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(54) **COMPACT TWEEZER HEAD FOR EPILATION**

(57) The invention relates to an epilation head for an epilation device, in particular for epilation head (3) for an epilation device (1), particularly for plucking hair from human skin, having a rotating cylinder (10) rotating around a rotational axis (36) comprising a first plucking unit (16) and a second plucking unit (18), wherein the first plucking unit (16) comprises a first movable clamping unit (20) and a first stationary clamping unit (22) and wherein the second plucking unit (18) comprises a second movable clamping unit (24) and a second stationary clamping unit (26), wherein the movable clamping unit and the stationary clamping unit form a closable plucking gap and wherein the first movable clamping unit (20) and the sec-

ond movable clamping unit (22) are movable in a direction essentially parallel to the rotational axis (32) and can each be moved from an open position to a closed position with a push rod (40), characterized in that the first movable clamping unit (20) and the second movable clamping unit (22) are provided by a single component (30) and wherein the first movable clamping unit (20) is arranged in a first plane vertical to the rotational axis and the second movable clamping element (26) is arranged in a second plane vertical to the rotational axis, wherein the second plane is shifted relative to the first claim in a direction parallel to the rotational axis.

EP 3 552 513 A1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a motor-driven epilation head for an epilation device, in particular for plucking hairs of the human skin. The invention furthermore relates to an epilation device.

BACKGROUND OF THE INVENTION

[0002] Epilation devices serve for removing hairs, if possible including the roots thereof. Known epilation devices are designed in such a way, for example, that the hairs are clamped between adjacent clamping elements and plucked by means of a movement of the clamping elements relative to the skin. This typically requires that the clamping elements are closed in a predetermined position in each case in order to capture the hairs, moved into another predetermined position in a closed state together with the clamped hairs, and then reopened in order to release the plucked hairs. In order to implement this pattern of movement, the clamping elements may be arranged, for example, on a rotation cylinder that is set in rotation by means of an electric motor. The opening and closing of the clamping elements is controlled by means of a control mechanism that can be designed in various ways. Generally, the control mechanism has actuation elements that act on the clamping elements, such that the clamping elements are closed or opened.

[0003] There is one alternative concept for building epilation devices, wherein no actuation means are used. In these devices the epilation cylinder can be provided from a number of disks. The disks are arranged around an axis which generally forms an angle, such that, upon rotation the disks open on the one side and close on the other side. The closing action can be used for plucking hairs. These relatively simple devices can also employ several structures for grasping hair on a single disk. A epilation device of this type is disclosed in EP 1 852 033 A1.

[0004] A rotation cylinder of the type employing actuation elements is known, for example, from EP 547 386 A. The rotation cylinder that is disclosed there for an epilation device is designed in such a way that movable clamping elements are coupled to actuation elements. The clamping elements can be moved toward one another in order to carry out a plucking movement. In the process, one clamping element in each case moves toward a central clamping element from the left and from the right.

[0005] Furthermore, an epilation device is known from EP 1 203 544 A1 in which the actuation elements are designed in the form of rods and arranged around the shaft of the rotation cylinder. All of the rods are coupled to a single return spring in such a way that the clamping elements are pretensioned via the rods in the direction toward the opened state. In order to close the clamping

elements, the rods are actuated in such a way that the clamping elements are displaced in an axial direction by overcoming the spring force of the return spring. These are displaced by the action of the return spring while in the non-actuated state of the rods and the clamping elements are opened as a result.

[0006] The object of the invention is to equip an epilation device with a large number of clamping elements, while keeping the expenditure of time and effort involved in the epilation process reasonable. The invention also aims at attaining as thorough and painless an epilation process as possible. In doing so, the epilation should be effective both on skin with thick hair growth and with sparse hair growth.

[0007] This object is achieved by the combination of features in Claim 1.

SUMMARY OF THE INVENTION

[0008] The invention relates to an epilation head for an epilation device, in particular for plucking hair from human skin having

[0009] The epilation head according to the invention for an epilation device, particularly for plucking hairs of the human skin, has a rotation cylinder capable of rotating about a rotation axis. A multiplicity of plucking gaps is provided on the rotation cylinder for the purpose of plucking hairs. According to the present invention, an epilation head for an epilation device is provided, in particular for epilation head (3) for an epilation device (1), particularly for plucking hair from human skin, having a rotating cylinder (10) rotating around a rotational axis (36) comprising a first plucking unit (16) and a second plucking unit (18), wherein the first plucking unit (16) comprises a first movable clamping unit (20) and a first stationary clamping unit (22) and wherein the second plucking unit (18) comprises a second movable clamping unit (24) and a second stationary clamping unit (26), wherein the movable clamping unit and the stationary clamping unit form a closable plucking gap and wherein the first movable clamping unit (20) and the second movable clamping unit (22) are movable in a direction essentially parallel to the rotational axis (32) and can each be moved from an open position to a closed position with a push rod (40), characterized in that the first movable clamping unit (20) and the second movable clamping unit (22) are provided by a single component (30).

[0010] The invention additionally relates to an epilation device, in particular for plucking hairs of the human skin, comprising a handheld housing and the epilation head according to the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention will be explained in further detail by means of the exemplary embodiments shown in the drawings below, in which:

- Fig. 1 shows a side view of an exemplary embodiment of a typical epilation device which, however, is not designed in detail according to the invention,
- Fig. 2 shows a perspective view of a rotation cylinder according to the present invention,
- Fig. 3 shows a perspective view of a components of a rotation cylinder with clamping elements according to the present invention,
- Fig. 4 shows several views of a component useful for the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0012] According to the present invention the epilation head can comprise a first plucking unit and a second plucking unit. Practically, in most cases the epilation head will comprise more than two plucking units, for example at least three, four and five plucking units and up to 20, 30 or 40 plucking units. The plucking units comprise two clamping units which together form a closable plucking gap.

[0013] The plucking gap is closed by moving a movable clamping unit relative to a stationary clamping unit. Therefore, the epilation head will comprise as many movable clamping elements and stationary clamping elements as it comprises plucking units. The movable clamping units are movable in a direction essentially parallel to the rotational axis. Thereby, by rotating the epilation head, a plucking unit can be brought in skin contact and in a synchronized movement, a plucking unit is closed for grasping hair by moving the movable clamping element towards the stationary element.

[0014] The epilation head employs at least one actuation element for moving a movable clamping element from the open position to the closed position. The actuation element can be provided by a push rod. It is useful to associate one push rod with one movable clamping unit. In some embodiments of the present invention it could also be, that one push rod is used for the actuation of the first movable clamping element and the second movable clamping element.

[0015] In accordance with the present invention at least the first movable clamping element and the second movable element are provided by a single component. Providing at least the first movable clamping element and the second movable clamping element by a single component, in one aspect, can be done by providing the two elements from a unitary component. Alternatively, the two clamping elements can be provided from subcomponents which are firmly attached as to provide one component when in use. Such attachment will therefore typically happen in the manufacturing process. The attachment can be by mechanical or chemical means.

[0016] Providing two or more clamping elements in one

single component is associated with several advantages. In one aspect, in the manufacturing process, at least when assembling the epilation head, fewer components are to be handled. In another aspect, the epilation head can be provided in more compact form. The provision of several clamping elements in the form of several components, by contrast, requires that these several components are mechanically supported by appropriate means. These means must allow to, on the one hand, hold the component in place and on the other hand must allow for it to be movable. Achieving both, holding the component in place, and allowing it to move, can be better achieved if two or movable clamping units are provided by and the same component.

[0017] It is also useful to have the element arranged at a different distance when seen vertical to the rotational axis. In this regard, it has been found useful that the first movable clamping element is arranged in a first plane vertical to the rotational axis and the second movable clamping element is arranged in a second plane vertical to the movable axis, wherein the two planes are shifted relative to the direction parallel to the rotational axis.

[0018] It is useful to provide the first movable clamping element and the second movable clamping element such they are offset in the direction of rotation. In other words, the first movable clamping element and the second movable clamping element are provided at different positions on the circumference of the rotating cylinder. Hence, the rotational axis appears under a different angle when seen from the first movable clamping element and when seen from the second movable clamping element. The respective angle is herein referred to as offset angle. It is useful that the offset angle is from 10° to 170°, or from 30° to 120°, such that the angular offset is from 10° to 170°, or from 30° to 120°.

[0019] It is also useful to provide a third plucking gap on the epilation head. The third plucking gap can be construed essentially as the first and the second plucking gap. Therefore, the third plucking gap will comprise a third movable clamping element and a third stationary clamping element, wherein the third movable clamping element and the third stationary clamping element form the closable plucking gap and wherein the first third movable clamping element is movable in a direction essentially parallel to the rotational axis and can be moved from an open position to a closed position with an actuation element wherein the third movable clamping element and the second movable clamping element are also provided by a single component. Again, and as generally in the context of the present invention, the actuation element can be provided as a push rod.

[0020] Clearly, it is also useful that the first and the second movable clamping element are provided by a single component. It is also useful, that the first, the second and the third movable clamping element are all provided by a single component. It can be useful to further have a fourth and/or a fifth movable clamping element provided by such a single component.

[0021] It is useful, that also the third clamping element is offset versus the first and/or the second clamping element in at least on direction. It is useful, in particular, that the second movable clamping element and the third movable clamping element are offset in the direction of rotation. Moreover, it is useful that the third movable clamping element lies in a third plane vertical to the rotational axis, the third plane being shifted versus the first plane and the second plane along the rotational axis.

[0022] There is many useful forms and materials for providing the single component, which in turn provides the movable clamping elements. It is useful to provide the single component from metal.

[0023] It is also useful to provide it such that it comprises a central disk. The central disk can be provided with radially extending arms, which in turn provide the movable clamping elements (or are at least comprised by the movable clamping elements). It is useful that the central disk comprises a central duct, which can receive the rotational axis.

[0024] Moreover, it is useful to provide bridge elements between two movable clamping elements. Hence, the bridge elements can be provided between neighboring radially extending arms. These bridge elements increase the mechanical stability of the single component. A portion of the bridge element can also provide a portion of the first or second or third clamping unit.

[0025] It is useful to provide the stationary clamping elements such that there are not movable relatively to the rotational cylinder.

[0026] The movement of the moveable clamping elements can be achieved by providing these elements such that they are movable relative to other parts of the single component. Alternatively or additionally, the single component can be provided such that it is movable as a whole.

[0027] It is useful to provide these stationary clamping elements from plastic. The stationary clamping elements are normally provided as part of the cylindrical role. In particular if the cylindrical role is provided from a multitude of discs, each disc comprising one or more stationary clamping element.

[0028] A number of discs can be placed on an axis, such that the discs form a cylinder. According to the present invention, the single components comprising movable clamping units can be placed between such discs to form the rotating cylinder of the present invention. Hence, a rotating cylinder according to the present invention will comprise a multitude of discs and a multitude of single components comprising movable clamping units. Normally, one component comprising movable clamping units is sandwiched between two discs.

[0029] For low cost easy manufacturing, it is preferred that all discs are of identical shape. This is a particular cost advantage if the discs are formed in a molding process. In accordance with the present invention it is possible to provide an efficient rotating cylinder, comprising discs of only one shape. Often it is beneficial to place the discs on the central axis with different orientation, e.g.

half the discs on the first half of the cylinder, e.g. the left half and half the discs on a second half of the cylinder, e.g. the right half, the dies on the second half being turned by 180° about an axis perpendicular to the central axis of the cylinder.

[0030] While the actuation element can be used to move the movable clamping elements from their closed position to an open position, it is often useful to use the actuation elements only for moving the movable clamping elements to the closed position. Other means can than be provided to move the movable clamping elements to the open position. Useful means are springs. For example a spiral spring can be employed for this purpose.

[0031] Fig. 1 shows a schematic plane view of a typical epilation device 1. The epilation device comprises housing 2 and epilation head 3. The epilation device 1 can be switched on or off using switch for situated in a central position on housing 2. The epilation head 3 encases an epilation cylinder 5 represented by prior art cylinder.

[0032] Fig. 2 shows an epilation cylinder which can be used with an epilation device as shown in Fig. 1. The epilation cylinder 10 comprises side discs 12a and 12b on either side.

[0033] The side discs 12 hold a multitude of discs in place which are stucked to provide, together with the side discs 12, the rotation cylinder 10. The rotation cylinder offers a multitude of plucking gaps for plucking human hair. These plucking gaps comprise first plucking gap 16 and second plucking gap 18.

[0034] Fig. 3 shows a similar view of an epilation cylinder corresponding to epilation cylinder 10 of Fig. 2. However, in Fig. 3 the cylinder is shown with most discs removed, such that only one side disc 12 and one disc 14 are in place.

[0035] As can be seen in Fig. 3, the first plucking gap 16 is provided by first movable clamping element 20 and cooperating first stationary clamping element 22. Likewise, second plucking gap 18 is provided by second movable clamping element 24 and by second stationary clamping element 26. Moreover third moving clamping element 28 is visible.

[0036] According to the present invention, the first movable clamping element 20, the second movable clamping element 24, and the third movable clamping element 28 are all provided from one single component, component 30. The discs 14 of the rotation cylinder 10 are provided on central axis 32. Also component 30 is provided on this axis 32. Spring 34, also provided on axis 32, is arranged between disc 14 and component 30.

[0037] In operation the epilation cylinder 10 is moved relative to pressure plate 36. This pressure plate comprises a series of cams. Counterpressure is provided by yoke spring 38. This mechanical principal allows to selectively operate push rods, such as push rod 40a and 40b. The respective push rods exert pressure on the movable clamping elements. Push rod 40a can exert pressure on the first movable clamping element 20. Push rod

40b can exert pressure on the second movable clamping element 24. Once the pressure is released and the respective push rods are retracted, spring 34 moves the movable clamping element into their non-plucking or open position. In this position the respective plucking gap is open, meaning the movable clamping element and the stationary clamping element do not touch. In this position hair to be removed can be guided into the respective plucking gaps.

[0038] Fig. 4 shows in view a, perspective view b and further side view c the component providing the movable clamping elements. Component 30 can provide three clamping elements, the first movable clamping element 20, the second movable clamping element 24 and the third movable clamping element 28. Component 30 comprises a central disc 42. Central disc 42 comprises a central duct 44, which can receive axis 32. The central disc 42 connects to the different clamping elements by legs 46. To support the feeding of hair to the plucking gaps, the movable clamping elements can comprise guide noses 48, as shown. Each guide nose normally forms an angle with the plucking face of the movable clamping elements.

[0039] As can be seen from view a the different movable clamping elements are arranged on different planes relative to the axis of movement which is parallel with axis 32. The first movable clamping element 20 is arranged on plane E₁ which is offset versus the second movable clamping element 24, which is arranged on second plane E₂. The third movable clamping element 28 is arranged on third plane E₃, which is offset versus the first plane E₁ and the second plane E₂. The direction of this offset is parallel to the direction of rotation.

[0040] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."

List of reference signs

[0041]

1	epilation device
2	housing
3	epilation head
4	switch
5	epilation cylinder (prior art)
10	rotation/epilation cylinder
12	side disc, flange
14	disc
16	first plucking gap
18	second plucking gap
20	first movable clamping element
22	first stationary clamping element
24	second movable clamping element

26	second stationary clamping element
28	third movable clamping element
30	component
32	axis
34	spring
36	pressure plate
38	yoke spring
40	push rod
42	disc
44	duct
46	leg
48	guide nose
E1	first plane
E2	second plane
E3	third plane

Claims

1. An epilation head (3) for an epilation device (1) particularly for plucking hair from human skin, having a rotating cylinder (10) rotating around a rotational axis (36) comprising a first plucking unit (16) and a second plucking unit (18), wherein the first plucking unit (16) comprises a first movable clamping unit (20) and a first stationary clamping unit (22) and wherein the second plucking unit (18) comprises a second movable clamping unit (24) and a second stationary clamping unit (26), wherein the movable clamping unit and the stationary clamping unit form a closable plucking gap and wherein the first movable clamping unit (20) and the second movable clamping unit (22) are movable in a direction essentially parallel to the rotational axis (32) and can each be moved from an open position to a closed position with a push rod (40), **characterized in that** the first movable clamping unit (20) and the second movable clamping unit (22) are provided by a single component (30) and wherein the first movable clamping unit (20) is arranged in a first plane vertical to the rotational axis and the second movable clamping element (26) is arranged in a second plane vertical to the rotational axis, wherein the second plane is shifted relative to the first plane in a direction parallel to the rotational axis.
2. The epilation head (3) according to Claim 1, in which the first movable clamping element (20) and the second movable clamping element (22) are offset in the direction of rotation.
3. The epilation head (3) according to any one of the preceding claims, in which further comprises a third plucking gap, comprising a third movable clamping element (28) and a third stationary clamping element, wherein the third movable clamping unit and the third stationary clamping unit form a closable plucking gap and wherein the third movable clamp-

ing element (28) is movable in a direction essentially parallel to the rotational axis (32) and can be moved from an open position to a closed position with a push rod (40) and wherein the third movable clamping element (28) and the second movable clamping element (22) are also provided by a single component (30). 5

4. Epilation head (3) according to claim 3, wherein the third movable clamping element (28) lies in a third plane vertical to the rotational axis, the third plane being shifted versus the first plane and the second plane along the rotational axis (32). 10
5. Epilation head (3) according to any one of the preceding claims, wherein the single component comprises a central duct (44), which can receive the rotational axis (32). 15
6. Epilation head (3) according to any one of the preceding claims, wherein the single component is made of metal. 20
7. Epilation head (3) according to any one of the preceding claims, wherein the single component comprises a central plate and wherein the movable clamping units are provided as readily extending legs (46). 25
8. Epilation head (3) according to the preceding claims, wherein a bridge element is provided between at least two movable clamping elements. 30
9. Epilation head (3) according to any one of the preceding claims, in which the stationary counter elements are not movable relative to the rotational cylinder. 35
10. Epilation head (3) according to any one of the preceding claims, wherein the stationary clamping elements are provided from plastic. 40
11. Epilation head (3) according to any one of the preceding claims, in which the movable clamping units can be moved from the closed position to an open position by a spring (34). 45
12. Epilation device (1) comprising an epilation head (3) which is attached to a housing and which can be motor operated and which comprises an epilation head (10) according to any one of the preceding claims. 50

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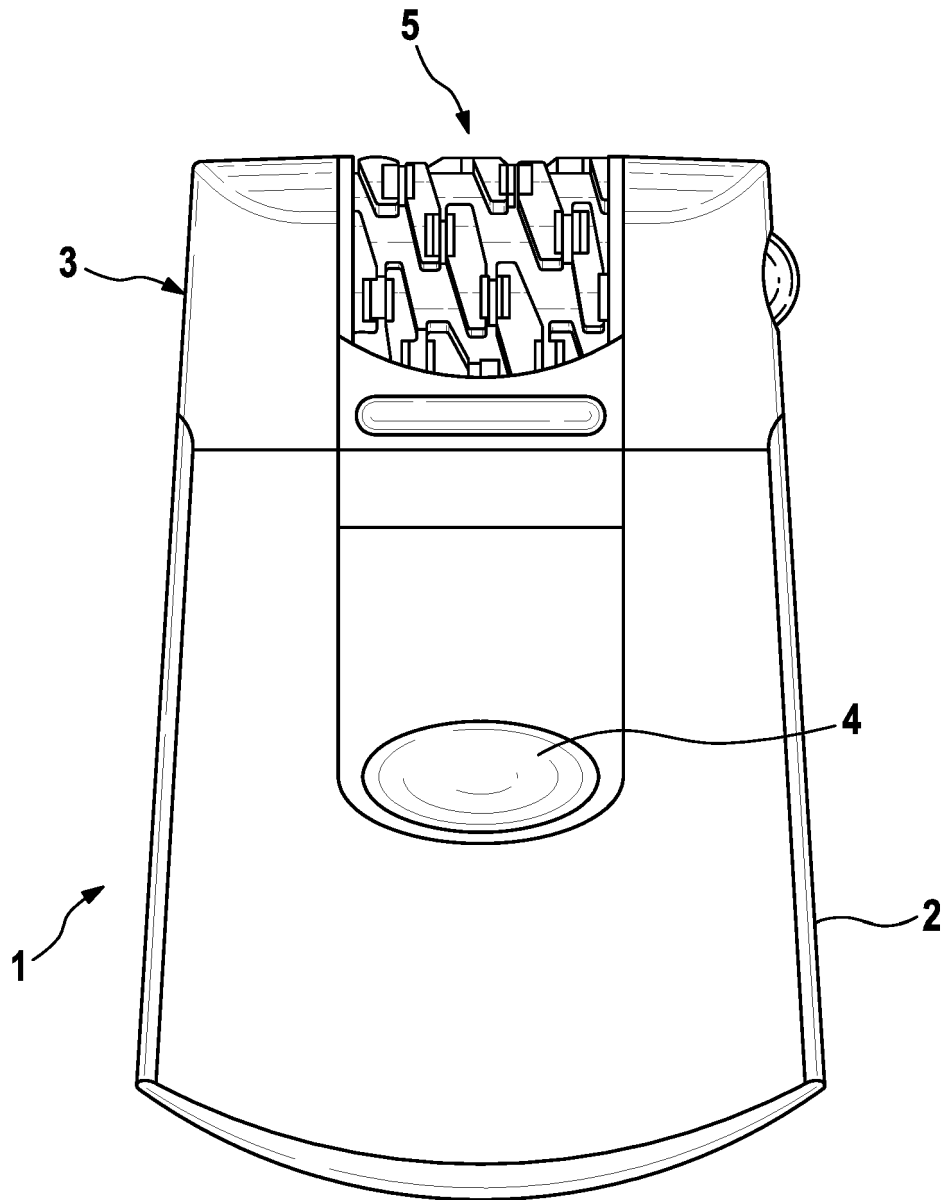


Fig. 1

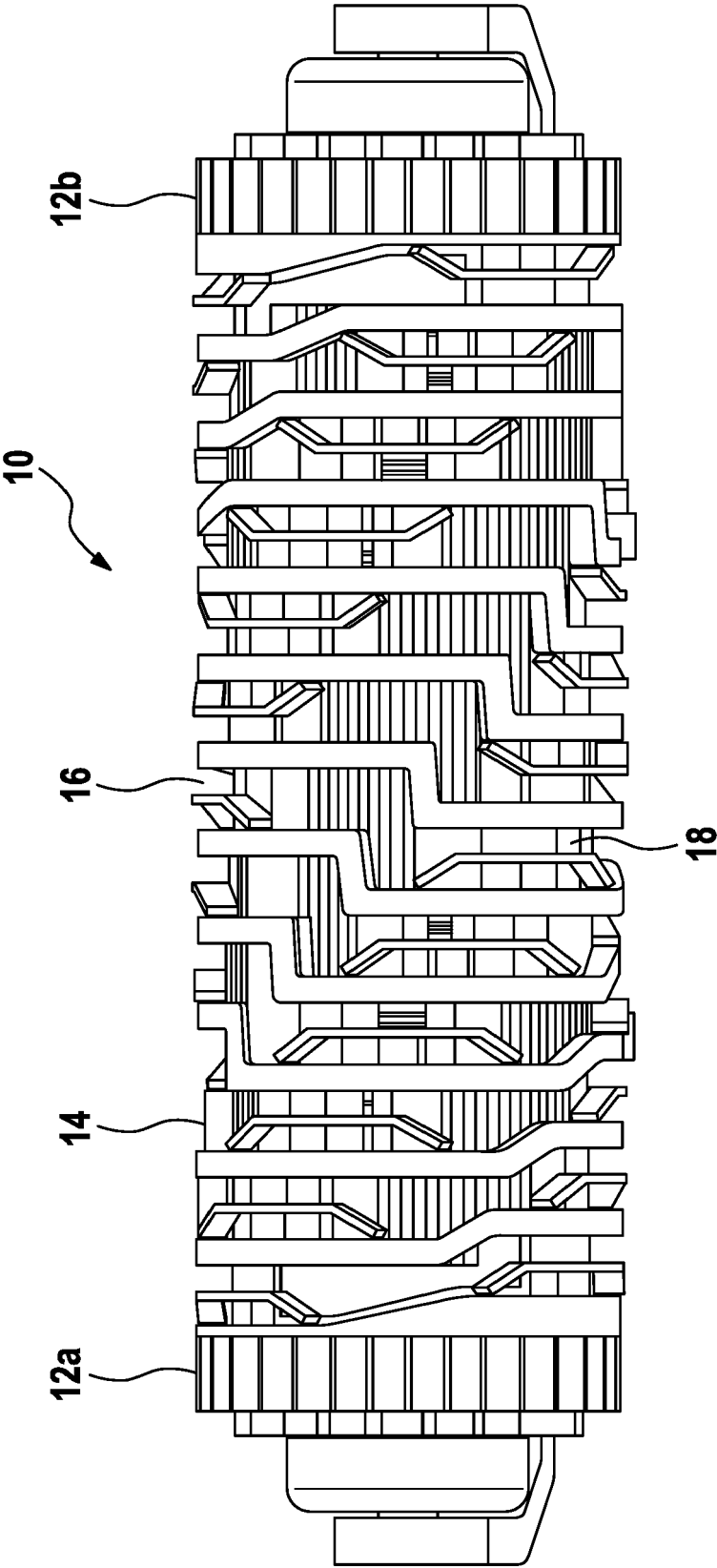


Fig. 2

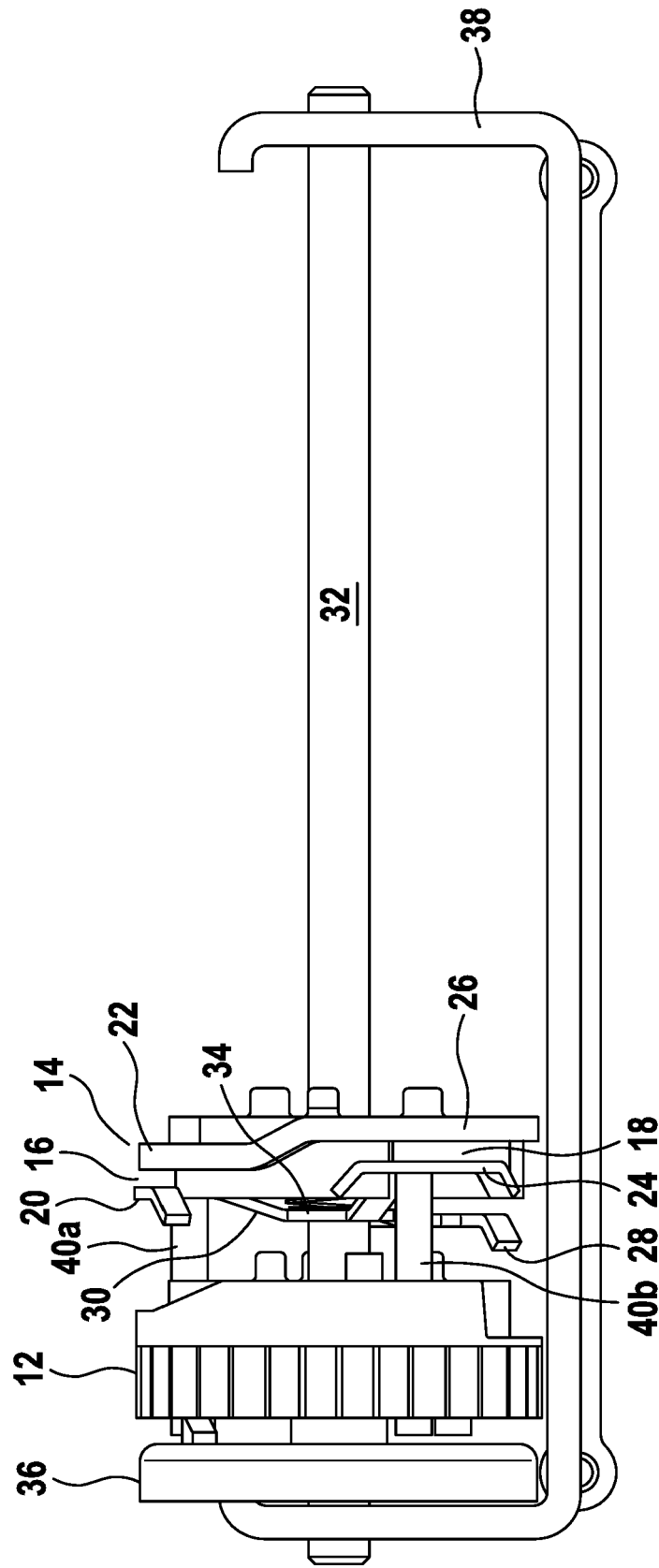
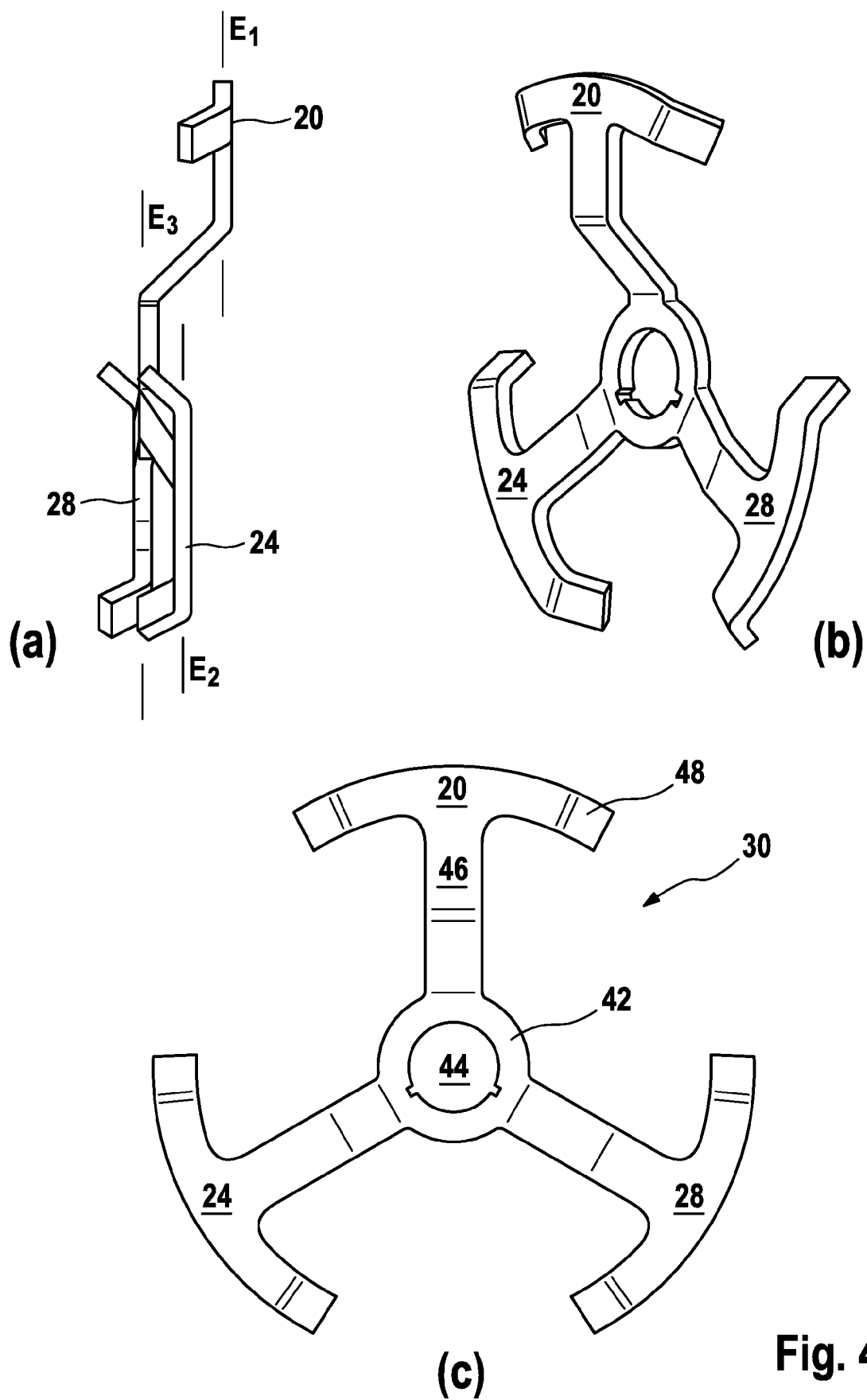


Fig. 3





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Application Number
EP 18 16 7023

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EP 18 16 7023

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