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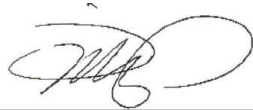
I served as Chief Examiner of the certified court interpreter test for the State of California and as a contract translator and interpreter for various federal agencies through the U.S. Department of State for more than a decade. I served as an instructor at the University of California at Berkeley and the Middlebury Institute of International Studies at Monterey (MIIS) Graduate Program in Translation.

I have more than 30 years of experience translating thousands of technical, legal, and business documents from Korean to English submitted to, among others, Korean judicial authorities, U.S. federal courts, the U.S. International Trade Commission (ITC), and the USPTO Patent Trial and Appeal Board (PTAB).

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Executed this 6th day of January 2025 in Contra Costa County of the State of California.

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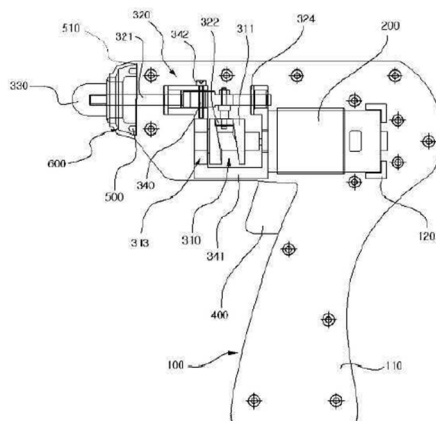
Total number of claims: 8 claims

Examiner: Seong Yeon Yang

(54) Title of the Invention: **MUSCLE VIBRATION MASSAGE DEVICE****(57) ABSTRACT**

The present invention relates to a muscle massage device that transmits mechanical vibrations to muscles to relax them, and more particularly to a muscle vibration massage device that is configured as a gun type for convenient use by holding it in the hand.

In constructing the muscle stimulating vibration massage device, the vibration massage device of the present invention enables the rotation force of the motor, which is a vibration force providing means, to act on the muscle stimulating member in the horizontal direction, so that the force transmission can be balanced and effective, so that a separate center of gravity shaft is unnecessary, and also simplifies the structure to make the handle more slim, so as to provide a muscle stimulating massage device that is beautiful in design and easy for users to hold and use.

REPRESENTATIVE DRAWING - FIG. 2

What is claimed is:**Claim 1**

A muscle vibration massage device configured to comprise a main body (100) with a gun-shaped handle (110), wherein the upper part of the main body (100) is equipped with a motor (200) for generating vibration and a space and a fixing means for embedding a vibration generating means for generating vibration by converting the rotational force of the motor (200) into front-to-back horizontal reciprocating motion; a motor control means for controlling the operation of the motor by supplying the motor's operating voltage to the lower handle part (110) of the main body (100) is built in and a fixing means for the motor control means is configured; and a gun switch (410) is formed on the outside of the handle part, where the user's finger is placed when holding the handle, to provide user operation instructions to the motor control means,

wherein the vibration generating means is configured to comprise:

a vibration rotation part (310) for making a vibration slide part (320) reciprocate horizontally by rotating it by forming a spiral groove (311a) along the direction of rotation from one side to the other side of the outer surface in the direction of the other side and having one side horizontally coupled to the rotation shaft (210) of the motor (200) and rotating;

a vibration slide part (320) that is coupled to the groove (311a) of the helix formed in the vibration rotation part (310) and moves back and forth horizontally with a width equal to the total length of the groove (311a) as the vibration rotation part (310) rotates; and

a vibration stimulus part (330) that is coupled to the front end of the vibration slide part (320) and exposed to the outside of the main body (100) to provide vibration stimulus to the user's muscles.

Claim 2

The muscle vibration massage device of claim 1, wherein the vibration slide part (320) further comprises an anti-dislodgement part (340) for preventing the vibration slide part (320) from dislodging left or right when the vibration slide portion (320) performs horizontal reciprocating motion.

Claim 3

The muscle vibration massage device of claim 1 further comprises an infrared lamp for providing an infrared heating function by operating under the control of the motor control means upon switching of the gun switch (400), and an infrared lamp housing (600), configured in a shape corresponding to the shape of the inner surface of the main body (100) and coupled from within the opening of the main body (100) so that the front part is exposed to the outside through the opening, to fixedly hold the infrared lamp and to guide the infrared light generated by the infrared lamp to irradiate the skin of the user.

Claim 4

The muscle vibration massage device of claim 3, wherein the infrared lamp consists of an infrared LED lamp (500), and the infrared LED lamp (500) is configured in such a way that the infrared LEDs are arranged on a circular panel, and wherein the infrared lamp housing (600) comprises a plurality of infrared lamp fixings (610) spaced at regular intervals along the outer periphery of the circular panel to which the infrared LEDs are fitted and coupled, and wherein the infrared lamp housing (600) is in the form of a tubular body comprising a shaft pass-through hole (620) for passing a slide shaft (321) through the center.

Claim 5

The muscle vibration massage device of claim 1, wherein the vibration rotation part (310) comprises a rotary axis coupling part (311b) coupled to the rotary axis (210) of the motor (200), a cam (311) having a helical groove (311a) formed outwardly thereof, a bearing (312) coupled to the other side of the rotary axis coupling part (311b) so that the cam (311) can rotate stably, and a bearing fixing part (313) for fixing the bearing (312),

wherein the vibration slide part (320) comprises a bearing (322) coupled to a groove (311a) of the vibration rotation part (310), a linker (323) connecting the bearing (322) to a slide shaft (321), the slide shaft (321) being horizontally reciprocated by the linker (323), and a bush ring (324) coupled to a front and rear end of the slide shaft (321).

Claim 6

A muscle vibration massage device of claim 1 or 5, wherein the slide shaft (321) comprises a linker coupling part (321a) for coupling a linker (323), and an anti-dislodgement groove (321b) for coupling a right-angle retaining pin (342) configured in the anti-dislodgement part (340), wherein the anti-dislodgement part (340) is fixed to the motor (200), supports the slide shaft (321) at the top, enables horizontal

reciprocating motion, and has a through hole (341a) in the slide shaft (321) as a means to prevent left-right dislodgement and a cam through hole (341b) for coupling a cam (311) to the rotary axis (210) of the motor (200) in the center, and a fixing bracket (341) with a right-angle pin coupling (341c) to prevent the slide shaft (321) from dislodging to the left or right, and a right-angle pin (342) to prevent the slide shaft (321) from dislodging to the left or right when the slide shaft (321) makes a horizontal reciprocating motion, which is coupled and supported on the fixing bracket (341) and coupled to the anti-dislodgement groove (321b) formed on the slide shaft (321).

Claim 7

The muscle vibration massage device of claim 1, wherein the vibration stimulation part (330) is replaceably constructed on the vibration slide part (320) and is made of a raw rubber latex or silicone rubber material.

Claim 8

The muscle vibration massage device of claim 1, wherein the fixing means of the body (100) comprises a motor support part (120) for supporting the force acting from the slide shaft (321) at the rear end of the motor (200), and a bracket fixing part for fixing the fixing bracket (341) for preventing dislodgement of and fixing the rotary axis (210) and for fixing a bearing (340) at the front end of the motor (200).

SPECIFICATION

FIELD OF TECHNOLOGY

[0001] The present invention relates to a muscle massage device that transmits mechanical vibrations to muscles to relax them, and more particularly to a muscle vibration massage device that is configured as a gun type for convenient use by holding it in the hand.

BACKGROUND ART

[0002] Mechanical vibration massage therapy is commonly utilized to aid in muscle rehabilitation. Vibration massage therapy is the therapeutic application of mechanical vibrations to the body to create a longitudinal wave-like flow that improves blood flow, relaxes contracted muscle tissue, and aids in the rehabilitation of damaged muscle tissue.

[0003] Other effects of muscle stimulation using vibration include pain relief, fat decomposition and cosmetic effects, increased blood circulation and blood pressure reduction, and muscle relaxation.

[0004] Previously, vibration massage devices such as the above were available only in hospitals or rehabilitation centers, but in recent years, various types of muscle vibration massage devices have been commercialized with improved performance while becoming small enough to be used at home and portable through technology development.

[0005] FIG. 1 shows Korean Patent No. KR20-0311328 "Muscle Stimulation Relaxator".

[0006] As shown in FIG. 1, a conventional muscle stimulation massage device includes a handle part 1 having a motor and a muscle stimulating member 2 is configured to stimulate the muscles by embedding an eccentric rotor having an eccentric rotation shaft, and causing the slide shaft 3 to reciprocate back and forth while the eccentric rotation shaft strikes the inner surface of the slide shaft 3 of the muscle stimulating member 2 as the rotor of the eccentric rotor rotates, so that the muscle stimulating member 2 stimulates the muscles.

[0007] Here, the conventional muscle stimulation massage device is composed of a motor and an eccentric rotor that rotates according to the rotation of the motor in the handle part 1, and both the support structure and the power circuitry thereof, so that the device unavoidably becomes thick, and it is difficult for the user to use it on the body when holding it by hand for treatment.

[0008] Furthermore, in a technical structure in which the rotating force of the motor is used to reciprocate the slide member back and forth using an eccentric rotor, the force of the motor acts perpendicularly to the slide shaft 3, so it is necessary to construct a center of gravity shaft 4 to balance it.

SPECIFICS OF THE INVENTION

PROBLEM TO BE SOLVED

[0009] The present invention aims to improve these conventional art problems by enabling the rotational force of a motor, which is a means for providing a vibration force, to act on a muscle stimulation member in a horizontal direction, so that the transmission of the force can be balanced and effective, so that a separate center of gravity is unnecessary, and also to provide a muscle stimulation massage device that can be easily grasped and used by a user by simplifying its structure so that the handle part can be further slimmed down.

MEANS TO SOLVE THE PROBLEM

[0010] The muscle vibration massage device of the present invention comprises a main body having a gun-shaped handle part, the upper part of the main body having a motor for generating vibration and a space and a fixing means for embedding a vibration generating means for generating vibration by converting a rotational force of the motor into a back and forth horizontal reciprocating motion, a motor control means for controlling the operation of the motor by supplying a drive voltage to the motor is embedded in the lower handle part of the main body, and a fixing means is formed thereof, and a gun switch is formed on the outer side of the handle part, where the fingers of the hand are located, to provide user operation instructions with the motor control means,

[0011] wherein the vibration generating means comprises:

[0012] a vibration rotation part in which a spiral groove is formed along a rotation direction from one side to an outer surface of another side, and the one side is horizontally coupled to a rotation shaft of the motor to rotate to cause the vibration slide part to reciprocate horizontally, and a vibration slide part which is coupled to the spiral groove formed in the vibration rotation part to reciprocate horizontally back and forth in a width equal to the total length of the groove as the vibration rotation part rotates, a vibration stimulation part which is coupled to the front end of the vibration slide part and exposed to the outside of the main body to provide vibration stimulation of the contacting vibration slide part to the muscles of the user, and further comprising an anti-dislodgement part for preventing the vibration slide part from dislodging to the left or right during the horizontal reciprocating movement.

EFFECT OF THE INVENTION

[0013] According to the present invention, the rotational force of the motor for generating the vibration is provided in the horizontal direction, so that the structure is simple and balanced force transmission is possible.

[0014] Furthermore, by not having a motor and a configuration for transmitting the rotational force of the motor to an shaft on a vertical plane as in the conventional art, the handle can be slimmed down to make the handle easier to hold and use by a user, eliminate the need for a center of gravity shaft to balance the weight, and be aesthetically pleasing.

A BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 shows a conventional muscle stimulation relaxator.

FIG. 2 is a drawing showing the upper part of the main body to show the configuration of the present invention's muscle vibration massage device.

FIG. 3 shows the combined state of each means in the present invention.

FIG. 4 shows a perspective view of the exterior of the present invention's muscle vibration massage device.

FIG. 5 is a drawing showing the structure of the infrared lamp housing in the present invention, showing the plane and the side.

FIG. 6 is a drawing showing the structure of the infrared LED lamp and a cross-sectional view of the A-A' line on this plane.

FIG. 7 shows several examples of the vibrating stimulus part in the present invention.

FIG. 8 is a drawing in which the vibration rotary part and the vibration slide part, and only the anti-dislodgement part are distinguished to describe the horizontal movement of the vibration rotation part and the vibration slide part in the present invention.

SPECIFIC DETAILS FOR PRACTICING THE INVENTION

[0016] The structure and operation of the muscle vibration massage device of the present invention will be described with reference to embodiments thereof shown in FIGS. 2 through 8 of the accompanying drawings.

[0017] The device is comprised of a main body 100 having a gun-shaped handle part 110, the upper part of the main body having a motor 200 for generating vibration and a space and a fixing means for embedding a vibration generating means for generating vibration by converting a rotational force of the motor 200 into a back and forth horizontal reciprocating motion, a motor control means for controlling the operation of the motor by supplying a drive voltage to the motor is embedded in the lower handle part 110 of the main body 100, and a fixing means is formed thereof, and a gun switch 400 is formed on the outer side of the handle part 110, where the fingers of the hand are located, to provide user operation instructions with the motor control means,

- [0018] wherein the vibration generating means comprises:
- [0019] a vibration rotation part 310 for rotating the vibration slide part 320 in a horizontal reciprocating motion by rotating the vibration slide part 320 along a rotation direction from one side to an outer surface in another one-sided direction, with a helical groove 311a formed in the vibration rotation part 310 and coupled horizontally to the rotation shaft 210 of the motor 200, the vibration slide part 320 coupled to a groove 311a of a helix formed in the vibration rotation part 310 for rotating the vibration rotation part 310 to cause the vibration slide part 320 to move back and forth horizontally in a width equal to the overall length of the groove 311a as the vibration rotation part 310 rotates, a vibration stimulation part 330 coupled to the front end of the vibration slide part 320 and exposed to the outside of the main body 100 to provide vibration stimulation of the contacting vibration slide part 320 to the muscles of the user, and an anti-dislodgement part 340 for preventing the vibration slide part 320 from dislodging to the left or right as the vibration rotation part 310 rotates.
- [0020] And further includes an infrared LED lamp 500 for providing an infrared heating function, and an infrared lamp housing 600, which is configured in a circular shape corresponding to the inner surface shape of the main body 100, and is coupled from within the opening of the main body 100 so that the front end is inserted into the opening and exposed to the outside, to fix the infrared LED lamp 500, and to guide the infrared light generated by the infrared LED lamp 500 to irradiate the skin of the user.
- [0021] The present invention describe above has
- [0022] the main body 100 shaped like a gun and has a motor 200 on top, and the vibration generating means which converts the rotational force of the motor 100 into horizontal vibration, and a motor control means is configured to rotate the motor 200 in the handle part 110.
- [0023] The vibration generating means comprises a vibration rotation part 310 coupled to the front end of the motor 200 for providing rotational force, a vibration slide part 320 for generating vibration by sliding back and forth by the vibration rotation part 310, a vibration stimulation part 330 for transmitting the vibration stimulation generated by the vibration slide part 320 to the user, and a anti-dislodgement part 340 for preventing the vibration slide part 320 from dislodging to the left or right.
- [0024] The vibration generating means is coupled to the rotation shaft 210 of the motor 200, and the vibration rotation part 310 is coupled to the front end of the rotation shaft 210 of the motor 200, so that they rotate together according to the rotation of the rotation shaft 210 of the motor 200.
- [0025] The vibration rotation part 310 includes a cam 311 having a rotary axis coupling part 311b coupled to the rotary axis 210 of the motor 200 and a helical groove 311a formed on the outside thereof, a bearing 312 coupled to the other side of the rotary axis coupling part 311b so that the cam 311 can rotate stably, and a bearing fixing part 313 for fixing the bearing 312.
- [0026] The rotary axis coupling part 311b includes a rotary axis coupling groove configured to engage the rotary axis 210 of the motor 200, and a structure coupled to the rotary axis 210 such that the rotary axis 210 engaged in the rotary axis coupling groove does not run idle while rotating.
- [0027] The overall width of the helical groove 311a formed in the cam 311 represents the horizontal traveling length of the vibration slide part 320.
- [0028] The vibration slide part 320 is coupled to the groove 311a of the cam 311, causing the vibration rotation part 310 to rotate. The vibration slide part 320 is configured to reciprocate horizontally while traveling along the groove 311a.
- [0029] The vibration slide part 320 comprises a bearing 322 coupled to the groove 311a of the vibration rotation part 310, a linker 323 connecting the bearing 322 and the slide shaft 321, the slide shaft 321 being horizontally reciprocated by the linker 323, and a bush ring 324 coupled to the front and rear ends of the slide shaft 321.
- [0030] The slide shaft 321 comprises a linker coupling part 321a for coupling the linker 323, an anti-dislodgement groove 321b for coupling the right angle locking pin 342 configured in the anti-dislodgement part 340, and the anti-dislodgement groove 321b is formed as a length over a distance that the slide shaft 321 moves in the direction of being slid back and forth so that the coupled right angle locking pin 342 is not jammed when the slide shaft 321 is slid back and forth.
- [0031] The vibration stimulation part 330 is coupled to the leading end of the slide shaft 321 of the vibration slide part 320 and exposed to the outside through the opening of the main body 100, and as such, it is a means for delivering vibration stimulation to the user's muscles in accordance with the vibration generated by the slide shaft 321.
- [0032] The vibration stimulating part 330 is replaceably constructed on the slide shaft 321, with a shaft engagement groove 331 configured for engagement with the slide shaft 321, and may take various forms of vibration stimulation part 330 depending on the massage application, as illustrated in FIG. 7.

- [0033] The vibration stimulator 330 is made of raw rubber latex or silicone rubber to protect the user's skin and to be harmless and non-discomforting to the human body.
- [0034] The anti-dislodgement part 340 is fixed to the motor 200 and supports the slide shaft 321 at the top to enable horizontal reciprocating movement, and is formed with a pass-through hole 341a of the slide shaft 321 as a means for preventing left or right dislodgement, a cam pass-through hole 341b for centrally coupling the cam 311 to the rotation shaft 210 of the motor 200, and a right-angle fixed pin coupling part 341c for preventing left or right dislodgement of the slide shaft 321, a fixing bracket 341 in which a right-angle fixing pin engagement part 341c is formed for preventing the slide shaft 321 from dislodging to the left or right, and a right-angle fixing pin 342 coupledly supported on the fixing bracket 341 and coupled to the anti-dislodgement groove 321b formed in the slide shaft 321 for preventing the slide shaft 321 from dislodging to the left or right when the slide shaft 321 is in a horizontal reciprocating movement.
- [0035] The main body 100 comprises a motor 200 disposed on a gun-shaped upper end, and a motor support 120 as a rear end of the motor 200.
- [0036] The motor support 120 is a means for preventing the motor 200 from being pushed backward when the motor 200 is forced backward by the elastic force acting from the slide shaft 321 when vibration is generated.
- [0037] The front end comprises a bracket fixing part (not shown) for coupling and fixing a fixing bracket 341 to which the rotation shaft 210 is fitted and to prevent horizontal reciprocating movement and dislodgement of the slide shaft 321.
- [0038] Then, the slide shaft 321 is moved forward and backward through the through bore 341a of the fixing bracket 341, the cam 311 is coupled to the rotation shaft 211 of the motor 200 through the cam through bore 341b, and a right angle fixing pin 342 fixedly supported on the fixing bracket 341 is inserted into the anti-dislodgement groove 321b of the slide shaft 321 to prevent the slide shaft 321 from moving from side to side.
- [0039] The opening of the body 100 is perforated to allow the vibration stimulating part 330 to be inserted and exposed from the inside.
- [0040] Within the handle part 110, a motor control means is configured for controlling the motor 200. A gun switch 400 is configured to provide a control signal to the motor control means at the position where the finger is placed.
- [0041] The gun switch 400 comprises a conventional switch structure configured to depress an internal operation switch when depressed by a user's finger, and comprises an elastic means providing resilient force to the gun switch 400 to return to its original position when the user releases the depressing force, and can be configured in various forms of switch structures.
- [0042] Here, the gun switch 400 is configured as a gun-shaped switch for the convenience of the user, but it can be configured as a regular shaped switch.
- [0043] The motor control means includes a power supply means, and a circuit means for controlling means for providing power provided by the power supply means to the motor 200 in response to switching of the gun switch 400 to drive the motor.
- [0044] The power supply means may be configured as a rechargeable type comprising a rechargeable battery and a means for charging and discharging the rechargeable battery, or it may be configured as a plug type comprising a power plug and used by connecting the power plug to an outlet.
- [0045] The infrared lamp further includes an infrared lamp housing 600, as shown in FIG. 5.
- [0046] The infrared lamp housing 600 holds the infrared LED lamp 500 and is a means for directing infrared light generated by the infrared LED lamp 500 to irradiate the skin of a user.
- [0047] The infrared lamp housing 600 is configured in a circular shape corresponding to the inner surface shape of the main body 100, and is coupled from within the opening of the main body 100 so that the front end fits into the opening and is exposed to the outside.
- [0048] The infrared lamp housing 600 is tubular in shape, comprising at least one or more infrared lamp fixing parts 610 spaced at regular intervals along a circular outer periphery to which the infrared LED lamp 500 is fitted and coupled, and a shaft pass-through hole 620 in the center for passing the slide shaft 321.
- [0049] The infrared LED lamp 500 is a means for generating infrared light to provide an infrared heating function.
- [0050] FIG. 6 is a drawing of an example infrared LED lamp 500, illustrating an infrared lamp fixture formed in an infrared lamp housing 600. The infrared LED lamp 500 may be configured in the form of infrared LED lamps arranged on the circular panel 510 so that they can be fitted and coupled to the infrared lamp fixing part 610.

- [0051] The infrared LED lamp 500 is controlled by the motor control means in accordance with the switching operation of the gun switch 410. It can be configured as shown in the example, or a separate switch can be configured to be used as a separate operation from the vibration massage.
- [0052] The motion and operation of the muscle vibration massage device of the present invention in this configuration will now be described in detail.
- [0053] When the user pulls the gun switch 410, a switch on the motor control means configured within the handle part 110 is touched, energizing the motor 200 and causing the motor 200 to rotate.
- [0054] Rotation of the motor 200 causes the cam 311 coupled to the rotational shaft 210 of the motor 200 to rotate.
- [0055] The cam 311 of the vibration rotation part 310 has a helical groove 311a formed on the cam 311, and when the cam 311 rotates as described above, the bearing 322 coupled to the groove 311a formed on the cam 311 moves along the groove 311a, causing the position of the bearing 322 to fluctuate across the left or right widths, and thus the linker 323 connected to the bearing 322 moves left and right, causing the slide shaft 321 to move horizontally left and right.
- [0056] As the cam 311 rotates as described above, the position of the groove 311a of the helix formed on the cam 311 changes from side to side, causing the position of the bearing 322 coupled to the groove 311a to move from side to side, causing the slide shaft 321 to slide from side to side, repeating the same process as described above, causing vibration to occur.
- [0057] FIG. 8 is a diagram illustrating the horizontal movement behavior of the vibration rotation part and the vibration slide part separately to illustrate the vibration rotation part, the vibration slide part, and only the anti-dislodgement part.
- [0058] The vibrations thus generated are transmitted to the muscles within the skin via the vibration stimulator 330 in contact with the user's skin.
- [0059] In this case, the vibration stimulating part 330 is configured as a replaceable structure on the slide shaft 321, so that the vibration stimulating part 330 as shown in (a) to (d) of FIG. 7 above can be selectively replaced and used according to the application.
- [0060] Furthermore, the infrared light generated by the infrared LED lamp 500 is emitted along the front of the infrared lamp housing 600 and irradiated onto the skin of the user to provide infrared heat.

DRAWINGS

FIG. 1

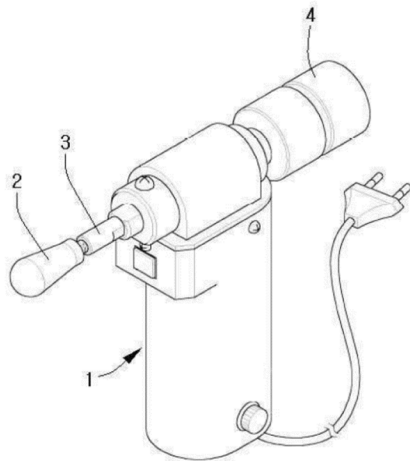


FIG. 2

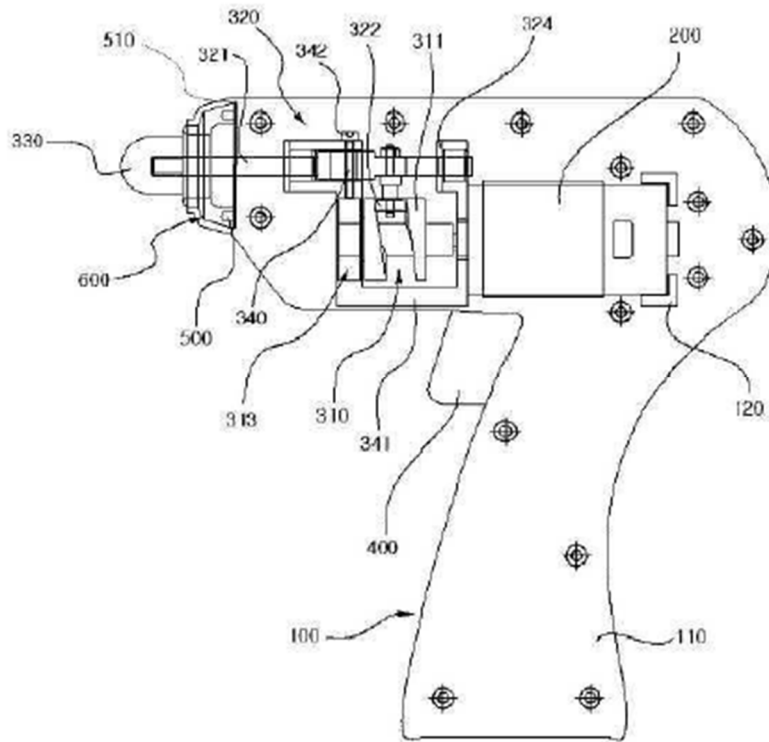


FIG. 3

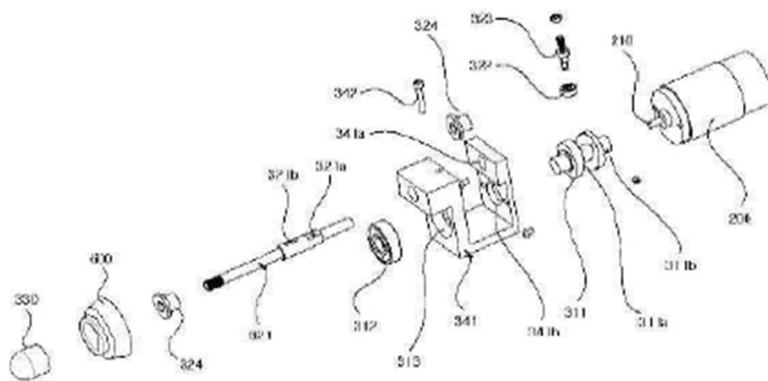


FIG. 4

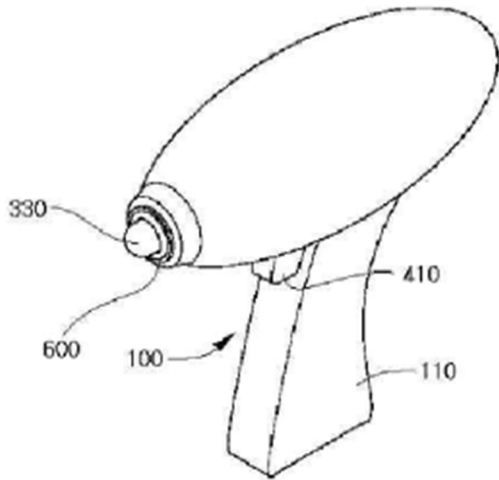


FIG. 5

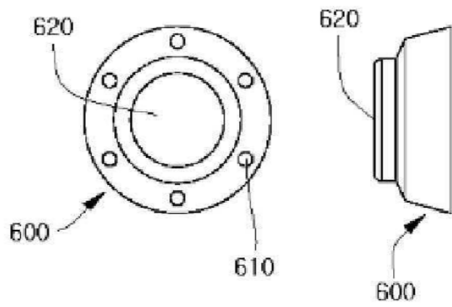


FIG. 6

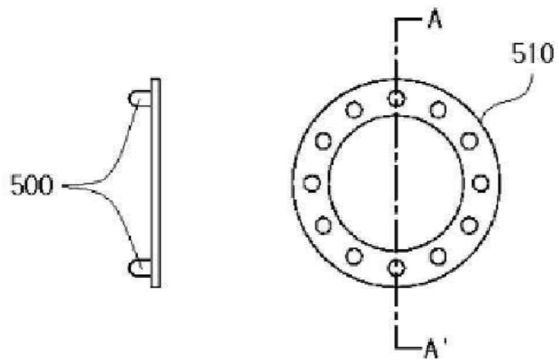


FIG. 7

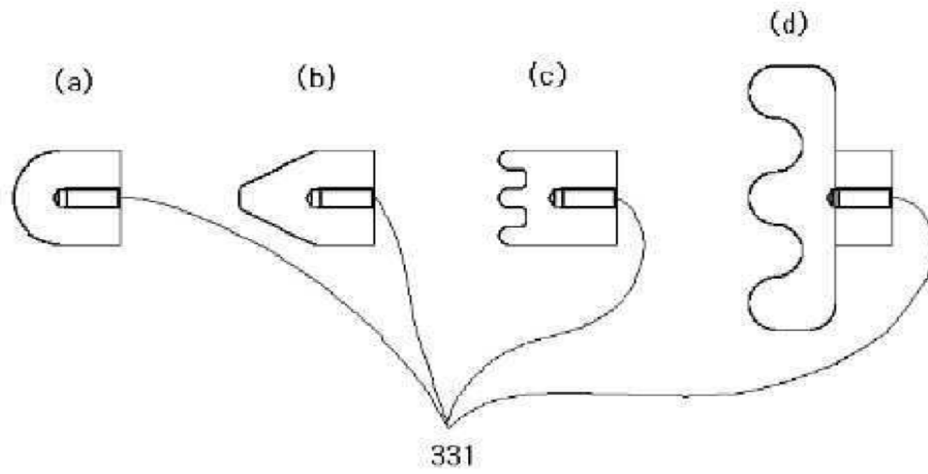


FIG. 8

