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(54) JOINT STRUCTURE AND SHAVING DEVICE

(57) A coupling structure and a shaving device having the same. The coupling structure includes a first coupling component (10); and a second coupling component (20); the first coupling component (10) is provided with a connection shaft (11), the second coupling component (20) is provided with a connection cavity (21) having a shape adapted to that of the connection shaft (11); the connection shaft (11) is provided with at least two protrusions (30), and the connection cavity (21) is provided with lacking latches (40) corresponding to positions of each of the protrusions (30) and capable of sliding along a radial direction, each of the lacking latches (40) is provided with a elastic member (50) configured for forcing the lacking latch (40) to slide toward the connection cavity (21), and the protrusion (30) forces the corresponding lacking latch (40) to radially slide until it is engaged with the lacking latch (40) when the connection shaft (11) is inserted into the connection cavity (21). The elastic member (50) can maintain elastic force to ensure that the first coupling component (10) and the second coupling component (20) are always in a stably connected state.

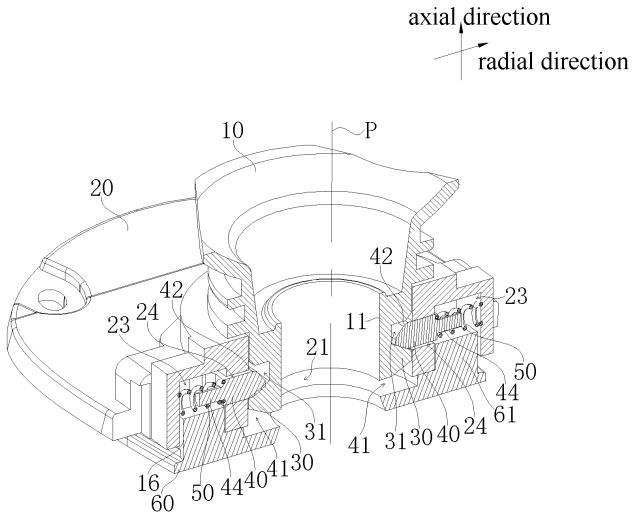

FIG. 2

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Description

Technical Field

[0001] The present application relates to the technical field of personal care products, and more particularly to a coupling structure and a shaving device having the same.

Background

[0002] Personal care products, such as shaving devices, generally include a cutter and a handle, and a detachable connection between the cutter and the handle is usually achieved by the engagement between connection buckles and buckle base. However, in the existing engagement method, when the shaving device is used for a long time, the elasticity of the connecting buckle will be weakened due to fatigue, and the stable engagement with the buckle base cannot be maintained. As a result, the service life of the shaving device is shortened. Therefore, it is necessary to provide a new coupling structure to improve the frequent assembly and disassembly of personal care products such as shaving devices to maintain a stable connection state.

Summary

[0003] The object of embodiments of the present application is to provide a coupling structure, which aims to solve the technical problem that personal care products such as shaving devices cannot be frequently assembled and disassembled and used to maintain a stable connection state in the prior art.

[0004] Further, a shaving device is provided, which aims to solve the technical problem that personal care products such as shaving devices cannot be frequently assembled and disassembled and used to maintain a stable connection state in the prior art.

[0005] In order to solve the above technical problems, embodiments of the present application adopt the technical solution are:

A coupling structure, including: a first coupling component; and a second coupling component; at least one of the first coupling component and the second coupling component is provided with a connection shaft, and another of the first coupling component and the second coupling component is provided with a connection cavity, a shape of the connection shaft is adapted to that of the connection cavity and is able to connect to or separate from the connection cavity; the connection shaft is provided with at least two protrusions extended along a radial direction, and the connection cavity is provided with lacking latches corresponding to positions of each of the protrusions and capable of sliding along a radial direction, and a front end of the lacking latches are able to protrude into the connection cavity, each of the lacking latches is provided with a elastic member configured for forcing the lacking latch to slide toward the connection cavity, and the protrusion forces the corresponding lacking latch to radially slide until it is engaged with the lacking latch.

[0006] A shaving device, including: a cutter assembly; and a handle assembly; the cutter assembly comprises at least one of the first coupling component or the second coupling component in the coupling structure above, and the handle assembly comprises another of the first coupling component or the second coupling component in the coupling structure above, the cutter assembly is connected with or separated from the handle assembly through connection of separation between the first coupling component and the second coupling component.

[0007] Compared with the prior art, the beneficial effects of the present application are: in the coupling structure of the present application, the mutual connection or separation between the first coupling component and the second coupling component is realized by the mutual connection or separation between the connection shaft and the connection cavity, the mutual connection or separation between the connection shaft and the connection cavity is realized by the engagement between the lacking latches and the protrusions. The engagement between the lacking latches and the protrusions is when the connection shaft is inserted into the connection cavity, the protrusion is pressed and forced the lacking latch to slide radially, and as the depth of the connection shaft inserted into the connection cavity increases, the protrusion is released from the compression on the lacking latch, and at the same time, the lacking latch slides toward the connection cavity and limits the protrusion under the action of the elastic force of the elastic member, so that the protrusion and the lacking latch are engaged. Since the connection or separation between the protrusion and the lacking latch is achieved by forcing the lacking latch to move in a radial direction, the elastic member used in forcing the lacking latch to move radially is an independent and elastic component, which is not achieved through the deformation of the lacking latch itself, it can effectively ensure that the first coupling component and the second coupling component are frequently assembled and disassembled, and the elastic member can maintain the due elastic force, thereby ensuring that the first coupling component and the second coupling component are maintained in stable connection state when the connection status thereof is changed. In addition, such a connection method of the coupling structure is easy to realize, and during the mounting process, the connection can be realized by applying a certain pressure when the connection shaft is inserted into the connection cavity through the protrusion to force the lacking latch to slide in the radial direction; during the disassembly process, a force is applied to the connection shaft to pull out in the axial direction, and the lacking latch is forced to slide in the radial direction through the protrusion to achieve separation.

[0008] Since the shaving device of the present application uses the above-mentioned coupling structure,

even if the cutter assembly and the handle assembly are frequently assembled and disassembled, the elastic member in the coupling structure can still be used to ensure that the first coupling component and the second coupling component are maintained in stable connection state when the connection status thereof is changed, the cutter assembly and the handle assembly can always maintain a stable connection state, and the entire assembly and disassembly operations are very convenient and practical.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In order to explain the embodiments of the present application more clearly, a brief introduction regarding the accompanying drawings that need to be used for describing the embodiments of the present application or the prior art is given below; it is obvious that the accompanying drawings described as follows are only some embodiments of the present application, for those skilled in the art, other drawings can also be obtained according to the current drawings on the premise of paying no creative labor.

Figure 1 is a schematic structural view of a coupling structure provided by an embodiment of the present application;
Figure 2 is a cross-sectional view taken along the line A-A in figure 1;
Figure 3 is a first exploded schematic view of a coupling structure provided by an embodiment of the present application;
Figure 4 is a second exploded schematic view of a coupling structure provided by an embodiment of the present application;
Figure 5 is a third exploded schematic view of a coupling structure provided by an embodiment of the present application;
Figure 6 is a schematic structural view of a first coupling component of a coupling structure provided by an embodiment of the present application;
Figure 7 is a schematic structural view of a second coupling component of a coupling structure provided by an embodiment of the present application;
Figure 8 is a cross-sectional view of a shaving device provided by an embodiment of the present application;
Figure 9 is an exploded schematic structural view of a shaving device provided by the embodiment of the present application.

[0010] Wherein, the same elements are numbered alike:

10-first coupling component; 11-connection shaft; 12-trimming plane;
20-second coupling component; 21-connection cavity; 22-limiting plane;
23-mounting cavity; 24-channel hole; 30-protrusion; 31-upper limiting area; 40-lacking latch; 41-lower limiting area;
42-chamfered arc surface; 43-lug; 44-limiting block; 50-elastic member; 60-sealing fixed plate; 61-sealing block;
100-cutter assembly; 200-handle assembly.

DETAILED DESCRIPTION

[0011] Herein, embodiments of the present application are described in detail, and examples of the embodiment are illustrated in the accompanying figures; wherein, an always unchanged reference number or similar reference numbers represent(s) identical or similar components or components having identical or similar functionalities. The embodiment described below with reference to the accompanying figures 1-9 is illustrative and intended to illustrate the present application, but should not be considered as any limitation to the present application.

[0012] In the description of the present application, it needs to be understood that, directions or location relationships indicated by terms such as "length", "width", "up", "down", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", and so on are the directions or location relationships shown in the accompanying figures, which are only intended to describe the present application conveniently and simplify the description, but not to indicate or imply that an indicated device or component must have specific locations or be constructed and manipulated according to specific locations; therefore, these terms shouldn't be considered as any limitation to the present application.

[0013] In addition, terms "the first" and "the second" are only used in describe purposes, and should not be considered as indicating or implying any relative importance, or impliedly indicating the number of indicated technical features. As such, technical feature(s) restricted by "the first" or "the second" can explicitly or impliedly comprise one or more such technical feature(s). In the description of the present application, "a plurality of" means two or more, unless there is additional explicit and specific limitation.

[0014] In the present application, unless there is additional explicit stipulation and limitation, terms such as "mount", "connect with each other", "connect", "fix", and so on should be generalizedly interpreted, for example, "connect" can be interpreted as being fixedly connected, detachably connected, or connected integrally; "connect" can also be interpreted as being mechanically connected or electrically connected; "connect" can be further interpreted as being directly connected or indirectly connected through intermediary, or being internal communication between two components or an interaction relationship between the two components. For the one of ordinary skill in the art, the specific meanings of the aforementioned terms in the present application can be interpreted according to specific conditions.

[0015] As shown in Figures 1 to 3, the coupling structure provided by the embodiments of the present application is suitable for personal care products such as shaving devices. The personal care products can also be trimmers, beauty instruments, and the like. The coupling structure includes a first coupling component 10 and a second coupling component 20. The first coupling component 10 and second coupling component 20 can be respectively configured onto the cutter assembly 100 and handle assembly 200 of personal care products (refer to Figures 8-9) to achieve the connection or separation of the cutter assembly 100 and the handle assembly 200. The first coupling component 10 and the second coupling component 20 can be used as a component of the cutter assembly 100 or the handle assembly 200 in personal care products, or they can be added component to allow the cutter assembly 100 and the handle assembly 200 to be connected or separated.

[0016] Among them, as shown in Figure 2, the first coupling component 10 and the second coupling component 20 can be provided with through holes at corresponding positions configured for communicating with each other, through which other components of the cutter assembly 100 and the handle assembly 200 can be installed or passed through, for example The through holes can be used for the arrangement and installation of a shaft, a connection shaft 11, cutter holder and other components. The specific method depends on different personal care products to choose different structural designs.

[0017] Further, at least one of the first coupling component 10 and the second coupling component 20 is provided with a connection shaft 11, and the other of the first coupling component 10 and the second coupling component 20 is provided with a connection cavity 21, that is, the first coupling component 10 is provided with the connection shaft 11, and the second coupling component 20 is provided with the connection cavity 21; or the first coupling component 10 is provided with the connection cavity 21, and the second coupling component 20 is provided with the connection shaft 11. In this embodiment, the first coupling component 10 being provided with the connection shaft 11, and the second coupling component 20 being provided with the connection cavity 21 are as an example for description.

[0018] As shown in figures 1 to 3, the shape of the connection shaft 11 matches the shape of the connection cavity 21 and can be connected with or separated from each other; the connection shaft 11 and the connection cavity 21 can be adapted to each other to ensure that the connection shaft 11 and the connection cavity 21 are suitable and will not affect the shaking or rotation of the product when in used, and the connection shaft 11 and the connection cavity 21 after the connection can be disassembled and separated under the action of external force.

[0019] Further, as shown in Figures 1 to 2, the connection or separation direction between the connection shaft 11 and the connection cavity 21 is defined as an axial direction, and the axial center line is the central axis P. All of the above or the following mentioned central axis P is based on this reference, and the direction perpendicular to the axial direction is defined as the radial direction. Among then, the connection shaft 11 is provided with at least two protrusions 30 protruding in the radial direction, and the connection cavity 21 is provided with lacking latches 40 corresponding to the position of each protrusion 30 and capable of sliding in the radial direction, and the front end of the lacking latch 40 protruding into the connection cavity 21. Each lacking latch 40 is equipped with an elastic member 50 for forcing the lacking latch 40 to slide toward the connection cavity 21. The elastic member 50 arranged at the lacking latch 40 can apply an elastic force onto the lacking latch 40 after installation through its own elastic force. The installation direction of the elastic member 50 is perpendicular to the direction of the central axis P, that is, consistent with the radial direction, and the elastic member 50 can be directly or indirectly connected with the lacking latch 40, or can be connected by a middle member, so that the elastic force applied by the elastic member 50 makes the lacking latch 40 always have a tendency to move along the radial direction. Then when the connection shaft 11 is inserted into the connection cavity 21 along the axial direction, the protrusion 40 forces the corresponding lacking latch 40 to slide radially until it is engaged with the lacking latch 40. After the lacking latch 40 and the protrusion 30 are engaged with each other, which can also achieve to limit the rotation of the first coupling component 10 and the second coupling component 20 around the central axis P, which indirectly maintains the stability of the engagement between the lacking latch 40 and the protrusion 30. The design is ingenious and practical.

[0020] The state after the protrusion 30 and the lacking latch 40 corresponding to the position are completely engaged is to achieve up and down abutment in the direction of the central axis P, so as to ensure that the protrusion 30 and the lacking latch 40 are avoided a relative displacement in the direction of the central axis P without external force.

[0021] As shown in Figures 1 to 3, the specific connection or separation between the first coupling component 10 and the second coupling component 20 is realized by the mutual connection or separation between the connection shaft 11 and the connection cavity 21, the mutual connection or separation between the connection shaft 11 and the connection cavity 21 is realized by the engagement between the lacking latches 40 and the protrusions 30. The engagement between the lacking latches 40 and the protrusions 30 is when the connection shaft 11 is inserted into the connection cavity 21, the protrusion 30 is pressed and forced the lacking latch 40 to slide radially, and as the depth of the connection shaft 11 inserted into the connection cavity 21 increases, the protrusion 30 is released from the compression on the lacking latch 40, and at the same time, the lacking latch 40 slides toward the connection cavity 21 and limits the pro-

trusion 30 under the action of the elastic force of the elastic member 50, so that the protrusion 30 and the lacking latch 40 are engaged. Since the connection or separation between the protrusion 30 and the lacking latch 40 is achieved by forcing the lacking latch 40 to move in a radial direction, the elastic member 50 used in forcing the lacking latch 40 to move radially is an independent and elastic component, which is not achieved through the deformation of the lacking latch 40 itself, it can effectively ensure that the first coupling component 10 and the second coupling component 20 are frequently assembled and disassembled, and the elastic member 50 can maintain the due elastic force, thereby ensuring that the first coupling component 10 and the second coupling component 20 are maintained in stable connection state when the connection status thereof is changed.

[0022] That is, the assembly and disassembly between the first coupling component 10 and the second coupling component 20 in the coupling structure in the present embodiment will not cause the fatigue of the local structure and affect its performance, for example, the elastic member 50 can still guarantee its own elastic force after used for a long time, that is, it can always apply an elastic force that enables the lacking latch 40 to achieve a stable engaging with the protrusion 30. Preferably, the elastic member 50 may be a tubular spring. The lacking latches 40 and protrusions 30 will not be deformed during specific use. Therefore, there is no need to worry that lacking latches 40 or protrusions 30 will have performance degradation as the use time increases, which will affect the stability connection of first coupling component 10 and second coupling component 20.

[0023] Of course, in other embodiments, the elastic member 50 can also be a plastic elastic member, as long as sufficient elastic force is used to force the lacking latch 40 to always maintain a force toward the connection cavity 21, and after the plastic elastic member is compressed by the lacking latch, the plastic elastic member can quickly recover and force the lacking latch 40 to protrude into the connection cavity 21 again once removing the force of compressing the plastic elastic member.

[0024] Among them, such a connection method of the coupling structure is easy to realize, and during the mounting process, the connection can be realized by applying a certain pressure when the connection shaft 11 is inserted into the connection cavity 21 through the protrusion 30 to force the lacking latch 40 to slide in the radial direction; during the disassembly process, a force is applied to the connection shaft 11 to pull out in the axial direction, and the lacking latch 40 is forced to slide in the radial direction through the protrusion 30 to achieve separation, which has the advantage of easy operation, and it is easy and free during use.

[0025] Preferably, as shown in Figures 2 and 4-5, two protrusions 30 are provided on the connection shaft 11, and the two protrusions 30 are arranged symmetrically along the radial direction. Accordingly, there are two lacking latches 40 on the connection cavity 21, and the two lacking latches 40 are arranged symmetrically along the radial direction. In this way, on the one hand, it can ensure that the first coupling component 10 and the second coupling component 20 are rotated relative to each other through the lacking latch 40 and the protrusion 30 that are connected to each other; on the other hand, it can also ensure the stability of the first coupling component 10 and the second coupling component 20 after being connected. There will be no looseness in local positions, and at the same time, the number of lacking latches 40 and protrusions 30 is set at the least, which reduces the complexity of the connection structure, reduces the structures, and is easy to manufacture.

[0026] Of course, in other embodiments, three or more than three protrusions 30 are provided on the connection shaft 11, and they are arranged at equal intervals around the circumference of the connection shaft 11. Correspondingly, the number and positions of lacking latches 40 being set in the connection cavity 21 are corresponding to that of the protrusions 30, in this way to ensure that the first coupling component 10 can be frequently assembled and disassembled with the second coupling component 20 without affecting the stability after connection.

[0027] In the embodiment, as shown in Figures 1 to 3, the connection shaft 11 is provided with at least one trimming plane 12, and the connection cavity 21 is provided with limiting planes 22 matched with each trimming plane 12 and configured for limiting the connection shaft 11 to rotate in the connection cavity with the central axis P as the center. The coupling structure in the connected state has at least one trimming plane 12 and one limiting plane 22 facing each other. Then when there is an external force that forces the first coupling component 10 and the second coupling component 20 to rotate relative to the central axis P, the limiting plane 22 and the trimming plane 12 can restrict each other to prevent the first coupling component 10 and the second coupling component 20 from rotating relative to each other. It can prevent the relative rotation of the first coupling component 10 and the second coupling component 20 from affecting the stability of the connection between the two or damaging the local components on the first coupling component 10 and the second coupling component 20.

[0028] Preferably, as shown in Figure 2, the shapes of the connection shaft 11 and the connection cavity 21 are circular structures, the trimming plane 12 can be formed on the outer wall of the connection shaft 11, and the limiting plane 22 can be formed on the inner wall of the connection cavity 21.

[0029] More preferably, as shown in Figures 6-7, the number of trimming planes 12 is two, and the two trimming planes 12 are arranged symmetrically in the radial direction. Similarly, the number of limiting planes 22 is also two, and the two limiting planes 22 is arranged symmetrically in the radial direction. In this way, the circular connection shaft 11 and the connection cavity 21 are provided with two trimming planes 12 and two limiting

planes 22 respectively to form a rounded rectangle shape similar to a stadium (playground) shape.

[0030] In the embodiment, as shown in Figure 3, at least one protrusion 30 is provided on a trimming plane 12. Preferably, each trimming plane 12 is provided with one protrusion 30, and each limiting plane 22 is provided with one lacking latch 40. The arrangement of the trimming plane 12 increases the space area of the outer wall of the connection shaft 11 at the position of the trimming plane 12, and provides an easier installation space for arranging the protrusion 30 for the installation of the protrusion 30. In the same way, at least one lacking latch 40 is arranged on a limiting plane 22, the arranging of the limiting plane 22 increases the space area of the inner wall of the connection cavity 21 at the position of the limiting plane 22, and provides an easier installation space for arranging the lacking latch 40 for the installation of the lacking latch 40. In addition, the trimming plane 12 is set to correspond to the limiting plane 22. When the connection shaft 11 needs to be inserted into the connection cavity 21, the trimming plane 12 and the limiting plane 22 are pre-positioned, so that only the trimming plane 12 and the limiting plane 22 are mutually alignment can complete the alignment between the protrusion 30 and the lacking latch 40. When the connection shaft 11 is inserted into the connection cavity 21 without the need to separately correspond to the protrusion 40 and the lacking latch 40, the engagement of the protrusion 30 and the lacking latch 40 can finally be realized.

[0031] In the embodiment, as shown in Figure 2, a lower limiting area 41 is formed between the front end of the lacking latch 40 protruded into the connection cavity 21 and a bottom portion of the connection cavity 21 and configured for receiving the protrusion 30. The lower limiting area 41 is mainly used to limit the displacement of the protrusion 30 along the axial direction. The limit height of the lower limiting area 41 is the distance between the lower end surface of the lacking latch 40 and the bottom wall of the connection cavity 21. When the connection shaft 11 is completely inserted into the connection cavity 21, the extension 30 is accommodated in the lower limiting area 41, and the limit height of the lower limiting area 41 is slightly larger than the thickness between the upper end surface and the lower end surface of the extension 30. In this way, the lower limiting area 41 can just fit and accommodate the protrusion 30. The lower end surface of the lacking latch 40 is used to limit the upper end surface of the protrusion 30, and the bottom wall of the connection cavity 21 is used to limit the lower end surface of the protrusion 30, so as to prevent the protrusion 30 from being displaced in the axial direction (toward the lower end surface of the lacking latch 40 or toward the bottom wall of the connection cavity 21) without being subjected to external force.

[0032] Furthermore, as shown in Figure 2, the connection shaft 11 is provided with an upper limiting area 31 located above the protrusion 30 and configured for receiving the front end of the lacking latch 40 protruding into the connection cavity 21. The upper limiting area 31 is mainly used to limit the displacement of the lacking latch 40 along the axial direction. The limit height of the upper limiting area 31 is the distance between the upper end surface of the protrusion 30 and the stepped surface above the protrusion 30 formed after the trimming plane 12 is set on the connection shaft 11. When the connection shaft 11 is completely inserted into the connection cavity 21, the lacking latch 40 is accommodated in the upper limiting area 31, and the limit height of the upper limiting area 31 is slightly larger than the thickness between the upper end surface and the lower end surface of the lacking latch 40. In this way, the upper limiting area 31 can be just adapted to accommodate the lacking latch 40. The upper end surface of the protrusion 30 is used to limit the lower end surface of the lacking latch 40. The stepped surface above the protrusion 30 formed after the trimming plane 12 is set on the connection shaft 11 is used to limit the upper end of the lacking latch 40, so as to prevent the lacking latch 40 from being displaced in the axial direction (toward the lower end surface of the protrusion 30 or toward the stepped surface above the protrusion 30 formed after the trimming plane 12 is set on the connection shaft 11) without being subjected to external force.

[0033] As shown in Figure 2, with the arrangement of upper limiting area 31 and lower limiting area 41, the lacking latch 40 and the protrusion 30 are interlocked to form an engaged state, which is similar to the engagement between the female button and the male button in a zipper. The stability is excellent. When without being subjected to external forces in the axial direction, there is no need to worry about disconnection of the lacking latch 40 and the protrusion 30, which can effectively guarantee the stability of the first coupling component 10 and the second coupling component 20 after they are connected.

[0034] At the same time, the arrangement of upper limiting area 31 and lower limiting area 41 also have the function of prompting whether the connection shaft 11 and the connection cavity 21 are connected in place. When the connection shaft 11 is inserted into the connection cavity 21, as the depth to which the connection shaft 11 is inserted into the connection cavity 21 is continuously applied, it can be judged by the hand feeling whether the protrusion 30 is in contact with the lower limit of the lower limiting area 41 (ie the bottom wall of connection cavity 21), and at the same time, one axial force of connection shaft 11 is reversely applied, which can be judged by the hand feeling whether the protrusion 30 is in contact with the upper limit of the lower limiting area 41 (ie the lower end of the lacking latch 40) to determine whether the connection shaft 11 is connected to the connection cavity 21 in place.

[0035] Of course, during the above operation, it can also be judged by the hand feeling whether the lacking latch 40 is in contact with the lower limit of the upper limiting area 31 (the upper end surface of the protrusion

30), and at the same time the reverse application of the axial force of the connection shaft 11 can be judged by the hand feeling whether the lacking latch 40 is in contact with the upper limit of the upper limiting area 31 (that is, the stepped surface above the production 30 formed after the trimming plane 12 is set on the connection shaft 11), to determine whether the connection shaft 11 and the connection cavity 21 are properly connected.

[0036] In addition, the setting of upper limiting area 31 and lower limiting area 41 can be realized by using limiting plane 22 and trimming plane 12, respectively, without independent design, and avoiding the complexity of the structure, the advantages of the original structure are effectively used, and further optimization of the design to form upper limiting area 31 and lower limiting area 41.

[0037] Preferably, as shown in Figures 4 to 5, each of the protrusions 30 and the lacking latches 40 has a wedge shape, that is, the front end of the protrusion 30 has a certain cone tip, and the front end of the lacking latch 40 also has a certain cone tip. After the wedge-shaped structure of the protrusion 30 and the wedge-shaped structure of the lacking latch 40 are engaged with each other, the force is applied in the axial direction to force the protrusion 30 to separate from the lacking latch 40, thereby making the lacking latch 40 and the protrusion 30 detachable connection.

[0038] In the embodiment, as shown in Figures 2 and 4 to 5, the upper end surface and the lower end surface of each lacking latch 40 protruding into the connection cavity 21 along the central axis P are provided with chamfered arc surfaces 42. Specifically, the setting of the chamfered arc surface 42 on the lacking latch 40 is mainly used to reduce the frictional force when contacting with the protrusion 30 and generating mutual axial displacement. When the connection shaft 11 is inserted into the connection cavity 21, the protrusion 30 abuts against the upper end surface of the lacking latch 40 and continues to exert force. The protrusion 40 presses against the upper end surface of the lacking latch 40 to force the lacking latch 40 to slide radially, then under the action of the chamfered arc surface 42, it is easier to realize mutual sliding between the protrusion 30 and the chamfered arc surface 42, and it is easier to force the lacking latch 40 to compress the elastic member 50 to achieve radial displacement until the connection shaft 11 is inserted into the connection cavity 21 and fits with the connection cavity 21. When the separation between the connection shaft 11 and the connection cavity 21 is required, the connection shaft 11 is pulled out by a force applied outward, and the upper end surface of the protrusion 30 on the connection shaft 11 abuts against the lower end surface of the lacking latch 40 and forces the lacking latch 40 to slide radially, and the protrusion 30 and the chamfered arc surface 42 are more likely to slide with each other under the action of the chamfered arc surface 42, and it is easier to force the lacking latch 40 to compress the elastic member 50 to achieve radial displacement until the connection shaft 11 is completely pulled out of the connection cavity 21, making the connection shaft 11 and the connection cavity 21 separation.

[0039] In other words, the upper and lower surfaces of the front end surfaces of the lacking latch 40 protruding into the connection cavity 21 are respectively provided with chamfered arc surface 42, which is beneficial to the connection and separation operations between the connection shaft 11 and the connection cavity 21, and the convenience and practicability are improved.

[0040] In other embodiments, in the mutually corresponding protrusions 30 and lacking latches 40, the outer end of at least one of the protrusion 30 and the lacking latch 40 has a rectangular structure, and the outer end of the other of the protrusion 30 and the lacking latch 40 has a round head structure. In this way, it is also possible to realize the mutual engagement of the corresponding protrusion 30 and the lacking latch 40.

[0041] In the embodiment, the materials of the lacking latches 40 and the protrusions 30 can be freely selected according to needs and different products, for example, they can be plastic or metal.

[0042] In the embodiment, preferably, as shown in Figure 6, each of the protrusions 30 is integrally formed on the connection shaft 11. When the connection shaft 11 is manufactured, the protrusion 30 is also manufactured, that is, the protrusion 30 and the connection shaft 11 are an integrated structure. This structure design can effectively improve the stability of the protrusion 30. Even if the volume of the connection shaft 11 is small, it can still ensure the structural stability of the protrusions 30, and this structural design can also ensure that the use and performance of the protrusions 30 will not be affected when the connection shaft 11 is set in the axial direction.

[0043] Specifically, when the connection shaft 11 is injection molded with a plastic material, the protrusion 30 is also made by integral injection molding.

[0044] Among then, as shown in Figure 2, Figure 5 and Figure 7, the first coupling component 10 or second coupling component 20 provided with the connection cavity 21 is also provided with a mounting cavity 23. In the embodiment, the second coupling component 20 provided with the connection cavity 21 and mounting cavity 23 is taken as examples for description. The mounting cavity 23 is located on the side of the connection cavity 21 and communicates with the connection cavity 21 through the channel hole 24, the channel hole 24 is arranged inside the second coupling component 20, and the channel hole 24 is located between the mounting cavity 23 and the connection cavity 21, at the same time, the extension direction of the channel hole 24 is radial, and the lacking latch 40 is slidably connected to the channel hole 24. The lacking latch 40 has at least a component structure located in the channel hole 24, and the outer ring size of the lacking latch 40 is matched with the inner ring size of the channel hole 24 to ensure that the lacking latch 40 can slide radially in the channel hole 24 as a standard. The elastic member 50 abuts between the rear end of the lacking latch 40 and the inner wall of the mounting

cavity 23. That is, one end of the elastic member 50 abuts against the radially distal inner wall of the mounting cavity 23, and the other end of the elastic member 50 abuts against the rear end of the lacking latch 40 (protruding to the front end of the connection cavity 21 relative to the lacking latch 40). In this way, the elastic member 50 can always apply an elastic force on the lacking latch 40, forcing the lacking latch 40 to always have a force to slide towards the connection cavity 21. The lacking latch 40 always has a part of the structure (such as the front end of the lacking latch 40) protruding into the connection cavity 21 without the force of the protrusion, so as to ensure that when the connection shaft 11 is completely inserted into the connection cavity 21, the lacking latch 40 is adaptably received in the upper limiting area 31.

[0045] When the length of the lacking latch 40 is relatively long, the length of the lacking latch 40 can be used to restrict the lacking latch 40 from sliding into the connection cavity 21 completely in the channel hole 24. For example, when the length of the lacking latch 40 is greater than the longest length of the relative position of the inner wall of the connection cavity 21, the lacking latch 40 cannot slide into the connection cavity 21 completely. The lacking latch 40 can also use a local special-shaped structure to restrict the lacking latch 40 from sliding into the connection cavity 21 from the connection channel.

[0046] When the length of the lacking latch 40 is relatively short, lugs 43 perpendicular to the central axis P are provided on the side of the rear end of the lacking latch 40 to abut the inner wall of the mounting cavity 23 to restrict the lacking latch 40 from sliding completely enter the connection cavity 21 in the channel hole 24. Specifically, when the elastic member 50 applies a large enough force to force the lacking latch 40 to slide toward the connection cavity 21, since the lugs 43 provided at the rear end of the lacking latch 40 will abut on the inner wall of the junction between the mounting cavity 23 and the channel, such that the inner wall of the mounting cavity 23 restricts the lacking latch 40 from sliding further into the connection cavity 21, thus ensuring that the connection cavity 21 does not slip into the connection cavity 21.

[0047] This design can ensure that the lacking latch 40 will not fall off after installation, and lacking latch 40 will not fall off after frequently slide in the channel hole 24. The structure design is ingenious and practical.

[0048] Preferably, as shown in Figures 4 to 5, there are two lugs 43, and the two lugs 43 are arranged oppositely (the two lugs 43 extend in opposite directions and extend on the same straight line), so that it can be implemented in two positions to restrict the lacking latch 40, completely prevent it from slipping into the connection cavity 21.

[0049] Preferably, the lacking latch 40 is formed by integral injection molding of a plastic material, and the lugs 43 and the lacking latch 40 are integrally formed by injection molding.

[0050] Furthermore, as shown in Figures 2 and 4 to 5, the rear end of the lacking latch 40 is also provided with a limiting post 44, and the elastic member 50 is sleeved outside the limiting post 44. The limiting post 44 is designed for 50 sets of elastic members. The elastic member 50 is preferably a tubular spring. The spring is sleeved outside the limiting post 44. Through the limiting of the limiting post 44, during the deformation of the spring being compressed or deformed by the elastic force, the spring is always deformed along the axial direction of the limiting post 44, which on one hand ensuring that when the spring is compressed, it will not spring away from the installation position due to the deformation. On the other hand, it can ensure that when the spring recovers its elastic force after compression, the elastic force always makes the lacking latch 40 slide in the radial direction in the channel hole 24, such that the front end of the lacking latch 40 protrudes into the connection cavity 21, so that the lacking latch 40 can be engaged with the protrusion 30 on the connection shaft 11.

[0051] Preferably, the limiting post 44 is also integrally formed with the lacking latch 40 by injection molding. The limiting post 44 is extended and arranged along the length of the lacking latch 40.

[0052] In the embodiment, as shown in Figures 2 and 4 to 5., the mounting cavity 23 is an open cavity, and the open cavity has an opening. That is, an opening is formed in the mounting cavity 23, and the setting of the opening facilitates the assembling of the lacking latch 40 and the elastic member 50. During specific assembly, the lacking latch 40 and the elastic member 50 sleeved outside the limiting post 44 can be placed in the mounting cavity from the opening, and the front end of the lacking latch 40 protrudes from the channel hole 24 into the connection cavity 21 to facilitate the installation and arrangement of the lacking latch 40 and the elastic member 50.

[0053] Furthermore, as shown in Figure 2 and Figures 4 to 5, the opening is sealed with a sealing block 61, and the sealing block 61 can be closely fitted (interference fit) with the opening to block the mounting cavity 23, such that a closed cavity structure is formed in the mounting cavity 23 to ensure that the elastic member 50 and the lacking latch 40 will not escape from the opening.

[0054] Furthermore, as shown in Figures 2, 4-5 and 7, when there are two or more mounting cavities 23, a sealing fixed plate 60 can be provided, and then t sealing blocks 6 corresponding to the position of each mounting cavity 23 are provided on the sealing fixing plate 60, so that a single piece of the sealing fixed plate 60 can ensure that the openings of the multiple mounting cavities 23 are sealed.

[0055] Preferably, as shown in Figure 2, the opening of the mounting cavity 23 is arranged at the bottom of the mounting cavity 23. Since the connection shaft 11 is preferably arranged above the connection cavity 21, that is, the first coupling component 10 is positioned above the second coupling component 20. Designing the opening of the mounting cavity 23 can prevent the sealing block 61 from being interfered by the first coupling com-

ponent 10.

[0056] The embodiment of the present application also provides a shaving device. As shown in figures 8-9, the shaving device includes a cutter assembly 100 and a handle assembly 200. The cutter assembly 100 is a component for realizing operations, and the handle assembly 200 is configured for holding and providing parts for mounting electric parts or power supply parts. Further, the cutter assembly 100 includes at least one first coupling component 10 or second coupling component 20 in the aforementioned coupling structure, and the handle assembly 200 includes another first coupling component 10 or second coupling component 20 in the aforementioned coupling structure, and the cutter assembly 100 and the handle assembly 200 are connected or separated through the connection or separation between the first coupling component 10 and the second coupling component 20.

[0057] The shaving device of the embodiment of the present application, since the above-mentioned coupling structure is used, even if the cutter assembly 100 and handle assembly 200 are frequently assembled and disassembled, the elastic member 50 in the coupling structure can still be used to ensure the first coupling component 10 and the second coupling component 20 are in the connected state, the cutter assembly 100 and the handle assembly 200 can always maintain a stable connection state, and the entire assembly and disassembly operations are very convenient and practical.

[0058] In other embodiments, personal care products such as trimmers, beauty instruments, etc. may also include the above-mentioned coupling structure to ensure that the cutter assembly 100 and handle assembly 200 of the personal care product can be assembled and disassembled frequently without affecting the stability of the connection between the cutter assembly 100 and handle assembly 200.

[0059] The aforementioned embodiments are only preferred embodiments of the present application, and should not be regarded as being limitation to the present application. Any modification, equivalent replacement, improvement, and so on, which are made within the spirit and the principle of the present application, should be included in the protection scope of the present application.

Claims

1. A coupling structure, comprising:

   a first coupling component; and
   a second coupling component;
   wherein at least one of the first coupling component and the second coupling component is provided with a connection shaft, and another of the first coupling component and the second coupling component is provided with a connection cavity, a shape of the connection shaft is adapted to that of the connection cavity and is able to connect to or separate from the connection cavity; the connection shaft is provided with at least two protrusions extended along a radial direction, and the connection cavity is provided with lacking latches corresponding to positions of each of the protrusions and capable of sliding along a radial direction, and a front end of the lacking latches are able to protrude into the connection cavity, each of the lacking latches is provided with a elastic member configured for forcing the lacking latch to slide toward the connection cavity, and the protrusion forces the corresponding lacking latch to radially slide until it is engaged with the lacking latch.

2. The coupling structure of claim 1, wherein the connection shaft is provided with at least one trimming plane, and the connection cavity is provided with limiting planes configured for matching with each trimming plane and configured for limiting the connection shaft to rotate around a central axis in the connection cavity.

3. The coupling structure of claim 2, wherein at least one of the protrusions is arranged on one of the trimming planes, and at least one of the lacking latches is arranged on one of the limiting planes.

4. The coupling structure of claim 1, wherein a lower limiting area is formed between the front end of the lacking latch protruded into the connection cavity and a bottom portion of the connection cavity and configured for receiving the protrusion.

5. The coupling structure of claim 1, wherein the connection shaft is provided with an upper limiting area located above the protrusion and configured for receiving the front end of the lacking latch protruding into the connection cavity.

6. The coupling structure of claim 1, wherein each of the protrusions and each of the lacking latches are in a wedge shape.

7. The coupling structure of claim 1, wherein an upper end surface and a lower end surface of the front end of each lacking latch protruding into the connection cavity are respectively provided with a chamfered arc surface.

8. The coupling structure of claim 1, wherein the protrusions are integrally formed on the connection shaft.

9. The coupling structure of any one of claims 1 to 8, wherein the first coupling component or the second

coupling component provided with the connection cavity is further provided with a mounting cavity, the mounting cavity is located at a side of the connection cavity and communicates with the connection cavity through a channel hole, the lacking latch is slidably connected in the channel hole, and the elastic member is abutted between a rear end of the lacking latch and an inner wall of the mounting cavity.

10. The coupling structure of claim 9, wherein the rear end of the lacking latch is provided with lugs configured for abutting against the inner wall of the mounting cavity to limit the lacking latch to completely slide into the connection cavity along the channel hole.

11. The coupling structure of claim 9, wherein the rear end of the lacking latch is further provided with limiting post, and the elastic member is sleeved outside the limiting post.

12. The coupling structure of claim 9, wherein the mounting cavity is an open cavity, and a sealing block is blocked at an opening of the open cavity.

13. A shaving device, comprising:

a cutter assembly; and
a handle assembly;
wherein the cutter assembly comprises at least one of the first coupling component or the second coupling component in the coupling structure of any one of claims 1-12, and the handle assembly comprises another of the first coupling component or the second coupling component in the coupling structure of any one of claims 1-12, the cutter assembly is connected with or separated from the handle assembly through connection of separation between the first coupling component and the second coupling component.

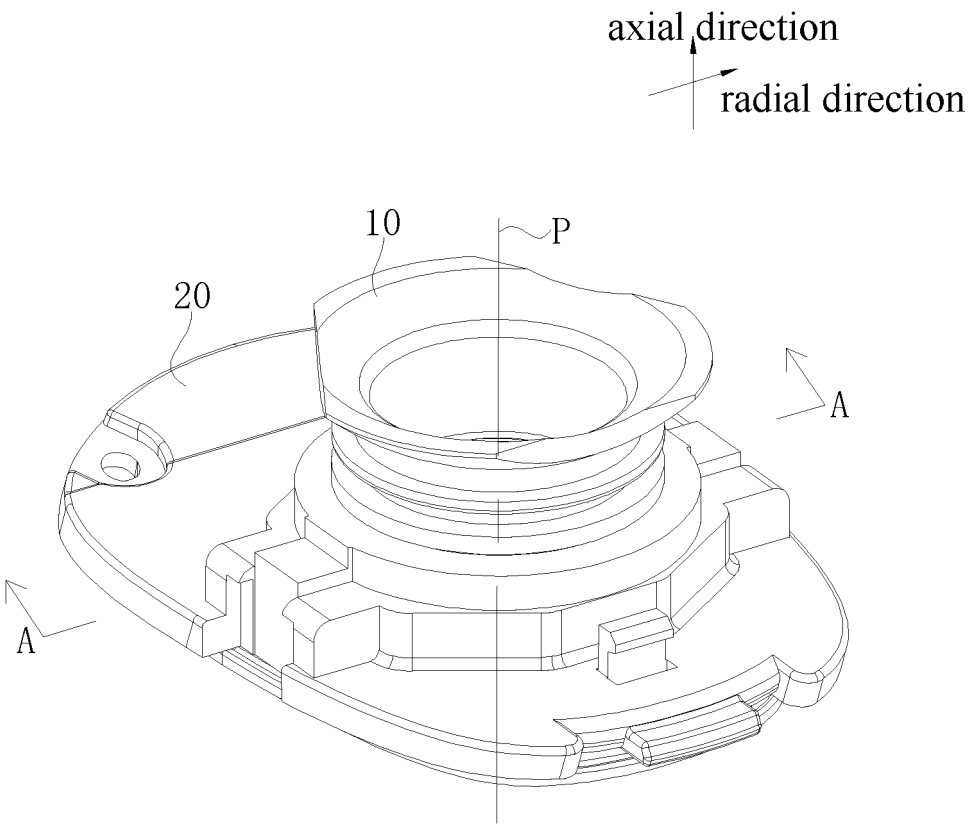

FIG. 1

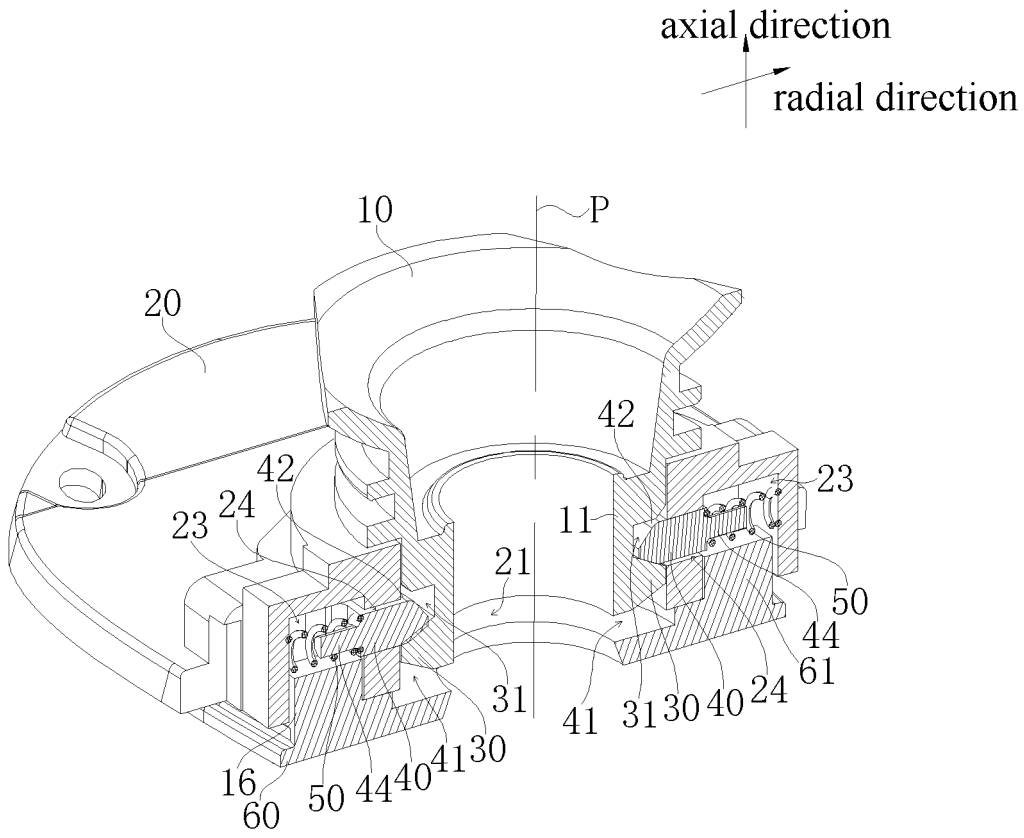
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FIG. 2

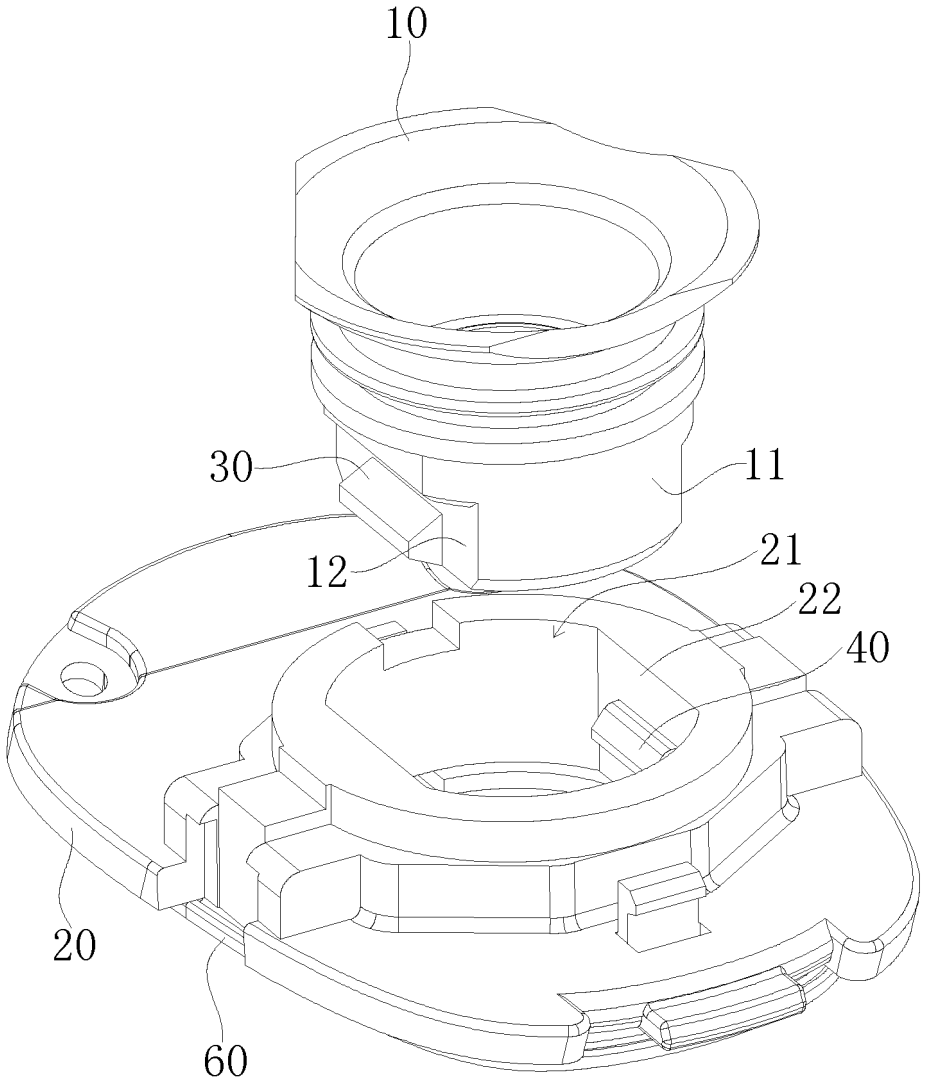

FIG. 3

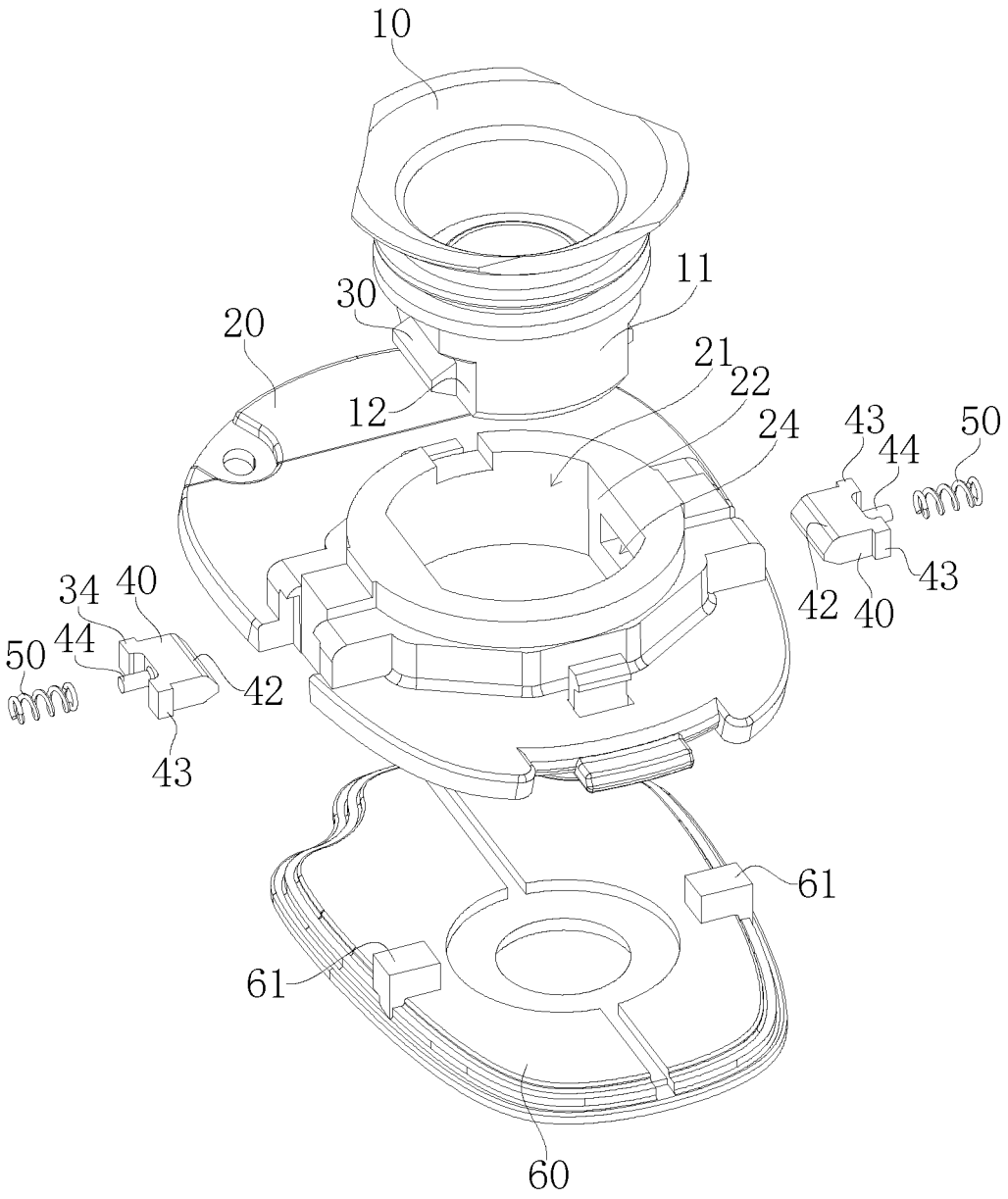

FIG. 4

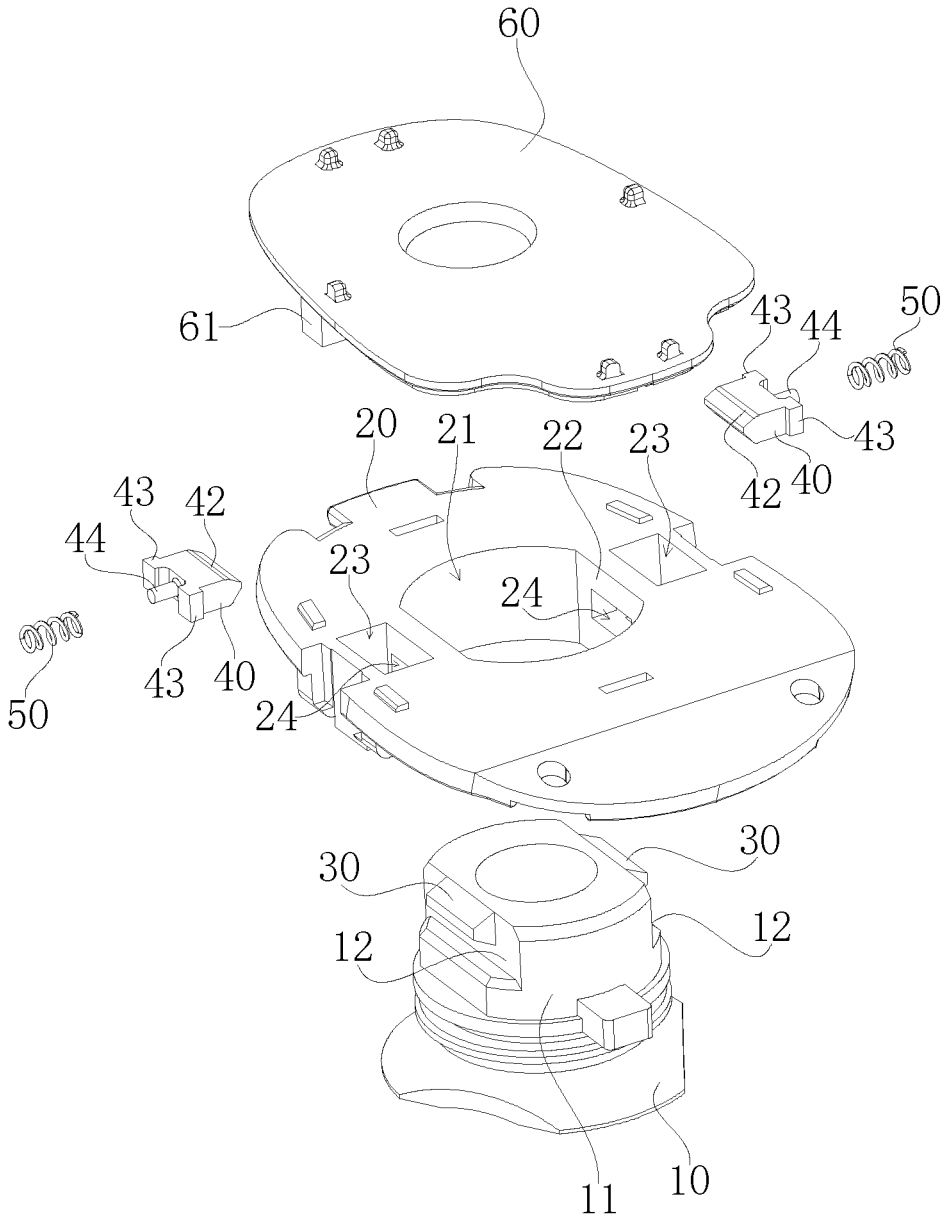
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FIG. 5

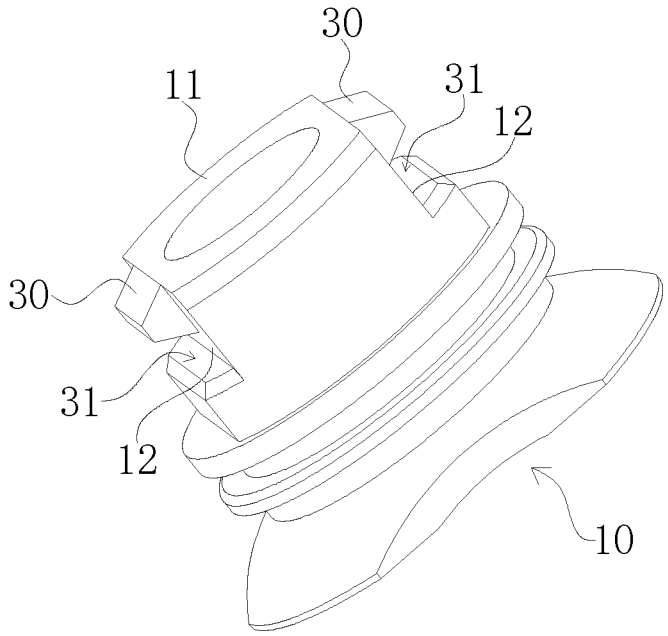

FIG. 6

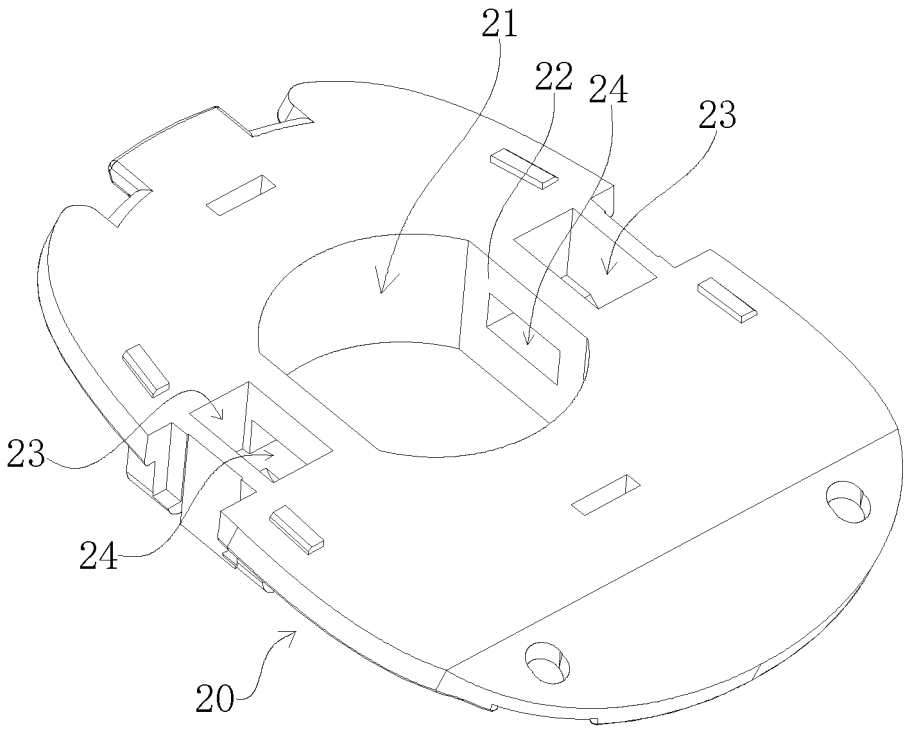

FIG. 7

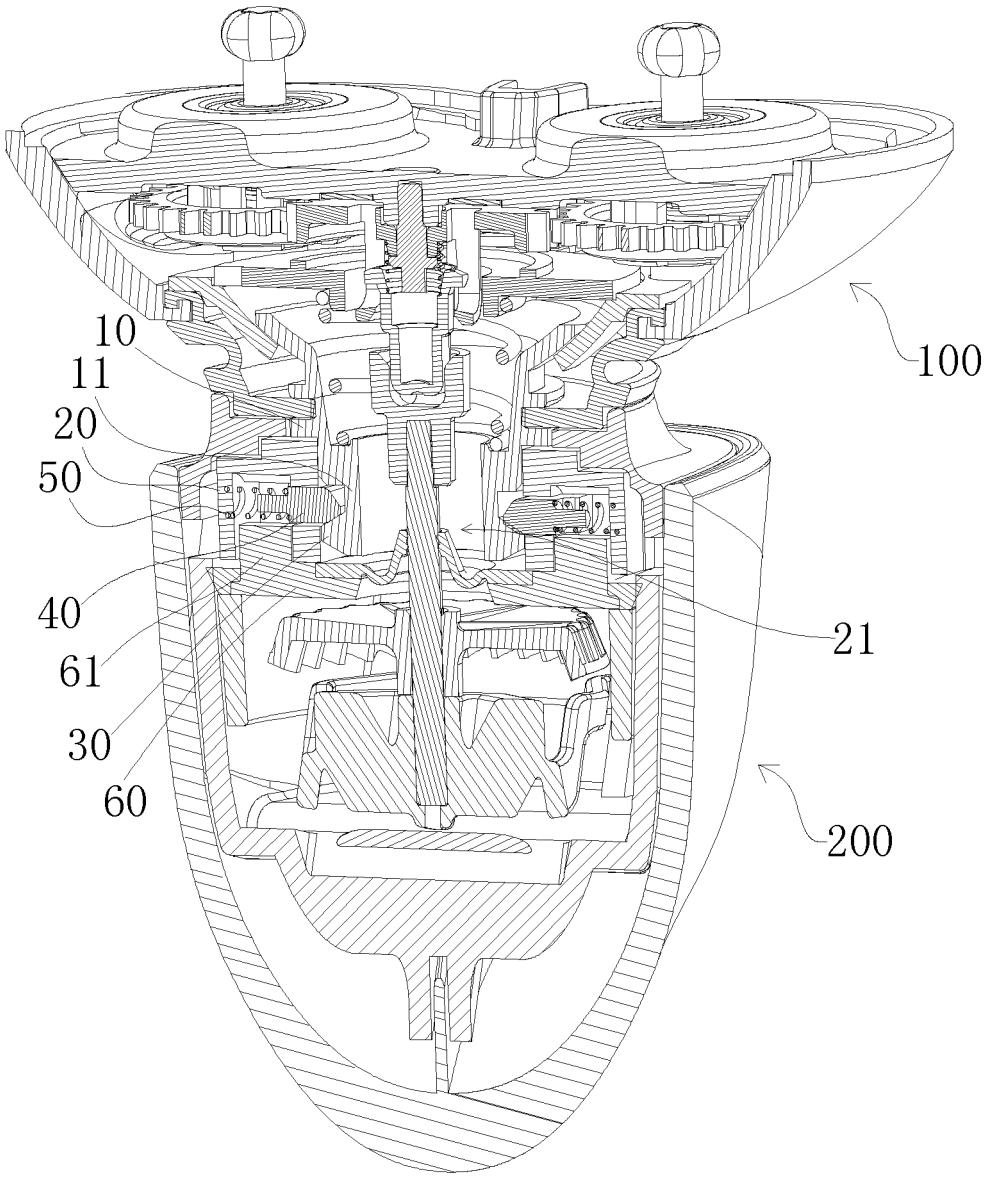

FIG. 8

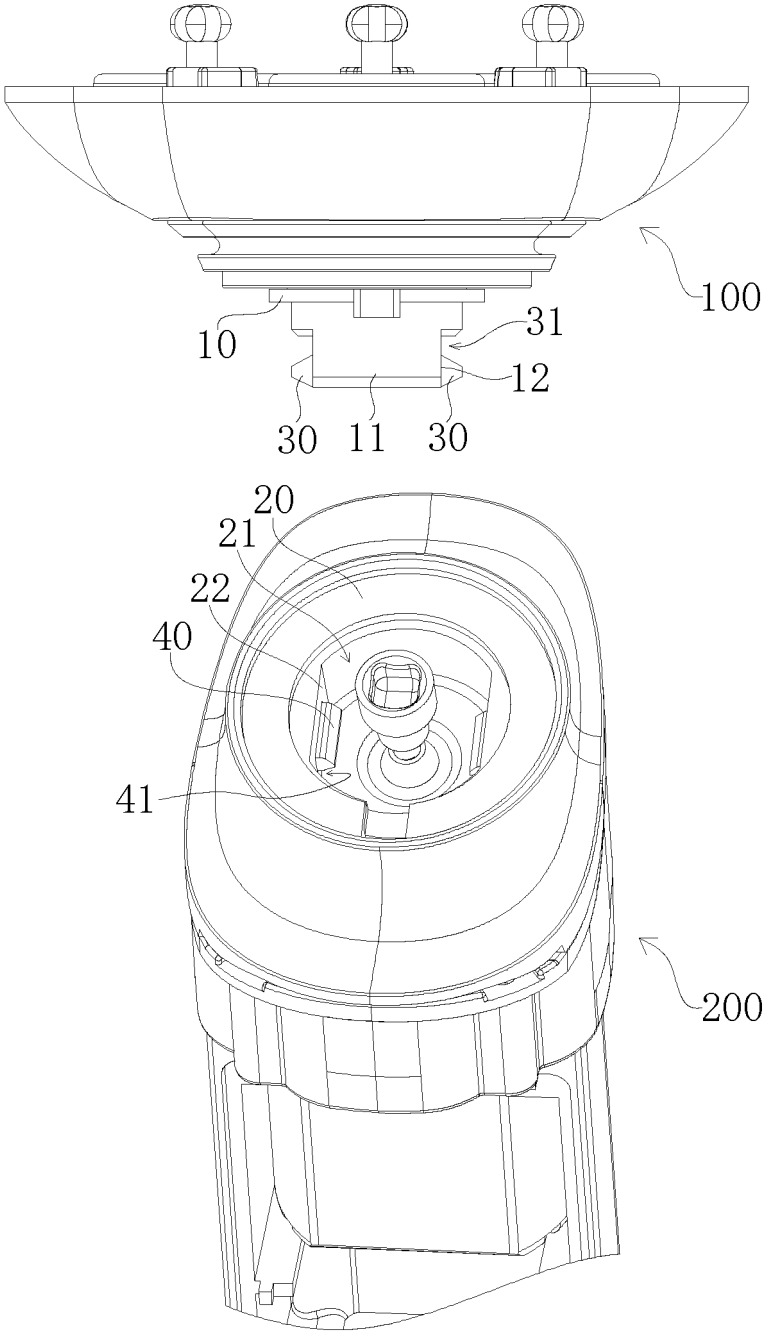

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/097222

A. CLASSIFICATION OF SUBJECT MATTER

B26B 19/14(2006.01)i; B26B 19/38(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B26B

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

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

CNABS, CNTXT, VEN, CNKI, DWPI, SIPOABS: 剃须, 刀头, 手柄, 联接, 连接, 耦合, 卡扣, 扣接, 拆卸, 弹性; shaver, cutter, handle, connect+, spring, elastic, buckle

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 207172152 U (SOOCAS SHENZHEN TECHNOLOGY CO., LTD. ET AL.) 03 April 2018 (2018-04-03) description, paragraphs 40-60, and figures 1-5	1-8, 13
A	CN 203887876 U (SHANGHAI POVOS ELECTRIC WORKS CO., LTD.) 22 October 2014 (2014-10-22) entire document	1-13
A	CN 203390959 U (SHANGHAI POVOS ELECTRIC WORKS CO., LTD.) 15 January 2014 (2014-01-15) entire document	1-13
A	CN 205969143 U (WANG, BAOHUA) 22 February 2017 (2017-02-22) entire document	1-13
A	CN 103707333 A (SHANGHAI POVOS ELECTRIC WORKS CO., LTD.) 09 April 2014 (2014-04-09) entire document	1-13
A	WO 2014110362 A1 (SPECTRUM BRANDS INC) 17 July 2014 (2014-07-17) entire document	1-13

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

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 March 2019	**25 April 2019**

Name and mailing address of the ISA/CN	Authorized officer
State Intellectual Property Office of the P. R. China (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/097222

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 207172152 U	03 April 2018	None	
CN 203887876 U	22 October 2014	None	
CN 203390959 U	15 January 2014	None	
CN 205969143 U	22 February 2017	None	
CN 103707333 A	09 April 2014	CN 103707333 B	16 September 2015
WO 2014110362 A1	17 July 2014	CN 104955621 A	30 September 2015
		US 2014196292 A1	17 July 2014
		US 9174349 B2	03 November 2015
		EP 2943319 A1	18 November 2015
		CA 2897176 A1	17 July 2014

Form PCT/ISA/210 (patent family annex) (January 2015)