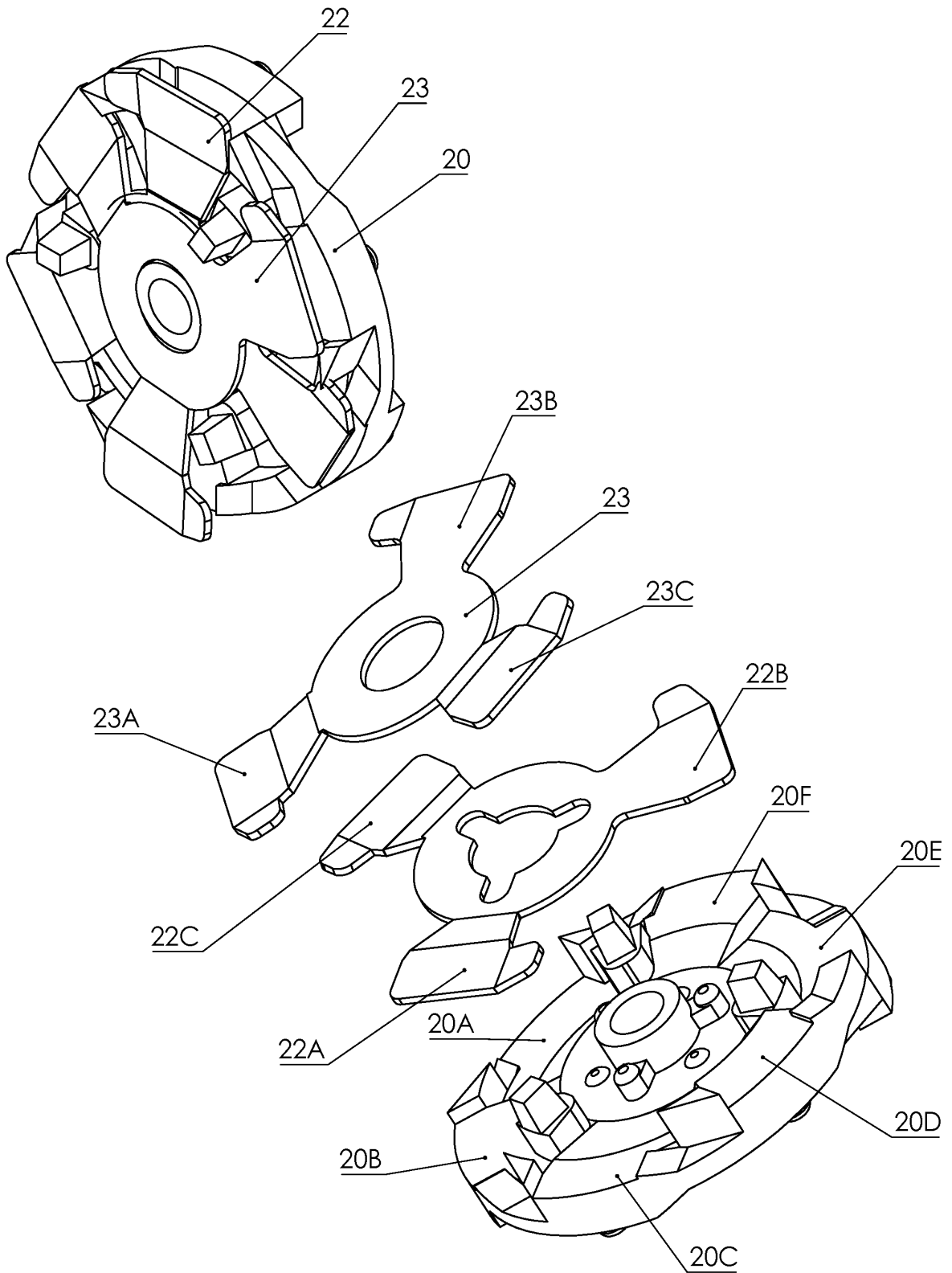


FIG 9

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- US 20120035621 A [0005]
- US 4935024 A, Dolev [0005]
- US 5057115 A, Dolev [0005]
- US 5190559 A, Gabion [0005]
- US 5797925 A, Heintke [0005]
- US 5857903 A, Ramspeck [0005]
- US 5312419 A, Garenfeld [0005]
- US 5196021 A, Kabla [0005]
- US 5281233 A, Dolev [0005]
- US 5462557 A, Jordan [0005]
- WO 2009010815 A1 [0008]
- EP 0950365 A [0009]
- EP 1405701 B1 [0010]
- WO 2005063076 A [0011]
- WO 2015121851 A [0012]