

CERTIFICATE OF TRANSLATION ACCURACY

I am a professional translator, reviewer, and coordinator specializing in translating Korean, Japanese and Chinese to English and vice versa.

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.

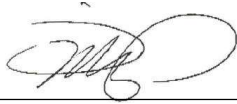
I have more than 30 years of experience translating thousands of technical, legal, and business documents from Chinese to English submitted to, among others, U.S. federal courts, the U.S. International Trade Commission (ITC), and the USPTO Patent Trial and Appeal Substrate (PTAB).

I certify that the following translation from Traditional Chinese to English is a true, correct, and complete translation of the corresponding source text to the best of my knowledge and ability.

I certify under penalty of perjury that the foregoing is true and correct.

Executed this 25th day of August 2024 in Contra Costa County of the State of California.

By:



Alex N. Jo
Member, ATA

IV. Declarations:

☐ Fact indicated as set forth in ☐ Subparagraph 1 or ☐ Subparagraph 2 of Paragraph 2 of Article 94 of the Patent Law, and the date when the fact occurred: YYYY MM DD.

☐ Applied for patent in the following country (region) prior to this application:

[For the format, follow the sequence in this order: country (region) of filing, date of filing, and application number]

☐ Claims international patent priority pursuant to Article 108 by applying mutatis mutandis Article 27, Paragraph 1 of the Patent Law:

☐ Claims no international priority pursuant to Article 108 by applying mutatis mutandis Article 27, Paragraph 1 of the Patent Law:

☐ Claims international priority pursuant to Article 108 by applying mutatis mutandis Article 29, Paragraph 1 of the Patent Law:

[For the format, follow the sequence in this order: date of filing, and application number]

VIII. Description of the Utility Model:

[Technical Field of the Utility Model]

The present invention relates to a massage tool for human physiotherapy, and more particularly to a low-resonance reciprocating motion mechanism.

[Background Art]

In the technical field of massage devices, it is a generally well-known technology to use a motor to provide power and use an eccentric transmission mechanism to output different forms of massage actions such as tapping and shaking. However, in such a technology, components are complex, and large vibration is transmitted to the outside through related components during actions of the components. Therefore, the technology is generally not suitable for a handheld massage tool. If the technology is implemented on a handheld massage tool, limited by the technical feature that the handheld massage tool has large vibration amplitude, only action modes of shaking and tapping or broad-area vibration can be used for human body massage. Regardless of a power output manner used for the handheld massage tool, a common deficiency in the handheld massage tool is that during use by a user, in addition to forming desired output massage actions, the transmission mechanism further causes resonance in the whole handheld massage tool. As a result, a holding hand of the user bears the overall vibration of the handheld massage tool, exposing the user to the risk of wrist injury. Accordingly, there is a need for making improvements.

[Utility Model Summary]

Therefore, a main object of the present invention is to provide a low-resonance reciprocating motion mechanism. Compared with the prior art, the overall vibration of the low-resonance reciprocating motion mechanism during use can be significantly reduced, thereby avoiding human wrist injury.

Another object of the present invention is to provide a low-resonance reciprocating motion mechanism, which can centrally output massage actions to massage specific parts of the human body instead of massaging only the broad-areas of the human body as practiced in the prior art. In this way, the low-resonance reciprocating motion mechanism can be particularly implemented for massaging acupuncture points of the human body.

Therefore, to achieve the above objects, the low-resonance reciprocating motion mechanism provided in the present invention includes: a base provided with a hollow body; a shaft moving member provided with a shaft rod of a predetermined length, slidably placed inside the body, at least having one end of a rod shaft extending out of the body, and reciprocally axially movable in a rod shaft direction of the shaft rod, where a clamping piece is clamped at a predetermined position of a rod body of one end of the shaft rod; a driving member provided with a power piece, where an eccentric rotating shaft is eccentrically arranged on an output shaft end of the power piece and connected to the clamping piece for transmitting power outputted from the output shaft end of the power piece to the clamping piece, to drive the shaft rod to reciprocally and axially move; and an elastic member sandwiched

between the body and the shaft moving member for providing the shaft moving member with an elasticity corresponding to the rod shaft direction of the shaft rod.

[Embodiment Mode]

A preferred embodiment of the present invention is illustrated below, and a further description is provided with reference to the accompanying drawings.

FIG. 1 is a three-dimensional exploded view of a preferred embodiment of the present invention.

FIG. 2 is a three-dimensional external view of a preferred embodiment of the present invention.

FIG. 3 is a cross-sectional view of a preferred embodiment of the present invention in the direction of 3-3 in FIG. 2.

FIG. 4 is a cross-sectional view of a preferred embodiment of the present invention in the direction of 4-4 in FIG. 2.

FIG. 5 to FIG. 8 are schematic plan views of a preferred embodiment of the present invention, showing action schematics of the shaft moving member being driven to displace.

FIG. 9 shows shapes of massage heads of different models applied to a preferred embodiment of the present invention.

Referring to the figures, a low-resonance reciprocating motion mechanism (10) provided in a preferred embodiment of the present invention is formed by a base (20), a shaft moving member (30), a driving member (40), and an elastic member (50).

The base (20) is provided with a strip-shaped hollow body (21) formed by joining two half-shells and having two ends along a major axis being open. The interior is hollow and cylindrical. In addition, an internal space is divided by an annular projection (211) into a front area (212) and a rear area (213). A shaft sleeve (22) is coaxially embedded in the front area (212).

The shaft moving member (30) is provided with a shaft rod (31) of an appropriate length, is coaxially and slidably arranged inside the body (21), and has one end of a rod shaft passing through the shaft sleeve (22) to extend out of an opening at one end of the body (21). A clamping piece (32) is slidably arranged in a space of the rear area (213) inside the body (21) and clamped to the shaft rod (31). Furthermore, the clamping piece (32) is provided with an annular clamping sleeve (321) formed by joining two half-sleeves and is coaxially sleeved over the shaft rod (31). A long clamping slot (322) is cut into a rod body of the shaft rod (31) and has a major axis perpendicularly corresponds to the rod shaft of the shaft rod (31). A long clamping strip (323) is arranged protruding from an inner side ring surface of the clamping sleeve (321) and is correspondingly clamped to the clamping slot (322) to clamp and fix the clamping sleeve (31) to the shaft rod (31). A rectangular sliding groove (324) of an appropriate width is arranged recessed in an outer side end surface of the clamping sleeve (321).

The driving member (40) is provided with a motor power piece (41). A cylindrical connecting block (43) provided with a protruding eccentric rotating shaft (42) is coaxially and fixedly connected to the tail of an output shaft end (411) of the motor power piece (41). A bearing (44) has a diameter close to a width of the clamping slot (324) and is axially arranged on the eccentric rotating shaft (42) and slidably embedded in the sliding groove (324) to be displaceable in a major axis direction of the sliding groove (324).

The elastic member (50) is a spring coaxially sleeved over a rod body of the other end of the shaft rod (31) and having two ends respectively abutted against a corresponding end side of the clamping sleeve (321) and an inner side ring surface of a through opening at the other end of the body (21) for providing the shaft moving member (30) with an elasticity corresponding to a rod shaft direction of the shaft rod (31).

Through the composition of the components described above, the low-resonance reciprocating motion mechanism (10) is powered by the motor power piece (41), and the output shaft (411) drives the eccentric rotating shaft (42) to perform a circling motion. The bearing (44) drives the clamping sleeve (321) to axially reciprocate along the shaft rod (31), to drive the shaft rod (31) to axially and reciprocally make a linear displacement along the shaft rod (31), so that the tail of the end of the shaft rod (31) extending out of the body (21) forms repeated expanding and retracting pressing actions suitable for specific parts of a human body.

It needs to be particularly noted that when the shaft moving member (30) is driven by the driving member (40), the elastic member (50) absorbs a counteracting force generated during the actions of the shaft moving member (30), which can significantly reduce the resonance generated from the actions of the shaft moving member (30), thereby practically remedy the deficiency of causing discomfort to a user in the prior art.

Moreover, due to the low-resonance effect of the low-resonance reciprocating motion mechanism (10), when the low-resonance reciprocating motion mechanism (10) is used as a massage tool, the shaft moving member (30) can output high power without causing discomfort to a user. In this way, the massage tool using the low-resonance reciprocating motion mechanism (10) can massage deeper tissue parts of a human body. Compared with the prior art that only achieves a broad-area and superficial massage effect, the low-resonance reciprocating motion mechanism (10) clearly has enhanced efficacy.

Furthermore, the low-resonance reciprocating motion mechanism (10) can output high power through the shaft moving member (30), and therefore can massage deeper tissues of a human body. Therefore, the strength of the shaft rod (31) needs to be correspondingly enhanced. One of the feasible manners is to increase the size of the shaft rod (31). For example, a solid rod body with a diameter of 12 mm can be used for the shaft rod (31). Under the support of the shaft sleeve (22), the shaft rod (31) can be driven stably to reciprocate. Accordingly, the massage efficacy of the low-resonance reciprocating motion mechanism (10) massaging deeper tissues of a human body can be enhanced.

In addition, it should be noted that the end of the shaft rod (31) extending out of the body (21) can be used to be connected to various models of massage heads, so that according to the characteristics of tissues of different parts of a human body, for example, what is shown in FIG. 9 is a specific structure that can be applied. However, this is not a main technical feature of the present invention, so it will not be described in further detail and is only referenced here for disclosure purposes.

[Brief Description of the Drawings]

FIG. 1 is a three-dimensional exploded view of a preferred embodiment of the present invention.

FIG. 2 is a three-dimensional external view of a preferred embodiment of the present invention.

FIG. 3 is a cross-sectional view of a preferred embodiment of the present invention in a direction 3-3 in FIG. 2.

FIG. 4 is a cross-sectional view of a preferred embodiment of the present invention in a direction 4-4 in FIG. 2.

FIG. 5 to FIG. 8 are schematic plan views of a preferred embodiment of the present invention, showing action schematics of the shaft moving member being driven to displace.

FIG. 9 shows shapes of massage heads of different models applied to a preferred embodiment of the present invention.

[Description of the Main Component Numerals]

(10) Low-resonance reciprocating motion mechanism	(20) Base	(21) Body
(211) Annular projection	(212) Front area	(213) Rear area
(22) Shaft sleeve	(30) Shaft moving member	(31) Shaft rod
(32) Clamping piece	(321) Clamping sleeve	(322) Clamping slot
(323) Clamping strip	(324) Sliding groove	(40) Driving member
(41) Motor power piece	(411) Output shaft	(42) Eccentric rotating shaft
(43) Connecting block	(44) Bearing	(50) Elastic member

V. Abstract of the Utility Model in Chinese:

The present invention provides a low-resonance reciprocating motion mechanism, comprising: a base provided with a hollow body; a shaft moving member provided with a shaft rod of a predetermined length, slidably placed inside the body, at least having one end of a rod shaft extending out of the body, and reciprocally axially movable in a rod shaft direction of the shaft rod, wherein a clamping piece is clamped at a predetermined position of a rod body of one end of the shaft rod; a driving member provided with a power piece, wherein an eccentric rotating shaft is eccentrically arranged on an output shaft end of the power piece and connected to the clamping piece for transmitting power outputted from the output shaft end of the power piece to the clamping piece, to drive the shaft rod to reciprocally and axially move; and an elastic member sandwiched between the body and the shaft moving member for providing the shaft moving member with an elasticity corresponding to the rod shaft direction of the shaft rod.

VI. Abstract of the Utility Model in English:

IX. Claims:

1. A low-resonance reciprocating motion mechanism, comprising:
a base provided with a hollow body;
a shaft moving member provided with a shaft rod of a predetermined length, slidably placed inside the body, at least having one end of a rod shaft extending out of the body, and reciprocally axially movable in a rod shaft direction of the shaft rod, wherein a clamping piece is clamped at a predetermined position of a rod body of one end of the shaft rod;
a driving member provided with a power piece, wherein an eccentric rotating shaft is eccentrically arranged on an output shaft end of the power piece and connected to the clamping piece for transmitting power outputted from the output shaft end of the power piece to the clamping piece, to drive the shaft rod to reciprocally and axially move; and
an elastic member sandwiched between the body and the shaft moving member for providing the shaft moving member with an elasticity corresponding to the rod shaft direction of the shaft rod.
2. The low-resonance reciprocating motion mechanism according to claim 1, wherein the elastic member is located between the clamping piece and the body.
3. The low-resonance reciprocating motion mechanism according to claim 1 or 2, wherein the elastic member is a spring and is sleeved over the shaft rod.
4. The low-resonance reciprocating motion mechanism according to claim 1, wherein the clamping piece further comprises an annular clamping sleeve coaxially sleeved over and clamped to the shaft rod.
5. The low-resonance reciprocating motion mechanism according to claim 4, wherein the clamping piece further comprises a straight clamping strip arranged protruding from an inner side ring surface of the clamping sleeve, and a straight clamping slot is arranged recessed in a side of a rod body of the shaft rod for being correspondingly clamped to the clamping strip.
6. The low-resonance reciprocating motion mechanism according to claim 4, wherein the clamping piece is provided with a rectangular sliding groove having a predetermined length, arranged recessed in an outer side ring surface of the clamping sleeve, and having a major axis perpendicular to the rod shaft of the shaft rod for being connected to the eccentric rotating shaft.
7. The low-resonance reciprocating motion mechanism according to claim 6, wherein the driving member further comprises a bearing having a diameter close to a groove width of the sliding groove, embedded in the sliding groove, and slidable in a major axis direction of the sliding groove, to enable the eccentric rotating shaft to be axially connected to the bearing.
8. The low-resonance reciprocating motion mechanism according to claim 1, wherein the base further comprises a shaft sleeve positioned and fixedly arranged inside the body and coaxially and slidably connected to one end of the shaft rod.

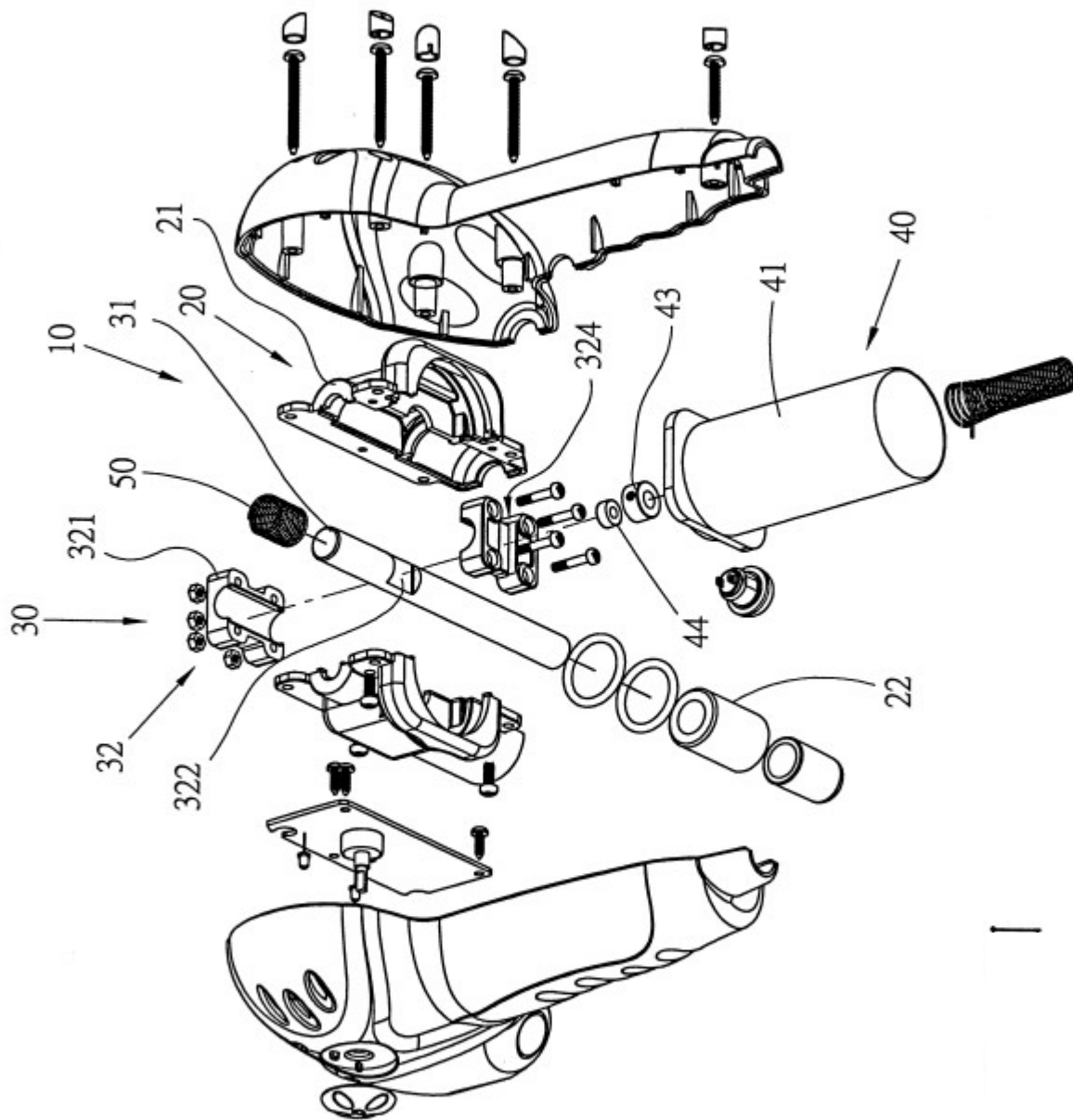


FIG. 1

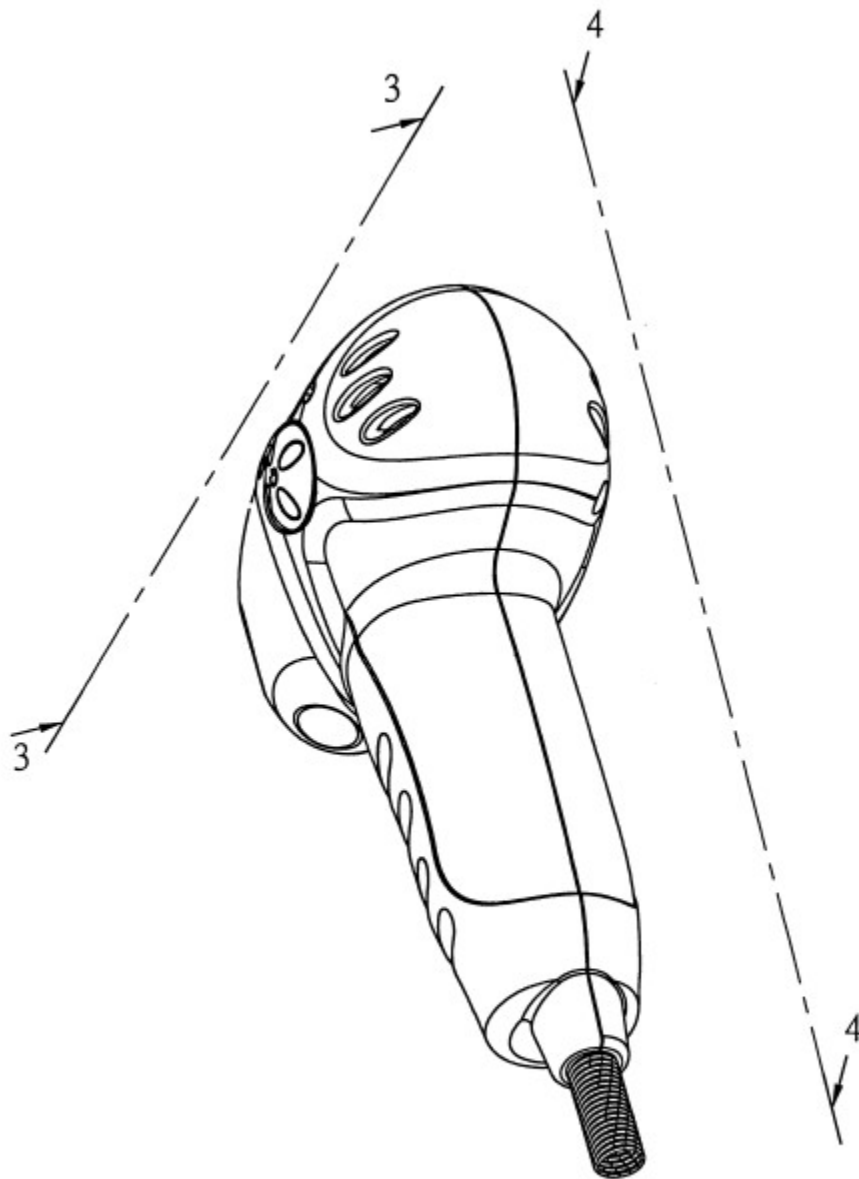


FIG. 2

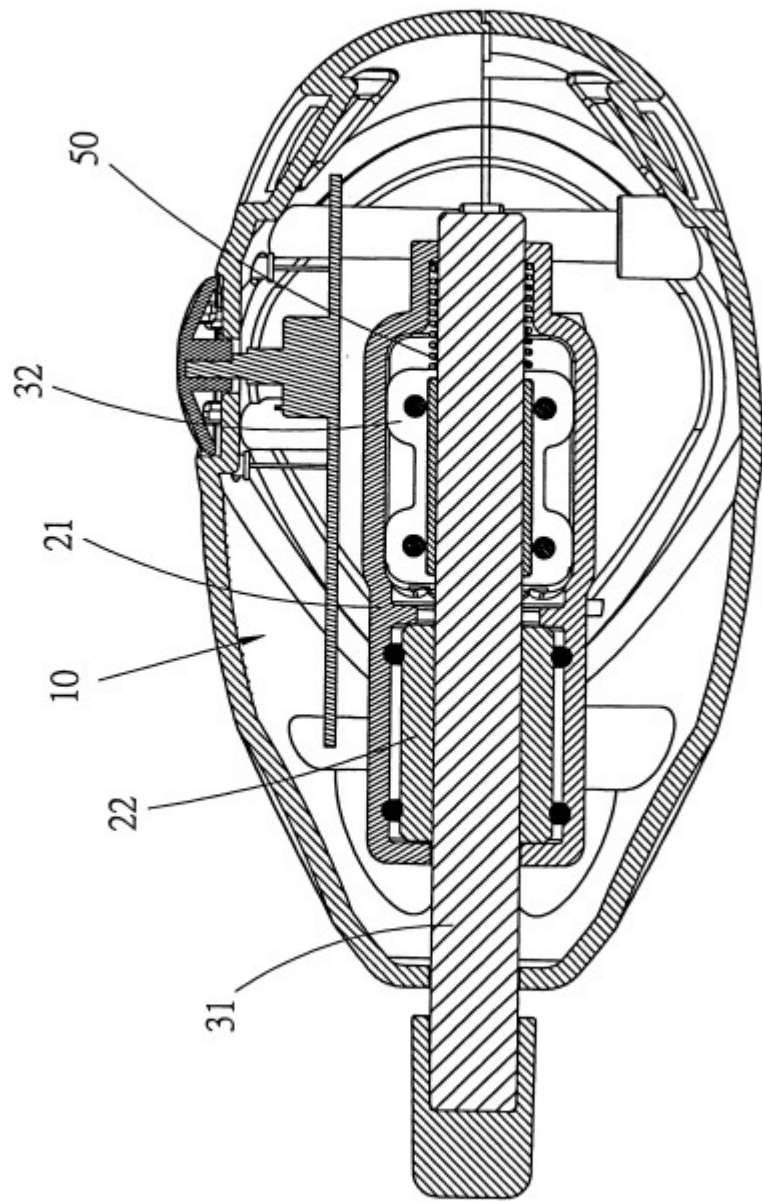


FIG. 3

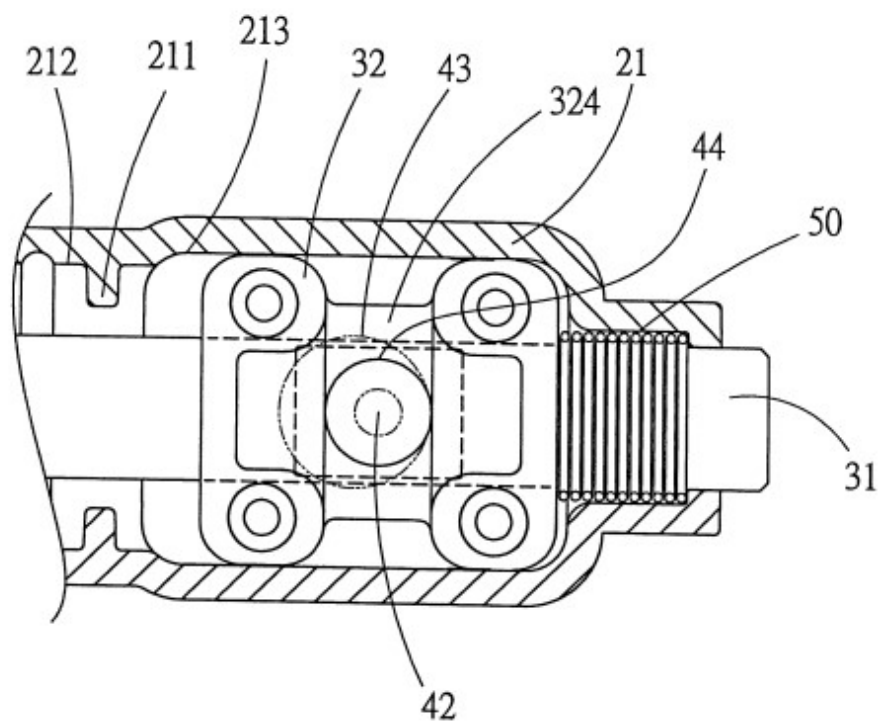


FIG. 5

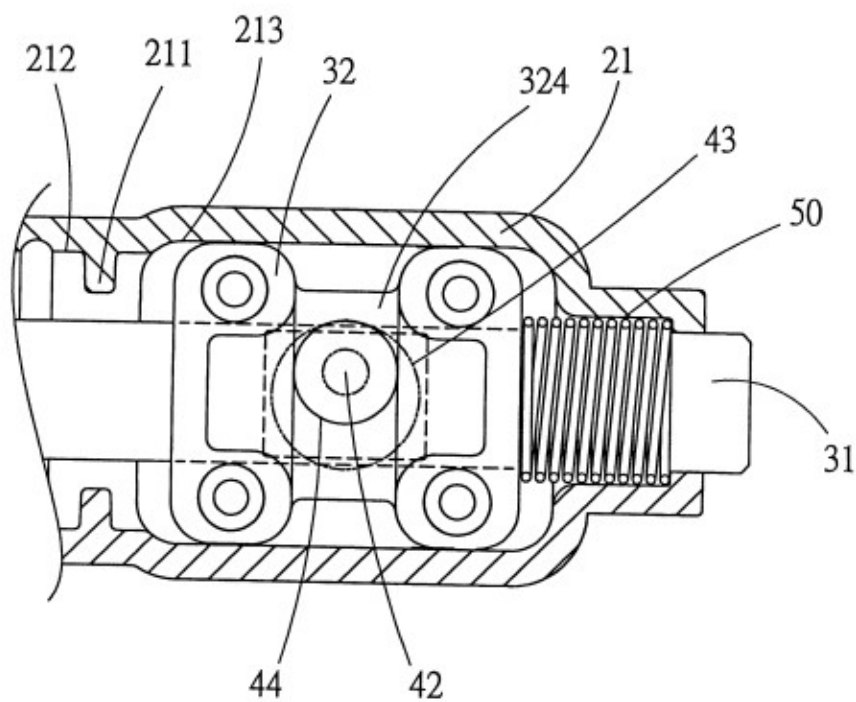


FIG. 6

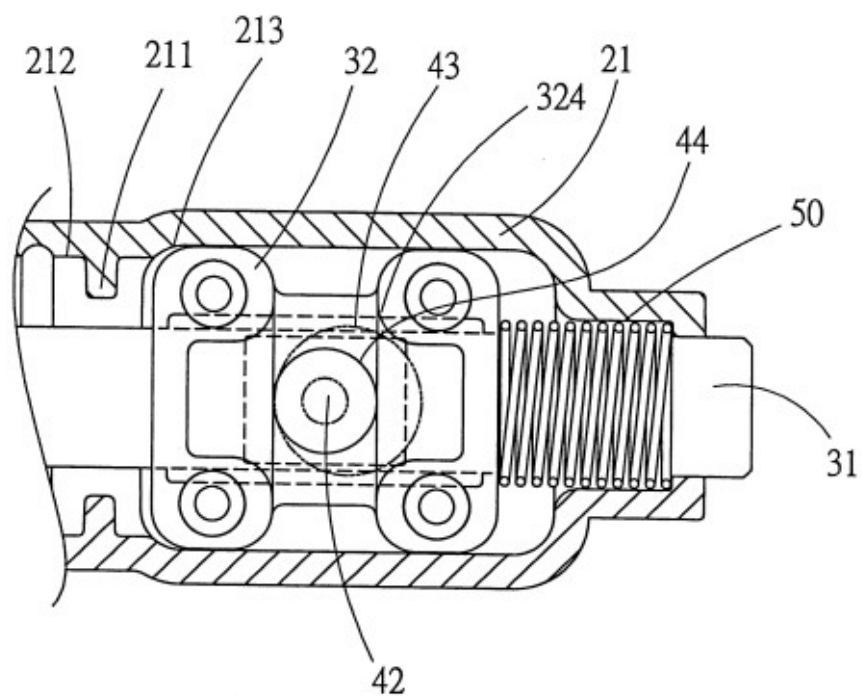


FIG. 7

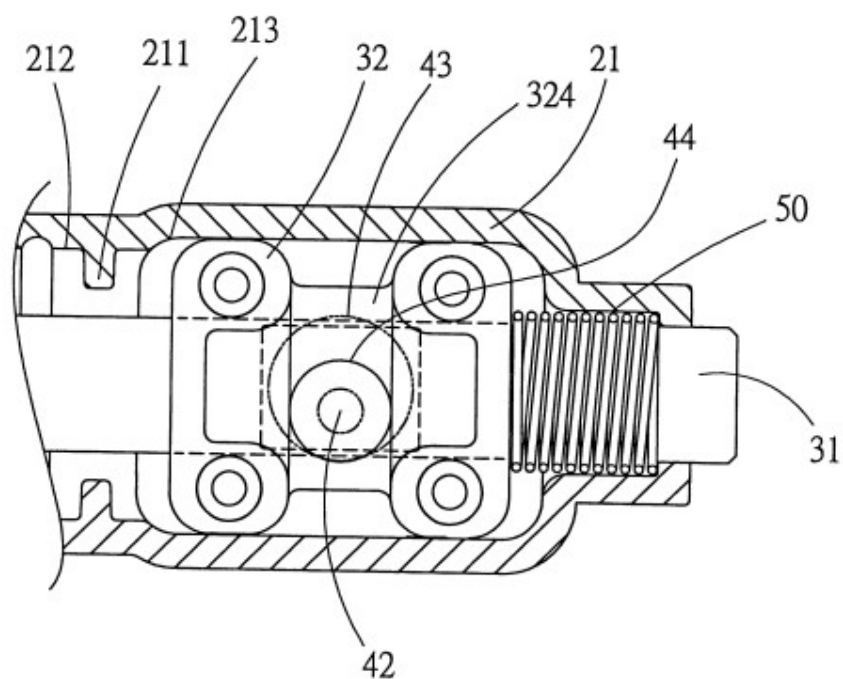


FIG. 8

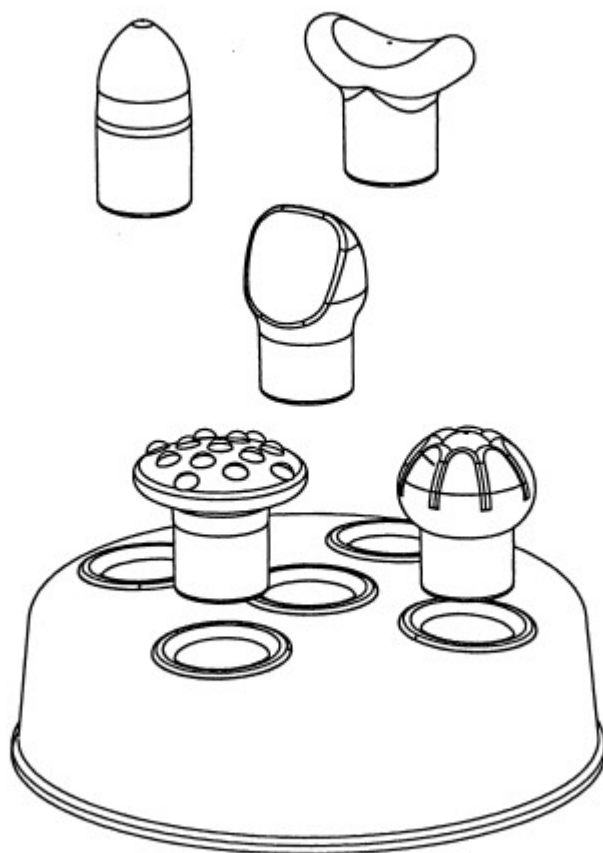


FIG. 9

VII. Designated Representative Drawing:

(I) The designated representative drawing for this case is: FIG. (4).

(II) Brief description of the main component numerals in this representative drawing:

(21) Body	(211) Annular projection	(212) Front area
(213) Rear area	(22) Shaft sleeve	(32) Clamping piece
(322) Clamping slot	(323) Clamping strip	(324) Sliding groove
(41) Motor power piece	(42) Eccentric rotating shaft	(43) Connecting block
(44) Bearing	(50) Elastic member	

Utility Model Patent Description

(Please do not alter the format, order, or bold text in the Specification. Do not fill in sections marked with ※)

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※ **IPC Classification:** A61H23/02(2006.01)

I. Title of the Invention: (Chinese/English)

LOW-RESONANCE RECIPROCATING MOTION MECHANISM

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