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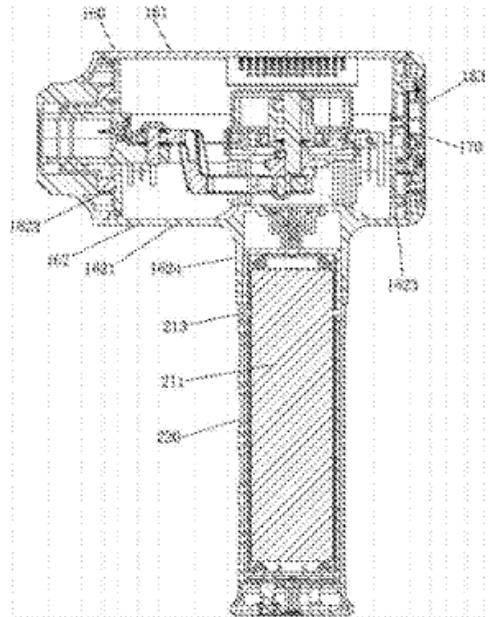
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(54) Name of invention

A Deep Myofascial Impact Massager and Massage Control Method

(57) Abstract

The present invention relates to a deep myofascial impact massager, comprising a main body and a massage structure located outside the main body, the main body comprising a housing, the housing being provided therein with a control system, a linkage structure, and a drive structure, the drive structure being connected to the control system and the linkage structure respectively, the linkage structure being connected to the massage structure, the linkage structure comprising an eccentric transmission wheel, a connecting rod, and a transmission shaft, the connecting rod being a Z-shaped connecting rod with one high end and one low end, the low end of the Z-shaped connecting rod being connected to the drive structure through the eccentric transmission wheel, the high end of the Z-shaped connecting rod being connected to the transmission shaft, the transmission shaft being connected to the massage structure, the drive structure driving the Z-shaped connecting rod to perform a reciprocating back-and-forth motion through the eccentric transmission wheel, and the Z-shaped connecting rod driving the massage structure to perform a reciprocating motion through the transmission shaft. The deep myofascial impact massager of the present invention has advantages such as a compact structure, long service life, low cost, and good safety performance.



1. A deep myofascial impact massager, comprising a main body and a massage structure located outside the main body, characterized in that: the main body comprises a housing, the housing being provided therein with a control system, a linkage structure, and a drive structure; the drive structure is connected to the control system and the linkage structure respectively; the linkage structure is detachably connected to the massage structure; the linkage structure comprises an eccentric transmission wheel, a connecting rod, and a transmission shaft; the connecting rod is a Z-shaped connecting rod with one high end and one low end; the low end of the Z-shaped connecting rod is connected to the drive structure through the eccentric transmission wheel; the high end of the Z-shaped connecting rod is connected to the transmission shaft; the transmission shaft is connected to the massage structure; the drive structure drives the Z-shaped connecting rod to perform a reciprocating back-and-forth motion through the eccentric transmission wheel; and the Z-shaped connecting rod drives the massage structure to perform a reciprocating motion through the transmission shaft.

2. The deep myofascial impact massager according to Claim 1, characterized in that: one side of the eccentric transmission wheel is provided with an upwardly protruding upper hollow mounting post, and the other side is provided with a downwardly protruding lower hollow mounting post; centerlines of the upper hollow mounting post and the lower hollow mounting post are not on the same vertical line; the upper hollow mounting post is connected to the drive structure; and the lower hollow mounting post is connected to the Z-shaped connecting rod.

3. The deep myofascial impact massager according to Claim 2, characterized in that: a side portion of the upper hollow mounting post is provided with a fastening mounting hole; and the eccentric transmission wheel is fixedly connected to the drive structure through a fastener at the fastening mounting hole.

4. The deep myofascial impact massager according to Claim 3, characterized in that: the drive structure comprises a mounting frame, a motor mounting plate, a drive motor, and a motor protective shell; the mounting frame is mounted inside the housing; the drive motor is mounted on the mounting frame through the motor mounting plate; a drive shaft of the drive motor extends into the upper hollow mounting post at the upper part of the eccentric transmission wheel; the motor protective shell is provided outside the drive motor; and mounting holes on the motor mounting plate are oblong mounting holes.

5. The deep myofascial impact massager according to Claim 1, characterized in that: the massage structure is a massage head; and the massage head is any one of a flat massage head, a round massage head, a fork-shaped massage head, a cone-shaped massage head, or a hot-compress massage head.

6. The deep myofascial impact massager according to Claim 1, characterized in that: the housing comprises a main body housing and a shaft housing structure; the main body housing comprises an upper shell and a lower shell connected via upper and lower snaps; the lower shell comprises a bottom shell and side mounting plates located on both sides of the bottom shell; and the lower shell is provided with a downwardly extending boss at a position corresponding to a vertical center of the drive motor.

7. The deep myofascial impact massager according to any one of Claims 1 to 6, characterized in that: the massager further comprises a battery structure for providing power to the drive structure and the massage structure; and the battery structure is detachably connected to the main body through the boss.

8. The deep myofascial impact massager according to Claim 7, characterized in that: the battery structure comprises a handheld housing, a battery assembly, a light guide plate, a circuit board, and a base; an outer periphery of the battery assembly is provided with a circle of outwardly protruding retaining ring; an upper portion of the retaining ring is detachably connected to the main body; a lower portion of the retaining ring is sleeved with the handheld housing; the circuit board and the light guide plate are disposed between the battery assembly and the base; the circuit board is provided with a power detection unit; the power detection unit is connected to the light guide plate; the bottom of the base is provided with a main power switch and a battery charging port; and the main power switch is connected to the circuit board in a contact-type manner.

9. The deep myofascial impact massager according to Claim 8, characterized in that: an outer circumferential surface of the light guide plate is flush with outer circumferential surfaces of the connected battery assembly and the base; an

upper surface of the light guide plate is provided with a circle of upwardly protruding mounting cylinder; and the circuit board is disposed within the mounting cylinder.

10. The massage control method for the deep myofascial impact massager according to Claims 1 to 9, characterized in that: the massage control method comprises a constant-speed mode, a fluctuating mode, a climbing mode, a static hot-compress mode, and a dynamic hot-compress mode;

In the constant-speed control method, the massage frequency is identical and the impact force of a single massage stroke is identical;

In the fluctuating control method, the massage frequency is identical, two adjacent massage strokes constitute a group, and the impact forces of the two massage strokes within the same group are different;

In the climbing control method, the massage frequency is identical, and the impact force of each massage stroke increases sequentially starting from the first stroke;

In the static hot-compress control method, the massage structure is a hot-compress massage head, the hot-compress massage head remains in a stationary state, and the impact massager is manually held to place the hot-compress massage head at a target position for static hot-compressing;

The dynamic hot-compress control method comprises three control methods: a constant-speed hot-compress control method, a fluctuating hot-compress control method, and a climbing hot-compress control method;

The aforementioned massage frequencies and impact forces are all preset via the control system; and with the exception of the static hot-compress control method, all the aforementioned control methods are multi-gear control modes.

A Deep Myofascial Impact Massager and Massage Control Method

Technical field

[0001] The present invention relates to the technical field of daily-life appliances, and specifically to a deep myofascial impact massager and a massage control method.

Prior art

[0002] Currently, existing myofascial impact massage guns or massagers include a drive structure, a linkage structure, and a massage structure.

[0003] The linkage structure is connected to the drive structure and the massage structure respectively; specifically, most connecting rods in the linkage structure are designed as straight rods. In the prior art, there are designs where a straight rod cooperates with a piston to form a piston-rod transmission structure, as well as designs where a crank, a movable slider, and a connecting rod cooperate to form a crank-linkage assembly (such as the disclosed text of Application Publication No. CN109481278A, titled Muscle Massage Device and Massager), which is driven by a drive structure to perform reciprocating motion for impacting and massaging muscles. When such piston-rod structures and crank-linkage structures are employed as transmission structures, they all suffer from defects such as a large main body volume, significant space consumption during carrying and transportation, and insufficient flexibility in use; meanwhile, during the reciprocating motion of the linkage structure, mating components are prone to wear, leading to deterioration and damage.

[0004] The power supply for the myofascial impact massage guns or massagers described above primarily takes one of the following two forms:

First, those without energy storage functions that directly use household power for charging. This power supply method brings great inconvenience to the user; when a user needs to relieve fatigue or exercise while outdoors, sufficient power becomes a major issue.

Second, those with a battery energy storage function where the battery structure and the main body are an integrated, non-detachable structure. When either the main body or the battery structure is damaged, the other becomes unusable and must be discarded, resulting in higher usage costs.

[0005] In addition, the two power supply methods described above share the following further deficiencies:

1. Neither incorporates a prominent power indicator. After operating the device for a period of time, the user has no means of knowing the current charge status, which causes significant inconvenience.

[0006] 2. The power switches are all disposed on the main body. During use, once the power switch on the main body is turned off, the battery structure portion is prone to leakage and power loss.

Content of the invention

[0007] To address the foregoing technical problems, the present invention provides a deep myofascial impact massager and a massage control method characterized by a compact main body structure, small volume, reduced wear, improved aesthetic appearance, and enhanced safety.

[0008] To achieve the above objectives, the following technical solutions are implemented.

[0009] A deep myofascial impact massager, comprising a main body and a massage structure located outside the main body, the main body comprising a housing, the housing being provided therein with a control system, a linkage structure, and a drive structure, the drive structure being connected to the control system and the linkage structure respectively, the linkage structure being detachably connected to the massage structure, the linkage structure comprising an eccentric transmission wheel, a connecting rod, and a transmission shaft, the connecting rod being a Z-shaped connecting rod with one high end and one low end, the low end of the Z-shaped connecting rod being connected to the drive structure through the eccentric transmission wheel, the high end of the Z-shaped connecting rod being connected to the transmission shaft, the transmission shaft being connected to the massage structure, the drive structure driving the Z-shaped connecting rod to perform a reciprocating back-and-forth motion through the eccentric transmission wheel, and the Z-shaped connecting rod driving the massage structure to perform a reciprocating motion through the transmission shaft. Through the arrangement of the linkage structure, the drive structure, and the massage structure, the deep myofascial impact massager of the present invention connects the drive structure and the massage structure via the linkage structure, enabling the drive structure to drive the massage structure in a reciprocating motion for massage through this linkage structure.

Therein, the linkage structure is primarily composed of the eccentric transmission wheel, the connecting rod, and the transmission shaft, featuring few components and a simple structure; the linkage structure adopts a Z-shaped connecting rod designed with one low end and one high end, with the low end connected to the drive structure through the eccentric transmission wheel. Once installed, the drive structure is located within the main body housing without protruding therefrom, allowing the top of the main body housing to be configured flush, resulting in a more compact structure and smaller volume for the main body; because the top of the main body housing is flush after installation, the overall appearance of the main body is more aesthetic.

[0010] Further, the massage structure is a massage head, which is any one of a flat massage head, a round massage head, a fork-shaped massage head, a cone-shaped massage head, or a hot-compress massage head. The massage head is detachably connected to the transmission shaft in the linkage structure, and the transmission shaft is a hollow transmission shaft. The interior of the hollow transmission shaft is provided with at least two circles of grooves. The massage head comprises a body and a massage rod, the outer contour of the massage rod matches the hollow portion of the hollow transmission shaft, and the massage rod is provided with a protruding ring that matches the grooves. The massage rod is made of an elastic material.

[0011] Further, one side of the eccentric transmission wheel is provided with an upwardly protruding upper hollow mounting post, and the other side is provided with a downwardly protruding lower hollow mounting post. The centerlines of the upper hollow mounting post and the lower hollow mounting post are not on the same vertical line. The upper hollow mounting post is connected to the drive structure, and the lower hollow mounting post is connected to the Z-shaped connecting rod. The upper hollow mounting post is provided to seat the drive structure and reinforce the connection between the drive structure and the eccentric transmission wheel; the lower hollow mounting post is provided to receive the low end of the connecting rod and reinforce the connection between the eccentric transmission wheel and the connecting rod.

[0012] Further, a side portion of the upper hollow mounting post is provided with a fastening mounting hole. The eccentric transmission wheel is fixedly connected to the drive structure through a fastener at the fastening mounting hole. After the drive shaft on the drive structure is inserted into the upper hollow mounting post, the eccentric transmission wheel and the drive shaft are locked together via the fastener, further strengthening the stability of the connection between the eccentric transmission wheel and the drive structure.

[0013] Further, the drive structure comprises a mounting frame, a motor mounting plate, a drive motor, and a motor protective shell. The mounting frame is mounted inside the housing, and the drive motor is mounted on the mounting frame through the motor mounting plate. A drive shaft of the drive motor extends into the upper hollow mounting post at the upper part of the eccentric transmission wheel, and the motor protective shell is provided outside the drive motor.

[0014] Further, the mounting holes on the motor mounting plate are oblong mounting holes, facilitating fine adjustment of the drive motor's position so that the drive motor installation is more precise.

[0015] Further, the housing comprises a main body housing and a shaft housing. The main body housing comprises an upper shell and a lower shell connected via upper and lower snaps. The lower shell comprises a bottom shell and side mounting plates located on both sides of the bottom shell. The lower shell is provided with a downwardly extending boss at a position corresponding to the vertical center of the drive motor, and the boss is sleeved over the upper portion of the battery housing above the retaining ring.

[0016] Further, a shaft guide sleeve is sleeved outside the transmission shaft, and at least one circle of oil guide groove is provided inside the shaft guide sleeve. An oil guide groove is provided within the shaft guide sleeve and filled with lubricating oil during assembly; as the transmission shaft undergoes reciprocating motion along the inner side of the shaft guide sleeve, the lubricating oil reduces friction, thereby lowering friction loss and extending product service life.

[0017] Further, a shaft housing is provided outside the shaft guide sleeve, and a guide sleeve jacket is provided between the shaft housing and the shaft guide sleeve, with the guide sleeve jacket being sleeved over the exterior of the shaft guide sleeve. The shaft housing disposed outside the shaft guide sleeve protects the transmission shaft and the shaft guide sleeve, while enclosing the transmission shaft, the shaft guide sleeve, and their associated components within the shaft housing to present a clean appearance.

[0018] Further, the guide sleeve jacket is made of a soft material, preferably a guide sleeve jacket made of a soft plastic material. Being sleeved over the exterior of the shaft guide sleeve, the guide sleeve jacket serves on one hand to protect and stabilize the shaft guide sleeve, and on the other hand to provide vibration damping and noise reduction during the reciprocating motion of the transmission shaft within the shaft guide sleeve.

[0019] The massager further comprises a battery structure for providing power to the drive structure and the massage structure, the battery structure being detachably connected to the main body through the boss. The battery structure

comprises a handheld housing, a battery assembly, a light guide plate, a circuit board, and a base, and the exterior of the battery assembly is provided with a circle of an outwardly protruding retaining ring. Specifically, the battery assembly comprises a lithium-ion battery located within a battery housing, the exterior of the battery housing is provided with a circle of the outwardly protruding retaining ring, the upper portion of the retaining ring is detachably connected to the main body, and the lower portion of the retaining ring is sleeved with the handheld housing. The arrangement of the retaining ring facilitates the abutment of the main body connected at the upper part and the handheld housing connected at the lower part. A circuit board and a light guide plate are provided between the battery assembly and the base; the circuit board is provided with a power detection unit, and the power detection unit is connected to the light guide plate. The bottom of the base is provided with a main power switch and a battery charging port, and the main power switch is connected to the circuit board in a contact-type manner. This battery structure is detachably connected to the main body; if a component in either the main body or the battery structure is damaged, only that part needs to be replaced, eliminating the need to discard the entire impact massager and effectively saving usage costs. At the same time, by providing a light guide plate between the battery assembly and the base and connecting the light guide plate to the power detection unit, when the power detection unit detects the current battery level, it feeds the information back to the control system. Upon receiving the battery feedback information, the control system issues color and brightness instructions to the light guide plate, which then displays different colors based on the battery level and instructions, serving to remind the user of the current product power level and greatly facilitating user operation. The arrangement of an anti-slip portion on the exterior of the handheld housing makes the product easy to hold and prevents it from slipping during use, which both facilitates use and effectively protects the product from damage due to falling.

[0020] Further, the outer circumferential surface of the light guide plate is flush with the outer circumferential surfaces of the connected battery assembly and the base; the upper surface of the light guide plate is provided with a circle of an upwardly protruding mounting cylinder, and the circuit board is disposed within the mounting cylinder.

[0021] Further, a mounting gasket is provided within the base, and the mounting gasket is made of a rubber pad. The rubber pad mounting gasket protects the light guide plate from impact or damage by the base during installation, thereby ensuring product quality. The bottom of the base is provided with a main power switch and a battery charging port, and the main power switch is connected to the circuit board in a contact-type manner. Both the main power switch and the charging port are disposed on the base of the battery structure; after the main power switch is turned off, both the main body and the battery structure are in a power-off state. No residual power or leakage will occur in the battery structure, effectively avoiding the leakage issues found in prior art products after the switch is turned off, further ensuring the safety of product use.

[0022] Further, the lower shell of the main body is provided with an elastic button assembly, which comprises a button, a downwardly extending first inverted buckle, and a spring abutting against a side portion of the inverted buckle; the button is assembled onto the first inverted buckle from the exterior of the lower shell, and the inner side of the first inverted buckle is provided with a spring abutting against internal components of the main body. The arrangement of the elastic button assembly facilitates the connection between the battery structure and the main body. The top center position of the battery housing is provided with an upwardly protruding battery assembly hollow mounting post, and one side of the top of the battery housing is provided with an upwardly extending second inverted buckle, which cooperates and connects with the first inverted buckle in the elastic button assembly.

[0023] The connection and disassembly between the battery structure and the main body are extremely simple and convenient for the user to operate; the specific operation methods are as follows:

When the battery structure needs to be connected to the main body, the battery housing of the battery structure is inserted from bottom to top into the boss on the main body, such that the portion of the battery housing above the retaining ring fully enters the boss; alternatively, the boss of the main body is aligned with the battery housing of the battery structure, and the boss is sleeved onto the battery housing from top to bottom. During the mating and connection process, the second inverted buckle extending upward from the top of the battery housing cooperates with the first inverted buckle extending downward from the elastic button assembly disposed within the main body; utilizing the wedge principle, they cooperate under external force to form a stable inverted buckle connection.

[0024] When it is necessary to disassemble the battery structure from the main body, the button in the elastic button assembly is pressed by external force, and the button drives the first inverted buckle in the assembly to move inward. When the first inverted buckle completely disengages from the second inverted buckle, the battery structure is removed from the boss, completing the disassembly.

[0025] The massage control method for the deep myofascial impact massager described above comprises constant-speed, fluctuating, climbing, static hot-compress, and dynamic hot-compress control methods, wherein:

In the constant-speed control method, the massage frequency is identical and the impact force of a single massage stroke is identical; under this control mode, during the massage motion of the product, it continuously operates at a single identical frequency preset by the control system until the massage ends; this constant-speed control mode utilizes a specific icon as the constant-speed mode indicator;

In the fluctuating control method, the massage frequency is identical, two adjacent massage strokes constitute a group, and the impact forces of the two massage strokes within the same group are different; under this control mode, during the massage motion of the product, it operates in a cycle between two different frequencies, high and low, preset by the control system; specifically, after operating in a high-frequency state for a period of time, it switches to a low-frequency state for an identical period of time, and then switches back to the high-frequency state for a period of time, cycling in this manner until the massage ends; this fluctuating control mode utilizes a specific icon as the fluctuating mode indicator;

In the climbing control method, the massage frequency is identical, and the impact force of each massage stroke increases sequentially starting from the first stroke; under this control mode, during the massage motion of the product, the frequency operates in an increasing manner as preset by the control system, cycling every 3 to 5 minutes; that is, after the product starts operation, the frequency becomes increasingly higher, and when the cycle period preset by the control system is reached, the frequency resets from low to high; this cycle continues until the massage ends; this climbing control mode utilizes a specific icon as the climbing mode indicator;

In the static hot-compress control method, the massage structure is a hot-compress massage head, the hot-compress massage head remains in a stationary state, and the impact massager is manually held to place the hot-compress massage head at a target position for static hot-compressing; under this control mode, the massage head in the massage structure is a hot-compress massage head, and during the working process, only the heating function of the hot-compress massage head is activated while the motor remains inactive, being used solely for hot-compress massage; this mode utilizes a specific icon as its indicator;

The dynamic hot-compress control method comprises three control methods: a constant-speed hot-compress control method, a fluctuating hot-compress control method, and a climbing hot-compress control method; that is, during this hot-compress massage, the constant-speed, fluctuating, and climbing motion mode buttons under the motion function mode key are activated to start the motor, performing kinetic massage simultaneously with the hot compress;

The foregoing massage frequencies and impact forces are all preset via the control system; and with the exception of the static hot-compress control method, all of the foregoing control methods are multi-gear control modes.

[0026] The hot-compress massage head comprises a base, an upper cover, a temperature regulating plate, a heat sink, and a first conductive member. The upper cover and the base are buckled together to form a space; the base is provided with a first fixing groove, and the heat sink is disposed within the first fixing groove; the upper cover is provided with a second fixing groove opposite to the first fixing groove, and the temperature regulating plate is disposed within the second fixing groove. The base is provided with an outwardly extending connection portion, and the first conductive member is fixedly disposed within the connection portion. The first conductive member comprises a first fixing plate and a conductive contact; the conductive contact is fixedly disposed on the first fixing plate, and two ends of the conductive contact respectively extend out from two side surfaces of the first fixing plate. The temperature regulating plate is provided with a lead wire, which is electrically connected to the conductive contact. A distance between a surface of the temperature regulating plate and a surface of the heat sink is 0.1 mm to 0.2 mm. The hot-compress massage head is fixed by connecting the connection portion to a sleeve, and then the temperature regulating plate is connected to a power source by connecting the first conductive member to a second conductive member of a connection seat, which facilitates the disassembly and replacement of the hot-compress head and makes the use of the hot-compress massage head more flexible and convenient. Heat is dissipated by providing the heat sink to avoid overheating. A gap of 0.1 mm to 0.2 mm is provided between the surface of the temperature regulating plate and the surface of the heat sink to ensure normal heat conduction and heat dissipation while preventing the heat sink from expanding due to heat and squeezing the temperature regulating plate, thereby extending the service life of the hot-compress head.

[0027] Compared with the prior art, the deep myofascial impact massager and the massage control method of the present invention provide the following beneficial effects:

First, compact structure. In the linkage structure of the deep myofascial impact massager of the present invention, the connecting rod is designed as a Z-shaped rod with one low end and one high end, and the low end of the connecting rod is connected to the drive structure through the eccentric transmission wheel. After installation, the drive structure is located within the main body housing and does not protrude therefrom, allowing the top of the main body housing to be configured flush, which results in a more compact structure and smaller volume for the main body.

Second, long service life. Oil guide grooves are provided within the shaft guide sleeve and filled with lubricating oil during assembly; as the transmission shaft undergoes reciprocating motion along the inner side of the shaft guide sleeve, the lubricating oil reduces friction, thereby lowering friction loss and extending product service life.

Third, aesthetic appearance. The linkage structure and the drive structure are both disposed within the main body housing, and one end of the main body housing is joined with the shaft housing enclosing the shaft guide sleeve. The shaft housing protects the transmission shaft and the shaft guide sleeve while concealing them and their associated components. Furthermore, since the drive structure does not protrude after installation, the top of the main body housing is flush, resulting in a more aesthetic overall appearance.

Fourth, high safety performance. The main power switch and the charging port are both disposed on the base of the battery structure. After the main power switch is turned off, both the main body and the battery structure are in a power-off state; no residual power or leakage will occur in the battery structure. This effectively avoids the leakage issues found in prior art products after the switch is turned off, further ensuring the safety of product use.

Fifth, prominent power display function and enhanced convenience. A light guide plate is provided between the battery assembly and the base and is connected to the power detection unit. When the power detection unit detects the current battery level, it feeds the information back to the control system. Upon receiving the battery feedback information, the control system issues color and brightness instructions to the light guide plate, which then displays different colors based on the battery level and instructions, serving to remind the user of the current power level and greatly facilitating user operation.

Sixth, wide range of application. The massage head is detachably connected to the transmission shaft in the linkage structure; during use, users can select an appropriate massage head to connect to the main body according to their own needs, providing a wide range of choices. Moreover, this technical solution offers multiple functional modes, including constant-speed, fluctuating, climbing, hot-compress, and dynamic hot-compress modes, meeting the needs of different user groups.

Brief description of the drawings

[0028] Figure 1 is a schematic assembly view of Embodiment 1 of the deep myofascial impact massager of the present invention;

Figure 2 is a structural schematic view of the round massage head in Figure 1;

Figure 3 is a schematic assembly view of the linkage structure in the deep myofascial impact massager of the present invention;

Figure 4 is an exploded schematic view of the linkage structure in the deep myofascial impact massager of the present invention;

Figure 5 is a schematic cross-sectional view of the connection between the transmission shaft and the shaft housing in Figure 4;

Figure 6 is a schematic cross-sectional view of the linkage structure installed within the main body in Figure 4;

Figure 7 is a first perspective structural view of the battery structure in the deep myofascial impact massager of the present invention;

Figure 8 is a second perspective structural view of the battery structure in the deep myofascial impact massager of the present invention;

Figure 9 is an exploded schematic view of the battery structure in the deep myofascial impact massager of the present invention;

Figure 10 is a schematic cross-sectional view after the battery structure and the main body of the deep myofascial impact massager of the present invention are connected;

Figure 11 is a perspective structural schematic view of the main body housing in Figure 10;

Figure 12 is a structural schematic view of the elastic button assembly on the main body in Figure 11;

Figure 13 is a structural schematic view of the fork-shaped massage head of the deep myofascial impact massager of the present invention;

Figure 14 is a structural schematic view of the flat massage head of the deep myofascial impact massager of the present invention;

Figure 15 is a structural schematic view of the cone-shaped massage head of the deep myofascial impact massager of the present invention;

Figure 16 is a structural schematic view of the hot-compress massage head of the deep myofascial impact massager of the present invention;

Figure 17 is a schematic assembly view of the deep myofascial impact massager equipped with a hot-compress massage head;

Figure 18 is a schematic view of the internal structure in Figure 17 with the main body housing and battery structure removed;

Figure 19 is an exploded structural schematic view of the hot-compress massage head of the deep myofascial impact massager of the present invention.

[0029] Figure 20 is a structural schematic view of the upper cover of the hot-compress massage head of the deep myofascial impact massager of the present invention;

[0030] Figure 21 is a structural schematic view of the first conductive member of the hot-compress massage head of the deep myofascial impact massager of the present invention;

[0031] Figure 22 is an exploded structural schematic view of the connection structure of the hot-compress massage head of the deep myofascial impact massager of the present invention;

[0032] Figure 23 is a structural schematic view of the second conductive member of the connection structure of the hot-compress massage head of the deep myofascial impact massager of the present invention.

Detailed description of embodiments

[0033] The deep myofascial impact massager and the massage control method of the present invention will be further described in detail below in conjunction with specific embodiments and the accompanying drawings.

[0034] Embodiment 1

As shown in Figures 1 to 12, a deep myofascial impact massager comprises a main body 100 and a massage structure 300 located outside the main body 100. The main body 100 comprises a housing 160, within which a control system, a linkage structure, and a drive structure 110 are provided. The drive structure 110 is connected to the control system and the linkage structure respectively. The linkage structure is detachably connected to the massage structure 300 and comprises an eccentric transmission wheel 140, a connecting rod 120, and a transmission shaft 130. The connecting rod 120 is a Z-shaped connecting rod 120 having a high end and a low end. The low end 122 of the Z-shaped connecting rod 120 is connected to the drive structure 110 through the eccentric transmission wheel 140, and the high end 121 of the Z-shaped connecting rod 120 is connected to the transmission shaft 130. The transmission shaft 130 is connected to the massage structure 300. The drive structure 110 drives the Z-shaped connecting rod 120 to perform reciprocating back-and-forth motion through the eccentric transmission wheel 140, and the Z-shaped connecting rod 120 drives the massage structure 300 to perform reciprocating motion via the transmission shaft 130. By arranging the linkage structure, drive structure 110, and massage structure 300, the deep myofascial impact massager of the present invention utilizes the linkage structure to connect the drive structure 110 and the massage structure 300, enabling the drive structure 110 to drive the massage structure 300 in a reciprocating motion for massage. The linkage structure is primarily composed of the eccentric transmission wheel 140, the connecting rod 120, and the transmission shaft 130, featuring few components and a simple structure. The linkage structure adopts a Z-shaped connecting rod 120 designed with one low end and one high end; the low end 122 is connected to the drive structure 110 via the eccentric transmission wheel 140. Once installed, the drive structure 110 is located within the housing 160 of the main body 100 without protruding therefrom, allowing the top of the housing 160 to be flush. This makes the structure of the main body 100 more compact and smaller in volume; additionally, the flush setting makes the overall appearance of the main body 100 more aesthetic.

[0035] As shown in Figures 1 and 2, the massage structure 300 is a massage head, specifically a round massage head. The massage head is detachably connected to the transmission shaft 130 in the linkage structure. The transmission shaft 130 is a hollow transmission shaft, and an interior of the hollow transmission shaft 130 is provided with at least two annular grooves. The massage head comprises a body and a massage rod. An outer contour of the massage rod is matched with a hollow portion of the hollow transmission shaft 130, and the massage rod is provided with protruding rings matched with the annular grooves. The massage rod is made of an elastic material.

[0036] As shown in Figures 13 to 16, in addition to the round massage head described above, the massage head can also be any one of a flat massage head, a fork-shaped massage head, a cone-shaped massage head, or a hot-compress massage head.

[0037] As shown in Figure 3 and Figure 4, one side of the eccentric transmission wheel 140 is provided with an upwardly protruding upper hollow mounting post 141, and the other side is provided with a downwardly protruding lower hollow mounting post 142. The centerlines of the upper hollow mounting post 141 and the lower hollow mounting post 142 are

not on the same vertical line. The upper hollow mounting post 141 is connected to the drive structure 110, and the lower hollow mounting post 142 is connected to the Z-shaped connecting rod 120. The upper hollow mounting post 141 seats the drive structure 110 and reinforces the connection between the drive structure 110 and the eccentric transmission wheel 140; the lower hollow mounting post 142 receives the low end 122 of the connecting rod 120 and reinforces the connection between the eccentric transmission wheel 140 and the connecting rod 120. A side portion of the upper hollow mounting post 141 is provided with a fastening mounting hole 114143. The eccentric transmission wheel 140 is fixedly connected to the drive structure 110 through a fastener 113 at the fastening mounting hole 114143. After the drive shaft 112 on the drive structure 110 is inserted into the upper hollow mounting post 141, the eccentric transmission wheel 140 and the drive shaft 112 are locked together via the fastener 113, further strengthening the stability of the connection between the eccentric transmission wheel 140 and the drive structure 110.

[0038] As shown in Figure 3 and Figure 4, the drive structure 110 comprises a mounting frame 150, a motor mounting plate 115, a drive motor 111, and a motor protective shell 116. The mounting frame 150 is mounted inside the housing 160, and the drive motor 111 is mounted on the mounting frame 150 through the motor mounting plate 115. The drive shaft 112 of the drive motor 111 extends into the upper hollow mounting post 141 at the upper part of the eccentric transmission wheel 140, and the motor protective shell 116 is provided outside the drive motor 111. The mounting holes 114 on the motor mounting plate 115 are oblong mounting holes 114, facilitating fine adjustment of the position of the drive motor 111 so that the installation of the drive motor 111 is more precise.

[0039] As shown in Figure 5, Figure 6, and Figure 11, the housing 160 comprises a main body 100 housing 160 and a shaft housing 135. The main body 100 housing 160 comprises an upper shell 161 and a lower shell 162 connected via upper and lower snaps. The lower shell 162 comprises a bottom shell 1621 and side mounting plates located on both sides of the bottom shell 1621, namely a left mounting plate 1622 located on the left side of the bottom shell 1621 and a right mounting plate 1623 located on the right side of the bottom shell 1621. The lower shell 162 is provided with a downwardly extending boss 1624 at a position corresponding to the vertical center of the drive motor 111, and the boss 1624 is sleeved over the upper portion of the battery housing located above the retaining ring 213.

[0040] As shown in Figure 5, Figure 6, Figure 10, and Figure 11, a shaft guide sleeve 132 is sleeved outside the transmission shaft 130, and at least one circle of oil guide groove 133 is provided inside the shaft guide sleeve 132. The oil guide groove 133 is filled with lubricating oil during assembly; as the transmission shaft 130 undergoes reciprocating motion along the inner side of the shaft guide sleeve 132, the lubricating oil reduces friction, thereby lowering friction loss and extending product service life. A shaft housing 135 is provided outside the shaft guide sleeve 132, and a guide sleeve jacket 134 is provided between the shaft housing 135 and the shaft guide sleeve 132, with the guide sleeve jacket 134 being sleeved over the exterior of the shaft guide sleeve 132. The shaft housing 135 disposed outside the shaft guide sleeve 132 protects the transmission shaft 130 and the shaft guide sleeve 132, while enclosing the transmission shaft 130, the shaft guide sleeve 132, and their associated components within the shaft housing 135 to present a clean appearance. The guide sleeve jacket 134 is made of a soft material, preferably a guide sleeve jacket 134 made of a soft plastic material. Being sleeved over the exterior of the shaft guide sleeve 132, the guide sleeve jacket 134 serves on one hand to protect and stabilize the shaft guide sleeve 132, and on the other hand to provide vibration damping and noise reduction during the reciprocating motion of the transmission shaft 130 within the shaft guide sleeve 132.

[0041] As shown in Figures 1 and 6 to 12, the massager further comprises a battery structure 200 for providing power to the drive structure 110 and the massage structure 300. The battery structure 200 is detachably connected to the main body 100 through the boss 1624. The battery structure 200 comprises a handheld housing 220, a battery assembly 210, a light guide plate 230, a circuit board 250, and a base 240. The exterior of the battery assembly 210 is provided with a circle of an outwardly protruding retaining ring 213. Specifically, the battery assembly 210 comprises a lithium-ion battery 211 located within a battery housing, which consists of a left battery shell 212 and a right battery shell 215 buckled together. The upper portion of the retaining ring 213 is detachably connected to the main body 100, and the lower portion is sleeved with the handheld housing 220. The arrangement of the retaining ring 213 facilitates the abutment of the main body 100 connected at the upper part and the handheld housing 220 connected at the lower part. The exterior of the handheld housing 220 is provided with an anti-slip portion 221, which may utilize inclined or spiral uneven surfaces, or other common anti-slip structures. A circuit board 250 and a light guide plate 230 are provided between the battery assembly 210 and the base 240. The circuit board 250 is provided with a power detection unit connected to the light guide plate 230. The bottom of the base 240 is provided with a main power switch 241 and a battery charging port 242, with the main power switch 241 being connected to the circuit board 250 in a contact-type manner. This battery structure 200 is detachably connected to the main body 100; if a component in either the main body 100 or the battery structure 200 is damaged, only that part needs to be replaced, eliminating the need to discard the entire impact massager and effectively saving usage costs. Simultaneously, by providing a light guide plate 230 between the battery assembly 210 and the base 240 and connecting

it to the power detection unit, when the current battery level is detected, the information is fed back to the control system. Upon receiving the battery feedback, the control system issues color and brightness instructions to the light guide plate 230, which displays different colors based on the battery level, serving to remind the user of the current power status and greatly facilitating use. The anti-slip portion 221 on the handheld housing 220 makes the product easy to hold and prevents slipping, facilitating use while protecting the product from damage due to falls. The outer circumferential surface of the light guide plate 230 is flush with the outer circumferential surfaces of the connected battery assembly 210 and the base 240. The upper surface of the light guide plate 230 is provided with a circle of an upwardly protruding mounting cylinder 231, within which the circuit board 250 is disposed. A mounting gasket 243 made of a rubber pad is provided within the base 240 to protect the light guide plate 230 from collisions or damage during installation, ensuring product quality. Since both the main power switch 241 and the battery charging port 242 are disposed on the base 240 of the battery structure 200, turning off the main power switch 241 ensures that both the main body 100 and the battery structure 200 are in a power-off state. No residual power or leakage will occur in the battery structure 200, effectively avoiding the leakage issues found in prior art products after shutdown and further ensuring the safety of product use.

[0042] As shown in Figure 9, Figure 11, and Figure 12, an elastic button assembly 180 is provided on the lower shell 162 of the main body 100. The elastic button assembly 180 comprises a button 181, a downwardly extending first inverted buckle 182, and a spring 183 abutting against a side portion of the inverted buckle. The button is assembled onto the first inverted buckle 182 from the exterior of the lower shell 162, and the inner side of the first inverted buckle 182 is provided with a spring 183 abutting against internal components of the main body 100. The arrangement of the elastic button assembly 180 facilitates the connection between the battery structure 200 and the main body 100. The top center position of the battery housing is provided with an upwardly protruding battery assembly hollow mounting post 214, and one side of the top of the battery housing is provided with an upwardly extending second inverted buckle 216, which cooperates and connects with the first inverted buckle 182 in the elastic button assembly 180.

[0043] The connection and disassembly between the battery structure 200 and the main body 100 are extremely simple and convenient for the user to operate; the specific operation methods are as follows:

Connection: When the battery structure 200 needs to be connected to the main body 100, the battery housing of the battery structure 200 is inserted from bottom to top into the boss 1624 on the main body 100, such that the portion of the battery housing above the retaining ring 213 fully enters the boss 1624; alternatively, the boss 1624 of the main body 100 is aligned with the battery housing of the battery structure 200, and the boss 1624 is sleeved onto the battery housing from top to bottom. During the mating and connection process, the second inverted buckle 216 extending upward from the top of the battery housing cooperates with the first inverted buckle 182 extending downward from the elastic button assembly 180 disposed within the main body 100; utilizing the wedge principle, they cooperate under external force to form a stable inverted buckle connection.

[0044] Disassembly: When it is necessary to disassemble the battery structure 200 from the main body 100, the button in the elastic button assembly 180 is pressed by external force, and the button drives the first inverted buckle 182 in the assembly to move inward. When the first inverted buckle 182 completely disengages from the second inverted buckle 216, the battery structure 200 is removed from the boss 1624, completing the disassembly.

[0045] Embodiment 2

The structure and principle of this embodiment are basically the same as those of Embodiment 1; the differences lie in that, besides the shape of the hot-compress massage head being different from the other massage heads, the structure is also significantly different. Specifically, the hot-compress massage head mainly comprises a base 1, an upper cover 2, a temperature regulating plate 3, a heat sink 4, and a first conductive member 5. Wherein, the upper cover 2 is made of die-cast aluminum alloy, which facilitates heat conduction to its surface. The upper cover 2 can be buckled with the base 1 to form a space. The base 1 is made of high-temperature resistant plastic; the side of the base 1 facing the upper cover 2 is provided with a first fixing groove 11, and the heat sink 4 is fixed within the first fixing groove 11; the heat sink 4 is used for heat dissipation of the hot-compress massage head to avoid excessively high temperatures. The upper cover 2 is provided with a second fixing groove 21 opposite to the first fixing groove 11, and the temperature regulating plate 3 is fixed within the second fixing groove 21; after the temperature regulating plate 3 is energized, it can generate heat, and the heat is conducted to the surface of the upper cover 2 for hot-compressing. Corresponding threaded holes are provided at the four corners of the first fixing groove 11 and the four corners of the second fixing groove 21, and the upper cover 2 and the base 1 can be connected through bolts. The base 1 is provided with an outwardly extending connection portion 12, and the connection portion 12 is in a hollow cylindrical shape. A cavity communicating with the first fixing groove 11 is formed in the middle of the connection portion 12, and the first conductive member 5 is fixedly disposed in the cavity

at a position near the end of the connection portion 12. Connection holes (not shown) are provided at the end of the connection portion 12 corresponding to the first conductive member 5. Wherein, the first conductive member 5 comprises a first fixing plate 51 and conductive contacts 52. The conductive contacts 52 are made of conductive metal, and the number thereof is two, which are a positive terminal contact and a negative terminal contact respectively. The conductive contacts 52 are fixed on the first fixing plate 51, and two ends of the conductive contacts 52 respectively extend out from two side surfaces of the first fixing plate 51. The temperature regulating plate 3 is provided with a lead wire 31, which passes through the lower end of the first fixing groove 11 and is electrically connected to the end of the conductive contacts 52 facing the interior of the base 1; specifically, the hot-compress head is connected to the circuit board 170 on the main body via a wire 190. By providing the first conductive member 5 and the connection portion 12, the disassembly and replacement of the hot-compress massage head can be facilitated, making the use of the hot-compress massage head more flexible and convenient. It should be noted that when the upper cover 2 is connected to the base 1, a gap of 0.1–0.2 mm is formed between the temperature regulating plate 3 and the heat sink 4; the gap can ensure normal heat conduction and heat dissipation while preventing the heat sink from expanding due to heat and squeezing the temperature regulating plate, thereby extending the service life of the hot-compress head.

[0046] Embodiment 3

A massage control method for a deep myofascial impact massager comprises constant-speed, fluctuating, climbing, static hot-compress, and dynamic hot-compress control methods, wherein:

In the constant-speed control method, the massage frequency is identical and the impact force of a single massage stroke is identical; under this control mode, during the massage motion of the product, it continuously operates at a single identical frequency preset by the control system until the massage ends; this constant-speed control mode utilizes a specific icon as the constant-speed mode indicator;

In the fluctuating control method, the massage frequency is identical, two adjacent massage strokes constitute a group, and the impact forces of the two massage strokes within the same group are different; under this control mode, during the massage motion of the product, it operates in a cycle between two different frequencies, high and low, preset by the control system; specifically, after operating in a high-frequency state for a period of time, it switches to a low-frequency state for an identical period of time, and then switches back to the high-frequency state for a period of time, cycling in this manner until the massage ends; this fluctuating control mode utilizes a specific icon as the fluctuating mode indicator;

In the climbing control method, the massage frequency is identical, and the impact force of each massage stroke increases sequentially starting from the first stroke; under this control mode, during the massage motion of the product, the frequency operates in an increasing manner as preset by the control system, cycling every 3 to 5 minutes; that is, after the product starts operation, the frequency becomes increasingly higher, and when the cycle period preset by the control system is reached, the frequency resets from low to high; this cycle continues until the massage ends; this climbing control mode utilizes a specific icon as the climbing mode indicator;

In the static hot-compress control method, the massage structure 300 remains in a stationary state, and the impact massager is manually held to place the massage head at a target position for static hot-compressing; under this control mode, the massage head in the massage structure 300 is a hot-compress massage head, and during the working process, only the heating function of the hot-compress massage head is activated while the motor remains inactive, being used solely for hot-compress massage; this mode utilizes a specific icon as its indicator;

The dynamic hot-compress control method comprises three control methods: a constant-speed hot-compress control method, a fluctuating hot-compress control method, and a climbing hot-compress control method; that is, during this hot-compress massage, the constant-speed, fluctuating, and climbing motion mode buttons under the motion function mode key are activated to start the motor, performing kinetic massage simultaneously with the hot compress;

The foregoing massage frequencies and impact forces are all preset via the control system; and with the exception of the static hot-compress control method, all of the foregoing control methods are multi-gear control modes.

[0047] The foregoing embodiments represent specific implementations of the present invention and are described in detail for illustrative purposes only; they shall not be construed as limitations on the scope of protection of the present invention. Persons of ordinary skill in the art will appreciate that various modifications and improvements may be made without departing from the inventive concept herein, and all such obvious alternatives fall within the scope of protection of the present invention.

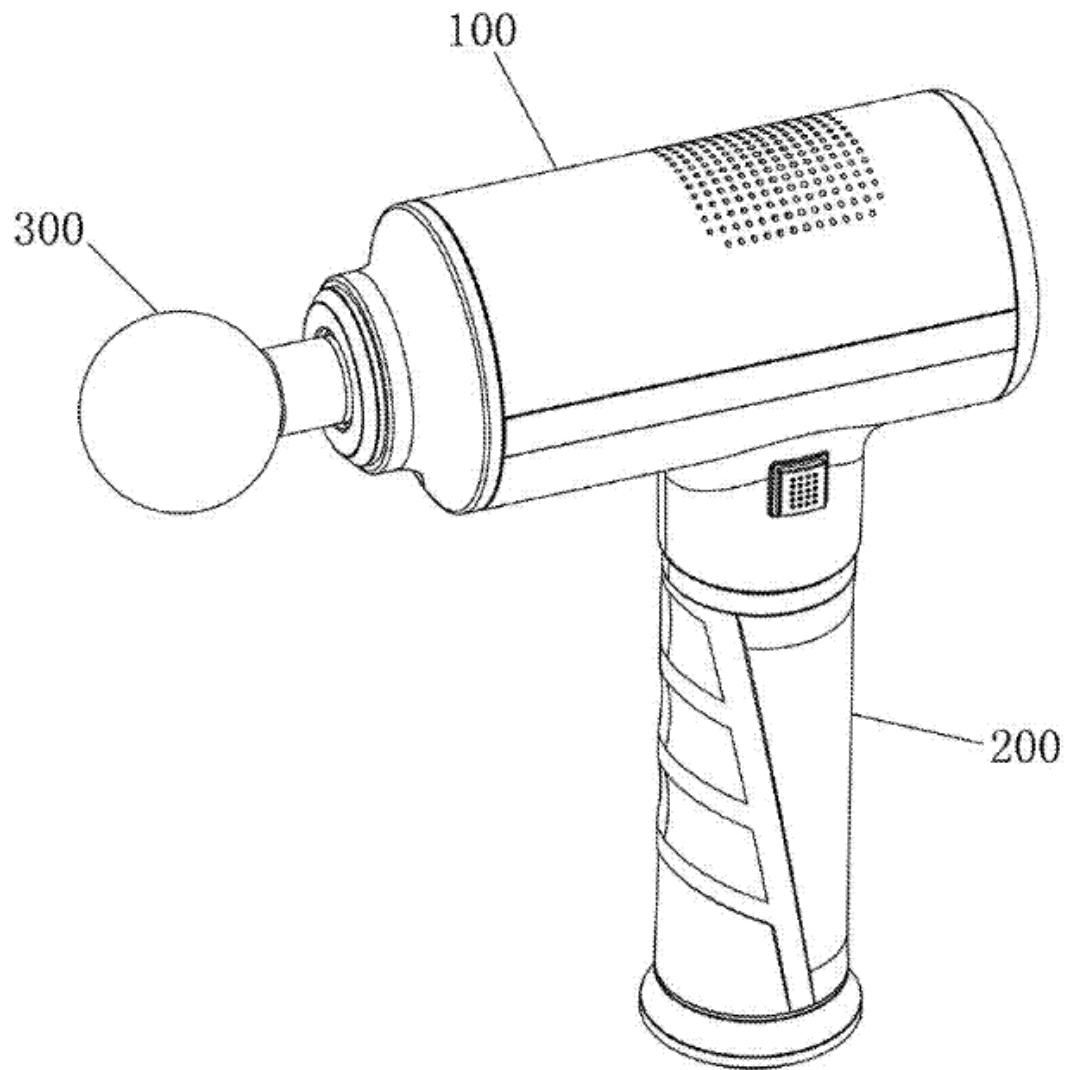


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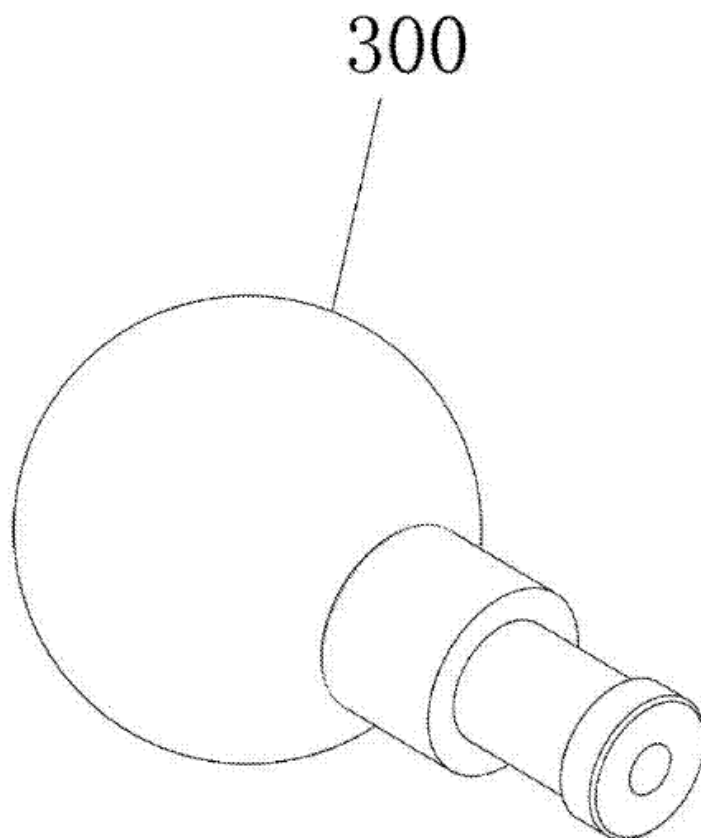


Figure 2

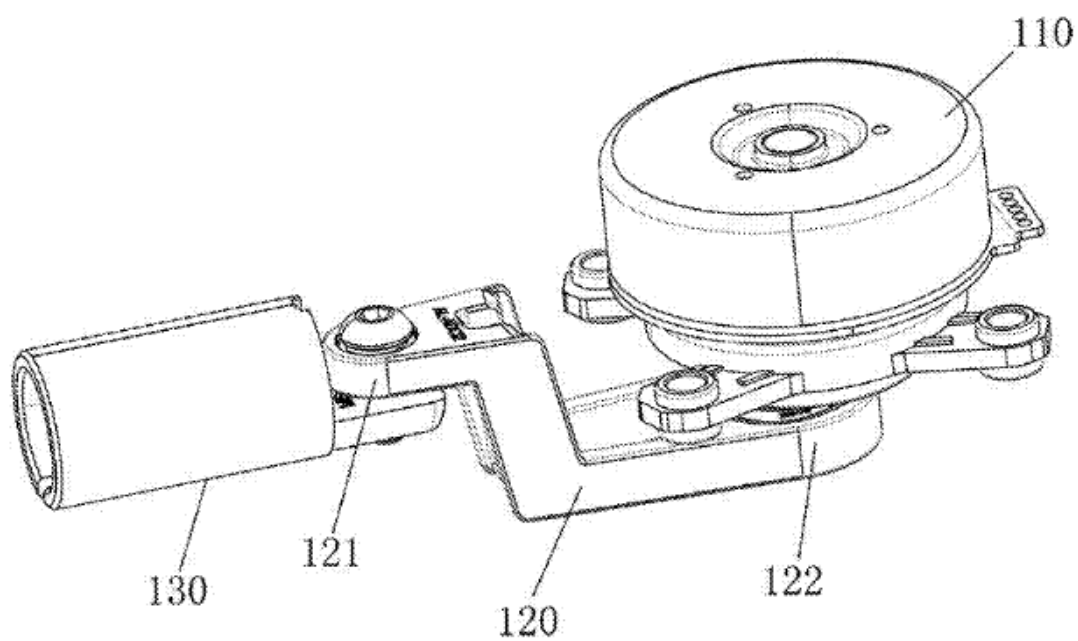


Figure 3

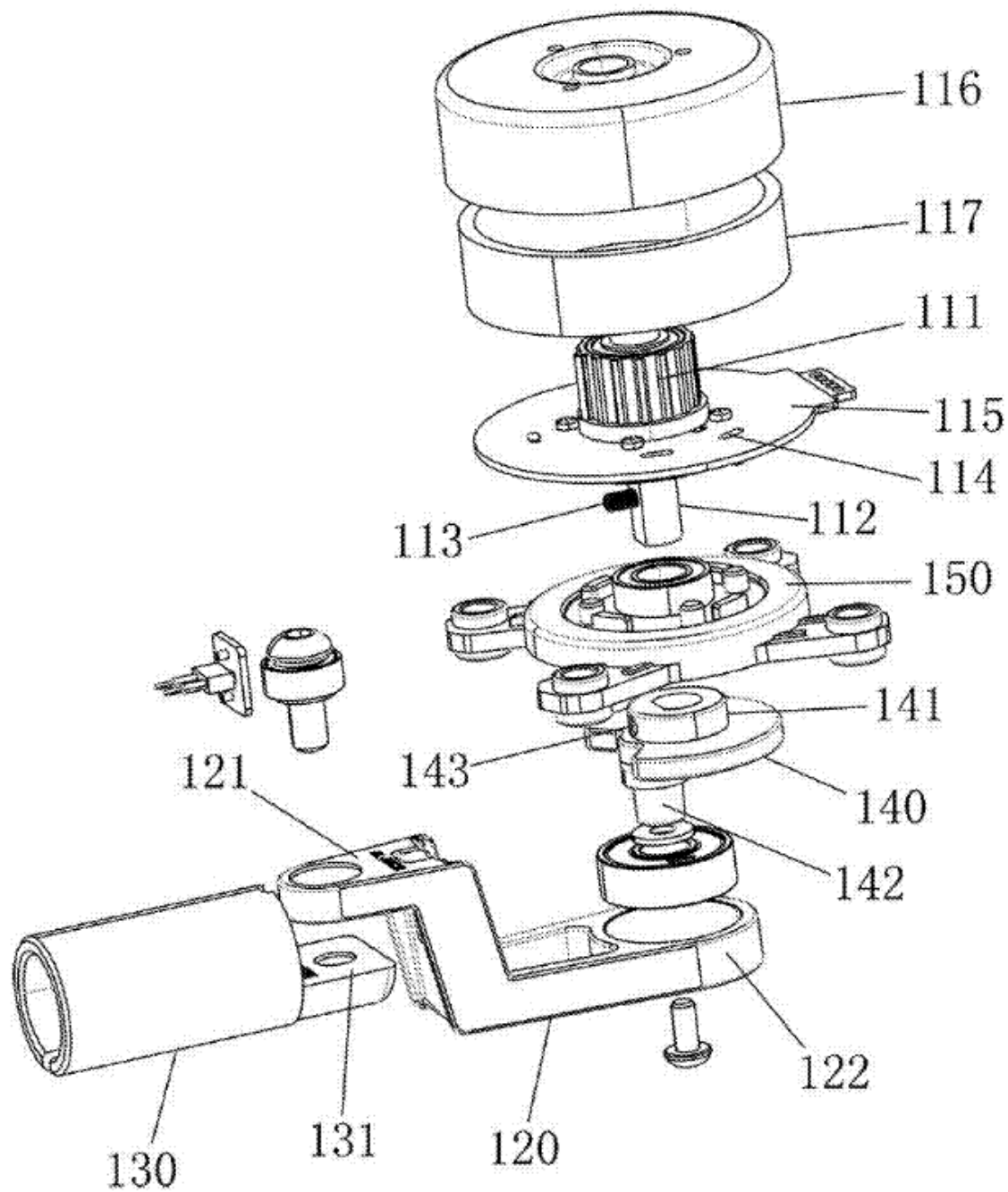


Figure 4

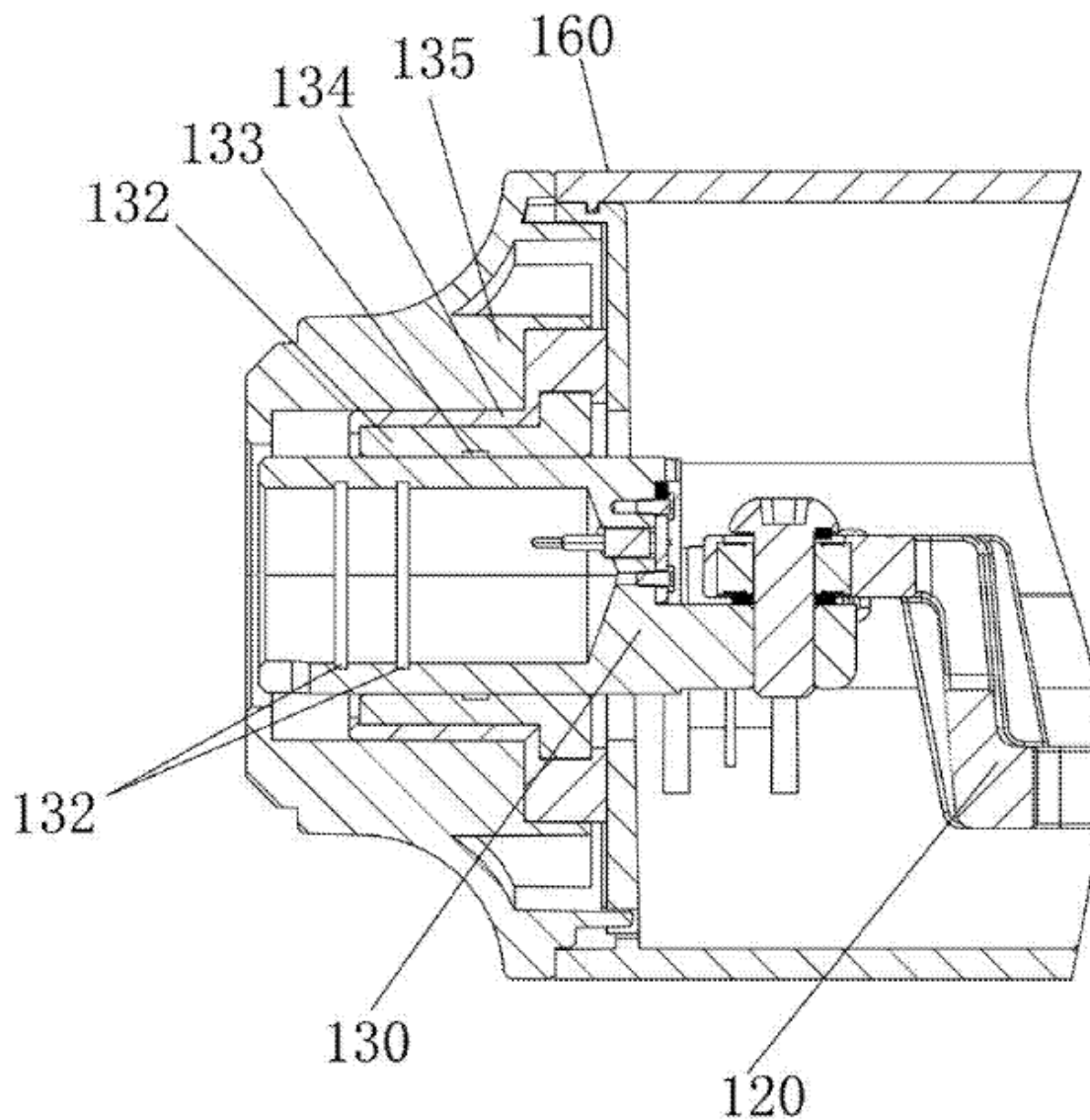


Figure 5

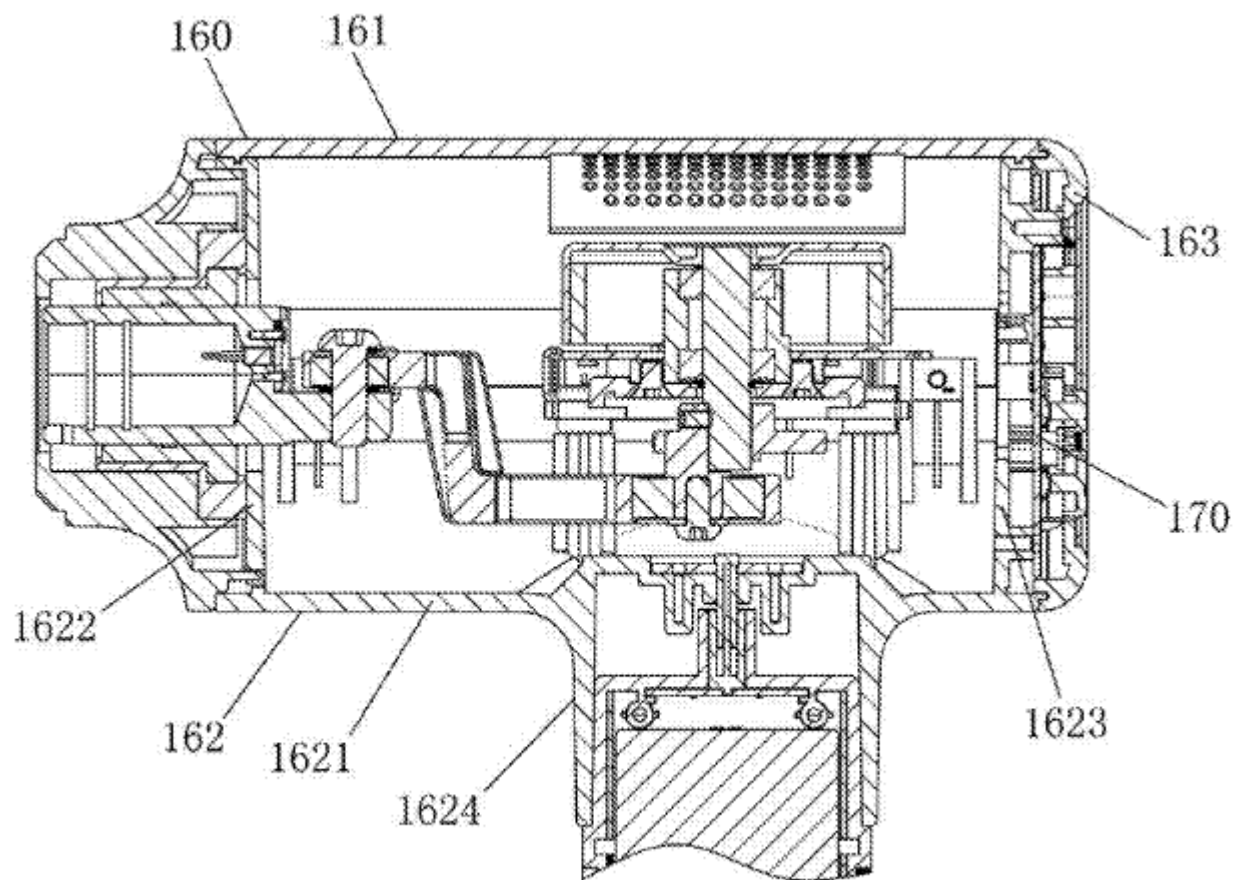


Figure 6

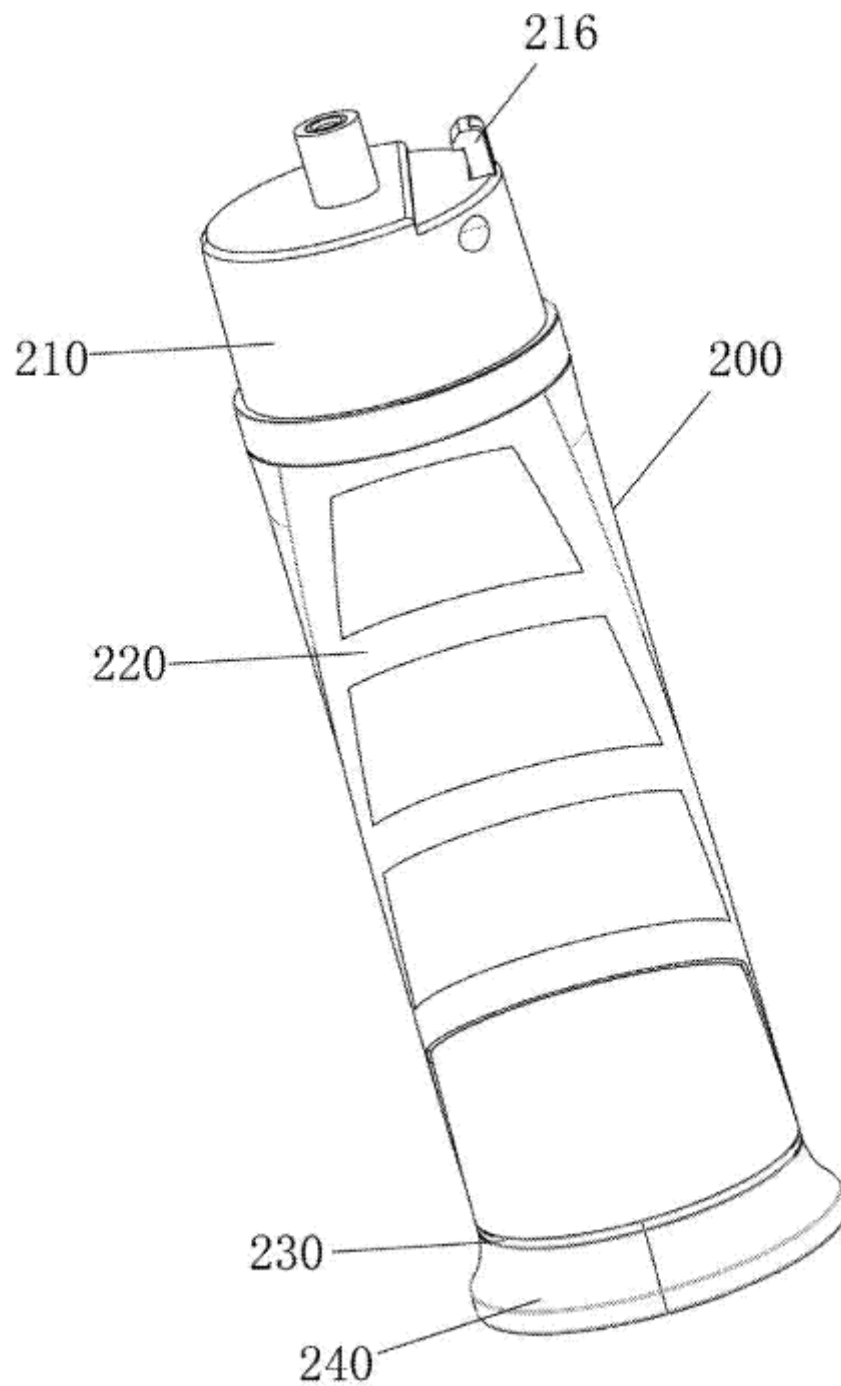


Figure 7

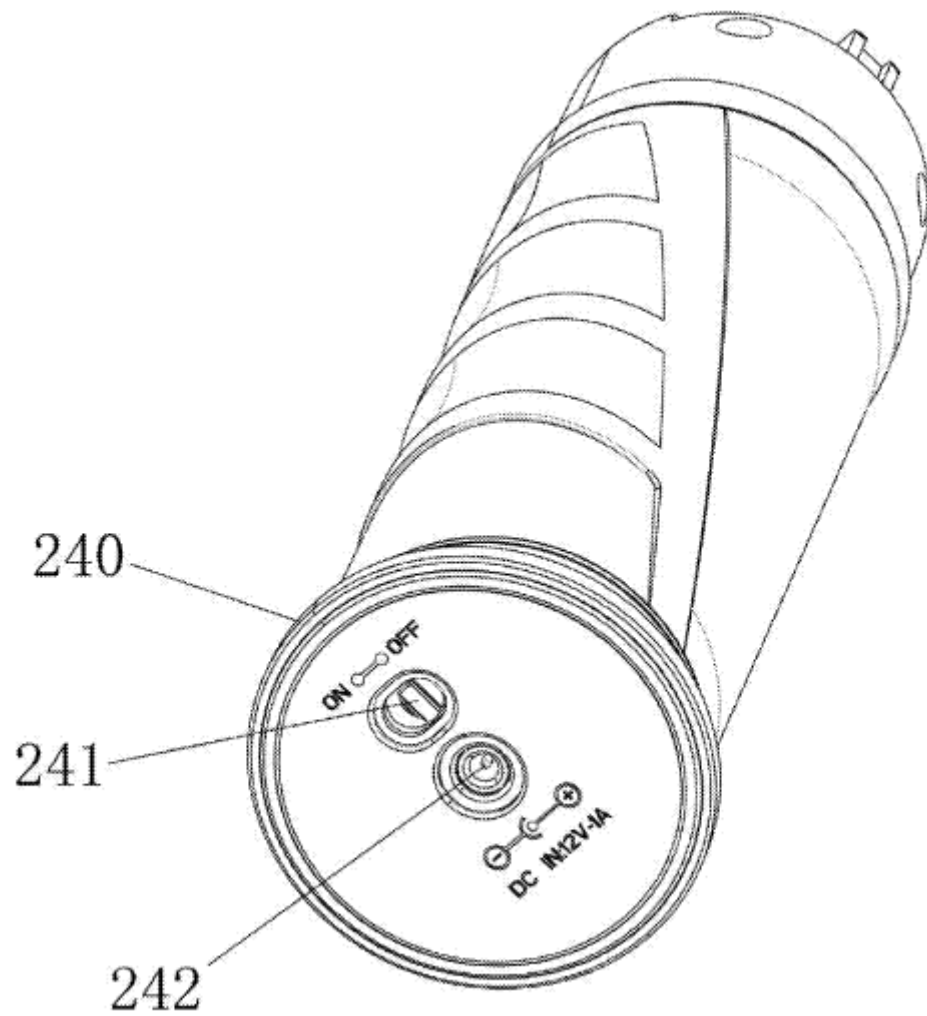


Figure 8

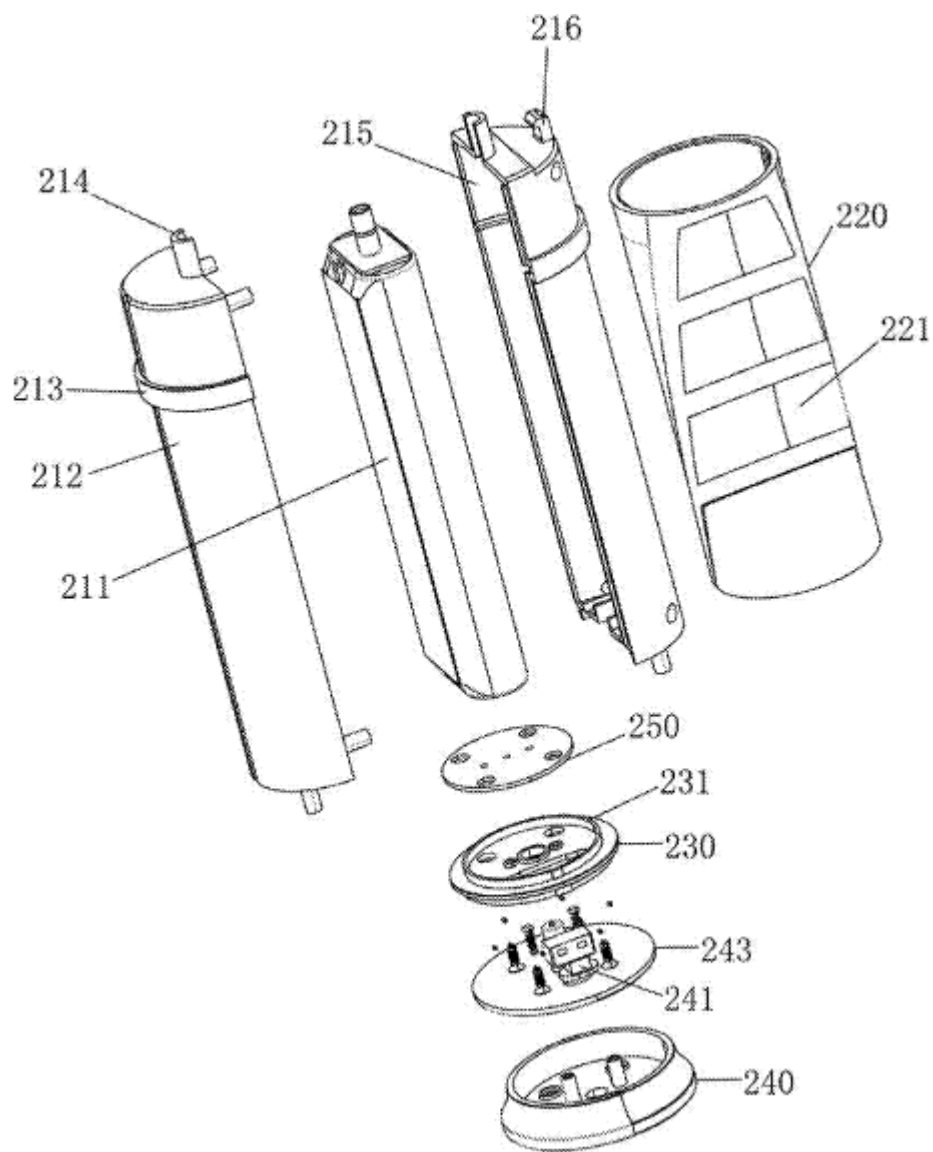


Figure 9

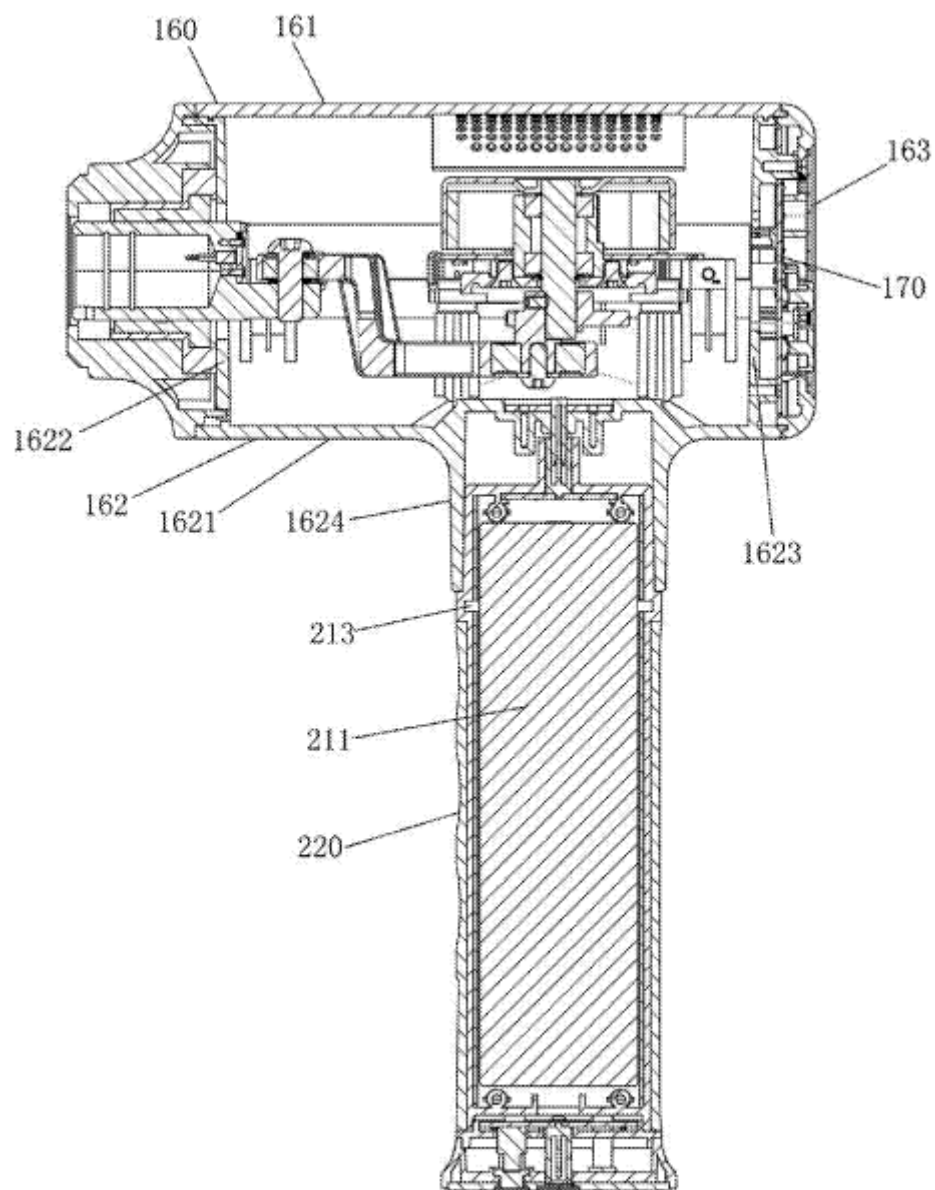


Figure 10

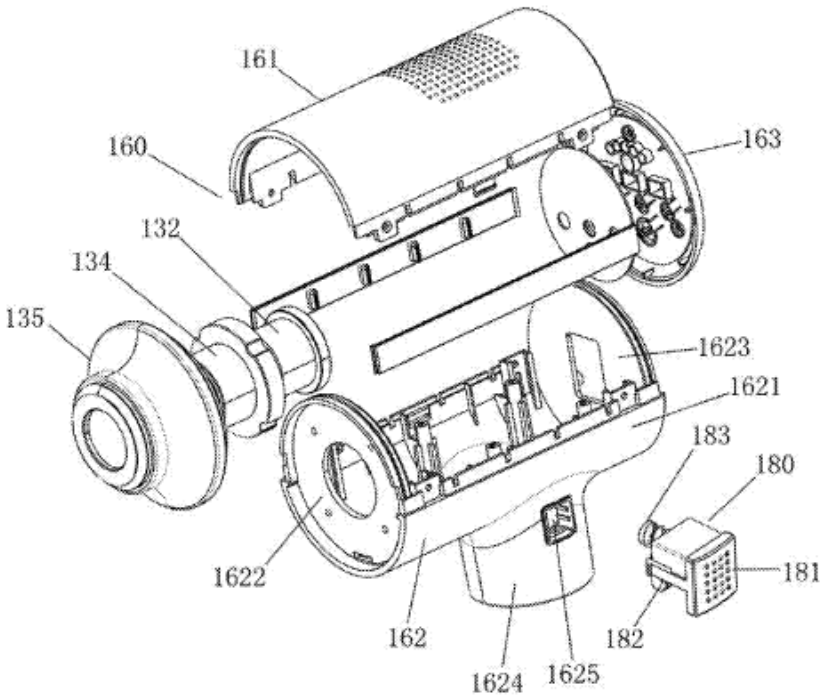


Figure 11

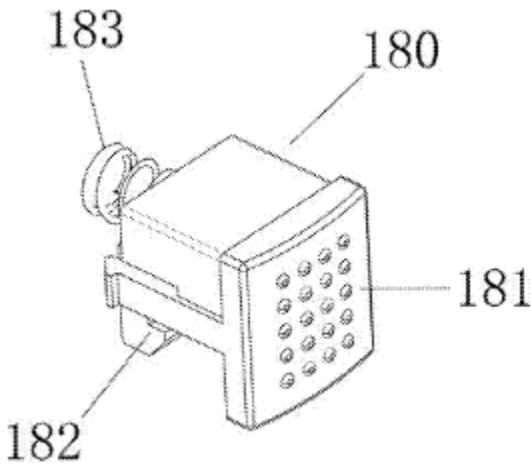


Figure 12

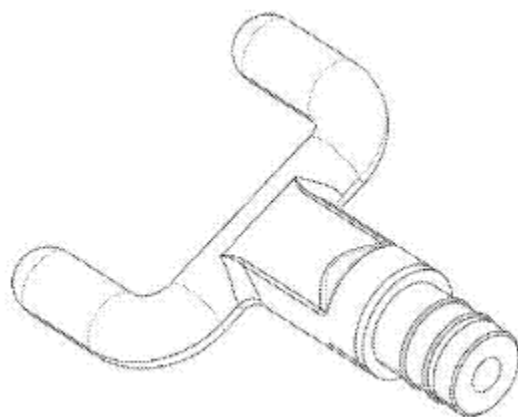


Figure 13

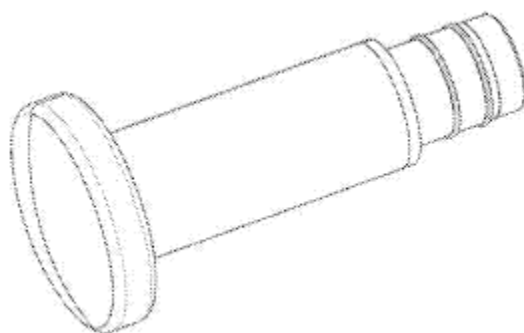


Figure 14

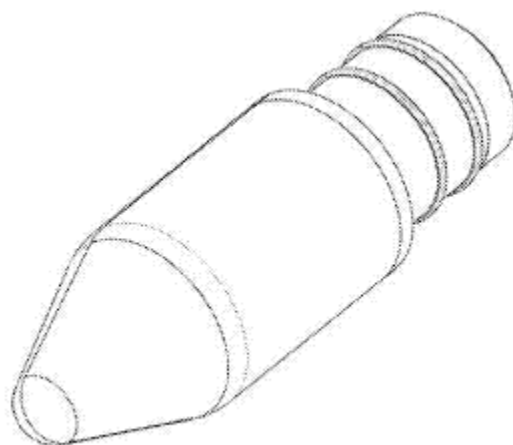


Figure 15

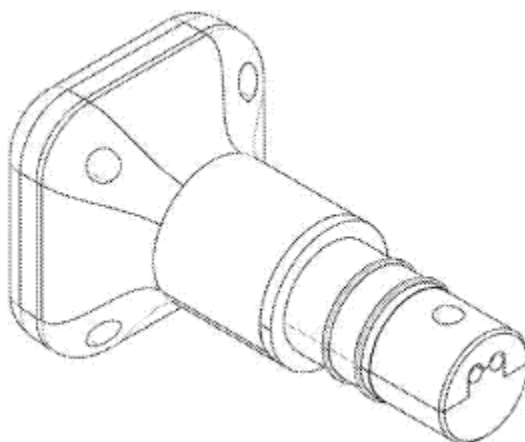


Figure 16

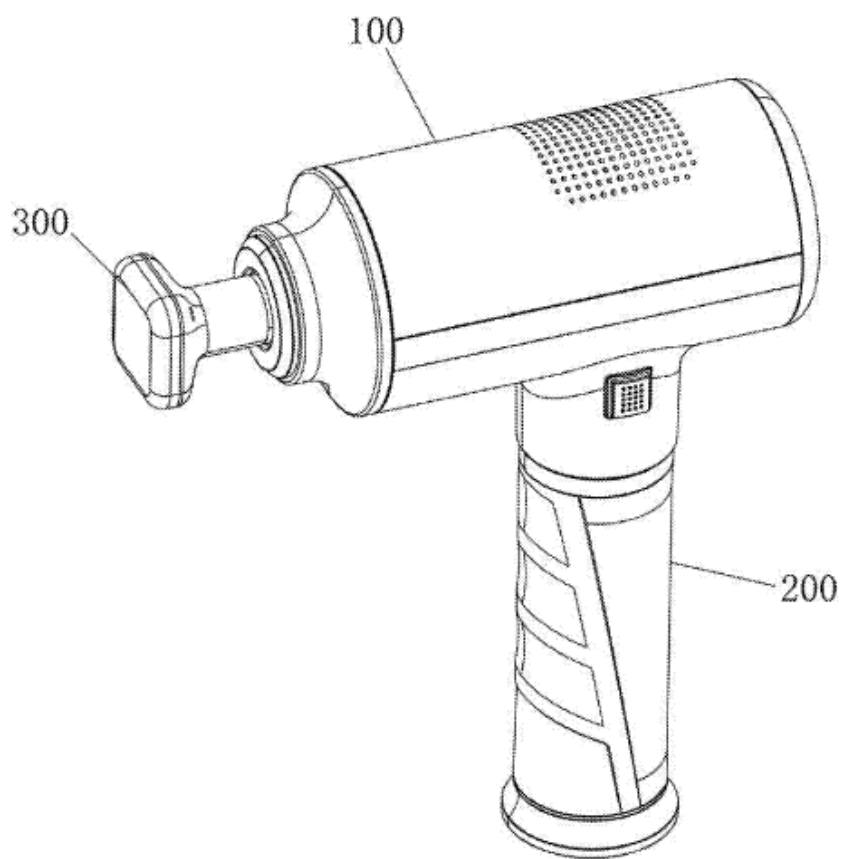


Figure 17

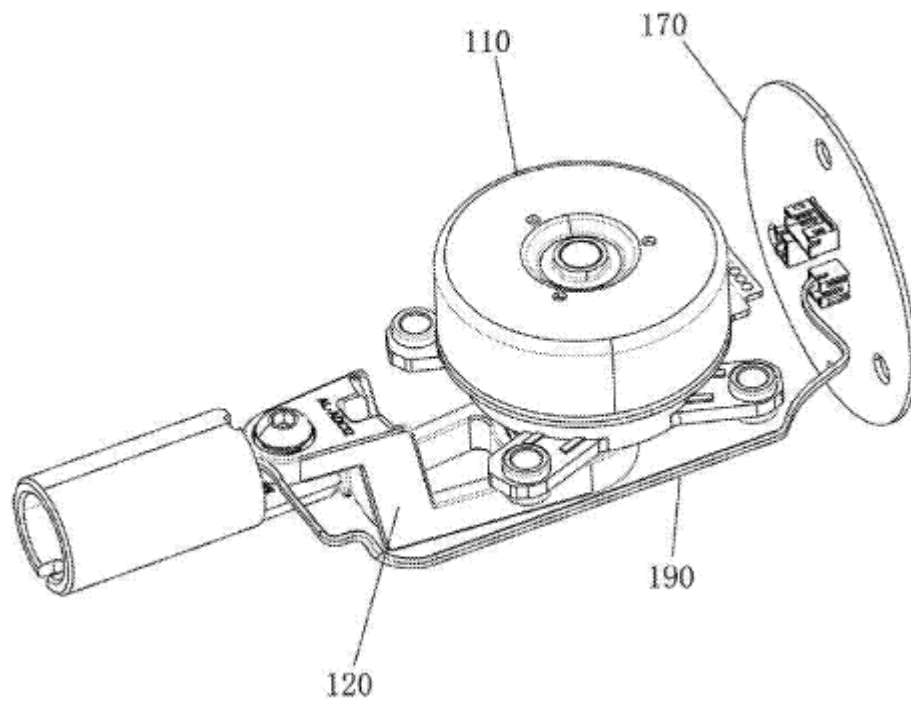


Figure 18

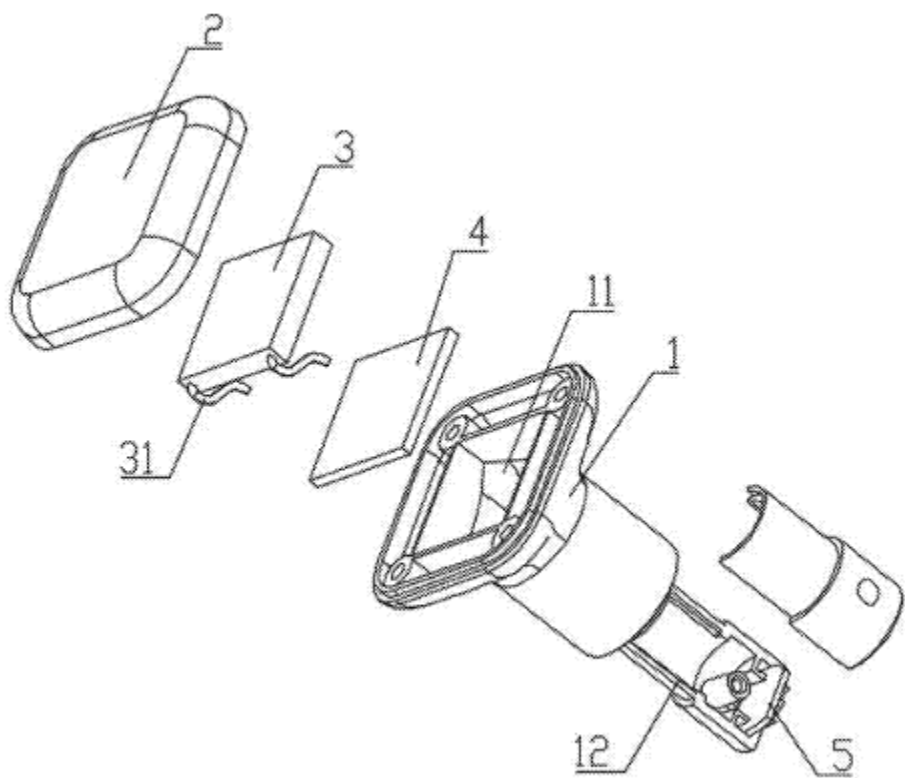


Figure 19

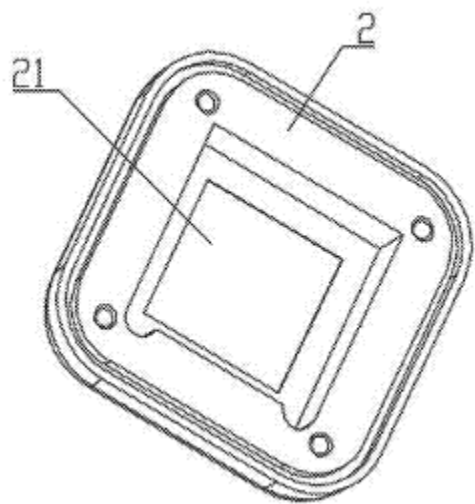


Figure 20

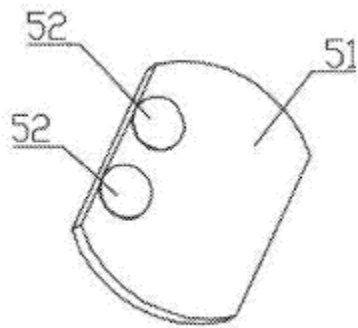


Figure 21

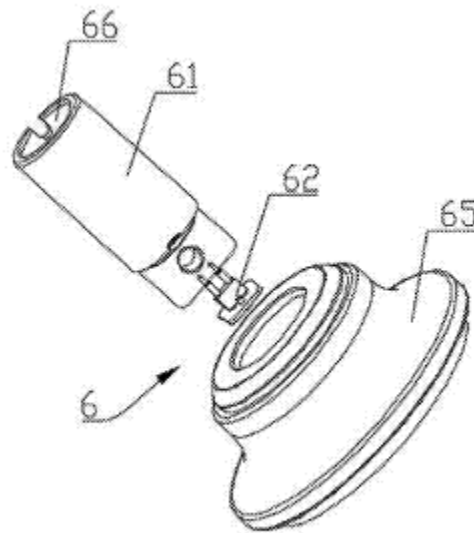


Figure 22

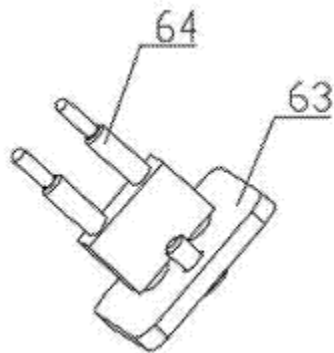


Figure 23