- U.S. Patent Application Serial No. 15/089,263, entitled SURGICAL INSTRUMENT HANDLE ASSEMBLY WITH RECONFIGURABLE GRIP PORTION;
- U.S. Patent Application Serial No. 15/089,262, entitled ROTARY POWERED SURGICAL INSTRUMENT WITH MANUALLY ACTUATABLE BAILOUT SYSTEM;
- U.S. Patent Application Serial No. 15/089,277, entitled SURGICAL CUTTING AND STAPLING END EFFECTOR WITH ANVIL CONCENTRIC DRIVE MEMBER;
- U.S. Patent Application Serial No. 15/089,283, entitled CLOSURE SYSTEM ARRANGEMENTS FOR SURGICAL CUTTING AND STAPLING DEVICES WITH SEPARATE AND DISTINCT FIRING SHAFTS;
- U.S. Patent Application Serial No. 15/089,296, entitled INTERCHANGEABLE SURGICAL TOOL ASSEMBLY WITH A SURGICAL END EFFECTOR THAT IS SELECTIVELY ROTATABLE ABOUT A SHAFT AXIS;
- U.S. Patent Application Serial No. 15/089,258, entitled SURGICAL STAPLING SYSTEM COMPRISING A SHIFTABLE TRANSMISSION;
- U.S. Patent Application Serial No. 15/089,278, entitled SURGICAL STAPLING SYSTEM CONFIGURED TO PROVIDE SELECTIVE CUTTING OF TISSUE;
- U.S. Patent Application Serial No. 15/089,284, entitled SURGICAL STAPLING SYSTEM COMPRISING A CONTOURABLE SHAFT;
- U.S. Patent Application Serial No. 15/089,295, entitled SURGICAL STAPLING SYSTEM COMPRISING A TISSUE COMPRESSION LOCKOUT;
- U.S. Patent Application Serial No. 15/089,300, entitled SURGICAL STAPLING SYSTEM COMPRISING AN UNCLAMPING LOCKOUT;
- U.S. Patent Application Serial No. 15/089,196 entitled SURGICAL STAPLING SYSTEM COMPRISING A JAW CLOSURE LOCKOUT;
- U.S. Patent Application Serial No. 15/089,203, entitled SURGICAL STAPLING SYSTEM COMPRISING A JAW ATTACHMENT LOCKOUT;
- U.S. Patent Application Serial No. 15/089,210, entitled SURGICAL STAPLING SYSTEM COMPRISING A SPENT CARTRIDGE LOCKOUT;
- U.S. Patent Application Serial No. 15/089,324, entitled SURGICAL INSTRUMENT COMPRISING A SHIFTING MECHANISM;
- U.S. Patent Application Serial No. 15/089,335, entitled SURGICAL STAPLING INSTRUMENT COMPRISING MULTIPLE LOCKOUTS;
- U.S. Patent Application Serial No. 15/089,339, entitled SURGICAL STAPLING INSTRUMENT;
- U.S. Patent Application Serial No. 15/089,253, entitled SURGICAL STAPLING SYSTEM CONFIGURED TO APPLY ANNULAR ROWS OF STAPLES HAVING DIFFERENT HEIGHTS;
- U.S. Patent Application Serial No. 15/089,304, entitled SURGICAL STAPLING SYSTEM COMPRISING A GROOVED FORMING POCKET;
- U.S. Patent Application Serial No. 15/089,331, entitled ANVIL MODIFICATION MEMBERS FOR SURGICAL STAPLERS;

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- U.S. Patent Application Serial No. 15/089,336, entitled STAPLE CARTRIDGES WITH ATRAUMATIC FEATURES;
- U.S. Patent Application Serial No. 15/089,312, entitled CIRCULAR STAPLING SYSTEM COMPRISING AN INCISABLE TISSUE SUPPORT;
- U.S. Patent Application Serial No. 15/089,309, entitled CIRCULAR STAPLING SYSTEM COMPRISING ROTARY FIRING SYSTEM; and
- U.S. Patent Application Serial No. 15/089,349, entitled CIRCULAR STAPLING SYSTEM COMPRISING LOAD CONTROL.

[0172] The Applicant of the present application also owns the U.S. Patent Applications identified below which were filed on December 31, 2015 which are each herein incorporated by reference in their respective entirety:

- U.S. Patent Application Serial No. 14/984,488, entitled MECHANISMS FOR COMPENSATING FOR BATTERY PACK FAILURE IN POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/984,525, entitled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS; and
- U.S. Patent Application Serial No. 14/984,552, entitled SURGICAL INSTRUMENTS WITH SEPARABLE MOTORS AND MOTOR CONTROL CIRCUITS.

[0173] The Applicant of the present application also owns the U.S. Patent Applications identified below which were filed on February 9, 2016 which are each herein incorporated by reference in their respective entirety:

- U.S. Patent Application Serial No. 15/019,220, entitled SURGICAL INSTRUMENT WITH ARTICULATING AND AXIALLY TRANSLATABLE END EFFECTOR;
- U.S. Patent Application Serial No. 15/019,228, entitled SURGICAL INSTRUMENTS WITH MULTIPLE LINK ARTICULATION ARRANGEMENTS;
- U.S. Patent Application Serial No. 15/019,196, entitled SURGICAL INSTRUMENT ARTICULATION MECHANISM WITH SLOTTED SECONDARY CONSTRAINT;
- U.S. Patent Application Serial No. 15/019,206, entitled SURGICAL INSTRUMENTS WITH AN END EFFECTOR THAT IS HIGHLY ARTICULATABLE RELATIVE TO AN ELONGATE SHAFT ASSEMBLY;
- U.S. Patent Application Serial No. 15/019,215, entitled SURGICAL INSTRUMENTS WITH NON¬ SYMMETRICAL ARTICULATION ARRANGEMENTS;
- U.S. Patent Application Serial No. 15/019,227, entitled ARTICULATABLE SURGICAL INSTRUMENTS WITH SINGLE ARTICULATION LINK ARRANGEMENTS;
- U.S. Patent Application Serial No. 15/019,235, entitled SURGICAL INSTRUMENTS WITH TENSIONING ARRANGEMENTS FOR CABLE DRIVEN ARTICULATION SYSTEMS;
- U.S. Patent Application Serial No. 15/019,230, entitled ARTICULATABLE SURGICAL INSTRUMENTS WITH OFF-AXIS FIRING BEAM ARRANGEMENTS; and
- U.S. Patent Application Serial No. 15/019,245, entitled SURGICAL INSTRUMENTS WITH CLOSURE STROKE REDUCTION ARRANGEMENTS.

[0174] The Applicant of the present application also owns the U.S. Patent Applications identified below which were filed on February 12, 2016 which are each herein incorporated by reference in their respective entirety:

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- U.S. Patent Application Serial No. 15/043,254, entitled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 15/043,259, entitled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 15/043,275, entitled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS; and
- U.S. Patent Application Serial No. 15/043,289, entitled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS.

[0175] Applicant of the present application owns the following patent applications that were filed on June 18, 2015 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 14/742,925, entitled SURGICAL END EFFECTORS WITH POSITIVE JAW OPENING ARRANGEMENTS;
- U.S. Patent Application Serial No. 14/742,941, entitled SURGICAL END EFFECTORS WITH DUAL CAM ACTUATED JAW CLOSING FEATURES;
- U.S. Patent Application Serial No. 14/742,914, entitled MOVABLE FIRING BEAM SUPPORT ARRANGEMENTS FOR ARTICULATABLE SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/742,900, entitled ARTICULATABLE SURGICAL INSTRUMENTS WITH COMPOSITE FIRING BEAM STRUCTURES WITH CENTER FIRING SUPPORT MEMBER FOR ARTICULATION SUPPORT;
- U.S. Patent Application Serial No. 14/742,885, entitled DUAL ARTICULATION DRIVE SYSTEM ARRANGEMENTS FOR ARTICULATABLE SURGICAL INSTRUMENTS; and
- U.S. Patent Application Serial No. 14/742,876, entitled PUSH/PULL ARTICULATION DRIVE SYSTEMS FOR ARTICULATABLE SURGICAL INSTRUMENTS.

[0176] Applicant of the present application owns the following patent applications that were filed on March 6, 2015 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 14/640,746, entitled POWERED SURGICAL INSTRUMENT;
- U.S. Patent Application Serial No. 14/640,795, entitled MULTIPLE LEVEL THRESHOLDS TO MODIFY OPERATION OF POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/640,832, entitled ADAPTIVE TISSUE COMPRESSION TECHNIQUES TO ADJUST CLOSURE RATES FOR MULTIPLE TISSUE TYPES; Attorney Docket No. END7557USNP/140482;
- U.S. Patent Application Serial No. 14/640,935, entitled OVERLAID MULTI SENSOR RADIO FREQUENCY (RF) ELECTRODE SYSTEM TO MEASURE TISSUE COMPRESSION;
- U.S. Patent Application Serial No. 14/640,831, entitled MONITORING SPEED CONTROL AND PRECISION INCREMENTING OF MOTOR FOR POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/640,859, entitled TIME DEPENDENT EVALUATION OF SENSOR DATA TO DETERMINE STABILITY, CREEP, AND VISCOELASTIC ELEMENTS OF MEASURES;

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- U.S. Patent Application Serial No. 14/640,817, entitled INTERACTIVE FEEDBACK SYSTEM FOR POWERED SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/640,844, entitled CONTROL TECHNIQUES AND SUB-PROCESSOR CONTAINED WITHIN MODULAR SHAFT WITH SELECT CONTROL PROCESSING FROM HANDLE;
- U.S. Patent Application Serial No. 14/640,837, entitled SMART SENSORS WITH LOCAL SIGNAL PROCESSING;
- U.S. Patent Application Serial No. 14/640,765, entitled SYSTEM FOR DETECTING THE MIS-INSERTION OF A STAPLE CARTRIDGE INTO A SURGICAL STAPLER;
- U.S. Patent Application Serial No. 14/640,799, entitled SIGNAL AND POWER COMMUNICATION SYSTEM POSITIONED ON A ROTATABLE SHAFT; and
- U.S. Patent Application Serial No. 14/640,780, entitled SURGICAL INSTRUMENT COMPRISING A LOCKABLE BATTERY HOUSING.

[0177] Applicant of the present application owns the following patent applications that were filed on February 27, 2015, and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 14/633,576, entitled SURGICAL INSTRUMENT SYSTEM COMPRISING AN INSPECTION STATION;
- U.S. Patent Application Serial No. 14/633,546, entitled SURGICAL APPARATUS CONFIGURED TO ASSESS WHETHER A PERFORMANCE PARAMETER OF THE SURGICAL APPARATUS IS WITHIN AN ACCEPTABLE PERFORMANCE BAND;
- U.S. Patent Application Serial No. 14/633,576, entitled SURGICAL CHARGING SYSTEM THAT CHARGES AND/OR CONDITIONS ONE OR MORE BATTERIES;
- U.S. Patent Application Serial No. 14/633,566, entitled CHARGING SYSTEM THAT ENABLES EMERGENCY RESOLUTIONS FOR CHARGING A BATTERY;
- U.S. Patent Application Serial No. 14/633,555, entitled SYSTEM FOR MONITORING WHETHER A SURGICAL INSTRUMENT NEEDS TO BE SERVICED;
- U.S. Patent Application Serial No. 14/633,542, entitled REINFORCED BATTERY FOR A SURGICAL INSTRUMENT;
- U.S. Patent Application Serial No. 14/633,548, entitled POWER ADAPTER FOR A SURGICAL INSTRUMENT;
- U.S. Patent Application Serial No. 14/633,526, entitled ADAPTABLE SURGICAL INSTRUMENT HANDLE;
- U.S. Patent Application Serial No. 14/633,541, entitled MODULAR STAPLING ASSEMBLY; and
- U.S. Patent Application Serial No. 14/633,562, entitled SURGICAL APPARATUS CONFIGURED TO TRACK AN END-OF-LIFE PARAMETER.

[0178] Applicant of the present application owns the following patent applications that were filed on December 18, 2014 and which are each herein incorporated by reference in their respective entireties:

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- U.S. Patent Application Serial No. 14/574,478, entitled SURGICAL INSTRUMENT SYSTEMS COMPRISING AN ARTICULATABLE END EFFECTOR AND MEANS FOR ADJUSTING THE FIRING STROKE OF A FIRING;
- U.S. Patent Application Serial No. 14/574,483, entitled SURGICAL INSTRUMENT ASSEMBLY COMPRISING LOCKABLE SYSTEMS;
- U.S. Patent Application Serial No. 14/575,139, entitled DRIVE ARRANGEMENTS FOR ARTICULATABLE SURGICAL INSTRUMENTS;
- U.S. Patent Application Serial No. 14/575,148, entitled LOCKING ARRANGEMENTS FOR DETACHABLE SHAFT ASSEMBLIES WITH ARTICULATABLE SURGICAL END EFFECTORS;
- U.S. Patent Application Serial No. 14/575,130, entitled SURGICAL INSTRUMENT WITH AN ANVIL THAT IS SELECTIVELY MOVABLE ABOUT A DISCRETE NON-MOVABLE AXIS RELATIVE TO A STAPLE CARTRIDGE;
- U.S. Patent Application Serial No. 14/575,143, entitled SURGICAL INSTRUMENTS WITH IMPROVED CLOSURE ARRANGEMENTS;
- U.S. Patent Application Serial No. 14/575,117, entitled SURGICAL INSTRUMENTS WITH ARTICULATABLE END EFFECTORS AND MOVABLE FIRING BEAM SUPPORT ARRANGEMENTS;
- U.S. Patent Application Serial No. 14/575,154, entitled SURGICAL INSTRUMENTS WITH ARTICULATABLE END EFFECTORS AND IMPROVED FIRING BEAM SUPPORT ARRANGEMENTS;
- U.S. Patent Application Serial No. 14/574,493, entitled SURGICAL INSTRUMENT ASSEMBLY COMPRISING A FLEXIBLE ARTICULATION SYSTEM; and
- U.S. Patent Application Serial No. 14/574,500, entitled SURGICAL INSTRUMENT ASSEMBLY COMPRISING A LOCKABLE ARTICULATION SYSTEM.

[0179] Applicant of the present application owns the following patent applications that were filed on March 1, 2013 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 13/782,295, entitled ARTICULATABLE SURGICAL INSTRUMENTS WITH CONDUCTIVE PATHWAYS FOR SIGNAL COMMUNICATION, now U.S. Patent Application Publication No. 2014/0246471;
- U.S. Patent Application Serial No. 13/782,323, entitled ROTARY POWERED ARTICULATION JOINTS FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0246472;
- U.S. Patent Application Serial No. 13/782,338, entitled THUMBWHEEL SWITCH ARRANGEMENTS FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0249557;
- U.S. Patent Application Serial No. 13/782,499, entitled ELECTROMECHANICAL SURGICAL DEVICE WITH SIGNAL RELAY ARRANGEMENT, now U.S. Patent Application Publication No. 2014/0246474;
- U.S. Patent Application Serial No. 13/782,460, entitled MULTIPLE PROCESSOR MOTOR CONTROL FOR MODULAR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0246478;
- U.S. Patent Application Serial No. 13/782,358, entitled JOYSTICK SWITCH ASSEMBLIES FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0246477;

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- U.S. Patent Application Serial No. 13/782,481, entitled SENSOR STRAIGHTENED END EFFECTOR DURING REMOVAL THROUGH TROCAR, now U.S. Patent Application Publication No. 2014/0246479;
- U.S. Patent Application Serial No. 13/782,518, entitled CONTROL METHODS FOR SURGICAL INSTRUMENTS WITH REMOVABLE IMPLEMENT PORTIONS, now U.S. Patent Application Publication No. 2014/0246475;
- U.S. Patent Application Serial No. 13/782,375, entitled ROTARY POWERED SURGICAL INSTRUMENTS WITH MULTIPLE DEGREES OF FREEDOM, now U.S. Patent Application Publication No. 2014/0246473; and
- U.S. Patent Application Serial No. 13/782,536, entitled SURGICAL INSTRUMENT SOFT STOP, now U.S. Patent Application Publication No. 2014/0246476.

[0180] Applicant of the present application also owns the following patent applications that were filed on March 14, 2013 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 13/803,097, entitled ARTICULATABLE SURGICAL INSTRUMENT COMPRISING A FIRING DRIVE, now U.S. Patent Application Publication No. 2014/0263542;
- U.S. Patent Application Serial No. 13/803,193, entitled CONTROL ARRANGEMENTS FOR A DRIVE MEMBER OF A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0263537;
- U.S. Patent Application Serial No. 13/803,053, entitled INTERCHANGEABLE SHAFT ASSEMBLIES FOR USE WITH A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0263564;
- U.S. Patent Application Serial No. 13/803,086, entitled ARTICULATABLE SURGICAL INSTRUMENT COMPRISING AN ARTICULATION LOCK, now U.S. Patent Application Publication No. 2014/0263541;
- U.S. Patent Application Serial No. 13/803,210, entitled SENSOR ARRANGEMENTS FOR ABSOLUTE POSITIONING SYSTEM FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0263538;
- U.S. Patent Application Serial No. 13/803,148, entitled MULTI-FUNCTION MOTOR FOR A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0263554;
- U.S. Patent Application Serial No. 13/803,066, entitled DRIVE SYSTEM LOCKOUT ARRANGEMENTS FOR MODULAR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0263565;
- U.S. Patent Application Serial No. 13/803,117, entitled ARTICULATION CONTROL SYSTEM FOR ARTICULATABLE SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0263553;
- U.S. Patent Application Serial No. 13/803,130, entitled DRIVE TRAIN CONTROL ARRANGEMENTS FOR MODULAR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0263543; and
- U.S. Patent Application Serial No. 13/803,159, entitled METHOD AND SYSTEM FOR OPERATING A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0277017.

[0181] Applicant of the present application also owns the following patent application that was filed on March 7, 2014 and is herein incorporated by reference in its entirety:

- U.S. Patent Application Serial No. 14/200,111, entitled CONTROL SYSTEMS FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2014/0263539.

[0182] Applicant of the present application also owns the following patent applications that were filed on March 26, 2014 and are each herein incorporated by reference in their respective entireties:

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- U.S. Patent Application Serial No. 14/226,106, entitled POWER MANAGEMENT CONTROL SYSTEMS FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2015/0272582;
- U.S. Patent Application Serial No. 14/226,099, entitled STERILIZATION VERIFICATION CIRCUIT, now U.S. Patent Application Publication No. 2015/0272581;
- U.S. Patent Application Serial No. 14/226,094, entitled VERIFICATION OF NUMBER OF BATTERY EXCHANGES/PROCEDURE COUNT, now U.S. Patent Application Publication No. 2015/0272580;
- U.S. Patent Application Serial No. 14/226,117, entitled POWER MANAGEMENT THROUGH SLEEP OPTIONS OF SEGMENTED CIRCUIT AND WAKE UP CONTROL, now U.S. Patent Application Publication No. 2015/0272574;
- U.S. Patent Application Serial No. 14/226,075, entitled MODULAR POWERED SURGICAL INSTRUMENT WITH DETACHABLE SHAFT ASSEMBLIES, now U.S. Patent Application Publication No. 2015/0272579;
- U.S. Patent Application Serial No. 14/226,093, entitled FEEDBACK ALGORITHMS FOR MANUAL BAILOUT SYSTEMS FOR SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2015/0272569;
- U.S. Patent Application Serial No. 14/226,116, entitled SURGICAL INSTRUMENT UTILIZING SENSOR ADAPTATION, now U.S. Patent Application Publication No. 2015/0272571;
- U.S. Patent Application Serial No. 14/226,071, entitled SURGICAL INSTRUMENT CONTROL CIRCUIT HAVING A SAFETY PROCESSOR, now U.S. Patent Application Publication No. 2015/0272578;
- U.S. Patent Application Serial No. 14/226,097, entitled SURGICAL INSTRUMENT COMPRISING INTERACTIVE SYSTEMS, now U.S. Patent Application Publication No. 2015/0272570;
- U.S. Patent Application Serial No. 14/226,126, entitled INTERFACE SYSTEMS FOR USE WITH SURGICAL INSTRUMENTS, now U.S. Patent Application Publication No. 2015/0272572;
- U.S. Patent Application Serial No. 14/226,133, entitled MODULAR SURGICAL INSTRUMENT SYSTEM, now U.S. Patent Application Publication No. 2015/0272557;
- U.S. Patent Application Serial No. 14/226,081, entitled SYSTEMS AND METHODS FOR CONTROLLING A SEGMENTED CIRCUIT, now U.S. Patent Application Publication No. 2015/0277471;
- U.S. Patent Application Serial No. 14/226,076, entitled POWER MANAGEMENT THROUGH SEGMENTED CIRCUIT AND VARIABLE VOLTAGE PROTECTION, now U.S. Patent Application Publication No. 2015/0280424;
- U.S. Patent Application Serial No. 14/226,111, entitled SURGICAL STAPLING INSTRUMENT SYSTEM, now U.S. Patent Application Publication No. 2015/0272583; and
- U.S. Patent Application Serial No. 14/226,125, entitled SURGICAL INSTRUMENT COMPRISING A ROTATABLE SHAFT, now U.S. Patent Application Publication No. 2015/0280384.

[0183] Applicant of the present application also owns the following patent applications that were filed on September 5, 2014 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 14/479,103, entitled CIRCUITRY AND SENSORS FOR POWERED MEDICAL DEVICE, now U.S. Patent Application Publication No. 2016/0066912;

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- U.S. Patent Application Serial No. 14/479,119, entitled ADJUNCT WITH INTEGRATED SENSORS TO QUANTIFY TISSUE COMPRESSION, now U.S. Patent Application Publication No. 2016/0066914;
- U.S. Patent Application Serial No. 14/478,908, entitled MONITORING DEVICE DEGRADATION BASED ON COMPONENT EVALUATION, now U.S. Patent Application Publication No. 2016/0066910;
- U.S. Patent Application Serial No. 14/478,895, entitled MULTIPLE SENSORS WITH ONE SENSOR AFFECTING A SECOND SENSOR'S OUTPUT OR INTERPRETATION, now U.S. Patent Application Publication No. 2016/0066909;
- U.S. Patent Application Serial No. 14/479,110, entitled USE OF POLARITY OF HALL MAGNET DETECTION TO DETECT MISLOADED CARTRIDGE, now U.S. Patent Application Publication No. 2016/0066915;
- U.S. Patent Application Serial No. 14/479,098, entitled SMART CARTRIDGE WAKE UP OPERATION AND DATA RETENTION, now U.S. Patent Application Publication No. 2016/0066911;
- U.S. Patent Application Serial No. 14/479,115, entitled MULTIPLE MOTOR CONTROL FOR POWERED MEDICAL DEVICE, now U.S. Patent Application Publication No. 2016/0066916; and
- U.S. Patent Application Serial No. 14/479,108, entitled LOCAL DISPLAY OF TISSUE PARAMETER STABILIZATION, now U.S. Patent Application Publication No. 2016/0066913.

[0184] Applicant of the present application also owns the following patent applications that were filed on April 9, 2014 and which are each herein incorporated by reference in their respective entireties:

- U.S. Patent Application Serial No. 14/248,590, entitled MOTOR DRIVEN SURGICAL INSTRUMENTS WITH LOCKABLE DUAL DRIVE SHAFTS, now U.S. Patent Application Publication No. 2014/0305987;
- U.S. Patent Application Serial No. 14/248,581, entitled SURGICAL INSTRUMENT COMPRISING A CLOSING DRIVE AND A FIRING DRIVE OPERATED FROM THE SAME ROTATABLE OUTPUT, now U.S. Patent Application Publication No. 2014/0305989;
- U.S. Patent Application Serial No. 14/248,595, entitled SURGICAL INSTRUMENT SHAFT INCLUDING SWITCHES FOR CONTROLLING THE OPERATION OF THE SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0305988;
- U.S. Patent Application Serial No. 14/248,588, entitled POWERED LINEAR SURGICAL STAPLER, now U.S. Patent Application Publication No. 2014/0309666;
- U.S. Patent Application Serial No. 14/248,591, entitled TRANSMISSION ARRANGEMENT FOR A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0305991;
- U.S. Patent Application Serial No. 14/248,584, entitled MODULAR MOTOR DRIVEN SURGICAL INSTRUMENTS WITH ALIGNMENT FEATURES FOR ALIGNING ROTARY DRIVE SHAFTS WITH SURGICAL END EFFECTOR SHAFTS, now U.S. Patent Application Publication No. 2014/0305994;
- U.S. Patent Application Serial No. 14/248,587, entitled POWERED SURGICAL STAPLER, now U.S. Patent Application Publication No. 2014/0309665;
- U.S. Patent Application Serial No. 14/248,586, entitled DRIVE SYSTEM DECOUPLING ARRANGEMENT FOR A SURGICAL INSTRUMENT, now U.S. Patent Application Publication No. 2014/0305990; and

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- U.S. Patent Application Serial No. 14/248,607, entitled MODULAR MOTOR DRIVEN SURGICAL INSTRUMENTS WITH STATUS INDICATION ARRANGEMENTS, now U.S. Patent Application Publication No. 2014/0305992.

[0185] Applicant of the present application also owns the following patent applications that were filed on April 16, 2013 and which are each herein incorporated by reference in their respective entireties:

- U.S. Provisional Patent Application Serial No. 61/812,365, entitled SURGICAL INSTRUMENT WITH MULTIPLE FUNCTIONS PERFORMED BY A SINGLE MOTOR;
- U.S. Provisional Patent Application Serial No. 61/812,376, entitled LINEAR CUTTER WITH POWER;
- U.S. Provisional Patent Application Serial No. 61/812,382, entitled LINEAR CUTTER WITH MOTOR AND PISTOL GRIP;
- U.S. Provisional Patent Application Serial No. 61/812,385, entitled SURGICAL INSTRUMENT HANDLE WITH MULTIPLE ACTUATION MOTORS AND MOTOR CONTROL; and
- U.S. Provisional Patent Application Serial No. 61/812,372, entitled SURGICAL INSTRUMENT WITH MULTIPLE FUNCTIONS PERFORMED BY A SINGLE MOTOR.

[0186] Numerous specific details are set forth to provide a thorough understanding of the overall structure, function, manufacture, and use of the embodiments as described in the specification and illustrated in the accompanying drawings. Well-known operations, components, and elements have not been described in detail so as not to obscure the embodiments described in the specification. The reader will understand that the embodiments described and illustrated herein are non-limiting examples, and thus it can be appreciated that the specific structural and functional details disclosed herein may be representative and illustrative. Variations and changes thereto may be made without departing from the scope of the claims.

[0187] The terms "comprise" (and any form of comprise, such as "comprises" and "comprising"), "have" (and any form of have, such as "has" and "having"), "include" (and any form of include, such as "includes" and "including") and "contain" (and any form of contain, such as "contains" and "containing") are open-ended linking verbs. As a result, a surgical system, device, or apparatus that "comprises," "has," "includes" or "contains" one or more elements possesses those one or more elements, but is not limited to possessing only those one or more elements. Likewise, an element of a system, device, or apparatus that "comprises," "has," "includes" or "contains" one or more features possesses those one or more features, but is not limited to possessing only those one or more features.

[0188] The terms "proximal" and "distal" are used herein with reference to a clinician manipulating the handle portion of the surgical instrument. The term "proximal" refers to the portion closest to the clinician and the term "distal" refers to the portion located away from the clinician. It will be further appreciated that, for convenience and clarity, spatial terms such as "vertical", "horizontal", "up", and "down" may be used herein with respect to the drawings. However, surgical instruments are used in many orientations and positions, and these terms are not intended to be limiting and/or absolute.

[0189] Various exemplary devices and methods are provided for performing laparoscopic and minimally invasive surgical procedures. However, the reader will readily appreciate that the various methods and devices disclosed herein can be used in numerous surgical procedures and applications including, for example, in connection with open surgical procedures. As the present Detailed Description proceeds, the reader will further appreciate that the various instruments

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disclosed herein can be inserted into a body in any way, such as through a natural orifice, through an incision or puncture hole formed in tissue, etc. The working portions or end effector portions of the instruments can be inserted directly into a patient's body or can be inserted through an access device that has a working channel through which the end effector and elongate shaft of a surgical instrument can be advanced.

[0190] A surgical stapling system can comprise a shaft and an end effector extending from the shaft. The end effector comprises a first jaw and a second jaw. The first jaw comprises a staple cartridge. The staple cartridge is insertable into and removable from the first jaw; however, other embodiments are envisioned in which a staple cartridge is not removable from, or at least readily replaceable from, the first jaw. The second jaw comprises an anvil configured to deform staples ejected from the staple cartridge. The second jaw is pivotable relative to the first jaw about a closure axis; however, other embodiments are envisioned in which first jaw is pivotable relative to the second jaw. The surgical stapling system further comprises an articulation joint configured to permit the end effector to be rotated, or articulated, relative to the shaft. The end effector is rotatable about an articulation axis extending through the articulation joint. Other embodiments are envisioned which do not include an articulation joint.

[0191] The staple cartridge comprises a cartridge body. The cartridge body includes a proximal end, a distal end, and a deck extending between the proximal end and the distal end. In use, the staple cartridge is positioned on a first side of the tissue to be stapled and the anvil is positioned on a second side of the tissue. The anvil is moved toward the staple cartridge to compress and clamp the tissue against the deck. Thereafter, staples removably stored in the cartridge body can be deployed into the tissue. The cartridge body includes staple cavities defined therein wherein staples are removably stored in the staple cavities. The staple cavities are arranged in six longitudinal rows. Three rows of staple cavities are positioned on a first side of a longitudinal slot and three rows of staple cavities are positioned on a second side of the longitudinal slot. Other arrangements of staple cavities and staples may be possible.

[0192] The staples are supported by staple drivers in the cartridge body. The drivers are movable between a first, or unfired position, and a second, or fired, position to eject the staples from the staple cavities. The drivers are retained in the cartridge body by a retainer which extends around the bottom of the cartridge body and includes resilient members configured to grip the cartridge body and hold the retainer to the cartridge body. The drivers are movable between their unfired positions and their fired positions by a sled. The sled is movable between a proximal position adjacent the proximal end and a distal position adjacent the distal end. The sled comprises a plurality of ramped surfaces configured to slide under the drivers and lift the drivers, and the staples supported thereon, toward the anvil.

[0193] Further to the above, the sled is moved distally by a firing member. The firing member is configured to contact the sled and push the sled toward the distal end. The longitudinal slot defined in the cartridge body is configured to receive the firing member. The anvil also includes a slot configured to receive the firing member. The firing member further comprises a first cam which engages the first jaw and a second cam which engages the second jaw. As the firing member is advanced distally, the first cam and the second cam can control the distance, or tissue gap, between the deck of the staple cartridge and the anvil. The firing member also comprises a knife configured to incise the tissue captured intermediate the staple cartridge and the anvil. It is desirable for the knife to be positioned at least partially proximal to the ramped surfaces such that the staples are ejected ahead of the knife.

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[0194] Before explaining various forms of mechanisms for compensating for drivetrain failure in powered surgical instruments in detail, it should be noted that the illustrative forms are not limited in application or use to the details of construction and arrangement of parts illustrated in the accompanying drawings and description. The illustrative forms may be implemented or incorporated in other forms, variations and modifications, and may be practiced or carried out in various ways. Further, unless otherwise indicated, the terms and expressions employed herein have been chosen for the purpose of describing the illustrative forms for the convenience of the reader and are not for the purpose of limitation thereof.

[0195] Further, it is understood that any one or more of the following-described forms, expressions of forms, examples, can be combined with any one or more of the other following-described forms, expressions of forms, and examples.

[0196] Various forms are directed to mechanisms for compensating for drivetrain failure in powered surgical instruments. In one form, the mechanisms for compensating for drivetrain failure in powered surgical instruments may be configured for use in open surgical procedures, but has applications in other types of surgery, such as laparoscopic, endoscopic, and robotic-assisted procedures.

[0197] FIGS. 1-18 depict various aspects of a surgical system that is generally designated as 10, and is in the form of a powered hand held electromechanical instrument configured for selective attachment thereto of a plurality of different end effectors that are each configured for actuation and manipulation by the powered hand held electromechanical surgical instrument. The aspects of FIGS. 1-18 are disclosed in U.S. Patent Application Publication No. 2014/01 10453, filed October 23, 2012, and titled SURGICAL INSTRUMENT WITH RAPID POST EVENT DETECTION, U.S. Patent Application Publication No. 2013/0282052, filed June 19, 2013, and titled APPARATUS FOR ENDOSCOPIC PROCEDURES, and U.S. Patent Application Publication No. 2013/0274722, filed May 10, 2013, and titled APPARATUS FOR ENDOSCOPIC PROCEDURES.

[0198] Referring to FIGS. 1-3, a surgical instrument 100 is configured for selective connection with an adapter 200, and, in turn, adapter 200 is configured for selective connection with an end effector or single use loading unit or reload 300. As illustrated in FIGS. 1-3, the surgical instrument 100 includes a handle housing 102 having a lower housing portion 104, an intermediate housing portion 106 extending from and/or supported on lower housing portion 104, and an upper housing portion 108 extending from and/or supported on intermediate housing portion 106. Intermediate housing portion 106 and upper housing portion 108 are separated into a distal half-section 110a that is integrally formed with and extending from the lower portion 104, and a proximal half-section 110b connectable to distal half-section 110a by a plurality of fasteners. When joined, distal and proximal half-sections 110a, 110b define a handle housing 102 having a cavity 102a therein in which a circuit board 150 and a drive mechanism 160 is situated.

[0199] Distal and proximal half-sections 110a, 110b are divided along a plane that traverses a longitudinal axis "X" of upper housing portion 108, as seen in FIGS. 2 and 3. Handle housing 102 includes a gasket 112 extending completely around a rim of distal half-section and/or proximal half-section 110a, 110b and being interposed between distal half-section 110a and proximal half-section 110b. Gasket 112 seals the perimeter of distal half-section 110a and proximal half-section 110b. Gasket 112 functions to establish an air-tight seal between distal half-section 110a and proximal half-section 110b such that circuit board 150 and drive mechanism 160 are protected from sterilization and/or cleaning procedures.

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[0200] In this manner, the cavity 102a of handle housing 102 is sealed along the perimeter of distal half-section 110a and proximal half-section 110b yet is configured to enable easier, more efficient assembly of circuit board 150 and a drive mechanism 160 in handle housing 102.

[0201] Intermediate housing portion 106 of handle housing 102 provides a housing in which circuit board 150 is situated. Circuit board 150 is configured to control the various operations of surgical instrument 100.

[0202] Lower housing portion 104 of surgical instrument 100 defines an aperture (not shown) formed in an upper surface thereof and which is located beneath or within intermediate housing portion 106. The aperture of lower housing portion 104 provides a passage through which wires 152 pass to electrically interconnect electrical components (a battery 156, as illustrated in FIG. 4, a circuit board 154, as illustrated in FIG. 3, etc.) situated in lower housing portion 104 with electrical components (circuit board 150, drive mechanism 160, etc.) situated in intermediate housing portion 106 and/or upper housing portion 108.

[0203] Handle housing 102 includes a gasket 103 disposed within the aperture of lower housing portion 104 (not shown) thereby plugging or sealing the aperture of lower housing portion 104 while allowing wires 152 to pass therethrough. Gasket 103 functions to establish an air-tight seal between lower housing portion 106 and intermediate housing portion 108 such that circuit board 150 and drive mechanism 160 are protected from sterilization and/or cleaning procedures.

[0204] As shown, lower housing portion 104 of handle housing 102 provides a housing in which a rechargeable battery 156, is removably situated. Battery 156 is configured to supply power to any of the electrical components of surgical instrument 100. Lower housing portion 104 defines a cavity (not shown) into which battery 156 is inserted. Lower housing portion 104 includes a door 105 pivotally connected thereto for closing cavity of lower housing portion 104 and retaining battery 156 therein.

[0205] With reference to FIGS. 3 and 5, distal half-section 110a of upper housing portion 108 defines a nose or connecting portion 108a. A nose cone 114 is supported on nose portion 108a of upper housing portion 108. Nose cone 114 is fabricated from a transparent material. A feedback indicator such as, for example, an illumination member 116 is disposed within nose cone 114 such that illumination member 116 is visible therethrough. Illumination member 116 is may be a light emitting diode printed circuit board (LED PCB). Illumination member 116 is configured to illuminate multiple colors with a specific color pattern being associated with a unique discrete event.

[0206] Upper housing portion 108 of handle housing 102 provides a housing in which drive mechanism 160 is situated. As illustrated in FIG. 5, drive mechanism 160 is configured to drive shafts and/or gear components in order to perform the various operations of surgical instrument 100. In particular, drive mechanism 160 is configured to drive shafts and/or gear components in order to selectively move tool assembly 304 of end effector 300 (see FIGS. 1 and 9) relative to proximal body portion 302 of end effector 300, to rotate end effector 300 about a longitudinal axis "X" (see FIG. 2) relative to handle housing 102, to move anvil assembly 306 relative to cartridge assembly 308 of end effector 300, and/or to fire a stapling and cutting cartridge within cartridge assembly 308 of end effector 300.

[0207] The drive mechanism 160 includes a selector gearbox assembly 162 that is located immediately proximal relative to adapter 200. Proximal to the selector gearbox assembly 162 is a function selection module 163 having a first motor 164 that functions to selectively move gear elements within the selector gearbox assembly 162 into engagement with an input drive component 165 having a second motor 166.

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[0208] As illustrated in FIGS. 1-4, and as mentioned above, distal half-section 110a of upper housing portion 108 defines a connecting portion 108a configured to accept a corresponding drive coupling assembly 210 of adapter 200.

[0209] As illustrated in FIGS. 6-8, connecting portion 108a of surgical instrument 100 has a cylindrical recess 108b that receives a drive coupling assembly 210 of adapter 200 when adapter 200 is mated to surgical instrument 100. Connecting portion 108a houses three rotatable drive connectors 118, 120, 122.

[0210] When adapter 200 is mated to surgical instrument 100, each of rotatable drive connectors 118, 120, 122 of surgical instrument 100 couples with a corresponding rotatable connector sleeve 218, 220, 222 of adapter 200 as shown in FIG. 6. In this regard, the interface between corresponding first drive connector 118 and first connector sleeve 218, the interface between corresponding second drive connector 120 and second connector sleeve 220, and the interface between corresponding third drive connector 122 and third connector sleeve 222 are keyed such that rotation of each of drive connectors 118, 120, 122 of surgical instrument 100 causes a corresponding rotation of the corresponding connector sleeve 218, 220, 222 of adapter 200.

[0211] The mating of drive connectors 118, 120, 122 of surgical instrument 100 with connector sleeves 218, 220, 222 of adapter 200 allows rotational forces to be independently transmitted via each of the three respective connector interfaces. The drive connectors 118, 120, 122 of surgical instrument 100 are configured to be independently rotated by drive mechanism 160. In this regard, the function selection module 163 of drive mechanism 160 selects which drive connector or connectors 118, 120, 122 of surgical instrument 100 is to be driven by the input drive component 165 of drive mechanism 160.

[0212] Since each of drive connectors 118, 120, 122 of surgical instrument 100 has a keyed and/or substantially non-rotatable interface with respective connector sleeves 218, 220, 222 of adapter 200, when adapter 200 is coupled to surgical instrument 100, rotational force(s) are selectively transferred from drive mechanism 160 of surgical instrument 100 to adapter 200.

[0213] The selective rotation of drive connector(s) 118, 120 and/or 122 of surgical instrument 100 allows surgical instrument 100 to selectively actuate different functions of end effector 300. Selective and independent rotation of first drive connector 118 of surgical instrument 100 corresponds to the selective and independent opening and closing of tool assembly 304 of end effector 300, and driving of a stapling/cutting component of tool assembly 304 of end effector 300. Also, the selective and independent rotation of second drive connector 120 of surgical instrument 100 corresponds to the selective and independent articulation of tool assembly 304 of end effector 300 transverse to longitudinal axis "X" (see FIG. 2). Additionally, the selective and independent rotation of third drive connector 122 of surgical instrument 100 corresponds to the selective and independent rotation of end effector 300 about longitudinal axis "X" (see FIG. 2) relative to handle housing 102 of surgical instrument 100.

[0214] As mentioned above and as illustrated in FIGS. 5 and 8, drive mechanism 160 includes a selector gearbox assembly 162; and a function selection module 163, located proximal to the selector gearbox assembly 162, that functions to selectively move gear elements within the selector gearbox assembly 162 into engagement with second motor 166. Thus, drive mechanism 160 selectively drives one of drive connectors 118, 120, 122 of surgical instrument 100 at a given time.

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[0215] As illustrated in FIGS. 1-3, handle housing 102 supports a control assembly 107 on a distal surface or side of intermediate housing portion 108. The control assembly 107 is a fully-functional mechanical subassembly that can be assembled and tested separately from the rest of the instrument 100 prior to coupling thereto.

[0216] Control assembly 107, in cooperation with intermediate housing portion 108, supports a pair of finger-actuated control buttons 124, 126 and a pair rocker devices 128, 130 within a housing 107a. The control buttons 124, 126 are coupled to extension shafts 125, 127 respectively. In particular, control assembly 107 defines an upper aperture 124a for slidably receiving the extension shaft 125, and a lower aperture 126a for slidably receiving the extension shaft 127.

[0217] The control assembly 107 and its components (e.g., control buttons 124, 126 and rocker devices 128, 130) my be formed from low friction, self-lubricating, lubricious plastics or materials or coatings covering the moving components to reduce actuation forces, key component wear, elimination of galling, smooth consistent actuation, improved component and assembly reliability and reduced clearances for a tighter fit and feel consistency. This includes the use of plastic materials in the bushings, rocker journals, plunger bushings, spring pockets, retaining rings and slider components. Molding the components in plastic also provides net-shape or mesh-shaped components with all of these performance attributes. Plastic components eliminate corrosion and bi-metal anodic reactions under electrolytic conditions such as autoclaving, steam sterilizations and cleaning Press fits with lubricious plastics and materials also eliminate clearances with minimal strain or functional penalties on the components when compared to similar metal components.

[0218] Suitable materials for forming the components of the control assembly 107 include, but are not limited to, polyamines, polyphenylene sulfides, polyphthalamides, polyphenylsulfones, polyether ketones, polytetrafluoroethylenes, and combinations thereof. These components may be used in the presence or absence of lubricants and may also include additives for reduced wear and frictional forces.

[0219] Reference may be made to a U.S. Patent Application Serial No. 13/33 1,047, now U.S. Patent No. 8,968,276, the entire contents of which are incorporated by reference herein, for a detailed discussion of the construction and operation of the surgical instrument 100.

[0220] The surgical instrument 100 includes a firing assembly configured to deploy or eject a plurality of staples into tissue captured by the end effector 300. The firing assembly comprises a drive assembly 360, as illustrated in FIG. 9. The drive assembly 360 includes a flexible drive beam 364 having a distal end which is secured to a dynamic clamping member 365, and a proximal engagement section 368. Engagement section 368 includes a stepped portion defining a shoulder 370. A proximal end of engagement section 368 includes diametrically opposed inwardly extending fingers 372. Fingers 372 engage a hollow drive member 374 to fixedly secure drive member 374 to the proximal end of beam 364. Drive member 374 defines a proximal porthole 376a which receives a connection member of drive tube 246 (FIG. 1) of adapter 200 when end effector 300 is attached to distal coupling 230 of adapter 200.

[0221] When drive assembly 360 is advanced distally within tool assembly 304, an upper beam 365a of clamping member 365 moves within a channel defined between anvil plate 312 and anvil cover 310 and a lower beam 365b moves over the exterior surface of carrier 316 to close tool assembly 304 and fire staples therefrom.

[0222] Proximal body portion 302 of end effector 300 includes a sheath or outer tube 301 enclosing an upper housing portion 301a and a lower housing portion 301b. The housing portions 301a and 301b enclose an articulation link 366 having a hooked proximal end 366a which extends from a proximal end of end effector 300. Hooked proximal end 366a

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of articulation link 366 engages a coupling hook (not shown) of adapter 200 when end effector 300 is secured to distal housing 232 of adapter 200. When drive bar 258 of adapter 200 is advanced or retracted as described above, articulation link 366 of end effector 300 is advanced or retracted within end effector 300 to pivot tool assembly 304 in relation to a distal end of proximal body portion 302.

[0223] As illustrated in FIG. 9 above, cartridge assembly 308 of tool assembly 304 includes a staple cartridge 305 supportable in carrier 316. The cartridge can be permanently installed in the end effector 300 or can be arranged so as to be removable and replaceable. Staple cartridge 305 defines a central longitudinal slot 305a, and three linear rows of staple retention slots 305b positioned on each side of longitudinal slot 305a. Each of staple retention slots 305b receives a single staple 307 and a portion of a staple pusher 309. During operation of instrument 100, drive assembly 360 abuts an actuation sled and pushes actuation sled through cartridge 305. As the actuation sled moves through cartridge 305, cam wedges of the actuation sled sequentially engage staple pushers 309 to move staple pushers 309 vertically within staple retention slots 305b and sequentially eject staples 307 therefrom for formation against anvil plate 312.

[0224] The hollow drive member 374 includes a lockout mechanism 373 that prevents a firing of previously fired end effectors 300. The lockout mechanism 373 includes a locking member 371 pivotally coupled within a distal porthole 376b via a pin 377, such that locking member 371 is pivotal about pin 377 relative to drive member 374.

[0225] With reference to FIGS. 10A and 10B, locking member 371 defines a channel 379 formed between elongate glides 381 and 383. Web 385 joins a portion of the upper surfaces of glides 381 and 383. Web 385 is configured and dimensioned to fit within the porthole 376b of the drive member 374. Horizontal ledges 389 and 391 extend from glides 381 and 383 respectively. As best shown in FIG. 9, a spring 393 is disposed within the drive member 374 and engages horizontal ledge 389 and/or horizontal ledge 391 to bias locking member 371 downward.

[0226] In operation, the locking member 371 is initially disposed in its pre-fired position at the proximal end of the housing portions 301a and 301b with horizontal ledge 389 and 391 resting on top of projections 303a, 303b formed in the sidewalk of housing portion 301b. In this position, locking member 371 is held up and out of alignment with a projection 303c formed in the bottom surface of housing portion 301b, distal of the projection 303a, 303b, and web 385 is in longitudinal juxtaposition with shoulder 370 defined in drive beam 364. This configuration permits the anvil 306 to be opened and repositioned onto the tissue to be stapled until the surgeon is satisfied with the position without activating locking member 371 to disable the disposable end effector 300.

[0227] Upon distal movement of the drive beam 364 by the drive tube 246, locking member 371 rides off of projections 303a, 303b and is biased into engagement with housing portion 301b by the spring 393, distal of projection 303c. Locking member 371 remains in this configuration throughout firing of the apparatus.

[0228] Upon retraction of the drive beam 364, after at least a partial firing, locking member 371 passes under projections 303a, 303b and rides over projection 303c of housing portion 301b until the distal-most portion of locking member 371 is proximal to projection 303c. The spring 393 biases locking member 371 into juxtaposed alignment with projection 303c, effectively disabling the disposable end effector. If an attempt is made to reactuate the apparatus, loaded with the existing end effector 300, the locking member 371 will abut projection 303c of housing portion 301b and will inhibit distal movement of the drive beam 364.

[0229] Another aspect of the instrument 100 is shown in FIG. 11. The instrument 100 includes the motor 164. The motor 164 may be any electrical motor configured to actuate one or more drives (e.g., rotatable drive connectors 118,

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120, 122 of FIG. 6). The motor 164 is coupled to the battery 156, which may be a DC battery (e.g., rechargeable lead-based, nickel-based, lithium-ion based, battery etc.), an AC/DC transformer, or any other power source suitable for providing electrical energy to the motor 164.

[0230] The battery 156 and the motor 164 are coupled to a motor driver circuit 404 disposed on the circuit board 154 which controls the operation of the motor 164 including the flow of electrical energy from the battery 156 to the motor 164. The driver circuit 404 includes a plurality of sensors 408a, 408b, . . . 408n configured to measure operational states of the motor 164 and the battery 156. The sensors 408a-n may include voltage sensors, current sensors, temperature sensors, pressure sensors, telemetry sensors, optical sensors, and combinations thereof. The sensors 408a-408n may measure voltage, current, and other electrical properties of the electrical energy supplied by the battery 156. The sensors 408a-408n may also measure rotational speed as revolutions per minute (RPM), torque, temperature, current draw, and other operational properties of the motor 164. RPM may be determined by measuring the rotation of the motor 164. Position of various drive shafts (e.g., rotatable drive connectors 118, 120, 122 of FIG. 6) may be determined by using various linear sensors disposed in or in proximity to the shafts or extrapolated from the RPM measurements. In aspects, torque may be calculated based on the regulated current draw of the motor 164 at a constant RPM. In further aspects, the driver circuit 404 and/or the controller 406 may measure time and process the above-described values as a function thereof, including integration and/or differentiation, e.g., to determine rate of change of the measured values and the like.

[0231] The driver circuit 404 is also coupled to a controller 406, which may be any suitable logic control circuit adapted to perform the calculations and/or operate according to a set of instructions. The controller 406 may include a central processing unit operably connected to a memory which may include transitory type memory (e.g., RAM) and/or non-transitory type memory (e.g., flash media, disk media, etc.). The controller 406 includes a plurality of inputs and outputs for interfacing with the driver circuit 404. In particular, the controller 406 receives measured sensor signals from the driver circuit 404 regarding operational status of the motor 164 and the battery 156 and, in turn, outputs control signals to the driver circuit 404 to control the operation of the motor 164 based on the sensor readings and specific algorithm instructions. The controller 406 is also configured to accept a plurality of user inputs from a user interface (e.g., switches, buttons, touch screen, etc. of the control assembly 107 coupled to the controller 406). A removable memory card or chip may be provided, or data can be downloaded wirelessly.

[0232] Referring to FIG. 12-18, a surgical system 10' is depicted. The surgical system 10' is similar in many respects to the surgical system 10. For example, the surgical system 10' includes the surgical instrument 100. Upper housing portion 108 of instrument housing 102 defines a nose or connecting portion 108a configured to accept a corresponding shaft coupling assembly 514 of a transmission housing 512 of a shaft assembly 500 that is similar in many respects to the shaft assembly 200.

[0233] The shaft assembly 500 has a force transmitting assembly for interconnecting the at least one drive member of the surgical instrument to at least one rotation receiving member of the end effector. The force transmitting assembly has a first end that is connectable to the at least one rotatable drive member and a second end that is connectable to the at least one rotation receiving member of the end effector. When shaft assembly 500 is mated to surgical instrument 100, each of rotatable drive members or connectors 118, 120, 122 of surgical instrument 100 couples with a corresponding rotatable connector sleeve 518, 520, 522 of shaft assembly 500 (see FIGS. 13 and 15). In this regard, the

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interface between corresponding first drive member or connector 118 and first connector sleeve 518, the interface between corresponding second drive member or connector 120 and second connector sleeve 520, and the interface between corresponding third drive member or connector 122 and third connector sleeve 522 are keyed such that rotation of each of drive members or connectors 118, 120, 122 of surgical instrument 100 causes a corresponding rotation of the corresponding connector sleeve 518, 520, 522 of shaft assembly 500.

[0234] The selective rotation of drive member(s) or connector(s) 118, 120 and/or 122 of surgical instrument 100 allows surgical instrument 100 to selectively actuate different functions of an end effector 400.

[0235] Referring to FIGS. 12 and 14, the shaft assembly 500 includes an elongate, substantially rigid, outer tubular body 510 having a proximal end 510a and a distal end 510b and a transmission housing 212 connected to proximal end 210a of tubular body 510 and being configured for selective connection to surgical instrument 100. In addition, the shaft assembly 500 further includes an articulating neck assembly 530 connected to distal end 510b of elongate body portion 510.

[0236] Transmission housing 512 is configured to house a pair of gear train systems therein for varying a speed/force of rotation (e.g., increase or decrease) of first, second and/or third rotatable drive members or connectors 118, 120, and/or 122 of surgical instrument 100 before transmission of such rotational speed/force to the end effector 501. As seen in FIG. 15, transmission housing 512 and shaft coupling assembly 514 rotatably support a first proximal or input drive shaft 524a, a second proximal or input drive shaft 526a, and a third drive shaft 528.

[0237] Shaft drive coupling assembly 514 includes a first, a second and a third biasing member 518a, 520a and 522a disposed distally of respective first, second and third connector sleeves 518, 520, 522. Each of biasing members 518a, 520a and 522a is disposed about respective first proximal drive shaft 524a, second proximal drive shaft 526a, and third drive shaft 228. Biasing members 518a, 520a and 522a act on respective connector sleeves 518, 520 and 522 to help maintain connector sleeves 218, 220 and 222 engaged with the distal end of respective drive rotatable drive members or connectors 118, 120, 122 of surgical instrument 100 when shaft assembly 500 is connected to surgical instrument 100.

[0238] Shaft assembly 500 includes a first and a second gear train system 540, 550, respectively, disposed within transmission housing 512 and tubular body 510, and adjacent coupling assembly 514. As mentioned above, each gear train system 540, 550 is configured and adapted to vary a speed/force of rotation (e.g., increase or decrease) of first and second rotatable drive connectors 118 and 120 of surgical instrument 100 before transmission of such rotational speed/force to end effector 501.

[0239] As illustrated in FIGS. 15 and 16, first gear train system 540 includes first input drive shaft 524a, and a first input drive shaft spur gear 542a keyed to first input drive shaft 524a. First gear train system 540 also includes a first transmission shaft 544 rotatably supported in transmission housing 512, a first input transmission spur gear 544 a keyed to first transmission shaft 544 and engaged with first input drive shaft spur gear 542a, and a first output transmission spur gear 544b keyed to first transmission shaft 544. First gear train system 540 further includes a first output drive shaft 546a rotatably supported in transmission housing 512 and tubular body 510, and a first output drive shaft spur gear 546b keyed to first output drive shaft 546a and engaged with first output transmission spur gear 544b.

[0240] In at least one instance, the first input drive shaft spur gear 542a includes 10 teeth; first input transmission spur gear 544a includes 18 teeth; first output transmission spur gear 544b includes 13 teeth; and first output drive shaft spur

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gear 546b includes 15 teeth. As so configured, an input rotation of first input drive shaft 524a is converted to an output rotation of first output drive shaft 546a by a ratio of 1:2.08.

[0241] In operation, as first input drive shaft spur gear 542a is rotated, due to a rotation of first connector sleeve 558 and first input drive shaft 524a, as a result of the rotation of the first respective drive connector 118 of surgical instrument 100, first input drive shaft spur gear 542a engages first input transmission spur gear 544a causing first input transmission spur gear 544a to rotate. As first input transmission spur gear 544a rotates, first transmission shaft 544 is rotated and thus causes first output drive shaft spur gear 546b, that is keyed to first transmission shaft 544, to rotate. As first output drive shaft spur gear 546b rotates, since first output drive shaft spur gear 546b is engaged therewith, first output drive shaft spur gear 546b is also rotated. As first output drive shaft spur gear 546b rotates, since first output drive shaft spur gear 546b is keyed to first output drive shaft 546a, first output drive shaft 546a is rotated.

[0242] The shaft assembly 500, including the first gear system 540, functions to transmit operative forces from surgical instrument 100 to end effector 501 in order to operate, actuate and/or fire end effector 501.

[0243] As illustrated in FIGS. 15 and 17, second gear train system 550 includes second input drive shaft 526a, and a second input drive shaft spur gear 552a keyed to second input drive shaft 526a. Second gear train system 550 also includes a first transmission shaft 554 rotatably supported in transmission housing 512, a first input transmission spur gear 554a keyed to first transmission shaft 554 and engaged with second input drive shaft spur gear 552a, and a first output transmission spur gear 554b keyed to first transmission shaft 554.

[0244] Second gear train system 550 further includes a second transmission shaft 556 rotatably supported in transmission housing 512, a second input transmission spur gear 556a keyed to second transmission shaft 556 and engaged with first output transmission spur gear 554b that is keyed to first transmission shaft 554, and a second output transmission spur gear 556b keyed to second transmission shaft 556.

[0245] Second gear train system 550 additionally includes a second output drive shaft 558a rotatably supported in transmission housing 512 and tubular body 510, and a second output drive shaft spur gear 558b keyed to second output drive shaft 558a and engaged with second output transmission spur gear 556b.

[0246] In at least one instance, the second input drive shaft spur gear 552a includes 10 teeth; first input transmission spur gear 554a includes 20 teeth; first output transmission spur gear 554b includes 10 teeth; second input transmission spur gear 556a includes 20 teeth; second output transmission spur gear 556b includes 10 teeth; and second output drive shaft spur gear 558b includes 15 teeth. As so configured, an input rotation of second input drive shaft 526a is converted to an output rotation of second output drive shaft 558a by a ratio of 1:6.

[0247] In operation, as second input drive shaft spur gear 552a is rotated, due to a rotation of second connector sleeve 560 and second input drive shaft 526a, as a result of the rotation of the second respective drive connector 120 of surgical instrument 100, second input drive shaft spur gear 552a engages first input transmission spur gear 554a causing first input transmission spur gear 554a to rotate. As first input transmission spur gear 554a rotates, first transmission shaft 554 is rotated and thus causes first output transmission spur gear 554b, that is keyed to first transmission shaft 554, to rotate. As first output transmission spur gear 554b rotates, since second input transmission spur gear 556a is engaged therewith, second input transmission spur gear 556a is also rotated. As second input transmission spur gear 556a rotates, second transmission shaft 256 is rotated and thus causes second output transmission spur gear 256b, that is keyed to second transmission shaft 556, to rotate. As second output transmission spur gear 556b rotates, since second output

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drive shaft spur gear 558b is engaged therewith, second output drive shaft spur gear 558b is rotated. As second output drive shaft spur gear 558b rotates, since second output drive shaft spur gear 558b is keyed to second output drive shaft 558a, second output drive shaft 558a is rotated.

[0248] The shaft assembly 500, including second gear train system 550, functions to transmit operative forces from surgical instrument 100 to end effector 501 in order rotate shaft assembly 500 and/or end effector 501 relative to surgical instrument 100.

[0249] As illustrated in FIGS. 15 and 18, the transmission housing 512 and shaft coupling assembly 514 rotatably support a third drive shaft 528. Third drive shaft 528 includes a proximal end 528a configured to support third connector sleeve 522, and a distal end 528b extending to and operatively connected to an articulation assembly 570.

[0250] As illustrated in FIG. 14, elongate, outer tubular body 510 of shaft assembly 500 includes a first half section 511a and a second half section 511b defining at least three longitudinally extending channels through outer tubular body 510 when half sections 511a, 511b are mated with one another. The channels are configured and dimensioned to rotatably receive and support first output drive shaft 546a, second output drive shaft 558a, and third drive shaft 528 as first output drive shaft 546a, second output drive shaft 558a, and third drive shaft 528 extend from transmission housing 512 to articulating neck assembly 530. Each of first output drive shaft 546a, second output drive shaft 558a, and third drive shaft 528 are elongate and sufficiently rigid to transmit rotational forces from transmission housing 520 to articulating neck assembly 530.

[0251] Turning to FIG. 14, the shaft assembly 500 further includes an articulating neck assembly 530. The articulating neck assembly 530 includes a proximal neck housing 532, a plurality of links 534 connected to and extending in series from proximal neck housing 532; and a distal neck housing 536 connected to and extending from a distal-most link of the plurality of links 534. It is contemplated that, in any of the aspects disclosed herein, that the shaft assembly may have a single link or pivot member for allowing the articulation of the end effector. It is contemplated that, in any of the aspects disclosed herein, that the distal neck housing can be incorporated with the distal most link.

[0252] The entire disclosures of:

U.S. Patent Application Publication No. 2014/0110453, filed October 23, 2012, and titled SURGICAL INSTRUMENT WITH RAPID POST EVENT DETECTION;

U.S. Patent Application Publication No. 2013/0282052, filed June 19, 2013, and titled APPARATUS FOR ENDOSCOPIC PROCEDURES; and

U.S. Patent Application Publication No. 2013/0274722, filed May 10, 2013, and titled APPARATUS FOR ENDOSCOPIC PROCEDURES, are hereby incorporated by reference herein.

[0253] Referring to FIGS. 19-20, a surgical instrument 1010 is depicted. The surgical instrument 1010 is similar in many respects to the surgical instrument 100. For example, the surgical instrument 1010 is configured for selective connection with the end effector or single use loading unit or reload 300 via the adapter 200. Also, the surgical instrument 1010 includes a handle housing 102 that includes a lower housing portion 104, an intermediate housing portion 106, and an upper housing portion 108.

[0254] Like the surgical instrument 100, the surgical instrument 1010 includes a drive mechanism 160 which is configured to drive shafts and/or gear components in order to perform the various operations of surgical instrument 1010. In at least one instance, the drive mechanism 160 includes a rotation drivetrain 1012 (See FIG. 20) configured to

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rotate end effector 300 about a longitudinal axis "X" (see FIG. 2) relative to handle housing 102. The drive mechanism 160 further includes a closure drivetrain 1014 (See FIG. 20) configured to move the anvil assembly 306 relative to the cartridge assembly 308 of the end effector 300 to capture tissue therebetween. In addition, the drive mechanism 160 includes a firing drivetrain 1016 (See FIG. 20) configured to fire a stapling and cutting cartridge within the cartridge assembly 308 of the end effector 300.

[0255] As described above, referring primarily to FIGS. 7, 8, and 20, the drive mechanism 160 includes a selector gearbox assembly 162 that can be located immediately proximal relative to adapter 200. Proximal to the selector gearbox assembly 162 is the function selection module 163 which includes the first motor 164 that functions to selectively move gear elements within the selector gearbox assembly 162 to selectively position one of the drivetrains 1012, 1014, and 1016 into engagement with the input drive component 165 of the second motor 166.

[0256] Referring to FIG. 20, the motors 164 and 166 are coupled to motor control circuits 1018 and 1018', respectively, which are configured to control the operation of the motors 164 and 66 including the flow of electrical energy from a power source 156 to the motors 164 and 166. The power source 156 may be a DC battery (e.g., rechargeable lead-based, nickel-based, lithium-ion based, battery etc.), an AC/DC transformer, or any other power source suitable for providing electrical energy to the surgical instrument 1010.

[0257] The surgical instrument 1010 further includes a microcontroller 1020 ("controller"). In certain instances, the controller 1020 may include a microprocessor 1036 ("processor") and one or more computer readable mediums or memory units 1038 ("memory"). In certain instances, the memory 1038 may store various program instructions, which when executed may cause the processor 1036 to perform a plurality of functions and/or calculations described herein. The power source 156 can be configured to supply power to the controller 1020, for example.

[0258] The processor 1036 can be in communication with the motor control circuit 1018. In addition, the memory 1038 may store program instructions, which when executed by the processor 1036 in response to a user input 1034, may cause the motor control circuit 1018 to motivate the motor 164 to generate at least one rotational motion to selectively move gear elements within the selector gearbox assembly 162 to selectively position one of the drivetrains 1012, 1014, and 1016 into engagement with the input drive component 165 of the second motor 166. Furthermore, the processor 1036 can be in communication with the motor control circuit 1018'. The memory 1038 may also store program instructions, which when executed by the processor 1036 in response to a user input 1034, may cause the motor control circuit 1018' to motivate the motor 166 to generate at least one rotational motion to drive the drivetrain engaged with the input drive component 165 of the second motor 166, for example.

[0259] The controller 1020 and/or other controllers of the present disclosure may be implemented using integrated and/or discrete hardware elements, software elements, and/or a combination of both. Examples of integrated hardware elements may include processors, microprocessors, microcontrollers, integrated circuits, ASICs, PLDs, DSPs, FPGAs, logic gates, registers, semiconductor devices, chips, microchips, chip sets, microcontrollers, SoC, and/or SIP. Examples of discrete hardware elements may include circuits and/or circuit elements such as logic gates, field effect transistors, bipolar transistors, resistors, capacitors, inductors, and/or relays. In certain instances, the controller 1020 may include a hybrid circuit comprising discrete and integrated circuit elements or components on one or more substrates, for example.

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[0260] In certain instances, the controller 1020 and/or other controllers of the present disclosure may be an LM 4F230H5QR, available from Texas Instruments, for example. In certain instances, the Texas Instruments LM4F230H5QR is an ARM Cortex-M4F Processor Core comprising on-chip memory of 256 KB single-cycle flash memory, or other non-volatile memory, up to 40 MHz, a prefetch buffer to improve performance above 40 MHz, a 32 KB single-cycle SRAM, internal ROM loaded with StellarisWare® software, 2KB EEPROM, one or more PWM modules, one or more QEI analog, one or more 12-bit ADC with 12 analog input channels, among other features that are readily available. Other microcontrollers may be readily substituted for use with the present disclosure. Accordingly, the present disclosure should not be limited in this context.

[0261] In various instances, one or more of the various steps described herein can be performed by a finite state machine comprising either a combinational logic circuit or a sequential logic circuit, where either the combinational logic circuit or the sequential logic circuit is coupled to at least one memory circuit. The at least one memory circuit stores a current state of the finite state machine. The combinational or sequential logic circuit is configured to cause the finite state machine to the steps. The sequential logic circuit may be synchronous or asynchronous. In other instances, one or more of the various steps described herein can be performed by a circuit that includes a combination of the processor 1036 and the finite state machine, for example.

[0262] Referring again to FIG. 20, the surgical instrument 1010 further includes a drivetrain failure detection module 1040. The processor 1036 can be in communication with or otherwise control the module 1040. The module 1040 can be embodied as various means, such as circuitry, hardware, a computer program product comprising a computer readable medium (for example, the memory 1038) storing computer readable program instructions that are executable by a processing device (for example, the processor 1036), or some combination thereof. In some aspects, the processor 1036 can include, or otherwise control the module 1040.

[0263] Referring to FIG. 20, the module 1040 may include one or more sensors (not shown) which can be configured to detect an acute drivetrain failure in one or more of the drivetrains 1012, 1014, and 1016.

[0264] Referring to FIG. 20, the module 1040 can be configured to detect an acute failure in an active drivetrain of the surgical instrument 1010. The term "active" as used herein in connection with the drivetrains 1012, 1014, and 1016 refers to a selected drivetrain that is engaged with the input drive component 165 and is driven by the second motor 166. The term "acute failure" as used herein refers to a failure that can cause one or more of the drivetrains 1012, 1014, and 1016, for example, to operate at less than optimal performance levels. One example of an acute drivetrain failure may involve a tooth damage to one or more of the gears of an active drivetrain and/or or excessive slop in the active drivetrain.

[0265] In the event of an acute drivetrain failure, the active drivetrain may still be operated to complete a surgical step or to reset the surgical instrument 1010; however, certain precautionary and/or safety steps can be taken, as described below in greater detail, to avoid or minimize additional damage to the active drivetrain and/or other components of the surgical instrument 1010. Alternatively, in the event of a catastrophic failure, the active drivetrain is rendered inoperable, and certain bailout steps are taken to ensure, among other things, a safe detachment of the surgical instrument 1010 from the tissue being treated.

[0266] Referring again to FIG. 21, a logic diagram 1021 represents possible operations that can be implemented by the surgical instrument 1010 in response to active drivetrain failures. The memory 1038 may include program instructions,

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which when executed by the processor 1036, may cause the processor 1036 to employ the module 1040 to continuously detect 1023 active dnvetrain failures. The memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to respond to a detected acute drivetrain failure by activating a safe mode 1022 of operation, for example. In addition, the memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to respond to a detected catastrophic drivetrain failure by activating a recovery or bailout mode 1022. If no drivetrain failures are detected, the processor 1036 may permit the surgical instrument 1010 to continue 1027 with normal operations until an active drivetrain failure is detected.

[0267] Referring to FIG. 22, the safe mode 1022 may include one or more steps such as, for example, a motor modulation step 1026 which can be employed by the processor 1036 to limit the speed of an active drivetrain. For example, if the firing drivetrain 1016 is being actively driven by the motor 166 during a firing sequence, a detection of an acute drivetrain failure by the module 1040 may cause the processor 1036 to communicate to the motor drive circuit 1018' instructions to cause the mechanical output of the motor 166 to be reduced. A reduction in the mechanical output of the motor 166 reduces the speed of the active drivetrain 1016 which ensures safe completion of the firing sequence and/or resetting of the active drivetrain 1016 to an original or starting positon.

[0268] Likewise, if the closure drivetrain 10 14 is being actively driven by the motor 166 during a closure motion to capture tissue by the end effector 300, a detection of an acute drivetrain failure by the module 1040 may cause the processor 1036 to communicate to the motor drive circuit 1018' instructions to cause the mechanical output of motor 166 to be reduced. A reduction in the mechanical output of the motor 166 reduces the speed of the active drivetrain 1014 which ensures safe completion of the closure motion and/or resetting of the active drivetrain 1014 to an original or starting positon. Also, if the rotation drivetrain 1012 is being actively driven by the motor 166, a detection of an acute drivetrain failure by the module 1040 may cause the processor 1036 to communicate to the motor drive circuit 1018' instructions to cause the mechanical output of motor 166 to be reduced. A reduction in the mechanical output of the motor 166 reduces the speed of the active drivetrain 1012 which ensures safe completion of the rotation and/or resetting of the active drivetrain 1012 to an original or starting positon.

[0269] Referring to FIG. 23, the motor modulation step 1026 can be implemented by program instructions stored in the memory 1038 which, when executed by the processor 1036, may cause the processor 1036 to communicate with the motor drive circuit 1018', for example, to modulate a motor input voltage (Vm) of the motor 166, for example, to reduce a speed of an active drivetrain operably coupled to the motor 166. In at least one instance, as illustrated in FIG. 23, the motor modulation 1026 may comprise delivering the motor input voltage (Vm) in pulses that are spaced apart from one another by time periods (ti) with no or zero motor input voltage (Vm). Alternatively, as illustrated in FIG. 23A, the motor modulation 1026 may comprise a reduction in the motor input voltage (Vm) from a first voltage (VI) to a second voltage (V2). Delivering the motor input voltage (Vm) sparingly reduces the mechanical output of the motor 166 which, in turn, reduces or limits the speed of the active drivetrain. Reducing the speed of the active drivetrain, as described above, can slow the rotation of the drivetrain around the damaged section and/or limit the force of engagement with a tooth that follows a damaged or missing tooth.

[0270] The motor input voltage (Vm) pulses may each comprise a time period (t_2). In at least one instance, a ratio of a time period (t_2) to a time period (ti) can be any value selected from a range of about 1/100 to about 1, for example. In at least one instance, a ratio of a time period (t_2) to a time period (ti) can be any value selected from a range of about 1/20

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to about 1/80, for example. In at least one instance, a ratio of a time period (t_2) to a time period (¾) can be any value selected from a range of about 1/30 to about 1/60, for example. Other values of the ratio of a time period (t_2) to a time period (ti) are contemplated by the present disclosure.

[0271] Referring to FIG. 22A, in certain instances, a different or dedicated motor modulation 1026 can be implemented for each of the drivetrains 1012, 1014, and/or 1016. A logic diagram 1041 represents possible operations that can be implemented by the surgical instrument 1010 in such instances. As described above, the memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to employ the module 1040 to continuously detect 1023 active drivetrain failures. The memory 1038 may also include program instructions, which when executed by the processor 1036, may cause the processor 1036 to respond to a detected 1027 acute drivetrain failure by implementing one of a firing drivetrain modulation algorithm 1043, a closure drivetrain modulation algorithm 1045, and a rotation drivetrain modulation algorithm 1049 depending on the type or nature of the active drivetrain when the acute failure is detected. The firing drivetrain modulation algorithm 1043, the closure drivetrain modulation algorithm 1045, and/or the rotation drivetrain modulation algorithm 1049 can be stored in the memory 1038, for example.

[0272] Referring again to FIG. 22, the safe mode 1022 may also include a sensor bypass step 1028. The surgical instrument 1010 may include a variety of sensors such as, for example, closed loop sensors that are configured to provide various data to the processor 1036 regarding the operation of the surgical instrument 1010. In the event of an acute drivetrain failure, the data provided by such sensors may not be accurate. In response, the memory 1038 may include program instructions which, when executed by the processor 1036, may cause the processor 1036 to respond to a detected acute drivetrain failure by bypassing input from such sensors and/or deactivating or pausing functions that are triggered in response to the input from such sensors.

[0273] The memory 1038 may include a sensor bypass database of a subset of sensors that are to be deactivated or ignored in the event of an acute drivetrain failure. In at least one instance, the processor 1036 may utilize the sensor bypass database to implement the sensor bypass step in the event of an acute drivetrain failure.

[0274] The safe mode 1022 may also include a step 1029 of alerting a user of the surgical instrument 1010 that an acute drivetrain failure has been detected, and that the surgical instrument 1010 will continue to run in the safe mode 1022 which may limit or reduce the functions available to the user, for example. The processor 1036 may employ a feedback system 1035 to issue such alerts to the user of the surgical instrument 1010. The feedback system 1035 may include one or more feedback elements 1034 and/or one or more user input elements 1037, for example. In certain instances, the feedback system 1035 may comprise one or more visual feedback elements including display screens, backlights, and/or LEDs, for example. In certain instances, the feedback system 1035 may comprise one or more audio feedback systems such as speakers and/or buzzers, for example. In certain instances, the feedback system 1035 may comprise one or more haptic feedback systems, for example. In certain instances, the feedback system 1035 may comprise combinations of visual, audio, and/or haptic feedback systems, for example.

[0275] Referring to FIG. 24, a logic diagram 1021', which is similar in many respects to the logic diagram 1021, represents possible operations that can be implemented by the surgical instrument 1010 in response to active drivetrain failures. In at least one instance, as illustrated in FIG. 24, operating the surgical instrument 1010 in the safe mode 1022 can be conditioned on obtaining an approval from a user of the surgical instrument 1010, as illustrated in FIG. 24. The

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motor 166, for example, can be suspended 1033 after an acute drivetrain failure is detected. The memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to suspend operation of an active drivetrain, in response to an acute drivetrain failure, by suspending operation of the motor 166, for example. The motor 166 can be stopped and/or disabled by disconnecting the power source 156 from the motor 166, for example. In various instances, a motor override circuit can be employed by the processor 1036 to stop power delivery to the motor 166, for example.

[0276] After disabling the motor 166, the processor 1036 can solicit an approval from the user to proceed in the safe mode 1022 via one or more of the feedback elements 1037. The operator's decision can be communicated to the processor 1036 via the user input 1034. If the operator chooses to proceed in the safe mode 1022, the processor 1036 can reactivate the damaged drivetrain, by reactivating power transmission to the motor 166, and proceed in the safe mode 1022. Alternatively, if the operator chooses not to proceed in the safe mode 1022, the processor 1036 may activate the bailout mode 1024.

[0277] Referring again to FIG. 22, the safe mode 1022 may also include a service request step 1042 for initiating a service request in the event of an acute failure of an active drivetrain. The memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to respond to a detected acute drivetrain failure by initiating a service request. The request can be communicated, through any suitable mode of communication, to a servicing unit which can be in the form of an external server, for example.

[0278] In at least one instance, a wireless mode of communication can be employed to initiate the service request. The wireless mode of communication can include one or more of Dedicated Short Range Communication (DSRC), Bluetooth, WiFi, ZigBee, Radio Frequency Identification (RFID) and Near Field Communication (NFC).

[0279] The service request communication may also include any saved data in connection with the detected drivetrain failure such as, for example, the time and date of the failure, the type of the active drivetrain, and/or the surgical step during which the failure occurred. Furthermore, the feedback system 1035 may include one or more visual feedback elements such as, for example, the screen 1046 which can be employed to provide an interactive walkthrough of serviceability options and/or rebuild steps, for example.

[0280] Referring again to FIG. 22, the safe mode 1022 may also include a limited functionality step 1044. The memory 1038 may include program instructions, which when executed by the processor 1036, may cause the processor 1036 to respond to a detected acute drivetrain failure by limiting the functions of the surgical instrument 1010 that are available to the user. In at least one instance, processor 1036 can limit the available functions to ones that reset or return the surgical instrument 1010 to an original or starting position. For example, in the event an acute failure is detected in the firing drivetrain 1016, the processor 1036 can be configured to suspend further advancement of the firing drivetrain 1016, and only allow retraction of the firing drivetrain 1016 to an original or starting position. Likewise, in the event an acute failure is detected in the closure drivetrain 1014 during a closure motion of the end effector 300, the processor 1036 can be configured to suspend further advancement of the closure drivetrain 1014, and only allow retraction of the closure drivetrain 1014 to an original or starting position thereby releasing any captured tissue. Otherwise, functions that are not affected by the detected failure may still remain available.

[0281] In the event a catastrophic drivetrain failure rather than an acute drivetrain failure is detected, a bailout mode 1024 can be activated. The memory 1038 may include program instructions, which when executed by the processor

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1036, may cause the processor 1036 to respond to an acute drivetrain failure by activating the bailout mode 1024. In at least one instance, as illustrated in FIG. 25, the bailout mode 1024 may include a mechanical bailout step 1046. In the event of a catastrophic failure of an active drivetrain such as, for example, the firing drivetrain 1016, the processor 1036 may suspend the firing drivetrain 1016 by stopping the motor 166. In addition, the processor 1036 may employ one or more of the feedback elements 1037 to alert 1029 the user as to the detected failure and provide instructions to the user of the surgical instrument 1010 to mechanically complete the firing sequence and/or reset the firing drivetrain 1016.

[0282] In the event of a catastrophic failure of an active closure drivetrain 1014, the processor 1036 may suspend the closure drivetrain 1014 by stopping the motor 166. In addition, the processor 1036 may employ one or more of the feedback elements 1037 to provide instructions to the user of the surgical instrument 1010 to mechanically complete the closure motion and/or reset the closure drivetrain 1014.

[0283] Referring to FIG. 19, the surgical instrument 1010 can include a bailout door 1013 which can be opened using a bailout handle 1047. The bailout door 1013 can be opened by a user of the surgical instrument 1010 to access a bailout assembly which can be employed to mechanically complete a firing sequence, for example, and/or reset a firing drivetrain 1016 of the surgical instrument 1010. U.S. Patent Application Serial No. 14/226,142, titled SURGICAL INSTRUMENT COMPRISING A SENSOR SYSTEM, and filed March 26, 2014, now U.S. Patent Application Publication No. 2015/0272575 and U.S. Patent Application Publication No. 2010/0089970 disclose bailout arrangements and other components, arrangements and systems that may also be employed with the various instruments disclosed herein. U.S. Patent Application Serial No. 14/226,142, titled SURGICAL INSTRUMENT COMPRISING A SENSOR SYSTEM, and filed March 26, 2014, now U.S. Patent Application Publication No. 2015/0272575, is hereby incorporated by reference in its entirety. Also, U.S. Patent Application Serial No. 12/249,117, titled POWERED SURGICAL CUTTING AND STAPLING APPARATUS WITH MANUALLY RETRACTABLE FIRING SYSTEM, now U.S. Patent Application Publication No. 2010/0089970, is hereby incorporated by reference in its entirety.

[0284] Referring again to FIG. 25, the bailout mode 1024 may further include of one or more of the steps described above in connection with the safe mode 1022. For example, the bailout mode 1024 may include a sensor bypass step 1028. The memory 1038 may include program instructions which, when executed by the processor 1036, may cause the processor 1036 to respond to a catastrophic drivetrain failure by bypassing input from various sensors and/or deactivating or pausing functions that are triggered in response to input from such sensors.

[0285] The memory 1038 may include a sensor bypass database of a subset of sensors that are to be deactivated or ignored in the event of a catastrophic drivetrain failure. In at least one instance, the processor 1036 may utilize the sensor bypass database to implement the sensor bypass step in the event of a catastrophic drivetrain failure. The bailout mode 1024 may also include a service request step 1042 for initiating a service request in the event of a catastrophic failure of an active drivetrain.

[0286] Referring to FIG. 26A, a surgical instrument 2010 is depicted. The surgical instrument 2010 is similar in many respects to the surgical instrument 100. For example, the surgical instrument 2010 is configured for selective connection with the end effector or single use loading unit or reload 300 via the adapter 200. Also, the surgical instrument 2010 includes a handle housing 102 that includes a lower housing portion 104, an intermediate housing portion 106, and an upper housing portion 108. In addition, the surgical instrument 2010 includes a power pack 2012 held in the lower housing portion 104. Like the battery 156, the power pack 2012 is separably couplable to the surgical instrument 2010.

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One or more connectors 2019 can be configured to electrically couple the power pack 2012 to the surgical instrument 2010, as illustrated in FIG. 28, when the power pack 2012 is attached to the surgical instrument 2010. The connectors 2019 facilitate communication and power exchange between the power pack 2012 and the surgical instrument 2010.

[0287] As illustrated in FIG. 26B, the lower housing portion 104 comprises resilient members 2017 and 2018 that are configured to provide a snap-fit engagement with the intermediate housing portion 106. Other mechanisms for attaching the lower housing portion 104 to the intermediate housing portion 106 are contemplated by the present disclosure. In the aspect illustrated in FIG. 26A, the power pack 2012 can be separated from the surgical instrument 2010 by retracting or pulling the lower housing portion 104 in a direction away from the intermediate housing portion 106.

[0288] Referring to FIGS. 26B and 28, the power pack 2012 includes a plurality of battery cells (B1...Bn) 2014 and an electronic control circuit 2016. The battery cells 2014 are arranged in series and are electrically coupled to the electronic control circuit 2016. Other arrangements of the battery cells 2014 are contemplated by the present disclosure. In the aspect illustrated in FIG. 26B, the power pack 2012 includes four battery cells (B1-B4). In other aspects, as illustrated in FIG. 28, the power pack 2012 may include more or less than four battery cells. In various instances, the battery cells 2014 are replaceable and/or rechargeable.

[0289] Referring to FIG. 27, a method 2009 of monitoring the health of the power pack 2012 during a firing sequence of the surgical instrument 2010 is depicted. The method 2009 includes steps for responding to a detected drop in the health of the power pack 2012 below a predetermined threshold. The method 2009 comprises a step 2011 of detecting activation of the firing sequence. The method 2009 further comprises a step 2013 of monitoring the health of the power pack after detection of the activation of the firing sequence. The step of monitoring the health of the power pack 2012 may include monitoring one or more parameters associated with the power pack 2012 such as, for example, temperature, output current, and/or output voltage. In the event it is detected that the health of the power pack 2012 is partially compromised, the method 2009 further comprises at least one post detection safety and/or operational measure. For example, the method 2009 further comprises alerting a user of the surgical instrument 2010 and/or recording a damaged status of the compromised power pack 2012.

[0290] In at least one instance, the method 2009 further comprises determining whether the firing sequence can be completed. In the event it is determined that the firing sequence cannot be completed, the method 2009 further comprises alerting the user of the surgical instrument 2010 and/or resetting the firing sequence. The step of resetting the firing sequence may include, among other things, retracting the drive assembly 360 to an original or starting position. In the event it is determined that the firing sequence can be completed, the method 2009 further comprises alerting the user of the surgical instrument 2010 to continue the firing sequence. In addition the method 2009 may further comprise increasing and/or prioritizing a power output of the power pack 2012 to facilitate completion of the firing sequence. Upon completion of the firing sequence, the method 9 may further comprise a step of deactivating the surgical instrument 2010.

[0291] The safety and/or operational measures of the method 2009 can be employed in addressing a situation where the firing sequence has been started but is only partially completed due to a failure of the power pack 2012. This situation generally yields a tissue region that is only partially stapled and/or resected. The method 2009 permits completion of the stapling and/or resection of the tissue region in the event the failure of the power pack 2012 is a partial failure.

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[0292] Referring to FIG. 28, the power pack 2012 may employ the electronic control circuit 2016 to monitor the health of the power pack 2012 during a firing sequence of the surgical instrument 2010 and respond to a detected drop in the health of the power pack 2012 below a predetermined threshold. The electronic control circuit 2016 may include one or more sensors (Sl ...Sn) 2015 for monitoring the health of the power pack 2012. In the aspect illustrated in FIG. 34, the electronic control circuit 2016 includes a voltage sensor 2022, a temperature sensor 2024, and a current sensor 2026 which cooperate to monitor the health status of the power pack 2012, as described in greater detail below. Other sensors can also be employed by the electronic control circuit 2016 to monitor the health of the power pack 2012.

[0293] Further to the above, the electronic control circuit 2016 includes a microcontroller 2028 ("controller") that is operably coupled to sensors 2015, as illustrated in FIG. 28. In certain instances, the controller 2028 may include a microprocessor 2030 ("processor") and one or more computer readable mediums or memory units 2032 ("memory"). In certain instances, the memory 2032 may store various program instructions, which when executed may cause the processor 2030 to perform a plurality of functions and/or calculations described herein such as, for example, one or more of the steps of the method 2009 depicted in FIG. 27. In certain instances, the memory 2032 may be coupled to the processor 2030, for example. The battery cells 2014 can be configured to supply power to the controller 2028, the sensors 2015, and/or other components of the electronic control circuit 2016, for example. Furthermore, the controller 2028 can be in communication with a main controller 2029 in the surgical instrument 2010, as illustrated in FIG. 28, which can also be powered by the battery cells 2014 through the connectors 2019.

[0294] The controller 2028 and/or other controllers of the present disclosure may be implemented using integrated and/or discrete hardware elements, software elements, and/or a combination of both. Examples of integrated hardware elements may include processors, microprocessors, microcontrollers, integrated circuits, ASICs, PLDs, DSPs, FPGAs, logic gates, registers, semiconductor devices, chips, microchips, chip sets, microcontrollers, SoC, and/or SIP. Examples of discrete hardware elements may include circuits and/or circuit elements such as logic gates, field effect transistors, bipolar transistors, resistors, capacitors, inductors, and/or relays. In certain instances, the controller 2028 may include a hybrid circuit comprising discrete and integrated circuit elements or components on one or more substrates, for example.

[0295] In certain instances, the controller 2028 and/or other controllers of the present disclosure may be an LM 4F230H5QR, available from Texas Instruments, for example. In certain instances, the Texas Instruments LM4F230H5QR is an ARM Cortex-M4F Processor Core comprising on-chip memory of 256 KB single-cycle flash memory, or other non-volatile memory, up to 40 MHz, a prefetch buffer to improve performance above 40 MHz, a 32 KB single-cycle SRAM, internal ROM loaded with StellarisWare® software, 2KB EEPROM, one or more PWM modules, one or more QEI analog, one or more 12-bit ADC with 12 analog input channels, among other features that are readily available. Other microcontrollers may be readily substituted for use with the present disclosure. Accordingly, the present disclosure should not be limited in this context.

[0296] In various instances, one or more of the various steps described herein can be performed by a finite state machine comprising either a combinational logic circuit or a sequential logic circuit, where either the combinational logic circuit or the sequential logic circuit is coupled to at least one memory circuit. The at least one memory circuit stores a current state of the finite state machine. The combinational or sequential logic circuit is configured to cause the finite state machine to the steps. The sequential logic circuit may be synchronous or asynchronous. In other instances,

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one or more of the various steps described herein can be performed by a circuit that includes a combination of the processor 2030 and the finite state machine, for example.

[0297] Referring to FIG. 28, the electronic control circuit 2016 may further include a boost converter 2036. As illustrated in FIG. 28, the battery cells 2014 are coupled to the voltage converter or a boost converter 2036. The processor 2030 can be configured to employ the boost converter 2036 to provide a boosted voltage or step-up the voltage to maintain a minimum voltage sufficient to complete a firing sequence in the event it is determined that one or more of the battery cells 2014 is damaged or compromised during operation of the surgical instrument 2010.

[0298] In at least one instance, as illustrated in FIG. 28, the processor 2030 can be configured to respond to a determination that one or more of the battery cells 2014 are compromised by employing a feedback system 2034 to issue an alert to a user of the surgical instrument 100. In certain instances, the feedback system 2034 may comprise one or more visual feedback systems such as display screens, backlights, and/or LEDs, for example. In certain instances, the feedback system 2034 may comprise one or more audio feedback systems such as speakers and/or buzzers, for example. In certain instances, the feedback system 2034 may comprise one or more haptic feedback systems, for example. In certain instances, the feedback system 2034 may comprise combinations of visual, audio, and/or haptic feedback systems, for example.

[0299] In at least one instance, the processor 2030 is configured to respond to a determination that one or more of the battery cells 2014 are compromised by storing or recording a damaged status of the power pack 2012 in the memory 2032. A damaged status of the power pack 2012 can also be stored in a memory 2054 of a main controller 2029 within the surgical instrument 2040. The processor 2030 of the controller 2028 of the power pack 2012 can be in communication with the processor 2052 of the main controller 2029 to report to the main controller 2029 the damaged status of the power pack 2012. In response to a determination that one or more of the battery cells 2014 are compromised, the processor 2052 of the main controller 2029 can be configured to reset the firing sequence by causing the drive assembly 360 to return to an original or starting position, for example. Alternatively, in certain instances, the processor 2052 can be configured to reroute power from non-essential systems of the surgical instrument 2040 to ensure completion of the firing sequence in the event of a determination that one or more of the battery cells 2014 are compromised during the firing sequence. Examples of non-essential systems may include backlit liquid crystal displays (LCDs) and/or Light-emitting diode (LED) indicators. After completion of the firing sequence, the processor 2052 of the main controller 2029 can be configured to cause the surgical instrument 2040 to be deactivated until the damaged power pack 2012 is replaced with an undamaged power pack, for example.

[0300] Referring to FIG. 29, the step 2013 of monitoring the health of the power pack 2012 may include monitoring an output voltage of the battery cells 2014. In such instances, the sensors 2015 may include a voltage sensor which can be arranged in parallel with the battery cells 2014. The voltage sensor can be configured to sample the output voltage of the battery cells 2014 during the firing sequence of the surgical instrument 2010. Additional voltage readings can be obtained prior to activation of the firing sequence and/or after completion of the firing sequence. The processor 2030 can be configured to receive the voltage readings of the voltage sensor, and compare the readings to a predetermined voltage threshold (vt) that can be stored in the memory 2032. In the event of a voltage reading, or an average of a plurality of voltage readings, that reaches and/or falls below the predetermined voltage threshold (vt), the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor

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2030 can be configured activate one or more of the safety and/or operational measures described above.

[0301] Referring to FIG. 30, the step 2013 of monitoring the health of the power pack 2012 may include monitoring the current draw from the battery cells 2014. In such instances, the sensors 2015 may include a current sensor which can be arranged in series with the battery cells 2014. The current sensor can be configured to sample the current draw from the battery cells 2014 during the firing sequence of the surgical instrument 2010. Additional current readings can be obtained prior to activation of the firing sequence and/or after completion of the firing sequence. The processor 2030 can be configured to receive the current readings of the current sensor and compare the readings to a predetermined current threshold (It) that can be stored in the memory 2032. In the event of a current reading, or an average of a plurality of current readings, that reaches and/or falls below the predetermined current threshold (It), the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor 2030 can be configured to activate one or more of the safety and/or operational measures described above.

[0302] Referring to FIG. 31, the step 2013 of monitoring the health of the power pack 2012 may include monitoring a temperature of the battery cells 2014. In such instances, the sensors 2015 may include one or more temperature sensors which can be positioned inside the power pack 2012 in close proximity to the battery cells 2014. The temperature sensors can be configured to sample the temperature of the battery cells 2014 during the firing sequence of the surgical instrument 100. Additional temperature readings can be obtained prior to activation of the firing sequence and/or after completion of the firing sequence. The processor 2030 can be configured to receive the temperature readings of the temperature sensor and compare the readings to a predetermined temperature threshold (Tt) that can be stored in the memory 2032. In the event of a temperature reading, or an average of a plurality of temperature readings, that reaches and/or exceeds the predetermined temperature threshold (Tt), the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor 2030 can be configured to activate one or more of the safety and/or operational measures described above.

[0303] Referring to FIG. 32, a surgical instrument 2040 is similar in many respects to the surgical instruments 2010 and 100. The surgical instrument 2040 includes a power pack 2042, which is similar in many respects to the power pack 2012. In addition, the power pack 2042 includes an insulation chamber 2044 that houses the battery cells 2014. The insulation chamber 2044 includes an insulation wall 2046 that is configured to resist heat transfer between the inside and the outside of the insulation chamber 2044. The insulation chamber 2044 also houses one or more temperature sensors 2024 that are configured to sample an internal temperature inside the insulation chamber 2044 during the firing sequence of the surgical instrument 2040. Additional temperature sensors 2024' are positioned outside the insulation chamber 2044 to sample an external temperature outside the insulation chamber 2044 during the firing sequence of the surgical instrument 2040.

[0304] The processor 2030 is configured to receive the external and internal temperature readings of the temperature sensors 2024' and 2024, respectively. In addition, the processor 30 is configured to apply an algorithm, which can be stored in the memory 2032, to quantitatively compare the received external and internal temperature readings. In the event an internal temperature reading, or an average of a plurality of internal temperature readings, exceeds a simultaneously taken external temperature reading, or an average of a plurality of external temperature readings, by a predetermined temperature threshold (Tt), which can be stored in the memory 2032, the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor 2030 can be

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configured to activate one or more of the safety and/or operational measures described above.

[0305] In certain instances, the internal temperature sensors 2024 and the external temperature sensors 2024' of the surgical instrument 2040 can be arranged in a Wheatstone bridge circuit 2048, as illustrated in FIG. 33. A voltage sensor 2022 can be employed to measure the voltage across the Wheatstone bridge circuit 2048. The processor 2030 can be configured to receive the voltage readings of the voltage sensor 2022. In the event of a voltage reading, or an average of a plurality of voltage readings, that reaches and/or exceeds a predetermined voltage threshold (vt), the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor 2030 can be configured activate one or more of the safety and/or operational measures described above.

[0306] In the aspect illustrated in FIG. 34, the electronic control circuit 2016 includes a voltage sensor 2022, a temperature sensor 2024, and a current sensor 2026 which cooperate to monitor the health status of the power pack 2012. The voltage sensor 2022 can be configured to monitor an output voltage of the battery cells 2014 while the current sensor 2026 and the temperature sensor 2024 simultaneously measure a current draw from the battery cells 2014 and a temperature of the battery cells 2014, respectively. In at least one instance, the processor 30 is configured to receive readings from the voltage sensor 2022, the temperature sensor 2024, and the current sensor 2026 during the firing sequence of the surgical instrument 2010. Additional readings can also be obtained prior to activation of the firing sequence and/or after completion of the firing sequence.

[0307] FIG. 35 is a logic diagram for assessing the health status of a power pack based on the sensor readings, according to at least one aspect of the present disclosure. Referring to FIG. 35, further to the above, the processor 2030 is configured to apply an algorithm 2050, which can be stored in the memory 2032, to assess the health status of the power pack 2012 based on the readings obtained from the voltage sensor 2022, the temperature sensor 2024, and the current sensor 2026. First, the processor 2030 is configured to determine whether the voltage reading received from the voltage sensor 2022 reaches or falls below a predetermined voltage threshold (Vt) stored in the memory 2032. Second, if the processor 2030 determines that the voltage reading reaches or falls below the predetermined voltage threshold (Vt), the processor 2030 is configured to further determine whether the current reading received from the current sensor 2026 reaches or falls below the predetermined current threshold (It) stored in the memory 2032. Third, if the processor 2030 determines that the current reading reaches or falls below the predetermined current threshold (It), the processor 2030 is further configured to determine whether the temperature reading received from the temperature sensor 2024 reaches or exceeds the predetermined temperature threshold (Tt) stored in the memory 2032. If any of the three conditions is not met, the processor 2030 may continue to monitor the health of the power pack 2012. However, if all of the three conditions are met, the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged. In response, the processor 2030 can be configured to activate one or more of the safety and/or operational measures described above. In at least one instance, if two of the three conditions are met the processor 2030 may conclude that one or more of the battery cells 2014 are compromised or damaged.

[0308] Referring to FIGS. 36-36B, a surgical instrument 3010 is depicted. The surgical instrument 3010 is similar in many respects to the surgical instrument 100. For example, the surgical instrument 3010 is configured for selective connection with the end effector or single use loading unit or reload 300 via the adapter 200. Also, the surgical instrument 3010 includes the handle housing 102 including the lower housing portion 104, the intermediate housing portion 106, and the upper housing portion 108. In addition, the surgical instrument 3010 further includes a replaceable

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motor cartridge 3012, as illustrated in FIG. 37. The motor cartridge 3012 is separably couplable to the surgical instrument 3010. A motor access door 3013 (FIG. 36) can be opened to obtain access to the motor cartridge 3012. Once the motor access door 3013 is opened, the motor cartridge 3012 can be removed and replaced with another motor cartridge.

[0309] As described in greater delay below, the surgical instrument 3010 is configured to detect a damaged motor cartridge 3012 and, in certain instances, instruct an operator of the surgical instrument 3010 to replace the damaged motor cartridge 3012 with an undamaged motor cartridge 3012. The ability to replace a motor cartridge 3012 is quite useful at least because it allows for an improved repair capability since a damaged motor cartridge 3012 can be readily replaced with an undamaged motor cartridge 3012. In absence of the ability to replace a damaged motor cartridge 3012, the surgical instrument 3010 may be rendered inoperable even though the majority of the components of the surgical instrument 3010 are in good operating condition. The ability to replace a motor cartridge 3012 is also useful in allowing modularity in new product designs, and simplifying installation of hardware upgrades as part of life cycle improvements. For example, a first generation motor cartridge can be readily replaced with an upgraded second generation motor cartridge. Motor cartridges can also be swapped between surgical instruments that employ the same type of motor cartridge, for example.

[0310] The motor cartridge 3012 comprises a housing 3014 which includes high current components of the surgical instrument 3010 such as, for example, at least one motor 3016 and at least one motor circuit board 3018. Since high current components of the surgical instrument 3010 are more susceptible to damage than low current components such as a main control circuit board 3019 and various feedback systems, it is desirable to be able to readily replace the high current components by replacing the motor cartridge 3012.

[0311] As illustrated in FIG. 38, the motor cartridge 3012 is releasably coupled to the surgical instrument 3010. An interface 3021 between the motor cartridge 3012 and the surgical instrument 3010 comprises a mechanical component represented by mechanical connectors 3022, 3023, 3024, and 3025, a power/communication transmission component represented by electrical connectors 3026, 3028, 3030, and 3032. In at least one instance, the main control circuit board 3019 comprises a receiver 3053 which can be in the form of a socket, as illustrated in FIG. 36B. The receiver 3053 can be configured to receive the connectors 3028 and 3032, for example, to electrically couple the main control circuit board 3019 to the circuit boards 3018 and 3018'. In certain instances, the interface 3021 may comprise one or more switches which can be activated after coupling engagement of the motor cartridge 3012 and the surgical instrument 3010. Various suitable connectors are described in U.S. Patent Application Publication No. 2014/0305990, filed April 16, 2013, and titled DRIVE SYSTEM DECOUPLING ARRANGEMENT FOR A SURGICAL INSTRUMENT, which is hereby incorporated by reference herein in its entirety.

[0312] In the aspect illustrated in FIG. 38, the motor cartridge 3012 includes two motors 3016 and 3016' which are controlled by separate motor control circuit boards 3018 and 3018'. Alternatively, the motors 3016 and 3016' can be controlled by one motor control circuit board. In certain instances, two or more separate motor cartridges can be employed with the surgical instrument 3010, wherein each motor cartridge includes at least one motor and at least one motor control circuit board for controlling the at least one motor, for example. For the sake of brevity, the following discussion will focus on the motor 3016 and the control circuit board 3018; however, the following discussion is also applicable to the motor 3016' and the control circuit board 3018'.

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[0313] The motor 3016 may be any electrical motor configured to actuate one or more drives (e.g., rotatable drive connector 3024 of FIG. 36B). The motor 3016 is powered by a power source 3034 in the surgical instrument 3010. Electrical energy is transmitted to the motor 3016 through the interface 3021. The power source 3034 may be a DC battery (e.g., rechargeable lead-based, nickel-based, lithium-ion based, battery etc.), an AC/DC transformer, or any other power source suitable for providing electrical energy to the motor 3016. When the motor cartridge 3012 is coupled to the surgical instrument 3010, the power source 3034 and the motor 3016 are coupled to the motor control circuit 3018 which controls the operation of the motor 3016 including the flow of electrical energy from the power source 3034 to the motor 3016.

[0314] Referring to FIG. 38, the main control circuit board 3019 includes a microcontroller 3020 ("controller"). In certain instances, the controller 3020 may include a microprocessor 3036 ("processor") and one or more computer readable mediums or memory units 3038 ("memory"). In certain instances, the memory 3038 may store various program instructions, which when executed may cause the processor 3036 to perform a plurality of functions and/or calculations described herein. The power source 3034 can be configured to supply power to the controller 3020 and/or other components of the main control circuit board 3019, for example.

[0315] The controller 3020 and/or other controllers of the present disclosure may be implemented using integrated and/or discrete hardware elements, software elements, and/or a combination of both. Examples of integrated hardware elements may include processors, microprocessors, microcontrollers, integrated circuits, ASICs, PLDs, DSPs, FPGAs, logic gates, registers, semiconductor devices, chips, microchips, chip sets, microcontrollers, SoC, and/or SIP. Examples of discrete hardware elements may include circuits and/or circuit elements such as logic gates, field effect transistors, bipolar transistors, resistors, capacitors, inductors, and/or relays. In certain instances, the controller 3020 may include a hybrid circuit comprising discrete and integrated circuit elements or components on one or more substrates, for example.

[0316] In certain instances, the controller 3020 and/or other controllers of the present disclosure may be an LM 4F230H5QR, available from Texas Instruments, for example. In certain instances, the Texas Instruments LM4F230H5QR is an ARM Cortex-M4F Processor Core comprising on-chip memory of 256 KB single-cycle flash memory, or other non-volatile memory, up to 40 MHz, a prefetch buffer to improve performance above 40 MHz, a 32 KB single-cycle SRAM, internal ROM loaded with StellarisWare® software, 2KB EEPROM, one or more PWM modules, one or more QEI analog, one or more 12-bit ADC with 12 analog input channels, among other features that are readily available. Other microcontrollers may be readily substituted for use with the present disclosure. Accordingly, the present disclosure should not be limited in this context.

[0317] In various instances, one or more of the various steps described herein can be performed by a finite state machine comprising either a combinational logic circuit or a sequential logic circuit, where either the combinational logic circuit or the sequential logic circuit is coupled to at least one memory circuit. The at least one memory circuit stores a current state of the finite state machine. The combinational or sequential logic circuit is configured to cause the finite state machine to the steps. The sequential logic circuit may be synchronous or asynchronous. In other instances, one or more of the various steps described herein can be performed by a circuit that includes a combination of the processor 3036 and the finite state machine, for example.

[0318] FIG. 39 depicts a logic diagram 3070 representative of possible operations that can be implemented by the

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surgical instrument 3010, for example, to monitor the health of a motor cartridge 3012 and respond to a detected motor cartridge malfunction. A motor activation signal can be received 3072 by the processor 3036 from an actuator 3042 of the surgical instrument 3010. The actuator 3042 can be a switch that is configured to close or open a circuit upon actuation of the actuator 3042. The closure or opening of the circuit can signal the processor 3036 that the actuator 3042 has been actuated. In at least one instance, the actuator 3042 can be in the form of a firing trigger which can be actuated by an operator to activate a firing sequence of the surgical instrument 3010, for example. In another instance, the actuator 3042 can be in the form of a closure trigger which can be actuated by an operator to close an end effector 300 of the surgical instrument 3010, for example. In another instance, the actuator 3042 can be in the form of a rotation trigger which can be actuated by an operator to rotate an end effector 300 of the surgical instrument 3010, for example.

[0319] Upon receipt of the activation signal, the processor 3036 may signal 3074 the motor control circuit board 3018 to activate the motor 3016. The health of the motor cartridge 3012 can be continuously monitored 3076 while the actuator 3042 is actuated. Under normal operating conditions, as illustrated in FIG. 38, the motor 3016 draws current from the power source 3034 and generates rotational motion(s) that are transmitted through the interface 3021 to the drive mechanism 160 in response to the actuation of the actuator 3042. If, however, a malfunction in the motor cartridge 3012 is detected 3078, one or more safety and/or operational measures can be activated 3079, as described in greater detail below. Otherwise, the motor cartridge health is continuously monitored 3076 while the actuator 3042 is actuated until a malfunction is detected 3078.

[0320] FIG. 40 depicts a logic diagram 3080 representative of possible operations that can be implemented by the surgical instrument 3010, for example, to monitor the health of a motor cartridge 3012 and respond to a detected motor cartridge malfunction. A motor activation signal can be received 3082 by the processor 3036 from an actuator 3042 of the surgical instrument 3010. Upon receipt of the activation signal, the processor 3036 may signal 3084 the motor control circuit board 3018 to activate the motor 3016. At 3086, the health of the motor cartridge 3012 can be continuously monitored, while the actuator 3042 is actuated, by monitoring the current draw of the motor cartridge 3012. As illustrated in FIG. 38, the current draw of the motor cartridge 3012 can be monitored by one or more current sensors 3040. Sensed current readings can be communicated to the processor 3036 by the current sensor 3040. At 3088, if the current draw of the motor cartridge 3012, while the actuator 3042 is actuated, becomes outside a predetermined value or range, the processor 3036 can conclude that a malfunction of the motor cartridge 3012 is detected 3088. If a malfunction in the motor cartridge 3012 is detected 3088, one or more safety and/or operational measures can be activated 3089, as described in greater detail below. Otherwise, the motor cartridge health is continuously monitored 3086 while the actuator 3042 is actuated until a malfunction is detected 3088.

[0321] The predetermined value or range can be stored in the memory 3038, for example. In the event a predetermined range is stored in the memory 3038, the processor 3036 may access the memory 3038 to compare a current reading, or an average of a plurality of current readings, of the current sensor 3040 to the predetermined range. If the current reading is greater than or equal to a maximum value of the predetermined range, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected 3088. Also, if the current reading is less than or equal a minimum value of the predetermined range, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected 3088.

[0322] Likewise, in the event a stored value is stored in the memory 3038, the processor 3036 may access the memory

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3038 to compare a current reading, or an average of a plurality of current readings, of the current sensor 3040 to the predetermined value. If the current reading is greater than or equal to the predetermined value, for example, or less than or equal to the predetermined value, for example, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected 3088.

[0323] In at least one instance, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected if the current draw of the motor cartridge 3012, while the actuator 4302 is activated, is less than or equal to 10% of the predetermined value. In at least one instance, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected if the current draw of the motor cartridge 3012, while the actuator 3042 is activated, is less than or equal to 20% of the predetermined value. In at least one instance, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected if the current draw of the motor cartridge 3012, while the actuator 3042 is actuated, is greater than or equal to 150% of the predetermined value. In at least one instance, the processor 3036 may conclude that a malfunction of the motor cartridge 3012 is detected if the current draw of the motor cartridge 3012, while the actuator 3042 is actuated, is greater than or equal to 200% of the predetermined value.

[0324] As indicated above, the processor 3036 can be configured to respond to a detected malfunction of the motor cartridge 3012 by activating (79 and 89) one or more safety and/or operational measures. For example, the processor 3036 may employ one or more feedback elements 3044 to issue an alert to an operator of the surgical instrument 3010. In certain instances, the feedback elements 3044 may comprise one or more visual feedback systems such as display screens, backlights, and/or LEDs, for example. In certain instances, the feedback elements 3044 may comprise one or more audio feedback systems such as speakers and/or buzzers, for example. In certain instances, the feedback elements 3044 may comprise one or more haptic feedback systems, for example. In certain instances, the feedback elements 3044 may comprise combinations of visual, audio, and/or haptic feedback systems, for example.

[0325] Further to the above, the processor 3036 may employ a feedback screen 3046 (FIG. 36B) of the surgical instrument 3010 to provide instructions to an operator for how to replace the motor cartridge 3012, for example. In addition, the processor 3036 may respond to a detected malfunction of the motor cartridge 3012 by storing or recording a damaged status of the motor cartridge 3012 in the memory 3038.

[0326] In at least one instance, the processor 3036 may disable the surgical instrument 3010 until the damaged motor cartridge 3012 is replaced with an undamaged motor cartridge. Tor example, the memory 3038 may include program instructions, which when executed by the processor 3036 in response to a detected malfunction of the motor cartridge 3012, may cause the processor 3036 to ignore input from the actuator 3042 until the damaged motor cartridge 3012 is replaced. A motor cartridge replacement feedback element 3058 can be employed to alert the processor 3036 when the motor cartridge 3012 is replaced, as described in greater detail below.

[0327] Referring primarily to FIGS. 36A and 38, the surgical instrument 3010 may include a motor access door 3013. The motor access door 3013 can be releasably locked to the handle housing 102 to control access to the motor cartridge 3012. As illustrated in FIG. 36A, the motor access door 3013 may include a locking mechanism such as, for example, a snap-type locking mechanism 3047 for locking engagement with the handle housing 102. Other locking mechanisms for locking the motor access door 3013 to the handle housing 102 are contemplated by the present disclosure. In use, a clinician may obtain access to the motor cartridge 3012 by unlocking the locking mechanism 3047 and opening the motor access door 3013. In at least one example, the motor access door 3013 can be separably coupled to the handle

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housing 102 and can be detached from the handle housing 102 to provide access to the motor access door 3013, for example. In another example, the motor access door 3013 can be pivotally coupled to the handle housing 102 via hinges (not shown) and can be pivoted relative to the handle housing 102 to provide access to the motor access door 3013, for example. In yet another example, the motor access door 3013 can be a sliding door which can be slidably movable relative to the handle housing 102 to provide access to the motor access door 3013.

[0328] Referring again to FIG. 38, in certain instances, a motor door feedback element 3048 can be configured to alert the processor 3036 that the locking mechanism 3047 is unlocked. In at least one example, the motor door feedback element 3048 may comprise a switch circuit (not shown) operably coupled to the processor 3036; the switch circuit can be configured to be transitioned to an open configuration when the locking mechanism 3047 is unlocked by a clinician and/or transitioned to a closed configuration when the locking mechanism 3047 is locked by the clinician, for example. In at least one example, the motor door feedback element 3048 may comprise at least one sensor (not shown) operably coupled to the processor 3036; the sensor can be configured to be triggered when the locking mechanism 3047 is transitioned to unlocked and/or locked configurations by the clinician, for example. The motor door feedback element 3048 may include other means for detecting the locking and/or unlocking of the locking mechanism 3047 by the clinician.

[0329] Referring to FIGS. 38 and 41, the controller 3020 may comprise one or more embedded applications implemented as firmware, software, hardware, or any combination thereof. In certain instances, the controller 3020 may comprise various executable modules such as software, programs, data, drivers, and/or application program interfaces (APIs), for example. FIG. 41 depicts an example module 3050 that can be stored in the memory 3038, for example. The module 3050 can be executed by the processor 3036, for example, to alert, guide, and/or provide feedback to a user of the surgical instrument 3010 with regard to replacing a motor cartridge 3012.

[0330] As illustrated in FIG. 41, the module 3050 is executed by the processor 3036 to provide the user with instructions as to how to replace a motor cartridge 3012, for example. In various instances, the module 3050 may comprise one or more decision-making steps such as, for example, a decision-making step 3052 with regard to the detection of one or more errors requiring replacement of the motor cartridge 3012. In at least one instance, as described above in greater detail, the processor 3036 is configured to detect an error requiring replacement of the motor cartridge 3012 when the current draw of the motor cartridge 3012, while the actuator 3042 is actuated, is outside a predetermined range, for example.

[0331] When the processor 3036 detects an error in the decision-making step 52, the processor 3036 may respond by stopping and/or disabling the motor 3016, for example. In addition, in certain instances, the processor 3036 may also store a damaged status of the motor cartridge 3012 in the memory 3038 after detecting the motor cartridge error, as illustrated in FIG. 42. As described above, the memory 3038 can be a non-volatile memory which may preserve the stored status when the surgical instrument 3010 is reset by the user, for example. In various instances, the motor 3016 can be stopped and/or disabled by disconnecting the power source 3034 from the motor 3016, for example. In various instances, the main control circuit board 3019 may include a motor override circuit which can be employed by the processor 3036 to stop power delivery to the motor cartridge 3012, for example. The step of stopping the motor 3016 and/or stopping power delivery to the motor cartridge 3012 can be advantageous in preventing, or at least reducing, the possibility of further damage to the surgical instrument 3010, for example.

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[0332] Further to the above, referring still to FIG. 41, the module 3050 may include a decision-making step 3054 for detecting whether the motor access door 3013 is removed. As described above, the processor 3036 can be operationally coupled to the motor door feedback element 3048 which can be configured to alert the processor 3036 as to whether the motor access door 3013 is removed. In certain instances, the processor 3036 can be programmed to detect that the motor access door 3013 is removed when the motor door feedback element 3048 reports that the locking mechanism 3047 is unlocked, for example. In certain instances, the processor 3036 can be programmed to detect that the motor access door 3013 is removed when the motor door feedback element 3048 reports that the motor access door 3013 is opened, for example. In certain instances, the processor 3036 can be programmed to detect that the motor access door 3013 is removed when the motor door feedback element 3048 reports that the locking mechanism 3047 is unlocked and that the motor access door 3013 is opened, for example.

[0333] Referring still to FIG. 41, when the processor 3036 does not detect a motor cartridge error in the decision-making step 3052 and does not detect that the motor access door 3013 is removed in the decision-making step 3054, the processor 3036 may not interrupt the normal operation of the surgical instrument 3010 and may proceed with various clinical algorithms. However, the processor 3036 may continue to detect errors requiring replacement of the motor cartridge 3012.

[0334] In certain instances, when the processor 3036 does not detect a motor cartridge error in the decision-making step 3052 but detects that the motor access door 3013 is removed in the decision-making step 3054, the processor 3036 may respond by stopping and/or disabling the motor 3016, as described above. In addition, the processor 3036 may also provide the user with instructions to reinstall the motor access door 3013. In certain instances, when the processor 3036 detects that the motor access door 3013 is reinstalled, while no motor cartridge error is detected, the processor 3036 can be configured to reconnect the power to the motor 3016 and allow the user to continue with clinical algorithms, as illustrated in FIG. 41.

[0335] Further to the above, when the processor 3036 detects a motor cartridge error and further detects removal of the motor access door 3013, the processor 3036 can signal the user to replace the motor cartridge 3012 by providing the user with a visual, audio, and/or tactile feedback, for example. In certain instances, the processor 3036 can signal the user of the surgical instrument 3010 to replace the motor cartridge 3012 by flashing a backlight of the feedback screen 3046. In any event, the processor 3036 may provide the user with instructions to replace the motor cartridge 3012, as illustrated in FIG. 41.

[0336] Referring again to FIG. 41, in various instances, the instructions provided by the processor 3036 to the user to remove the motor access door 3013 and/or to replace the motor cartridge 3012 may comprise one or more steps; the steps may be presented to the user in a chronological order. The steps may comprise actions to be performed by the user. In such instances, the user may proceed through the steps by performing the actions presented in each of the steps. In certain instances, the actions required in one or more of the steps can be presented to the user in the form of animated images displayed on the feedback screen 3046 (FIG. 36B), for example. In certain instances, one or more of the steps can be presented to the user as messages which may include words, symbols, and/or images.

[0337] Further to the above, referring still to FIG. 41, the module 3050 may include a decision-making step 3056 for detecting whether the motor cartridge 3012 has been replaced. In at least one instance, the user of the surgical instrument 3010 is requested to alert the processor 3036 when the motor cartridge 3012 has been replaced using one or

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more of the user feedback elements 3044, for example. Alternatively, as illustrated in FIG. 38, the processor 3036 can be operationally coupled to a motor cartridge replacement feedback element 3058 which can be configured to alert the processor 3036 when the motor cartridge 3012 is replaced. In at least one instance, the motor cartridge replacement feedback element 3058 includes one or more sensors and/or switches which can be triggered when the motor cartridge 3012 is removed and/or replaced to alert the processor 36 when the motor cartridge 3012 has been removed and/or replaced.

[0338] In at least one instance, the motor cartridge replacement feedback element 3058 includes a pressure sensor positioned at the interface 3021 between the surgical instrument 3010 and the motor cartridge 3012. The processor 3036 can be configured to employ the pressure sensor of the motor cartridge replacement feedback element 3058 to detect when the motor cartridge 3012 has been removed and/or replaced. In at least one instance, the processor 3036 can be configured to employ the pressure sensor of the motor cartridge replacement feedback element 3058 to detect a threshold-setting pressure reading when the motor cartridge 3012 is installed with the surgical instrument 3010. The threshold-setting pressure reading can be used to set a predetermined threshold which can be stored in the memory 3038. Alternatively, the predetermined threshold can be calculated and stored in the memory 3036 independent of any readings obtained by the pressure sensor.

[0339] Further to the above, the processor 3036 can be configured to conclude that an installed motor cartridge 3012 has been removed when one or more pressure readings detected by the pressure sensor of the motor cartridge replacement feedback element 3058 are less than or equal to the predetermined threshold. The processor 3036 can also be configured to conclude that a replacement motor cartridge 3012 has been installed when subsequent pressure readings detected by the pressure sensor of the motor cartridge replacement feedback element 3058 become greater than or equal to the predetermined threshold, for example.

[0340] Further to the above, still referring to FIG. 41, once it is determined that the motor cartridge 3012 has been replaced, the processor 3036 can be configured to instruct the user to reinstall the motor access door 3013. Upon subsequent detection that the motor access door 3013 has been installed, the processor 3036 can be configured to allow power transmission to the installed replacement motor cartridge 3012. In certain instances, the processor 3036 is further configured to employ one or more of the user feedback elements 3044 to alert the use of successful installation of the replacement motor cartridge 3012 and/or that the surgical instrument 3010 is now ready to continue with various clinical algorithms.

[0341] In various instances, the motor access door 3013 can be replaced with a motor access member or a motor securement member configured to secure the motor cartridge 3012 to the handle housing 102. Alternatively, the motor access door 3013 can be removed completely or integrated into the housing 3014 of the motor cartridge 3012 such that the motor cartridge 3012 can be readily removed or separated from the surgical instrument 3010 by pulling or retracting the motor cartridge 3012 away from the handle housing 102, for example. In at least one instance, in the absence of a motor access door, an outer wall 3059 (FIG. 37) of the housing 3014 of the motor cartridge 3012 can be configured to form a portion of an outer wall of the handle housing 102 of the surgical instrument 3010 when the motor cartridge 3012 is installed with the surgical instrument 3010. In such instances, the outer wall 3059 may include an attachment portion (not shown) that can be grabbed by a user of the surgical instrument and pulled to facilitate separating the motor cartridge 3012 from the handle housing 102, for example.

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[0342] FIG. 42 depicts an example module 3060 which can be stored in the memory 38, for example. The module 3060 is similar in many respects to the module 3050. For example, the module 3060 can also be executed by the processor 3036, for example, to alert, guide, and/or provide feedback to a user of the surgical instrument 3010 with regard to replacing a motor cartridge 3012; however, the module 3060 is implemented when the a motor access door feature is not used.

[0343] As illustrated in FIG. 41, the module 3050 is executed by the processor 3036 to provide the user with instructions as to how to replace a motor cartridge 3012, for example. In various instances, the module 3050 may comprise one or more decision-making steps such as, for example, a decision-making step 3052 with regard to the detection of one or more errors requiring replacement of the motor cartridge 3012. In at least one instance, as described above in greater detail, the processor 3036 is configured to detect an error requiring replacement of the motor cartridge 3012 when the current draw of the motor cartridge 3012, while the actuator 3042 is activated, is outside a predetermined range, for example.

[0344] Like the module 3050, the module 3060 also includes one or more decision-making steps such as, for example, the decision-making step 3052 with regard to the detection of one or more errors requiring replacement of the motor cartridge 3012. When the processor 3036 detects an error in the decision-making step 3052, the processor 3036 may respond by stopping and/or disabling the motor 3016, for example. In addition, in certain instances, the processor 3036 also may store a damaged status of the motor cartridge 3012 in the memory 3038 after detecting the motor cartridge error, as illustrated in FIG. 42.

[0345] Further to the above, when the processor 3036 detects a motor cartridge error, the processor 3036 can signal the user to replace the motor cartridge 3012 by providing the user with a visual, audio, and/or tactile feedback, for example. In certain instances, the processor 3036 can signal the user of the surgical instrument 3010 to replace the motor cartridge 3012 by flashing a backlight of the feedback screen 3046. In any event, the processor 36 may provide the user with instructions to replace the motor cartridge 3012, as illustrated in FIG. 42. Furthermore, the module 3060 includes the decision-making step 3056 for detecting whether the motor cartridge 3012 has been replaced, as describe above in greater detail. In addition, once it is determined that the motor cartridge 3012 has been replaced, the processor 3036 can be configured to allow power transmission to the installed replacement motor cartridge 3012. The processor 3036 can be further configured to employ one or more of the user feedback elements 3044 to alert the user of successful installation of the replacement motor cartridge 3012.

[0346] Referring to FIGS. 43-44, a surgical instrument 4010 is depicted. The surgical instrument 4010 is similar in many respects to the surgical instrument 100. For example, the surgical instrument 4010 is configured for selective connection with the end effector or single use loading unit or reload 300 via the adapter 200. Also, the surgical instrument 4010 includes a handle housing 102 that includes a lower housing portion 104, an intermediate housing portion 106, and an upper housing portion 108.

[0347] Like the surgical instrument 100, the surgical instrument 4010 includes a drive mechanism 160 which is configured to drive shafts and/or gear components in order to perform the various operations of surgical instrument 4010. In at least one instance, the drive mechanism 160 includes a rotation drivetrain 4012 (See FIG. 44) configured to rotate end effector 300 about a longitudinal axis "X" (see FIG. 2) relative to handle housing 102. The drive mechanism 160 further includes a closure drivetrain 4014 (See FIG. 44) configured to move the anvil assembly 306 relative to the

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cartridge assembly 308 of the end effector 300 to capture tissue therebetween. In addition, the drive mechanism 160 includes a firing drivetrain 4016 (See FIG. 44) configured to fire a stapling and cutting cartridge within the cartridge assembly 308 of the end effector 300.

[0348] As described above, referring primarily to FIGS. 7, 8, and 44, the drive mechanism 160 includes a selector gearbox assembly 162 that can be located immediately proximal relative to adapter 200. Proximal to the selector gearbox assembly 162 is the function selection module 163 which includes the first motor 164 that functions to selectively move gear elements within the selector gearbox assembly 162 to selectively position one of the drivetrains 4012, 4014, and 4016 into engagement with the input drive component 165 of the second motor 166.

[0349] Referring to FIG. 44, the motors 164 and 166 are coupled to motor control circuits 4018 and 4018', respectively, which are configured to control the operation of the motors 164 and 166 including the flow of electrical energy from a power source 156 to the motors 164 and 166. The power source 156 may be a DC battery (e.g., rechargeable lead-based, nickel-based, lithium-ion based, battery etc.), an AC/DC transformer, or any other power source suitable for providing electrical energy to the surgical instrument 4010.

[0350] The surgical instrument 4010 further includes a microcontroller 4020 ("controller"). In certain instances, the controller 4020 may include a microprocessor 4036 ("processor") and one or more computer readable mediums or memory units 4038 ("memory"). In certain instances, the memory 4038 may store various program instructions, which when executed may cause the processor 4036 to perform a plurality of functions and/or calculations described herein. The power source 156 can be configured to supply power to the controller 4020, for example.

[0351] The processor 4036 can be in communication with the motor control circuit 4018. In addition, the memory 4038 may store program instructions, which when executed by the processor 4036 in response to a user input 4034, may cause the motor control circuit 4018 to motivate the motor 164 to generate at least one rotational motion to selectively move gear elements within the selector gearbox assembly 162 to selectively position one of the drivetrains 4012, 4014, and 4016 into engagement with the input drive component 165 of the second motor 166. Furthermore, the processor 4036 can be in communication with the motor control circuit 4018'. The memory 4038 may also store program instructions, which when executed by the processor 4036 in response to a user input 4034, may cause the motor control circuit 4018' to motivate the motor 166 to generate at least one rotational motion to drive the drivetrain engaged with the input drive component 165 of the second motor 166, for example.

[0352] The controller 4020 and/or other controllers of the present disclosure may be implemented using integrated and/or discrete hardware elements, software elements, and/or a combination of both. Examples of integrated hardware elements may include processors, microprocessors, microcontrollers, integrated circuits, ASICs, PLDs, DSPs, FPGAs, logic gates, registers, semiconductor devices, chips, microchips, chip sets, microcontrollers, SoC, and/or SIP. Examples of discrete hardware elements may include circuits and/or circuit elements such as logic gates, field effect transistors, bipolar transistors, resistors, capacitors, inductors, and/or relays. In certain instances, the controller 4020 may include a hybrid circuit comprising discrete and integrated circuit elements or components on one or more substrates, for example.

[0353] In certain instances, the controller 4020 and/or other controllers of the present disclosure may be an LM 4F230H5QR, available from Texas Instruments, for example. In certain instances, the Texas Instruments LM4F230H5QR is an ARM Cortex-M4F Processor Core comprising on-chip memory of 256 KB single-cycle flash

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memory, or other non-volatile memory, up to 40 MHz, a prefetch buffer to improve performance above 40 MHz, a 32 KB single-cycle SRAM, internal ROM loaded with StellarisWare® software, 2KB EEPROM, one or more PWM modules, one or more QEI analog, one or more 12-bit ADC with 12 analog input channels, among other features that are readily available. Other microcontrollers may be readily substituted for use with the present disclosure. Accordingly, the present disclosure should not be limited in this context.

[0354] In various instances, one or more of the various steps described herein can be performed by a finite state machine comprising either a combinational logic circuit or a sequential logic circuit, where either the combinational logic circuit or the sequential logic circuit is coupled to at least one memory circuit. The at least one memory circuit stores a current state of the finite state machine. The combinational or sequential logic circuit is configured to cause the finite state machine to the steps. The sequential logic circuit may be synchronous or asynchronous. In other instances, one or more of the various steps described herein can be performed by a circuit that includes a combination of the processor 4036 and the finite state machine, for example.

[0355] In various instances, it can be advantageous to be able to assess the state of the functionality of a surgical instrument to ensure its proper function. It is possible, for example, for the drive mechanism, as explained above, which is configured to include various motors, drivetrains, and/or gear components in order to perform the various operations of the surgical instrument 4010, to wear out over time. This can occur through normal use, and in some instances the drive mechanism can wear out faster due to abuse conditions. In certain instances, a surgical instrument 4010 can be configured to perform self-assessments to determine the state, e.g. health, of the drive mechanism and it various components.

[0356] For example, the self-assessment can be used to determine when the surgical instrument 4010 is capable of performing its function before a re-sterilization or when some of the components should be replaced and/or repaired. Assessment of the drive mechanism and its components, including but not limited to the rotation drivetrain 4012, the closure drivetrain 4014, and/or the firing drivetrain 4016, can be accomplished in a variety of ways. The magnitude of deviation from a predicted performance can be used to determine the likelihood of a sensed failure and the severity of such failure. Several metrics can be used including: Periodic analysis of repeatably predictable events, Peaks or drops that exceed an expected threshold, and width of the failure.

[0357] In various instances, a signature waveform of a properly functioning drive mechanism or one or more of its components can be employed to assess the state of the drive mechanism or the one or more of its components. One or more vibration sensors can be arranged with respect to a properly functioning drive mechanism or one or more of its components to record various vibrations that occur during operation of the properly functioning drive mechanism or the one or more of its components. The recorded vibrations can be employed to create the signature waveform. Future waveforms can be compared against the signature waveform to assess the state of the drive mechanism and its components.

[0358] In at least one aspect, the principles of acoustics can be employed to assess the state of the drive mechanism and its components. As used herein, the term acoustics refers generally to all mechanical waves in gases, liquids, and solids including vibration, sound, ultrasound (sound waves with frequencies higher than the upper audible limit of human hearing), and infrasound (low-frequency sound, lower in frequency than 20 Hz [hertz] or cycles per second, hence lower than the "normal" limit of human hearing). Accordingly, acoustic emissions from the drive mechanism and

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its components may be detected with acoustic sensors including vibration, sound, ultrasound, and infrasound sensors. In one aspect, the vibratory frequency signature of a drive mechanism 160 can be analyzed to determine the state of one or more of the drivetrains 4012, 4014, and/or 4016. One or more vibration sensors can be coupled to one or more of the drivetrains 4012, 4014, and/or 4016 in order to record the acoustic output of the drivetrains when in use.

[0359] Referring again to FIG. 44, the surgical instrument 4010 includes a drivetrain failure detection module 4040 configured to record and analyze one or more acoustic outputs of one or more of the drivetrains 4012, 4014, and/or 4016. The processor 4036 can be in communication with or otherwise control the module 4040. As described below in greater detail, the module 4040 can be embodied as various means, such as circuitry, hardware, a computer program product comprising a computer readable medium (for example, the memory 4038) storing computer readable program instructions that are executable by a processing device (for example, the processor 4036), or some combination thereof. In some aspects, the processor 4036 can include, or otherwise control the module 4040.

[0360] The module 4040 may include one or more sensors 4042 can be employed by the module 4040 to detect drivetrain failures of the surgical instrument 4010. In at least one instance, as illustrated in FIG. 45, the sensors 4042 may comprise one or more acoustic sensors or microphones, for example. In at least one instance, as illustrated in FIG. 48, the sensors 4042 may comprise one or more accelerometers.

[0361] Various types of filters and transforms can be used on the output of a sensor 4042 to generate a waveform that represents the operational state of a drivetrain, for example, of the surgical instrument 4010. As illustrated in FIG. 45, a plurality of Band-pass filters can be configured to communicate with a sensor 4042 in order to process an output thereof. In the example shown in FIG. 45, there are four Band-pass filters, BPF1, BPF2, BPF3, and BPF4, used to filter the output of the sensor 4042. These filters are used to determine the various thresholds used to assess the health of a surgical instrument 4010, including acceptable limits, marginal limits, and critical limits, for example. In one example, a series of low pass filters as illustrated in FIG. 48 can be used on the output of the sensor 4042.

[0362] In one aspect, as illustrated in FIG. 45, logic gates can be employed with the filters to process the output of the sensors 4042. Alternatively, a processor such as, for example, the processor 4036 can be employed with the filters to process the output of the sensors 4042, as illustrated in FIGS. 48 and 48A. FIGS. 48B, 48C, and 48D depict an example structure and operational details of a Band-pass filter used to filter the output of the sensor 4042. In at least one instance, one or more of the filters employed in filtering the output the sensor 4042 is a Dual Low-Noise JFET-Input General-Purpose Operational Amplifier.

[0363] While various frequencies can be used, the exemplary frequencies of the filters shown in FIG. 45 are 5kHz, 1kHz, 200Hz, and 50Hz. The output of each filter is shown in FIG. 49, which illustrates the voltage amplitude at the frequency of each filter. The peak amplitude of the output of each filter is shown in FIG. 50. These values can be used to determine the health of the surgical instrument 4010 by comparison against threshold values stored in the memory 4038, for example. As illustrated in FIG. 48, a multiplexer 4044 and an analogue to digital converter 4046 can be employed to communicate the output of the filters to the processor 4036.

[0364] In at least one instance, an output of a sensor 4042 can be recorded when a motor is running during a known function having repeatable movement. For example, the output can be recorded when the motor 166 is running to retract or reset a drivetrain such as, for example the firing drivetrain 4016 to an original or starting position. The recorded output of the sensor 4042 can be used to develop a signature waveform of that movement. In one example, the recorded

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output of the sensor 4402 is run through a fast Fourier transform to develop the signature waveform.

[0365] Further to the above, the amplitude of key regions of the resulting signature waveform can be compared to predetermined values stored in the memory 4038, for example. In at least one instance, the memory 4038 may include program instructions which, when executed by the processor 4036, may cause the processor 4036 to compare the amplitudes of the key regions to the predetermined values stored in the memory 4038. When the amplitudes exceed those stored values, the processor 4036 determines that one or more components of the surgical instrument 4010 is no longer functioning properly and/or that the surgical instrument 4010 has reached the end of its usable life.

[0366] FIG. 46 illustrates a vibratory response from a drivetrain that is functioning properly. The output in volts from a microphone that is positioned on or in close proximity to the drivetrain is recorded over time. The frequency response of that output is determined using a fast Fourier transform, as shown in FIG. 46A, to develop a signature waveform for a properly functioning drivetrain. The signature waveform of the properly functioning drivetrain can be employed to detect any malfunction in the same drivetrain or other similar drivetrains. For example, FIG. 47 illustrates a vibratory response from a drivetrain that is not functioning properly. The microphone output is used to determine the frequency response of the malfunctioning drivetrain, as illustrated in FIG. 47A. The deviation of the frequency response of the malfunctioning drivetrain from the signature waveform of the properly functioning drivetrain indicates a malfunction in the drivetrain.

[0367] In at least one instance, stored values of key regions of a frequency response of a properly functioning drivetrain, as shown in FIG. 47A, are compared against recorded values of corresponding regions of a frequency response of an examined drivetrain, as shown in FIG. 48A. In the event the stored values are exceeded by the recorded values, it can be concluded that a malfunction is detected in the examined drivetrain. In response, various safety and remedial steps can be taken as described in greater detail in commonly owned U.S. Patent Application Serial No. 14/984,525, titled MECHANISMS FOR COMPENSATING FOR DRIVETRAIN FAILURE IN POWERED SURGICAL INSTRUMENTS, and filed December 30, 2015, which is incorporated herein by reference in their entireties.

[0368] There can be various stages of operation of the surgical instrument 4010 as the components are moved to effect a function at an end effector of the surgical instrument 4010 such as, for example capturing tissue, firing staples into the captured tissue, and/or cutting the captured tissue. The vibrations generated by the drive mechanism 160 of the surgical instrument 4010 can vary depending on the stage of operation of the surgical instrument 4010. Certain vibrations can be uniquely associated with certain stages of operation of the surgical instrument 4010. Accordingly, taking into consideration the stage or zone of operation of the surgical instrument 4010 allows for selectively analyzing the vibrations that are associated with that stage or zone of operation while ignoring other vibrations that are not relevant to that stage or zone of operation. Various sensors such as, for example, position sensors can be employed by the processor 4036 to determine the stage of operation of the surgical instrument 4010.

[0369] In one example, various stages of operation of the instrument 4010 are represented in the graph of FIG. 51, which illustrates the force needed to fire (FTF) the surgical instrument 4010 in relation to a displacement position of the drive assembly 360 from a starting or original position during a firing sequence or stroke of the surgical instrument 4010. In zone 1, an end effector 300 of the surgical instrument 4010 has clamped onto tissue, as described above, but has not affected the tissue. In zone 2, a load is being applied to move an actuation sled of the surgical instrument 4010

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to allow the end effector 300 to affect the tissue by, for example, cutting and stapling the tissue. In zone 3, the tissue has been cut and stapled by the end effector 300 of the surgical instrument 4010. Depending on which zone the surgical instrument 4010 is in during capture and processing of the vibrations made by the various drivetrains, the vibrations can either be compared to threshold frequency values or can be disregarded or not considered. For vibrations captured by a sensor 4042 in block 4048 and block 4050 of FIG. 51, certain portions of the captured vibrations can be disregarded or not considered for the purposes of determining the health of the surgical instrument 4010.

[0370] In at least one instance, any vibrations captured below the threshold line 4052 can be disregarded or not considered. In at least one instance, the ratio of the minimum threshold 4052 to a maximum FTF during a firing sequence or stroke of the surgical instrument 4010 is any value selected from a range of about 0.001 to about 0.30, for example. In at least one instance, the ratio is any value selected from a range of about 0.01 to about 0.20, for example. In at least one instance, the ratio is any value selected from a range of about 0.01 to about 0.10, for example.

[0371] In addition, any vibrations captured within the block 4048 and block 4050 can also be disregarded or not considered as long as the events within those blocks are not a catastrophic event. In the event of a catastrophic failure, a drive mechanism 160 is rendered inoperable, and certain bailout steps are taken to ensure, among other things, a safe detachment of the surgical instrument 4010 from the tissue being treated. Alternatively, In the event of an acute drivetrain failure, the drivetrain may still be operated to complete a surgical step or to reset the surgical instrument 4010; however, certain precautionary and/or safety steps can be taken to avoid or minimize additional damage to the drivetrain and/or other components of the surgical instrument 4010.

[0372] Referring again to FIG. 51, in at least one instance, vibrations detected at the beginning and/or the end of the firing stroke of the surgical instrument 4010 are disregarded or not considered for the purposes of assessing a damage/function status of the surgical instrument 4010. In one example, only vibrations detected at a central segment of the firing stroke of the surgical instrument 4010 are considered for the purposes of assessing a damage/function status of the surgical instrument 4010. In at least one instance, vibrations detected at the beginning of zone 1 and/or at the end of 2one 2 of the firing stroke of the surgical instrument 4010, as illustrated in FIG. 51, are disregarded or not considered for the purposes of assessing a damage/function status of the surgical instrument 4010.

[0373] A limited increase in noise could indicate increased wear or a non-catastrophic failure of parts of the gears, for example. A significant increase in the magnitude of the noise in chronic fashion could indicate continuing erosion of the transmission but could be used to predict the life of the instrument 4010 and it performance degradation allowing the completion of certain jobs, for example. An acute dramatic increase in magnitude or number of peaks could indicate a substantial or catastrophic failure causing the instrument to initiate more immediate and final reaction options, for example.

[0374] FIG. 52 illustrates the velocity of the drive assembly 360 of the surgical instrument 4010 in relation to a displacement position of the drive assembly 360 from a starting or original position. Point A, shown in FIGS. 51 and 52, represents an initial contact with tissue, increasing the force to advance the drive assembly 360 of the surgical instrument 4010, as shown in FIG. 51, and decreasing the velocity of drive assembly 360, as shown in FIG. 52. Point B, also shown in FIGS. 51 and 52, represents a contact with the thickest portion of the tissue during the stapling and cutting. Accordingly, the FTF at point B is at maximum, as shown in FIG. 51, and the velocity at point B is at its lowest point, as shown in FIG. 52. One or more sensors such as, for example, force sensors can be configured to measure the

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FTF as the drive assembly 360 is advanced. In addition, one or more position sensors can be configured to detect the position of the drive assembly 360 during a firing sequence of the surgical instrument 4010.

[0375] In at least one instance, the memory 4038 includes program instructions which, when executed by the processor 4036, causes the processor 4036 to employ one or more sensors 4042 positioned near one or more components of the drive mechanism 160 of the surgical instrument 4010 to selectively capture or record vibrations generated by the one or more components of the drive mechanism 160 during a predetermined section of the firing sequence. In at least one instance, the sensors 4042 are activated by the processor 4036 at a starting point of the predetermined section and deactivated at an end point of the predetermined section of the firing sequence or stroke so that the sensors 4042 may only capture or record vibrations generated by during the predetermined section.

[0376] The predetermined section may have a starting point after the firing sequence is begun and an end point before the firing sequence is completed. Said another way, the processor 4036 is configured to cause the sensors 4042 to only record vibrations at a central section of the firing sequence. As illustrated in FIG. 52, the processor 4036 can be configured to cause the sensors 4042 to start capturing or recording vibrations during a downward slope of the velocity of the drive assembly 360, and stop recording vibrations during an upward slope of the velocity of the drive assembly 360. Alternatively, the sensors 4042 can be active during the entire firing sequence of the surgical instrument 4010 while the processor 4036 ignores or excludes vibrations recorded outside the predetermined section of the firing sequence or stroke.

[0377] FIG. 53 illustrates acceptable limit modifications based on the zone of the stroke location. Limit profiles for both zone 1 and zone 2 are shown. The threshold limits for zone 2 are higher than zone 1 due to the load of the tissue on the surgical instrument 4010. As the velocity of the instrument decreases as the instrument moves from zone 1 to zone 2, the power spectrum will shift down in frequency. As shown in FIG. 54, which represents voltage amplitude versus frequency at various bandwidth represented by the filters shown in FIG. 48 for points A and B of FIGS. 51 and 52, the frequency lines associated with point B for each filter bandwidth are lower than the frequency lines associated with point A due to the load on the instrument 4010 from the tissue at point B and the velocity change due to the stroke zone.

[0378] Thus, these limits can be used to assess potential damage to the surgical instrument 4010. Using the captured vibrations from the various drivetrains of the surgical instrument 4010, the vibrations can be processed using the processor 4036 shown in FIG. 45 to determine when the frequency of the vibrations is above certain threshold values stored in memory 4038 associated with the processor 4036 while taking into account the zone of operation of the surgical instrument 4010 during the time of the capture of the vibrations. When the surgical instrument 4010 is determined to be defective in some way, the instrument 4010 can be repaired or replaced before sterilization or its subsequent use. Various other safety and/or remedial steps can also be taken.

[0379] In another aspect, the magnitude of the noise produced by the surgical instrument 4010 can be compared to predefined system harmonics to assess potential damage to the surgical instrument 4010, and the severity of that damage. As shown in FIG. 55, the output from the sensor 4042 from one or more drivetrains of the surgical instrument 4010 is presented as a voltage signal for zone 1, for example. Each frequency, as captured during the processing of the signal through the filters, such as those shown in FIG. 48, can have its own threshold profile.

[0380] For example, as shown in FIG. 55, each frequency may have its own acceptable limit 4054, marginal limit

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4056, and critical limit 4058 for each zone of operation of the surgical instrument 4010. Based on the example shown in FIG. 55, all the frequencies are acceptable and represent a properly functioning surgical instrument 4010 except for the frequency represented by A'. In at least one instance, this causes a processor, such as the processor 4036 shown in FIG. 48, to conclude that an acute but not catastrophic drivetrain failure had occurred.

[0381] Further to the above, in at least one instance, the processor 4036 is configured to conclude that a catastrophic drivetrain failure had occurred when any one frequency is equal to or exceeds the critical limit 4058. Alternatively, the processor 4036 may be configured to conclude that a catastrophic drivetrain failure had occurred only when a plurality of frequencies is equal to or exceeds the critical limit 4058, for example. Alternatively, the processor 4036 may be configured to conclude that a catastrophic drivetrain failure had occurred only when all frequencies, as captured during the processing of the signal through the filters, are equal to or exceed the critical limit 4058, for example.

[0382] Further to the above, in at least one instance, the processor 4036 is configured to conclude that an acute drivetrain failure had occurred when any one frequency is equal to or exceeds the marginal limit 4056 but is below the critical limit 4058, as illustrated in FIG. 55. Alternatively, the processor 4036 may be configured to conclude that an acute drivetrain failure had occurred only when a plurality of frequencies is equal to or exceeds the marginal limit 4056 but below the critical limit 4058, for example. Alternatively, the processor 4036 may be configured to conclude that an acute drivetrain failure had occurred only when all frequencies, as captured during the processing of the signal through the filters, are equal to or exceed the marginal limit 4056 but below the critical limit 4058, for example.

[0383] Referring to FIG. 56, a logic diagram 4021 represents possible operations that can be implemented by the surgical instrument 4010 in response to detected drivetrain failures. The memory 4038 may include program instructions, which when executed by the processor 4036, may cause the processor 4036 to assess the severity of a drivetrain failure based on input from the sensors 4042, and activate appropriate responses depending on the determined severity. The memory 4038 may include program instructions, which when executed by the processor 4036, may cause the processor 4036 to respond to a detected 4023 acute drivetrain failure by activating a safe mode 4022 of operation, for example. In addition, the memory 4038 may include program instructions, which when executed by the processor 4036, may cause the processor 4036 to respond to a detected catastrophic drivetrain failure by activating a recovery or bailout mode 4022. When no drivetrain failures are detected, the processor 4036 may permit the surgical instrument 4010 to continue 4027 with normal operations until a drivetrain failure is detected.

[0384] Referring again to FIG. 56, the safe mode 4022 may comprise one or more steps such as, for example, a motor modulation step which can be employed by the processor 4036 to limit the speed of an active drivetrain. For example, when the firing drivetrain 4016 is being actively driven by the motor 166 during a firing sequence, a detection of an acute drivetrain failure by the module 4040 may cause the processor 4036 to communicate to the motor drive circuit 4018' (FIG. 44) instructions to cause the mechanical output of the motor 166 to be reduced. A reduction in the mechanical output of the motor 166 reduces the speed of the active drivetrain 4016 which ensures safe completion of the firing sequence and/or resetting of the active drivetrain 4016 to an original or starting positon.

[0385] In another aspect, a frequency comparison of a cumulative magnitude of noise with respect to a predetermined minimum and/or maximum threshold is used to assess potential damage to the surgical instrument 4010. In at least one instance, a minimum threshold defines an acceptable limit 4054. A cumulative magnitude of noise that is below the minimum threshold is construed by the processor 4036 as an acceptable limit 4054. In addition, a maximum threshold

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can be employed to define a critical limit 4058. A cumulative magnitude of noise that is above the minimum threshold is construed by the processor 4036 as a critical limit 4058. A marginal limit 4056 can be defined by the minimum and maximum thresholds. In one example, a cumulative magnitude of noise that is above the minimum threshold but below the maximum threshold is construed by the processor 4036 as a marginal limit 4056.

[0386] FIG. 57 is a representation of a processed signal of the output of a sensor 4042 that was filtered by four Band¬pass filters, BPF1, BPF2, BPF3, and BPF4. The processed signal is represented within frequency bandwidths a_1, a_2, a_3, and a_4 that correspond to the bandwidths of the four Band-pass filters, BPF1, BPF2, BPF3, and BPF4.

[0387] FIG. 57 illustrates a graph of voltage amplitude versus frequency of the processed signal. The peal voltage amplitudes of the processed signal at the center frequencies of the Band-pass filters, BPF1, BPF2, BPF3, and BPF4 are represented by solid vertical lines A, A', A", and A'", respectively. In addition, a baseline threshold value 4060 is used to allow for a predictable amount of noise to be disregarded or not considered. Additional noise can be either taken into consideration or disregarded depending on where it falls in the frequency spectrum.

[0388] In the example illustrated in FIG. 57, the voltage amplitude Z2 is discounted as it is below the baseline threshold value 4060 that represented an acceptable level of noise, and Z4 is discounted as it falls outside the predetermined bandwidths a_1, a_2, a_3, and a_4. As Z, Zl, and Z3 fall above the baseline threshold value 4060 and are within the predetermined bandwidths al, a2, a3, and a4, these voltage amplitudes are considered with A, A', A", and A'" in defining the cumulative magnitude of noise and, in turn, determining the potential damage to the instrument 4010.

[0389] In at least one instance, the Voltage amplitude values at the center frequencies A, A', A", and A'" are summed to generate the cumulative magnitude of noise, as represented by voltage amplitude, that is then employed to assess whether a failure had occurred, and when so, the severity of that failure. In another instance, the Voltage amplitude values at the center frequencies A, A', A", and A'" and any voltage amplitude within the predetermined bandwidths al, a2, a3, and a4 are summed to generate the cumulative magnitude of noise, as represented by voltage amplitude, that is then employed to assess whether a failure had occurred, and when so, the severity of that failure. In another instance, the Voltage amplitude values at the center frequencies A, A', A", and A'" and any voltage amplitude values greater than the baseline threshold value 4060 and within the predetermined bandwidths al, a2, a3, and a4 are summed to generate the cumulative magnitude of noise, as represented by voltage amplitude, that is then employed to assess whether a failure had occurred, and when so, the severity of that failure.

[0390] In various instances, a comparison between a present noise signal and a previously recorded noise signal, which may be stored in the memory 4038, can be employed by the processor 4036 to determine a damage/function status of the surgical instrument 4010. A noise signal that is recorded by the sensor 4042 during a normal operation of the surgical instrument 4010 can be filtered and processed by the processor 4036 to generate normal processed signal that is stored in the memory 4038. Any new noise signal recorded by the sensor 4042 can be filtered and processed in the same manner as the normal noise signal to generate a present processed signal which can be compared to normal processed signal stored in the memory 4038.

[0391] A deviation between the present processed signature and the normal processed signal beyond a predetermined threshold can be construed as potential damage to the surgical instrument 4010. The normal processed signal can be set the first time the instrument is used, for example. Alternatively, a present processed signal becomes the normal processed signal against the next present processed signal.

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[0392] FIG. 58 is a representation of two processed signals of the output of a sensor 4042 that was filtered by four Band-pass filters, BPFl, BPF2, BPF3, and BPF4. The processed signals are represented within frequency bandwidths ai, a_2, a_3, and a_4 that correspond to the bandwidths of the four Band-pass filters, BPFl, BPF2, BPF3, and BPF4. FIG. 58 illustrates a graph of voltage amplitude versus frequency of the processed signal.

[0393] The voltage amplitudes of the normal and present processed signals are represented by solid vertical lines. The normal processed signal is in the solid lines while the present processed signal is in the dashed lines represents a present/current processed signal, as described above. There is a baseline threshold value 4060 that is used to allow for a predictable amount of noise to be disregarded, similar to the baseline threshold 4060 of FIG. 57. The difference between the two iterations are calculated and shown as 51, 52, and 53 in FIG. 58. There are various threshold values that are compared to the various 5 values to determine the damage of the surgical instrument 4010, indicating an acceptable 5, a marginal 5, or a critical 5 that would indicate the need to replace or repair the instrument 4010.

[0394] In at least one instance, one or more voltage amplitudes are compared to corresponding voltage amplitudes in a previously recorded noise pattern to assess any damage of the surgical instrument 4010. The difference between a present voltage amplitude and a previously-stored voltage amplitude can be compared against one or more predetermined thresholds, which can be stored in the memory 4038, to select an output of an acceptable, marginal, or critical status.

[0395] In at least one instance, the differences between the present voltage amplitudes and the previously stored voltage amplitudes are summed and compared to one or more predetermined thresholds stored in the memory 4038, for example, to select an output of an acceptable, marginal, or critical status. Magnitude of deviance could be compared range to range to indicate shear change in a local event.

[0396] In various instances, one or more algorisms, which may be stored in the memory 4038, can be employed by the processor 4036 to determine a damage/function status of the surgical instrument 4010 based on the processed signal of the output of the sensor 4042. Different noise signals that are recorded by the sensor 4042 can be construed to represent different damage/function statuses of the surgical instrument 4010. During normal operation, a normal or expected noise signal is recorded by the sensor 4042. When an abnormal noise signal is recorded by the sensor 4042, it can be further evaluated by the processor 4036, using one or more of the algorisms stored in the memory 4038, to determine a damage/function status of the surgical instrument 4010. The abnormal signal may comprise unique characteristics that can be used to assess the nature of the damage to the surgical instrument 4010. For example, the unique characteristics of the abnormal signal may be indicative of damage to a particular component of the surgical instrument 4010, which can be readily replaced.

[0397] In certain instances, one or more algorisms are configured to assess normal wear in one or more components of the surgical instrument 4010 based on the processed signal of the output of the sensor 4042. Normal wear can be detected by identifying a noise signal indicative of potential debris, for example. When the debris, as measured by its recorded noise signs, reaches or exceeds a predetermined threshold stored in the memory 4038, for example, the processor 4036 can be configured to issue an alert that surgical instrument 4010 is nearing the end of its life or requires maintenance, for example.

[0398] Furthermore, one or more algorisms can be configured to determine potential damage to one or more gear mechanisms such as, for example, a planet gear mechanism within the drive mechanism 160 based on the processed

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signal of the output of a sensor 4042. During normal operation, the planet gear may produce a normal noise signal as recorded by the sensor 4042. When the planet gear is damaged due to a broken tooth, for example, an abnormal noise signal is recorded by the sensor 4042. The abnormal signal may comprise unique characteristics indicative of a damaged planet gear, for example.

[0399] FIG. 59 is a representation of a processed signal of the output of a sensor 4042 that was filtered by four Band¬pass filters, BPF1, BPF2, BPF3, and BPF4. The processed signal is represented within frequency bandwidths a_1, a_2, a_3, and a_4, that correspond to the bandwidths of the four Band-pass filters, BPF1, BPF2, BPF3, and BPF4. Various algorisms, as described above, can be applied to the processed signal of FIG. 59 to determine a damage/function status of the surgical instrument 4010.

[0400] Like FIG. 57, FIG. 59 illustrates a graph of voltage amplitude versus frequency of the processed signal. The voltage amplitudes of the processed signal are represented by solid vertical lines. Within each of the bandwidths a_1, a_2, a_3, and a_4, the processed signal is evaluated within an expected range defined by an amplitude threshold and a sub-bandwidth threshold. Expected ranges Ei, E_2, E_3, and E_4 correspond to the bandwidths a_1, a_2, a_3, and a_4, respectively.

[0401] In the example illustrated in FIG. 59, a first event indicative of potential planet damage is observed. The observed first event includes a processed signal that comprises two voltage amplitude readings that are indicative of potential planet damage. The two voltage amplitude readings are a first voltage amplitude reading that exceeds the expected range E_1 at the center frequency of the bandwidth a_1, and a second voltage amplitude reading at a frequency that falls between but outside the bandwidths ai and a_2. A first algorism may be configured to recognize the observed event as indicative of potential planet damage. The processor 4036 may employ the first algorism to conclude that potential planet damage is detected.

[0402] Also, in the example illustrated in FIG. 59, a second event indicative of a unique potential damage in connection with a hub of the surgical instrument 4010 is observed. The second event includes a processed signal that comprises a voltage amplitude reading that falls below the expected voltage amplitude threshold at the center frequency of the bandwidth a_2. In addition, the processed signal comprises voltage amplitude readings Z_1 and Z_2 that exceed the baseline threshold value 4060, and are within the bandwidth a_2, but fall outside the sub-bandwidth threshold of the Expected range E_2. A second algorism may be configured to recognize the observed second event as indicative of a unique potential damage. The processor 4036 may employ the second algorism to conclude that potential damage in connection with a hub of the surgical instrument 4010 is detected.

[0403] Also, in the example illustrated in FIG. 59, a third event indicative of potential debris indicative of wear associated with one or more components of the surgical instrument 4010 is observed. The third event includes a processed signal that comprises a voltage amplitude reading that exceeds the expected voltage amplitude threshold at the center frequency of the bandwidth a_4. A third algorism may be configured to recognize the observed third event as indicative of potential debris. The processor 4036 may employ the third algorism to evaluate the severity of the potential debris based on the difference between the observed voltage amplitude and the expected voltage amplitude threshold, for example.

[0404] Certain surgical stapling and cutting end effectors described herein include an elongate channel configured to removably receive a staple cartridge that has surgical staples stored therein. The staple cartridge includes ejectors, or drivers, movably supported within a cartridge body of the staple cartridge which are each configured to support one or

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more staples thereon. The staple supporting drivers are arranged in longitudinal rows within the cartridge body located on each side of a longitudinally-extending slot defined in the cartridge body. The slot is configured to movably accommodate a firing member that may have a tissue cutting edge thereon that serves to cut the tissue that has been clamped between the anvil and the staple cartridge. The drivers are urged upwardly in the cartridge body, i.e., toward a deck of the cartridge body, when they are contacted by a sled that is configured to be driven longitudinally through the cartridge body by the firing member. The sled is movably supported in the cartridge and includes a plurality of angled or wedge-shaped cams that correspond to lines of staple drivers within the cartridge body. In an unfired or "fresh" staple cartridge, the sled is positioned in a starting position that is proximal to the first, or proximal-most, staple drivers in each line. The sled is advanced distally by the firing member during a firing stroke to eject the staples from the cartridge body. Once the staple cartridge has been at least partially fired, i.e., ejected from the cartridge body, the firing member is retracted back to a beginning or unfired position and the sled remains at a distal end of the now-spent staple cartridge. Once the firing member has been returned to the beginning or unfired position, the spent staple cartridge may be removed from the channel of the end effector.

[0405] Further to the above, a surgical instrument system 19010 is illustrated in FIG. 60. The surgical instrument system 19010 comprises a handle 19014 and a shaft assembly 19200 which is removably attachable to the handle 19014. The shaft assembly 19200 comprises an end effector 19300 including a cartridge channel 19302 and an anvil 19306 movable relative to the cartridge channel 19302. A staple cartridge 19304 is removably positioned in the cartridge channel 19302.

[0406] Such cutting and stapling end effectors are mounted to a distal end of an elongate shaft assembly that operably supports various drive shafts and components configured to apply various control motions to the end effector. In various instances, a shaft assembly may include an articulation joint or can be otherwise configured to facilitate the articulation of the end effector relative to a portion of the elongate shaft when articulation motions are applied to the end effector. The shaft assembly is coupled to a housing that supports various drive systems that operably interface with various components in the elongate shaft assembly. In certain arrangements, the housing may comprise a handheld housing or handle. In other arrangements, the housing may comprise a portion of a robotic or automated surgical system. The various drive systems of the housing may be configured to apply axial drive motions, rotary drive motions, and/or combinations of axial and rotary drive motions to the elongate shaft assembly. In handheld arrangements, the axial motions may be generated by one or more manually-actuated handcranks and/or generated by one more electric motors. The robotic system may employ electric motors and/or other automated drive arrangements that are configured to generate and apply the necessary control motions to the elongate shaft assembly and, in some cases, ultimately to the firing member in the end effector.

[0407] For surgical end effectors that require rotary control motions, the elongate shaft assembly may include a "proximal" rotary drive shaft portion that is rotated by a corresponding motor or other source of rotary motion that is supported in the housing. The proximal rotary drive shaft is configured to apply the rotary control motion to an end effector drive shaft that is supported in the end effector. In such arrangements, the firing member interfaces with the end effector drive shaft such that the firing member may be longitudinally advanced through the end effector and then returned to the unfired position.

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[0408] When using surgical instruments that are configured to cut and staple tissue, measures should be taken to ensure that an unspent surgical staple cartridge has been properly installed in the end effector of the surgical instrument prior to actuating the firing drive system of the surgical instrument. If a clinician were to inadvertently actuate a tissue cutting member of the firing drive system without first having installed an unspent staple cartridge in the end effector, for instance, the tissue cutting member may sever the tissue without stapling it. Similar problems could also arise if the clinician were to unwittingly install a partially-spent staple cartridge into the end effector. A partially-spent staple cartridge can be created when a staple cartridge is used in a prior procedure, or a prior step in a procedure, and then removed from the end effector before all of the staples have been ejected therefrom. If such a partially-spent cartridge were to be re-used in the surgical instrument, the tissue cutting member may create an incision in the tissue that is longer than the staple lines that are applied to the tissue. Thus, when using surgical end effectors that are configured to cut and staple tissue, it is desirable for the surgical end effector to be configured to prevent the actuation of the tissue cutting member unless an unspent "fresh" staple cartridge has been properly installed in the end effector.

[0409] FIGS. 61 and 62 depict portions of a surgical cutting and stapling end effector 20000 that may address such concerns. As can be seen in FIGS. 61 and 62, the end effector 20000 includes a rotary end effector drive shaft 20010. Although not shown, the rotary end effector drive shaft 20010 is rotatably supported within an elongate channel that is configured to removably support a surgical staple cartridge therein. The rotary end effector drive shaft 20010 is configured to receive rotary drive motions from a proximal rotary drive shaft that is attached to the channel or otherwise operably interfaces with the rotary end effector drive shaft 20010. Rotary control motions may be applied to the proximal rotary drive shaft through a corresponding drive arrangement that may comprise a motor or motors that are manually actuated or controlled by a robotic control system or other source(s) of rotary control motions. In alternative arrangements, the rotary control motions may be manually generated. Still referring to FIGS. 61 and 62, the surgical end effector 20000 comprises a firing assembly 20020 that is configured for longitudinal travel within the channel. In the illustrated embodiment, the firing assembly 20020 comprises an upper firing body 20022 that has a distal firing lug 20024 and a proximal firing lug 20026. The distal firing lug 20024 has an unthreaded hole (not shown) therein that is configured to receive the rotary end effector drive shaft 20010 therethrough. The proximal firing lug 20026 is spaced from the distal firing lug 20024 to define a nut cavity 20028 therebetween. The proximal firing lug 20026 has an unthreaded hole 20027 therethrough that is configured to receive the rotary end effector drive shaft 20010 therethrough.

[0410] As can be seen in FIGS. 61 and 62, the rotary end effector drive shaft 20010 is threaded. The firing assembly 20020 comprises a travel nut 20030 that is threadably journaled on the rotary end effector drive shaft 20010 and is located in the nut cavity 20028 between the distal firing lug 20026 and proximal firing lug 20027. The travel nut 20040 is movable within the nut cavity 20028 between a first position (FIG. 61) and a second position (FIG. 62). The travel nut 20040 includes an upper notched portion 20042 that has a distally extending retainer tab 20044 protruding therefrom. When the travel nut 20040 is in the first position, the notched upper portion 20042 is in vertical alignment with the upper firing body 20022 of the firing assembly 20020. As can be further seen in FIGS. 61 and 62, the distal firing lug 20024 may include a pair of laterally protruding distal fins 20025 (only one can be seen in the Figures) and the proximal firing lug 20026 may include a pair of laterally protruding proximal fins 20027. Likewise, the travel nut 20040 may include a pair of nut fins 20046 that are configured to align with the distal fins 20025 and the proximal fins 20027 when the travel nut 20040 is in the first position. See FIG. 61. When in that aligned position, the fins 20025,

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20027 and 20046 are free to pass within a channel provided in the body of the staple cartridge. Also in the illustrated arrangement, the upper body portion 20022 of the firing assembly 20020 includes a pair of laterally protruding upper fins 20030 that are configured to be slidably received in corresponding channels in the anvil or otherwise slidably engage the anvil as the firing assembly is distally driven through the end effector. Thus, the fins 20025, 20027, 20046 and upper fins 20030 serve to retain the anvil at a desired distance from the staple cartridge during the firing process. The firing assembly 20020 also includes a tissue cutting surface or tissue cutting blade 20032 for cutting the tissue that has been clamped between the anvil and the staple cartridge.

[0411] The channel of the surgical end effector 20000 is configured to operably and removably support a surgical staple cartridge therein that includes a sled 20050. The sled 20050 is movable from a starting position located in the proximal end of the staple cartridge to an ending position within the cartridge. The sled 20050 includes a central sled body 20052 that has a collection of cam wedges 20054 formed therein. In the illustrated example, the sled 20050 includes four cam wedges 20054 with two cam wedges 20054 being located on each side of the central sled body 20052. Each cam wedge 20054 would correspond to a line of staple supporting drivers located in the cartridge body. As the sled 20050 is driven distally through the cartridge body, the cam wedges 20054 would sequentially drive the staple drivers in the corresponding line upward within the cartridge body to thereby drive the staples into forming contact with the underside of the anvil.

[0412] In the illustrated example, the sled 20050 includes retention cavity 20056 that is formed in the central sled body 20052 that is configured to retainingly engage the distally extending retainer tab 20044 on the travel nut 20040 when the travel nut is in the first position and the sled 20050 is in the starting (pre-fired) position. See FIG. 61. In certain arrangements, one or more biasing members 20060 may be provided in the firing assembly 20020 to bias the travel nut 20040 into the first position. For example, a torsion spring may be supported in one or both of the proximal firing lug 20024 and distal firing lug 20026 to bias the travel nut 20040 into the first position (direction **Di)** when the threaded end effector drive shaft 20020 is unactuated. However, when the threaded end effector drive shaft 20020 is rotated in the firing direction (D_2), the rotating drive shaft 20020 overcomes the bias of the biasing member(s) 20060 and will move the travel nut 20030 to the second position shown in FIG. 62. When the travel nut 20030 is in the second position, the retention tab 20044 is out of alignment with the slot in the cartridge body that slidably accommodates the central sled body 20052 and the nut fins 20046 are out of alignment with the channels in the cartridge body. Thus, further rotation of the rotary end effector drive rod 20010 will not drive the firing assembly 20020 distally due to this misalignment of the tab 20044 and the fins 20046 with the corresponding portions of the cartridge body. However, if the cartridge is unspent (never been fired), the cartridge will have a sled 20050 in the starting position. When the cartridge is properly seated in the end effector channel, the retainer tab 20044 will be received in the retention cavity 20056 in the sled 20050 which will retain the travel nut 20030 in the first position when the rotary end effector drive shaft 20010 is rotated in the firing direction. Thus, such arrangement will prevent the clinician from unwittingly advancing the firing assembly 20020 (and tissue cutting surface 20044) when an unspent cartridge has not been properly seated in the channel. If a spent or even a partially spent cartridge is seated in the channel, the sled will not be in the starting position and the clinician will not be able to fire the firing assembly. If an unspent cartridge is present in the channel, but has not bee properly seated therein so that retention tab is received within the retention cavity in the sled, the clinician will be unable to advance the firing assembly.

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[0413] Turning next to FIGS. 63-65, portions of another surgical cutting and stapling end effector 20100 are shown. The end effector 20100 includes a channel 201 10 that is configured to removably receive therein a surgical staple cartridge 20200. In at least one embodiment, the end effector 20100 includes a rotary end effector drive shaft 20120 that is selectively movable or deflectable between a first "locked" position and a second "drive" position. The rotary end effector drive shaft 20120 is configured to receive rotary drive motions from a proximal rotary drive shaft (not shown). Rotary control motions may be applied to the proximal rotary drive shaft through a corresponding drive arrangement that may comprise a motor or motors that are manually actuated or controlled by a robotic control system. In alternative arrangements, the rotary control motions may be manually generated. The rotary end effector drive shaft 20120 may be rotatably supported on its proximal and distal ends by corresponding rotary bearing arrangements or cradles that facilitate operational rotation of the rotary end effector drive shaft 20120, yet enable a portion of the rotary end effector drive shaft to deflect between the first and second positions while remaining in rotational operational engagement with the proximal rotary a drive shaft or other source of rotary motion.

[0414] As can be seen in FIGS. 63-67, the surgical end effector 20100 comprises a firing assembly 20130 that is configured for longitudinal travel within the channel 201 10. In the illustrated embodiment, the firing assembly 20130 comprises a firing body 20132 that is threadably journaled on the rotary end effector drive shaft 20120. The firing body 20132 includes a pair of laterally protruding fins 20134 that are configured to pass within a passage 201 12 in the channel 201 10. The passage 201 12 may be defined by two inwardly extending spaced channel tabs 201 14 (only one tab can be seen in FIGS. 66 and 67) that have a slot 20116 therebetween to accommodate the rotary end effector drive shaft 20120 as well as passage of the firing body 20132 therebetween. See FIGS. 66 and 67. Also in the illustrated arrangement, an upper body portion 20136 of the firing assembly 20130 includes a pair of laterally protruding upper fins 20138 that are configured to be slidably received in corresponding channels 20152 in an anvil 20150 as the firing assembly 20130 is distally driven through the end effector 20100. Thus, the fins 20134 and 20138 serve to retain the anvil 20150 at a desired distance from the staple cartridge 20200 during the firing process. The firing assembly 20130 also includes a tissue cutting surface or tissue cutting blade 20139 that is configured to cut the tissue that has been clamped between the anvil and the staple cartridge.

[0415] FIG. 63 illustrates installation of an unspent staple cartridge 20200 into the surgical end effector 20100. As can be seen in FIG. 63, the unspent staple cartridge 20200 includes a sled 20210 that is located in a starting position. The sled 20210 is movable from the starting position located in the proximal end of the staple cartridge 20200 to an ending position within the cartridge 20200. As can be seen in FIG. 67, the sled 20210 includes a central sled body 20212 that has a collection of cam wedges 20214 formed therein. In the illustrated example, the sled 20210 includes four cam wedges 20214 with two cam wedges 20214 being located on each side of the central sled body 20212. Each cam wedge 20214 corresponds to a line of staple supporting drivers that are supported in the cartridge 20200. As the sled 20210 is driven distally through the cartridge 20200, the cam wedges 20214 sequentially drive the staple drivers in the corresponding line upward within the cartridge 20200 to thereby drive the staples into forming contact with the underside of the anvil 2015. Prior to seating the unspent staple cartridge 20200 in the channel 201 10, the rotary drive shaft 20120 is located in the first or up position (represented by arrow "U"). FIG. 66 illustrates the position of the rotary drive shaft 20120 and the firing assembly 20130 in a locked position prior to installation of a staple cartridge within the end effector. As can be seen in FIG. 66, the fins 20134 are aligned with the channel tabs 20144 of the

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channel 201 10 so that if the clinician were to actuate the rotary drive shaft 20120 in an effort to drive the firing assembly distally through the channel 201 10, the firing assembly 20130 would be prevented from moving distally due to the contact between the fins 20134 and the channel tabs 201 14. The distance that the rotary drive shaft 20120 as well as the firing assembly 20130 may deflect downwardly is represented as distance $\mathbf{D}_f$ in FIG. 66.

[0416] In the illustrated example, a firing assembly engagement notch 20216 is provided in the sled body 20212 that is configured to engage a corresponding engagement notch 20137 in the upper body portion 20136 of the firing assembly 20130. As the firing assembly engagement notch 20216 of the sled 20210 initially engages the engagement notch 20137 in the upper body portion 20136 of the firing assembly 20130, the sled 20120 biases or deflects the firing assembly 20130 and end effector rotary drive shaft 20120 downward into the channel 201 10 (represented by arrows **"D"** in FIG. 67). Such movement aligns the fins 20134 of the firing assembly 20130 with the passage 201 12 in the channel 201 10. The surgical staple cartridge 20220 may be configured to be snapped into the channel 20100 and retained therein in a properly installed orientation. FIGS. 64 and 67 illustrate the rotary drive shaft 20120 in the "drive position" or "second position" wherein the firing assembly 20130 is vertically aligned with the channel 201 10 so as to permit the firing assembly 20130 to be distally driven through the staple cartridge 20200 when the rotary drive shaft 20120 is rotated in a firing direction.

[0417] FIG. 65 illustrates installation of a spent or partially spent staple cartridge 20200' into the surgical end effector 20 100. As can be seen in FIG. 65, the sled 202 10 has been distally moved from the starting position within the staple cartridge 20200'. Thus, when the staple cartridge 20200' is properly installed within the channel 201 10, the sled 20210 and, more particularly, the firing assembly engagement notch 20126 in the sled 20210 is out of engagement with the engagement notch 20137 in the firing assembly 20130. Thus, the firing assembly 20130 remains in the first or locked position. Thus, if the clinician were to unwittingly actuate the rotary end effector drive shaft 20120, the firing assembly 20130 would not be distally advanced into the cartridge 20200'.

[0418] FIGS. 68-73 illustrate portions of another lockable firing assembly 20300 that is prevented from being advanced distally unless an unspent surgical staple cartridge has been properly seated within the end effector channel 20400. FIG. 68 illustrates the threaded nut portion 20302 of the firing assembly 20300 that is threadably journaled on a rotary end effector drive shaft in the manner described herein. The rotary end effector drive shaft has been omitted for clarity in FIGS. 68-73. In the illustrated embodiment a locking lug 20304 and an actuator lug 20306 protrude laterally from the threaded nut portion 20302. Although not shown, the firing assembly 20300 includes an upper firing body with a tissue cutting edge that may be similar to those disclosed herein. FIGS. 69-73, illustrate the threaded nut portion 20302 in connection with the channel 20400. It will be understood that the channel 20400 is configured to operably and removably support a surgical staple cartridge therein. Turning first to FIG. 69, the channel 20400 includes a centrally disposed, longitudinal slot 20402 that is configured to operably support the rotary end effector drive shaft as well as to permit longitudinal travel of the threaded nut 20302 through the channel 20400. In addition, a first longitudinal ledge 20404 and a second longitudinal ledge 20406 are provided on each side of the longitudinal slot 20402. The ledges 20404, 20406 serve to define a longitudinal passage 20408 that permits passage of the lugs 20304 and 20306 therein when the firing assembly 20300 is distally fired through the channel 20400. In addition, the channel 20400 includes a longitudinal cavity 20410 for receiving the cartridge body therein. It will be understood that the cartridge body may be configured to be snappingly and removably retained within the cavity 20410.

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[0419] In the illustrated embodiment, a locking notch 20412 is provided in the ledge 20404. The locking notch 20412 is sized to receive at least a portion of the locking lug 20304 therein when the firing assembly 20300 is in a first or beginning position prior to firing. A lock spring or biasing member 204 14 is provided on the ledge 20406 and is configured to engage and bias the actuator lug 20306 in the locking direction "L". Such rotation of the actuator lug 20306 causes the locking lug 20304 to enter into the locking notch 20412. When in that position, the firing assembly 20300 cannot be advanced distally when the rotary end effector drive shaft is rotated in a firing direction.

[0420] FIG. 7 1 illustrates the position of the threaded nut portion 20302 of the firing assembly 20300 when the firing assembly has been moved to a second or unlocked position. FIG. 72 illustrates what happens when a surgical staple cartridge is initially introduced into the channel 20400. In FIGS. 72 and 73, the cartridge body has been omitted for clarity. However, it will be understood that the surgical staple cartridge includes a sled 20500. The sled 20500 is movable from the starting position located in the proximal end of the staple cartridge to an ending position within the cartridge. As can be seen in FIGS. 72 and 73, the sled 20500 includes a central sled body 20502 that has a collection of cam wedges 20504 formed therein. In the illustrated example, the sled 20500 includes four cam wedges 20504 with two cam wedges 20504 being located on each side of the central sled body 20502. Each cam wedge 20504 corresponds to a line of staple supporting drivers located in the cartridge 20500. As the sled 20500 is driven distally through the cartridge, the cam wedges 20504 sequentially drive the staple drivers in the corresponding line upward within the cartridge to thereby eject the staples into forming contact with the underside of the anvil.

[0421] Still referring to FIG. 72, the sled 20500 is configured to contact the actuator lug 20306 when the cartridge is properly installed within the channel 20400 and the sled is in the starting position. In the illustrated embodiment for example, a downwardly extending actuator member 20506 is formed on or otherwise attached to the sled 20500. When the cartridge is installed in the channel 20400, the actuator member 20506 on the sled 20500 contacts the actuator lug 20306 and biases the firing assembly in the unlocking direction "UL" (FIG. 72) to the position shown in FIG. 73. As can be seen in FIG. 73, the locking lug 20304 is out of the locking notch 20412 and the firing assembly 20300 can now be longitudinally advanced through the channel and the staple cartridge. Thus, such arrangement will prevent the clinician from unwittingly advancing the firing assembly unless a cartridge with a sled in the starting position has been properly installed in the channel. As used in this context, the term "properly installed" means that the staple cartridge has been retainingly seated into the channel in the intended manner so as to permit the sled and other portions thereof to interact with the firing assembly in the manners described herein.

[0422] FIGS. 74-76 illustrate portions of an end effector 20500 that is configured to cut and staple tissue. The end effector 20500 comprises an elongate channel 205 10 that is configured to operably support a surgical staple cartridge 20600 therein. The end effector includes an anvil assembly 20700 that operably supports an anvil concentric drive member 20710 for operably driving a firing member 20720 through the end effector 20500. The anvil concentric drive member 20710 may, for example, be centrally disposed within the anvil frame 20712 and substantially extend the length thereof. The anvil concentric drive member 20710 in the illustrated embodiment comprises an anvil drive shaft that includes a distal bearing lug 20714 and a proximal bearing lug 20716. The distal bearing lug 20714 is rotatably housed in a distal bearing housing 20718 that is supported in a bearing pocket in the anvil frame 20712. The proximal bearing lug 20716 is rotatably supported in the anvil assembly 20700 by a floating bearing housing 20720 that is movably supported in a bearing pocket 20722 that is formed in the proximal anvil portion 20724. See FIG. 75. The proximal

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and distal bearing housing arrangements may serve to prevent or at least minimize an occurrence of compressive forces on the anvil drive shaft 20710 which might otherwise cause the anvil drive shaft 20710 to buckle under high force conditions. The anvil drive shaft 20710 further includes a driven firing gear 20726, a proximal threaded or helix section 20728 and a distal threaded or helix section 20730. In the illustrated arrangement, the proximal threaded section 20728 has a first length and the distal threaded section 20730 has a distal length that is greater than the first length. In the illustrated arrangement, the pitch of the distal threaded section 20730 is greater than the pitch of the proximal threaded section 20728. Stated another way, the lead of the distal threaded section 20730 is greater than the lead of the proximal threaded section 20728. In one arrangement, the lead of the distal threaded section 20730 may be approximately twice as large as the lead of the proximal threaded section 20728. In addition, a dead space 2073 1 may be provided between the proximal threaded section 20728 and the distal threaded section 20730. In at least one example, the anvil drive shaft 20710 may be fabricated in one piece from extruded gear stock.

[0423] To facilitate assembly of the various anvil components, the anvil assembly 20700 includes an anvil cap 20740 that may be attached to the anvil frame 20712 by welding, snap features, etc. In addition, the anvil assembly 20700 includes a pair of anvil plates or staple forming plates 20742 that may contain various patterns of staple forming pockets on the bottom surfaces thereof that correspond to the staple arrangements in the surgical staple cartridge 20600 that is supported in the elongate channel 205 10. The staple forming plates 20742 may be made of a metal or similar material and be welded to or otherwise attached to the anvil frame 20712. In other arrangements, a single anvil plate that has a slot therein to accommodate a firing member may also be employed. Such anvil plate or combination of plates may serve to improve the overall stiffness of the anvil assembly. The anvil plate(s) may be flat and have the staple forming pockets "coined" therein, for example.

[0424] As can be seen in FIGS. 74 and 77-79, the surgical end effector 20500 includes a firing member 20800 that has a body portion 20802 that has a knife nut portion 20804 formed thereon or otherwise attached thereto. The knife nut portion 20804 is configured to be received on the anvil drive shaft 20710. A distal thread nodule 20806 and a proximal thread nodule 20808 that are configured to engage the proximal threaded section 20728 and the distal threaded section 20730 are formed in the knife nut portion 20804. The distal thread nodule 20806 is spaced from the proximal thread nodule 20808 relative to the length of the dead space 2073 1 such that when the knife nut portion 20804 spans across the dead space 2073 1, the distal thread nodule 20806 is in threaded engagement with the distal threaded section 20730 and the proximal thread nodule 20808 is in threaded engagement with the proximal threaded section 20728. In addition, anvil engaging tabs 20810 protrude laterally from opposite lateral portions of the knife nut 20804 and are each oriented to engage the corresponding staple forming plates 20742 that are attached to the anvil frame 20712. The firing member 20800 further includes a channel engaging tab 20820 that protrudes from each lateral side of the body portion 20800 The firing member 20800 also includes a tissue cutting surface 20822.

[0425] Rotation of the anvil drive shaft 20710 in a first rotary direction will result in the axial movement of the firing member 20800 from a first position to a second position. Similarly, rotation of the anvil drive shaft 20710 in a second rotary direction will result in the axial retraction of the firing member 20800 from the second position back to the first position. The anvil drive shaft 20710 ultimately obtains rotary motion from a proximal drive shaft (not shown) that operably interfaces with a distal power shaft 20830. In the illustrated arrangement, the distal power shaft 20830 has a distal drive gear 20832 that is configured for meshing engagement with the driven firing gear 20726 on the anvil drive

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shaft 20710 when the anvil assembly 20710 is in the closed position. The anvil drive shaft 20710 is said to be "separate and distinct" from the distal power shaft 20830. That is, at least in the illustrated arrangement for example, the anvil drive shaft 20710 is not coaxially aligned with the distal power shaft 20830 and does not form a part of the distal power shaft 20830. In addition, the anvil drive shaft 20710 is movable relative to the distal power shaft 20830, for example, when the anvil assembly 20700 is moved between open and closed positions. The proximal drive shaft may ultimately be rotated by a motor supported in a housing that is attached to a shaft assembly coupled to the surgical end effector 20500. The housing may comprise a handheld assembly or a portion of a robotically controlled system.

[0426] In the illustrated arrangement, the anvil assembly 20700 is closed by distally advancing a closure tube 20900. As can be seen in FIG. 74, the closure tube 20900 includes an internally threaded closure nut 20902 that is configured for threaded engagement with a closure thread segment 20834 that is formed on the distal power shaft 20830. Initial rotation of the distal power shaft 20830 will drive the closure tube 20900 distally to cam the anvil assembly 20700 to the closed position. Rotation of the distal power shaft 20830 in an opposite direction will drive the closure tube 20900 in the proximal direction to permit the anvil assembly 20700 to move to an open position.

[0427] Turning to FIGS. 77-79, the channel includes a pair of inwardly extending, longitudinal retention tabs 205 12 that have a slot space 205 14 therebetween to accommodate the longitudinal movement of the firing member 20800. In addition, the channel 205 10 includes a proximal locking cavity 205 16 that is proximal to the retention tabs 205 12. The locking cavity 205 16 transitions to a distal firing cavity that is coextensive with the tabs 205 12 and the space 205 14 therebetween. The locking cavity 205 16 is larger than the distal firing cavity to permit the firing member 20800 to pivot to the position shown in FIG. 77. When in that position, the firing member body 20802 is out of alignment with the slot space and the tabs 20820 are out of alignment with the distal firing cavity 20518. When in that position, one of the tabs 20820 that protrude from the firing member 20800 is in alignment with one of the retention tabs 205 12 and thus the firing member 20800 is prevented from being longitudinally advanced through the channel 205 10. The firing member 20800 will pivot to that "locked" position when the anvil drive shaft 20710 is initially rotated and a surgical staple cartridge with a sled in a starting position has not been installed in the channel 205 10. However, when a cartridge that has a sled in a starting position has been installed in the channel 205 10, the sled will serve to contact or otherwise interface with the firing member 20800 to position and retain the firing member 20800 in alignment with the space 205 14 between the retention tabs 205 12. See FIG. 78. Thus, continued rotation of the anvil drive shaft 207 10 will drive the firing member 20800 distally through the channel 205 10 as shown in FIG. 79. Such arrangement will therefore, prevent the clinician from unwittingly actuating the anvil drive shaft 20710 to drive the firing member 20800 distally through the channel 205 10 unless an unspent surgical staple cartridge that has a sled in a starting position has been installed in the channel.

[0428] In still other arrangements, the detection of the sled in the correct location within an unspent staple cartridge that has been properly seated in the channel of a surgical cutting and stapling end effector may be determined electrically. For example, this may be accomplished with contacts on the sled that complete a circuit when the sled is in a starting position in a cartridge that has been properly seated in the channel. Upon firing, the circuit is opened and further firing is not permitted until the circuit is closed again.

[0429] As mentioned above, stapling assemblies for first grasping, clamping, stapling, and/or cutting tissue are well known in the art. Previous stapling assemblies, such as those disclosed in U.S. Patent No. 5,865,361, for example, have

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comprised a loading unit that is operably connected to a handle assembly. The disclosure of U.S. Patent No. 5,865,361, entitled SURGICAL STAPLING APPARATUS, which issued on February 2, 1999, is incorporated by reference in its entirety. While the handle assemblies of these previous stapling assemblies were configured for multiple uses, the loading units were configured for a single use. After each loading unit was spent, or at least partially spent, the loading unit was removed from the handle assembly and then replaced with a new, or unspent, loading unit if desired. The configuration of these previous loading units did not permit a cartridge portion of the loading unit to be replaced so that a spent loading unit could be used once again.

[0430] U.S. Patent Application Publication No. 2012/0286021 discloses an alternative stapling assembly comprising a first jaw including an anvil and a secondjaw including a staple cartridge. The entire disclosure of U.S. Patent Application Publication No. 2012/0286021, entitled REPLACEABLE STAPLE CARTRIDGE, which published on November 15, 2012, is incorporated by reference herein. Unlike the previous loading units, the secondjaw of these stapling assemblies can be completely removed from the loading unit and then replaced with another secondjaw, presumably after the previous secondjaw has been spent. Notably, the entire secondjaw of these stapling assemblies is replaced - not just a portion of the secondjaw as disclosed in U.S. Patent No. 6,988,649, entitled SURGICAL STAPLING INSTRUMENT HAVING A SPENT CARTRIDGE LOCKOUT, which issued on January 24, 2006, the entire disclosure of which is incorporated by reference herein.

[0431] The stapling assembly disclosed in U.S. Patent Application Publication No. 2012/0286021, however, is defective. For instance, the stapling assembly disclosed in U.S. Patent Application Publication No. 2012/0286021 includes a cutting member which can be advanced distally eventhough a second jaw is not attached to the stapling assembly. As a result, the cutting member may be unintentionally exposed to the tissue of a patient. Various improvements to these stapling assemblies, among others, are discussed further below.

[0432] Turning now to FIG. 80, a surgical instrument system 21000 comprises a handle 21010 and a stapling assembly, or loading unit, 21030 attached to a shaft 21020 of the handle 21010. Referring primarily to FIG. 81, the loading unit 21030 comprises a proximal end, or bayonet connector, 21032 configured to releasably attach the loading unit 21030 to the shaft 21020. Similar to the stapling assembly disclosed in U.S. Patent Application Publication No. 2012/0286021, the loading unit 21030 comprises an anvil 21040 and an attachable cartridge jaw 21050. The cartridge jaw 21050, once attached to the loading unit 21030, is pivotable between an open position (FIG. 80) and a closed, or clamped, position.

[0433] The handle 21010 comprises an actuator, or trigger, 21014 which is rotatable toward a pistol grip 21012 of the handle 21010 to drive a firing bar of the loading unit 21030 distally. During a first stroke of the trigger 21014, the firing bar engages the cartridge jaw 21050 and moves the cartridge jaw 21050 into its closed position. During one or more subsequent strokes of the trigger 21014, the firing bar is advanced through the cartridge jaw 21050. The cartridge jaw 21050 comprises a plurality of staples removably stored therein which are ejected from the cartridge jaw 21050 as the firing bar is advanced distally through the cartridge jaw 21050. More particularly, as discussed in greater detail elsewhere herein, the firing bar enters into the cartridge jaw 21050 and pushes a sled stored in the cartridge jaw 21060 distally which, in turn, drives the staples out of the cartridge jaw 21050.

[0434] Referring primarily to FIG. 81, the loading unit 21030 further comprises an articulation joint 21036 about which the anvil 21040 and the cartridge jaw 21050 can be articulated. The loading unit 21030 comprises an articulation

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driver configured to articulate the anvil 21040 and the cartridge jaw 21050 about the articulation joint 21036. The articulation driver is operably coupled with an articulation actuator 21016 which is rotatable to push or pull the articulation driver, depending on the direction in which the articulation actuator 21016 is rotated.

[0435] An alternative surgical instrument system 21100 is illustrated in FIGS. 82 and 83. The system 21100 comprises a handle 21110 and an attachable loading unit 21130. Similar to the above, the loading unit 21130 comprises an anvil jaw 21040 and a removably attached cartridge jaw 21050. The loading unit 21130 further comprises an articulation joint 21138 and a flex joint 21136 which are configured to permit the end effector to articulate relative to a shaft portion 21120 of the loading unit 21130. The shaft portion 21120 comprises a proximal connector 21122 configured to attach the loading unit 21130 to the handle 21110. Referring primarily to FIG. 84, the proximal connector 21122 comprises rotatable inputs 21128 which are operably engageable with rotatable outputs 21118 of the handle 21110. Each rotatable input 21128 is part of a drive system which articulates the loading unit 21130 about the flex joint 21136 and/or articulation joint 21128, closes the cartridge jaw 21050, and/or fires the staples from the cartridge jaw 21050, for example. The handle 21110 comprises controls 21114 and 21116 which can be utilized to operate the drive systems of the loading unit 21130. The disclosure of U.S. Patent Application Publication 2013/0282052, entitled APPARATUS FOR ENDOSCOPIC PROCEDURES, which published on October 24, 2013, is incorporated by reference in its entirety.

[0436] Further to the above, the staple cartridge jaw 21050 is removably attached to the anvil jaw 21040 of the loading unit 21030. Referring primarily to FIGS. 85 and 86, the proximal end of the anvil jaw 21040 comprises attachment projections 21042 extending from opposite sides thereof. The proximal end of the staple cartridge jaw 21050 comprises recesses 21052 defined therein which are configured to receive the attachment projections 21042. The anvil jaw 21040 is fixedly attached to the frame of the loading unit 21030 and the attachment projections 21042 extend fixedly from the anvil jaw 21040. In at least one instance, the anvil jaw 21040 and/or the attachment projections 21042 are integrally formed with the frame of the anvil portion 21030.

[0437] The staple cartridge jaw 21050 further comprises clips 21056 configured to engage and grasp the attachment projections 21042. Each clip 21056 is positioned within a slot 21055 defined in the cartridge jaw 21050. When the cartridge jaw 21050 is attached to the loading unit 21030, the clips 21056 flex around the attachment projections 21042. When the cartridge jaw 21050 is fully attached to the loading unit 21030, the clips 21056 resiliently snap or return toward their unflexed configuration and hold the attachment projections 21042 in the recesses 21052.

[0438] Further to the above, the cartridge jaw 21050 is properly attached to the loading unit 21030 when the clips 21056 are engaged with the attachment projections 21042 and the attachment projections 21042 are fully seated in the recesses 21052. That said, the loading unit 21030 does not include a sensing system configured to detect whether or not the cartridge jaw 21050 is properly attached to the loading unit 21030. Turning now to FIGS. 87-91, a loading unit 21130 comprises a system configured to detect whether or not a staple cartridge jaw 21150 is properly attached to an anvil jaw 21140 of the loading unit 21130, as described in greater detail below.

[0439] The loading unit 21130 comprises an electrical circuit that is completed, or closed, when the staple cartridge jaw 21150 is properly attached to the loading unit 21130. The electrical circuit is in communication with a microprocessor, or controller, of the surgical instrument system. The controller is in the handle of the surgical instrument system; however, the controller can be in any suitable part of the surgical instrument system, such as the

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loading unit 21130, for example. Alternatively, the controller can be in a housing of a surgical instrument assembly that is attached to a robotic surgical system and/or in the robotic surgical system itself. In any event, the controller is in communication with an electric motor which drives the staple firing system of the surgical instrument system.

[0440] When the controller detects that a staple cartridge is not properly attached to the loading unit 21130, further to the above, the controller can prevent the electric motor from driving the staple firing system through a staple firing stroke. In at least one such instance, the controller can open a switch between a power source, such as a battery, for example, and the electric motor to prevent electrical power from being supplied to the electric motor. When the controller detects that a staple cartridge 21150 is properly attached to the loading unit 21130, the controller can permit the electric motor to receive power from the battery and drive the staple firing system through a staple firing stroke when actuated by the user of the surgical instrument system. In at least one such instance, the controller can close the switch between the battery and the electric motor, for example.

[0441] The electrical circuit of the loading unit 21130 comprises conductors 21147 (FIGS. 89 and 91) extending through a shaft portion of the loading unit 21130 and, in addition, a contact 21146 positioned around each of the attachment projections 21142. Each of the conductors 21147 is electrically coupled to the microprocessor and a contact 21146. The staple cartridge 21150 comprises a portion of the electrical circuit which completes the electrical circuit when the staple cartridge 21150 is fully engaged with the attachment projections 21142. The portion of the electrical circuit in the staple cartridge 21150, referring to FIG. 90, comprises a contact 21159 positioned in each of the recesses 21052 and a conductor, or trace, 21157 extending between and electrically coupled with the contacts 21159. The clips 21056 are configured to hold the contacts 21159 of the staple cartridge jaw 21150 against the contacts 21146 extending around the attachment portions 21142. In at least one instance, the clips 21056 are comprised of a conductive material and are in communication with the trace 21157. In such instances, the clips 21056 are part of the electrical circuit in the staple cartridge 21150. In any event, when the staple cartridge jaw 21150 is detached from the loading unit 21130, the electrical circuit is broken, or opened, and the microprocessor can detect that a staple cartridge jaw 21150 is no longer attached to the loading unit 21130.

[0442] Further to the above, the controller can determine that a staple cartridge jaw 21150 is improperly attached to the loading unit 21130 if only one of the contacts 21159 is engaged with its respective contact 21146. In such instances, the electrical circuit would be in an open condition and, as a result, the microprocessor would treat an improperly assembled staple cartridge jaw 21150 as a missing cartridge jaw 21150 and prevent the electric motor from being actuated to perform the staple firing stroke. In various instances, the surgical instrument system can include an indicator light and/or feedback system that communicates to the user of the surgical instrument system that the staple cartridge jaw detection circuit has not been closed. In response thereto, the user can investigate the condition and properly seat the staple cartridge jaw 21150 to close the detection circuit.

[0443] As illustrated in FIG. 90, the conductor 21157 extends laterally across the cartridge jaw 21150. When a firing member is advanced distally through the cartridge jaw 21150, the firing member can transect and/or break the conductor 21157 and open the jaw detection circuit. At such point, the controller can permit the electric motor to be operated to advance the firing member distally until the firing member is retracted back to its unfired position. After the firing member has been retracted to its unfired position, the controller can then prevent the re-operation of the electric motor until an unspent cartridge jaw 21150 is properly attached to the loading unit 21130. As a result, the electrical

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circuit of the loading unit 21130 can serve as a missing cartridge lockout, an improperly attached cartridge lockout, and a spent cartridge lockout.

[0444] In addition to or in lieu of the above, the sled 21170 can comprise a conductive portion which electrically connects the lateral jaw contacts 21159 and/or the electrically conductive clips 21056 when the sled 21170 is in its unfired position. In at least one instance, the sled 21170 comprises a conductor and/or trace extending from one lateral side of the sled 21170 to the other. When the sled 21170 is advanced distally, the conductive portion of the sled 21170 is no longer in electrical communication with the contacts 21159 and/or clips 21056 and the jaw detection circuit is opened. To the extent that the jaw assembly also comprises the conductor 21157, the conductor 21157 can be cut or broken to open the jaw detection circuit as described above. In various instances, the sled 21170 can be displaced from the jaw detection circuit at the same time that the conductor 21157 is cut or broken, for example. In any event, the conductive sled 21170 can provide a spent cartridge lockout.

[0445] In various alternative embodiments, the electrical circuit lockout of the loading unit is not transected when the firing member is advanced distally. Turning now to FIG. 93, a staple cartridge jaw 21250 of a loading unit 21230 comprises a cartridge body 21251, a plurality of staple cavities 21258 defined in the cartridge body 21251, and a longitudinal slot 21259 defined in the cartridge body 21251 which is configured to receive a portion of the firing member. Similar to the staple cartridge jaw 21150, the staple cartridge jaw 21250 comprises a portion of the loading unit electrical circuit. The portion of the electrical circuit in the staple cartridge jaw 21250 comprises electrical contacts, such as contacts 21159, for example, defined in the recesses 21052 and compliant electrical contacts 21257 disposed on opposite sides of the longitudinal slot 21251. Each compliant contact 21257 is in electrical communication with a contact 21052 via a conductor, or trace, for example, extending through the cartridge body 21251.

[0446] The compliant contacts 21257 are configured to engage an anvil jaw 21240 of the loading unit 21230 when the staple cartridge jaw 21250 is assembled to the loading unit 21250. More specifically, the compliant contacts 21257 engage a conductive pathway 21247 defined in the anvil jaw 21240 which electrically connects the compliant contacts 21257 and, at such point, the electrical circuit has been closed. The compliant contacts 21257 remain constantly engaged with the conductive pathway 21247, i.e., when the cartridge jaw 21250 is in an open position, when the cartridge jaw 21250 is in a closed position, and when the cartridge jaw 21250 is moved between its open and closed positions. When the firing member is advanced distally, the firing member passes through a gap defined between the contacts 21257 and, as a result, the electrical jaw detection circuit is not transected. Such an arrangement can provide a missing cartridge jaw lockout and/or an improperly attached cartridge jaw lockout.

[0447] Further to the above, the compliant contacts 21257 can comprise springs configured to bias the staple cartridge jaw 21250 into an open position. When the staple cartridge jaw 21250 is moved into its closed position, the compliant contacts 21257 are compressed between the staple cartridge jaw 21250 and the anvil 21240. The compliant contacts 21257, along with the other portions of the electrical jaw detection circuit, are electrically insulated from the metal, or conductive, portions of the stapling assembly so as to maintain the integrity of the jaw detection circuit and prevent the jaw detection circuit from shorting out.

[0448] In addition to or in lieu of an electrical or electronic lockout such as the lockout described above, for example, a loading unit can include a mechanical lockout that prevents the firing system from performing a staple firing stroke if a staple cartridge jaw is not properly attached to the loading unit. Turning now to FIG. 92, the staple cartridge jaw

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21150 comprises a sled 21170 which is pushed distally by the firing member 21160 (FIG. 89) when the firing member 21160 is advanced distally during a staple firing stroke. The staple cartridge jaw 21150 further comprises lockout members 21172 which are pivotably engaged with the cartridge body 21151 of the cartridge jaw 21150. As described in U.S. Patent Application Publication No. 2012/0286021, the lockout members 21172 are biased inwardly into a locked out position after the sled 21170 has been at least partially advanced distally during a firing stroke which prevent the cartridge jaw 21150 from being re-fired.

[0449] Although the lockout members 21172 can block the distal advancement of the firing member 21160, as discussed above, the firing member 21160 may be able to push through and slide between the lockout members 21172 in certain instances. As an improvement, one or both of the lockout members 21172 can comprise a latch or hook extending inwardly toward the firing member 21160. When the lockout members 21172 are biased inwardly after the sled 21170 has been advanced distally, the latches or hooks can engage apertures defined in the firing member 21160 when the firing member 21160 is retracted back into its unfired position. Once the latches or hooks are positioned in the firing member apertures, they can prevent the firing member 21160 from being advanced distally through the already spent cartridge. At such point, the staple cartridge would have to be replaced to unlock the firing member 21160.

[0450] As described above, an attachable staple cartridge jaw can be moved between open and closed positions to clamp tissue therebetween. Other embodiments are envisioned in which the staple cartridge jaw is removably attachable to a stapling instrument but the anvil jaw is movable between open and closed positions. Turning now to FIGS. 94-97, a stapling assembly 21530 comprises an attachable staple cartridge jaw 21550 including a cartridge body 21551 and, in addition, a pivotable anvil jaw 21540. The stapling assembly 21530 further comprises a firing member, such as firing member 21160, for example, which is movable distally to engage the anvil jaw 21540 and move the anvil jaw 21540 into a closed position. More specifically, the firing member 21160 comprises a first camming member 21162 configured to engage the cartridge jaw 21550 and a second camming member 21164 configured to engage the anvil jaw 21540 and move the anvil jaw 21540 toward the cartridge jaw 21550.

[0451] The stapling assembly 21530 further comprises a mechanical lockout 21572. The lockout 21572 is mounted to a frame of the stapling assembly 21530 at a frame pivot 21232. The lockout 21572 extends distally and is supported by a frame pin 21533. The lockout 21572 comprises a metal wire; however, the lockout 21572 can be comprised of any suitable material. The lockout 21572 further comprises an elongated recess track 21576 defined therein which is configured to receive a lockout pin 21166 extending from the firing member 21160. Referring primarily to FIG. 94, the elongated recess track 21276 constrains or limits the longitudinal displacement of the firing member 21160 when the lockout 21572 is in its locked position. More specifically, the recess track 21576 is configured to permit the firing member 21160 to be advanced distally to move the anvil jaw 21540 between its open and closed positions but prevent the firing member 21160 from being advanced distally to perform a firing stroke unless the lockout 21572 is moved into its unlocked position, as discussed below.

[0452] When the staple cartridge jaw 21550 is attached to the stapling assembly 21530, as illustrated in FIG. 95, the sled 21270 of the cartridge jaw 21550 contacts a distal arm 21574 of the lockout 21572 and deflects the lockout 21572 downwardly into its unlocked position. At such point, the lockout 21572 has been displaced below the lockout pin 21166 of the firing member 21160 and, as a result, the firing member 21160 can be advanced distally to perform a

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staple firing stroke, as illustrated in FIG. 96. During the staple firing stroke, the firing member 21160 pushes the sled 21270 distally off of the lockout arm 21574 and the lockout 21572 can return back to its unflexed, or locked, configuration. When the firing member 21160 is retracted, as illustrated in FIG. 97, the lockout pin 21166 can engage the lockout 21572 and flex the lockout 21572 downwardly to permit the firing member 21160 to return to its unfired position. Notably, the sled 21270 is not retracted with the firing member 21160 and, as a result, cannot re-unlock the lockout 21572 even though the firing member 21160 has been retracted. As a result of the above, the lockout 21572 can serve as a missing cartridge lockout and a spent cartridge lockout.

[0453] Turning now to FIGS. 98-102, a stapling assembly 21330 comprises an attachable staple cartridge jaw 21350 including a cartridge body 2135 1and, in addition, an anviljaw 21340. The stapling assembly 21330 further comprises a firing member, such as firing member 21160, for example, which is movable distally to engage the anviljaw 21340 and the cartridge jaw 21350. More specifically, the firing member 21160 comprises a first camming member 21162 configured to engage the cartridge jaw 21350 and a second camming member 21164 configured to engage the anviljaw 21340 which close the jaws 21340 and 21350 when the firing member 21160 is advanced distally.

[0454] The stapling assembly 21330 further comprises a mechanical lockout 21372. The lockout 21372 is mounted to a frame of the stapling assembly 21330 at a frame pivot 21232. The lockout 21372 extends distally and is constrained by a frame pin 21333. The lockout 21372 comprises a metal wire; however, the lockout 21372 can be comprised of any suitable material. The lockout 21372 further comprises an elongate recess track 21376 defined therein which is configured to receive the lockout pin 21166 extending from the firing member 21160. Referring primarily to FIG. 98, the elongate recess track 21376 constrains or limits the longitudinal displacement of the firing member 21160 when the lockout 21372 is in its locked position. More specifically, the recess track 21376 is configured to permit the firing member 21160 to be advanced distally to close the stapling assembly 21330 but prevent the firing member 21160 from being advanced distally to perform a firing stroke.

[0455] When the staple cartridge jaw 21550 is attached to the stapling assembly 21530, as illustrated in FIG. 99, the sled 21370 of the cartridge jaw 21350 contacts distal arms 21374 of the lockout 21372 and deflects the lockout 21372 upwardly into an unlocked position. At such point, the lockout 21372 has been displaced above the lockout pin 21166 of the firing member 21160 and, as a result, the firing member 21160 can be advanced distally to perform a staple firing stroke, as illustrated in FIG. 100. During the staple firing stroke, the firing member 21160 pushes the sled 21370 distally out from under the lockout arms 21374 and the lockout 21372 can return back to its unflexed, or locked, configuration. When the firing member 21160 is retracted, as illustrated in FIG. 101, the lockout pin 21166 can engage the lockout 21372 and flex the lockout 21372 upwardly to permit the firing member 21160 to return to its unfired position. Notably, the sled 21370 does not return with the firing member 21160. As a result of the above, the lockout 21372 can serve as a missing cartridge lockout and a spent cartridge lockout.

[0456] Referring to FIG. 102, the arms 21374 of the lockout 21372 are laterally spaced apart on opposite sides of the longitudinal slot 21359 such that the firing member 21160 can slide between the arms 21374. In such instances, the arms are not transected by the firing member 21160.

[0457] During a surgical procedure, several loading units can be used with a handle of a surgical stapling system. In at least one instance, a first loading unit can be used which is configured to apply a 30 mm staple line, a second loading unit can be used which is configured to apply a 45 mm staple line, and a third loading unit can be used which is

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configured to apply a 60 mm staple line, for example. In the event that each of these loading units comprises a replaceable cartridge jaw, it is possible that the wrong staple cartridge jaw can be attached to a loading unit. For instance, a clinician may attempt to attach a 60 mm staple cartridge jaw to a loading unit configured to apply a 30 mm staple line. As a result, it is possible that some of the staples ejected from the 60 mm staple cartridge jaw may not be deformed by the anvil and/or that the tissue incision line may be longer than the staple lines. The stapling assemblies and/or loading units disclosed herein can include means for preventing the wrong staple cartridge jaw from being attached thereto, as discussed in greater detail below.

[0458] Referring to FIGS. 103 and 105, further to the above, the recesses 21052 defined in the cartridge jaw 21250 are configured to closely receive the attachment projections 21142 of the loading unit 21130 such that there is a snug fit therebetween. The attachment projections 21242' (FIG. 104) of a second loading unit 21130', in at least one instance, are smaller than the attachment projections 21142 and, correspondingly, the recesses of a second cartridge jaw for use with the second loading unit 21130' are smaller than the recesses 21052. In order to provide a form of error proofing, the recesses of the second cartridge jaw are too small to receive the attachment projections 21142 of the loading unit 21130 and, as a result, the second cartridge jaw cannot be attached to the loading unit 21130. Similarly, turning now to FIG. 104, the recesses 21052 of the cartridge jaw 21250 are larger than the attachment projections 21242' of the second loading unit 21130' such that the clips 21056 of the cartridge jaw 21250 cannot hold the attachment projections 21242' in the recesses 21052 and, as a result, cannot hold the cartridge jaw 21250 to the loading unit 21130'. In such instances, the interconnection between the cartridge jaw 21250 and the loading unit 21130' would be too loose for the cartridge jaw 21250 to be used with the loading unit 21130'.

[0459] In the instances described above, the attachment projections of a loading unit, the recesses of a staple cartridge jaw, and the spring clips holding the staple cartridge jaw to the loading unit have the same configuration on both sides of the stapling assembly. In other instances, the attachment projection, the recess, and/or the spring clip on one side of the stapling assembly is different than the attachment projection, the recess, and/or the spring clip on the other side of the stapling assembly. For example, a large attachment projection, recess, and spring clip are disposed on one side of the stapling assembly while a smaller attachment projection, recess, and spring clip are disposed on the other side. Such arrangements can increase the permutations available to prevent an incorrect staple cartridge jaw from being attached to a loading unit.

[0460] In the instances described above, the attachment projections of a loading unit, the recesses of a staple cartridge jaw, and the spring clips are aligned with respect to a common lateral axis. In other instances, the attachment projection, the recess, and/or the spring clip on one side of the stapling assembly are not aligned with the attachment projection, the recess, and/or the spring clip on the other side. Stated another way, one side is offset from the other. Such arrangements can also increase the permutations available to prevent an incorrect staple cartridge jaw from being attached to a loading unit.

[0461] Further to the above, it is contemplated that a kit of loading units can be provided wherein each loading unit of the kit can be configured such that only a cartridge jaw intended to be used with the loading unit can be properly attached to the loading unit.

[0462] Turning now to FIGS. 106 and 107, the staple cartridge jaw 21050 comprises a proximal shoulder 21058 which is positioned in close proximity to the frame of the loading unit 21030 when the cartridge jaw 21050 is attached

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to the loading unit 21030. Owing to the snug fit between the projections 21042, the recesses 21052, and the clips 21056, the cartridge jaw 21050 is held in position such that the shoulder 21058 of the cartridge jaw 21050 does not interfere with the distal progression of the firing member 21160, for example. More particularly, the shoulder 21058 does not interfere with the first camming member 21162 of the firing member 21160. In the event that an incorrect staple cartridge were attached to the cartridge jaw 21050, in certain instances, the proximal shoulder of the incorrect cartridge jaw may interfere with the distal progression of the first camming member and, as a result, prevent the firing member 21160 from performing a firing stroke with the incorrect staple cartridge. Turning now to FIG. 108, a staple cartridge jaw 21450 is an incorrect staple cartridge jaw for use with the loading unit 21030. Eventhough the staple cartridge jaw 21450 has been attached to the loading unit 21030, the proximal shoulder 21458 prevents the firing member 21060 from being advanced distally.

[0463] Further to the above, the proximal shoulder of a staple cartridge jaw can comprise a sharp or abrupt corner. In at least one such instance, the proximal shoulder does not comprise a chamfer or lead-in, for example.

[0464] In various instances, a proximal shoulder of a staple cartridge jaw can be configured to block the distal advancement of a staple firing member if the tissue clamped between the staple cartridge jaw and an opposing anvil jaw is too thick. In such instances, the staple cartridge jaw would not close completely and the proximal shoulder of the staple cartridge jaw would be positioned in front of the staple firing member. Such an arrangement would comprise a tissue thickness lockout; however, such an arrangement could also serve as a tissue clamping lockout in the event that the staple cartridge jaw had not yet been moved into its clamped position.

[0465] In addition to or in lieu of the above, an electronic or software lockout of a surgical instrument system can be utilized to prevent a firing drive from performing a staple firing stroke in the event that an incorrect staple cartridge jaw is attached to the surgical instrument system. In various instances, as discussed above, a portion of a jaw detection circuit can extend through a staple cartridge jaw and, in at least one instance, a controller of the surgical instrument system can be configured to evaluate the portion of the jaw detection circuit extending through the staple cartridge jaw to determine whether the staple cartridge attached to the surgical instrument system jaw is an appropriate staple cartridge jaw for use with the surgical instrument system. In at least one instance, the clips 21056 of a first staple cartridge jaw have detectably different electrical properties, such as resistance or impedance, for example, than the clips 21056 of a second staple cartridge jaw.

[0466] Referring again to FIGS. 81, 85, and 87, a cartridge jaw removal tool 21090 can be used to detach a cartridge jaw from a loading unit. U.S. Patent Application Publication No. 2012/0286021 discusses a cartridge removal tool in greater detail.

[0467] It is desirable to employ lockout systems with surgical stapling instruments having replaceable staple cartridge assemblies. For example, in the event that a user forgets to install a staple cartridge into an instrument without such a lockout system, the firing member of the surgical instrument could be used to cut the tissue of a patient without stapling it. Such circumstances are undesirable. In yet another example, in the event that a user installs a spent, or partially-spent, staple cartridge into an instrument and without a lockout system, the firing member of the surgical instrument would, similarly, cut but not staple, or just partially staple, the tissue of a patient. Such circumstances are also undesirable. As a result, surgical instruments which can automatically lock out the firing member to prevent the firing member from being advanced within an end effector are desirable.

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[0468] Turning now to FIGS. 109 and 110, a surgical instrument system 25100 comprising a missing cartridge and spent cartridge lockout system is depicted. The system 25100 comprises a firing member 25110, a staple cartridge assembly 25120, and an anvil jaw 25130. The firing member 25110 comprises a distally-presented cutting portion 25111 configured to cut tissue when advanced through an end effector portion of the surgical instrument system 25100. The firing member 25110 is configured to deploy a plurality of staples from the staple cartridge assembly 25120 toward the anvil jaw 25130 by advancing a sled 25121 longitudinally through the staple cartridge assembly 25120. The sled 25121 is movable from a proximal unfired position to a distal fully-fired position during a staple firing stroke. After the staple firing stroke has been completed, the firing member 25110 is retracted. The sled 25121 does not retract with the firing member 25110. However, embodiments are envisioned in which the sled 25121 is at least partially retracted.

[0469] The surgical instrument system 25100 further comprises a lockout member 25140. The lockout member 25140 is configured to prevent the firing member 25110 from being advanced through the staple firing stroke when a cartridge is not present in the surgical instrument system 25100 or a spent, or partially spent, cartridge is present in the surgical instrument system 25100. The lockout member 25140 comprises a proximal portion 25141 pivotably mounted to a spine pin 25101 of a frame portion of the system 25100. The lockout member 25140 further comprises a lock face, or shoulder, 25142 configured to catch the firing member 25110, and a deflectable portion 25143. The lockout member 25140 is movable, or deflectable, between a locked position (FIG. 109) and an unlocked position (FIG. 110) when a staple cartridge assembly is installed within the system 25100. The lockout member 25140 is spring-biased into the locked position when a staple cartridge assembly is not installed within the system 25100, as discussed in greater detail below. The lockout member 25140 is also spring-biased into the locked position when a spent, or partially spent, staple cartridge assembly is installed within the system 25100, as also discussed in greater detail below.

[0470] When the lockout member 25140 is in its locked position as illustrated in FIG. 109, a firing member pin 25113 mounted on the firing member 25110 is configured to abut the lock face 25142 of the lockout member 25140 which prevents the firing member 25110 from being advanced distally. To move the lockout member 25140 from the locked position to the unlocked position, an unspent, ready-to-fire staple cartridge assembly must be properly installed within in the system 25100. More specifically, the sled 25121 of an unspent, ready-to-fire staple cartridge assembly is in its proximal unfired position and, when such a staple cartridge assembly is installed into the system 25100, the sled 25121 deflects, or bends, the deflectable portion 25143 downwardly into its unlocked positon. When the lockout member 25140 is in its unlocked position referring to FIG. 110, the firing member pin 25113 is clear to advance beyond the lock face 25142 thus permitting the firing member 25110 to be advanced distally to deploy staples and cut tissue during a firing stroke.

[0471] As can be seen in FIGS. 109 and 110, some longitudinal movement of the firing member 25110 is permitted when the lockout member 25140 is in its locked position. This freedom of longitudinal movement when the lockout member 25140 is in its locked position allows the firing member 25110 to be advanced distally to close the jaws of the system 25100 and moved proximally to prevent the jaws to be re-opened. Manipulating the jaws of the system 25100 may be necessary for loading and/or unloading staple cartridges, for example.

[0472] As mentioned above, the sled 25121 does not return with the firing member 25110 when the firing member 25110 is retracted after the firing stroke. When the firing member 25110 is retracted, the firing member pin 25113 deflects, or bends, the deflectable portion 25143 to its unlocked position permitting the pin 25113 to pass the lock face

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25142 and return to a home position. Once the pin 25113 is retracted past the lock face 25142, the lockout member 25140 springs back, or returns, to its locked position to prevent a repeat firing with a spent staple cartridge installed within the system 25100. The firing member 25110 can be retracted even further such that the jaws of the system 25100 can then be undamped from the stapled tissue.

[0473] Referring now to FIGS. 111-113, another surgical instrument system 25200 is depicted. The system 25200 comprises another type of a missing cartridge and spent cartridge lockout arrangement. The system 25200 comprises a firing member 25210 and a staple cartridge assembly 25220. The firing member 25210 comprises a distally-presented cutting portion 25211 configured to cut tissue when advanced through the system 25200. The firing member is configured to deploy a plurality of staples from the staple cartridge assembly 25220 by advancing a sled 25221 longitudinally through the staple cartridge assembly 25220. The sled 25221 is movable from a proximal unfired position to a distal fully-fired position during a staple firing stroke. The sled 25221 does not retract with the firing member 25210; however, embodiments are envisioned in which the sled 25221 is at least partially retracted.

[0474] The surgical instrument system 25200 further comprises a lockout member 25240. The lockout member 25240 is configured to prevent the firing member 25210 from being advanced through its staple firing stroke when a cartridge is not present within the system 25200 or a spent, or partially spent, cartridge is present within the system 25200. The lockout member 25240 comprises a first, or proximal, portion 25241 rotatably mounted to a first spine pin 25201 of the system 25200. The spine pin 25201 may extend from a shaft frame, or spine, of the system 25200, for example. The lockout member 25240 further comprises a second portion 25242, a third, or catch, portion 25243, and a fourth, or distal, portion 25245. The lockout member 25240 is movable between a locked position (FIGS. 111 and 113) and an unlocked position (FIG. 112). The lockout member 25240 is spring-biased into the locked position when a staple cartridge assembly is not properly installed within the system 25200. The lockout member 25240 is also biased into the locked position when a spent, or partially spent, staple cartridge assembly is installed within the system 25200.

[0475] When the lockout member 25240 is in its locked position as illustrated in FIG. 111, a firing member pin 25213 mounted on the firing member 25210 is configured to abut a lock face, or shoulder, 25244 of the lockout member 25240. As a result of the lock face 25244, distal advancement of the firing member 25210 is blocked beyond this position. To move the lockout member 25240 from its locked position to its unlocked position, an unspent, ready-to-fire staple cartridge assembly must be installed within the system 25200. An unspent, ready-to-fire staple cartridge assembly comprises a sled 25221 in a proximal unfired position.

[0476] The sled 25221 comprises a magnet 25226 oriented with one of its poles "P1" facing the distal portion 25245 of the lockout member 25240 and another pole "P2" facing away from the distal portion 25245 of the lockout member 25240. The distal portion 25245 of the lockout member 25240 comprises a magnet 25246 disposed thereon. The magnet 25246 is orientated with a pole "P1" facing the like pole "P1" of the sled magnet 25226 and another pole "P2" facing away from the sled magnet 25226. The pole P1 of the magnet 25226 and the pole P1 of the magnet 25246 repel each other. This relationship creates a levitational effect when the sled 25221 is in its proximal unfired position (FIG. 112) which pushes, or repels, the lockout member 25240 upward into its unlocked position, lifting the lock face 25244 away from the pin 25213 of the firing member 25210 to permit the pin 25213 to advance beyond the lock face 25142. The firing member 25210 can then be advanced distally to deploy staples and cut tissue during a firing stroke.

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[0477] When the firing member 25210 is retracted after its firing stroke, the pin 25213 is configured to contact an angled face of the distal portion 25245 to push the distal portion 25245 and, thus, the lockout member 25240 toward its unlocked position permitting the pin 25213 to pass the lock face 25244 when returning to a home position. Once the pin 25213 passes the lock face 25244, the lockout member 25240 springs back, or returns, to its locked position to prevent to prevent the firing stroke from being repeated with a spent, or partially spent, staple cartridge installed within the system 25100.

[0478] Similar to the system 25100 illustrated in FIGS. 109 and 110, the lockout member 25240 is configured to permit the firing member 25210 to move within a distance "y" to permit the clamping and unclamping of the jaws when the firing member 25210 is relied on for the clamping and unclamping functions. The pin 25213 and, thus, the firing member 25210 can be moved proximally and distally within the catch portion 25243 of the lockout member 25240 even though a staple cartridge is missing from and/or a spent staple cartridge is positioned within the system 25100.

[0479] Another surgical instrument system 25300 is depicted in FIGS. 114-119. The system 25300 comprises another type of lockout arrangement where the system 25300 is configured to be locked out when a cartridge is not installed within the system 25300. The system is further configured to be locked out when a spent, or partially spent, cartridge is installed within the system 25300. The system 25300 comprises a firing member 25310 and a staple cartridge assembly 25320. The firing member 25310 comprises a distally-presented cutting portion 25311 configured to cut tissue when advanced through the system 25300. The firing member 25310 is configured to deploy a plurality of staples from the staple cartridge assembly 25320 by advancing a sled 25330 (FIG. 115) longitudinally through the staple cartridge assembly 25320. The sled 25330 is movable between a proximal unfired position to a distal fully-fired position during a firing stroke. In various instances, the sled 25230 does not retract with the firing member 25310; however, embodiments are envisioned in which the sled 25230 is at least partially retracted.

[0480] The surgical instrument system 25300 further comprises a lockout member 25340. The lockout member 25340 is configured to prevent the firing member 25310 from being advanced through a staple firing stroke when a cartridge is not present within the system 25300 or a spent, or partially spent, cartridge is present within the system 25300. The lockout member 25340 is similar to the lockout members 25140, 25240 in many respects. Referring to FIGS. 117-119, the lockout member 25340 comprises a first, or proximal, portion 25341 rotatably mounted to a first spine pin 25301 of the system 25300. Alternatively, the proximal portion 25341 can be fixedly mounted to the spine 25301 of the system 25300. The lockout member 25340 further comprises a second portion 25342, a third, or catch, portion 25343, and a fourth, or distal, portion 25345. The lockout member 25340 is movable between a locked position (FIGS. 117 and 119) and an unlocked position (FIG. 118). The lockout member 25340 is spring-biased into its locked position when a staple cartridge assembly is not installed within the system 25300. The lockout member 25340 is also biased into its locked position when a spent, or partially spent, staple cartridge assembly is installed within the system 25300.

[0481] The staple cartridge assembly 25320 comprises a sled 25330 and plurality of drivers 25328 configured to eject a staple upon being driven by the ramps 25330A, 25330B, 25330C, and 25330D of the sled 25330 during a staple firing stroke. The staple cartridge assembly 25320 further comprises a control member movable between an unspent position and a spent position by the sled 25330 when the sled 25330 is advanced distally during its staple firing stroke. The control member is in its unspent position when a staple cartridge 25320 is loaded into the surgical instrument

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system 25300 and is configured to move the lockout member 25340 from its locked position to its unlocked position when the unspent staple cartridge assembly 25320 is loaded into the surgical instrument system 25300. A first configuration of a proximal driver 25325 is illustrated in FIGS. 114 and 116. The proximal driver 25325 comprises a driver wedge portion 25326 and a magnetic portion 25327. When the proximal driver 25325 is in its unspent position and the sled 25330 is in its unfired position (FIG. 118), the driver wedge portion 25326 is positioned within a sled notch 2533 1 and the magnetic portion 25327 is in close enough proximity to the distal portion 25327 to attract the distal portion 25327 to move, or lift, the lockout member 25340 into its unlocked position.

[0482] A similar proximal driver configuration is depicted in FIGS. 118 and 119. A proximal driver 25325' comprises a driver wedge portion 25326' and a magnetic portion 25327'. The wedge portion 25326' of the proximal driver 25325' is positioned on the side of the proximal driver 25325'. When the proximal driver 25325' is in its unspent position and the sled 25330 is in its unfired position (FIG. 118), the driver wedge portion 25326' is positioned within the sled notch 2533 1 and the magnetic portion 25327' is in close enough proximity to the distal portion 25327' to attract the distal portion 25327' to move the lockout member 25340 into its unlocked position. When the driver wedge portion 25326' is positioned within the sled notch 2533 1, the magnetic portion 25327' is configured to retain the lockout member 25340 in its unlocked position. When the sled 25330 is advanced distally from its unfired position, the sled 25330 drives the proximal driver 25325' so that the driver wedge portion 25326' is driven out of the sled notch 2533 1. As a result, the magnetic portion 25327' is no longer in close enough proximity to the lockout member 25340 to hold the lockout member in its unlocked position and, therefore, the lockout member is spring-biased into its locked position (FIG. 119). A datum "D" is defined as a top surface of the sled 25330 and, when the bottom of the wedge portion 25326' is aligned with or above the datum D, the magnetic relationship between the distal portion 25345 and the magnetic portion 25327' is insufficient to hold the lockout member 25340 in its unlocked position thus releasing the lockout member 25340.

[0483] Once the lockout member 25340 has been released to its locked position (FIG. 119) and the installed cartridge assembly 25320 has been at least partially spent (FIG. 119), the system 25300 is prevented from re-firing the same cartridge assembly 25320. When the firing member 253 10 is retracted, the lockout pin 253 12 rides underneath the distal portion to move the lockout member 25340 temporarily out of the way until the lockout pin 253 12 reaches the catch portion 25343. When the lockout pin 253 12 reaches the catch portion 25343, the lockout member 25340 springs back, or returns, to its locked position. When in its spent position, the magnetic portion 25327' does not pull the lockout member 25340 into its unlocked position. In various instances, the proximal driver 25325' may engage the staple cartridge assembly 25320 in a press-fit manner when the proximal driver 25325' is moved into its spent position by the sled 25330 to prevent the proximal driver 25325' from falling toward its unspent position. Such an arrangement may prevent the lockout member 25340 from being falsely unlocked. In addition to a spent cartridge assembly, not having a cartridge installed within the system 25300 urges the lockout member into its locked position. The mere absence of a proximal driver altogether prevents the lockout member 25340 from moving to its unlocked position.

[0484] The control members 25325, 25325' are driven by the sled 25330 and can be referred to as drivers; however, they do not drive staples. In this way, the control members 25325, 25325' comprise "false" drivers. That said, it is contemplated that the proximal most staple driver of a staple cartridge assembly could be used as a control member.

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[0485] Another surgical instrument system is depicted in FIGS. 120-122. The system 25400 comprises a staple cartridge assembly 25410, a lockout circuit system 25420, and a lockout member 25430. The lockout member 25440 is fixedly attached to a spine portion 25401 of the system 25400. The lockout member 25430 further comprises a spring member, for example, and is biased toward its locked position (FIG. 122). When the lockout member 25430 is in its locked position, a hook portion 2543 1 of the lockout member 25430 is configured to catch a firing member in the event that the surgical instrument or clinician tries to advance the firing member beyond the lockout member 25440 without an unspent staple cartridge assembly installed within the system 25400.

[0486] To move the lockout member 25440 to its unlocked position so that a firing member can be advanced through the staple cartridge assembly 25410 during a staple firing stroke, an electromagnet 25421 is employed. The electromagnet 25421 is disposed on the spine portion 25401 of the system 25400 but may be disposed at any suitable location within the system 25400. Conductors are positioned within the system 25400 along the spine portion 25401, for example, to power the electromagnet 25421. The lockout circuit system 25420 which encompasses the electromagnet 25421 and its power source extends through the staple cartridge assembly 25410. As discussed below, when the circuit 25420 is complete, or closed, the electromagnet 25421 is powered. When the circuit is not complete, or open, the electromagnet 25421 is not powered. As also discussed below, the presence of a spent, or partially-spent, cartridge in the system 25400 is a scenario where the circuit 25420 is open. The absence of a cartridge in the system 25400 is another scenario where the circuit 25420 is open.

[0487] The lockout circuit system 25420 comprises conductors 25422 extending from the electromagnet 25421 to a pair of electrical contacts 25423 positioned within the system 25400. The electrical contacts 25423 are positioned within a jaw of the system 25400 such as a channel portion which receives the staple cartridge assembly 25410, for example. The staple cartridge assembly 25410 further comprises conductor legs 25425 configured to engage the contacts 25423 when the staple cartridge assembly 25410 is fully seated in the channel portion of the jaw. The conductor legs 25425 are part of an electrical trace 25424 defined within the staple cartridge assembly 25410. The conductor legs 25425 are disposed on a proximal face 25412 of the cartridge assembly 25410. Also disposed on the proximal face 25412 is a severable portion 25426 of the electrical trace 25424 which extends across a slot 2541 1 of the staple cartridge assembly 25410. A cutting edge of a firing member is configured to sever, or incise, the severable portion 25426 during a staple firing stroke of the firing member.

[0488] When a cartridge assembly is installed and is unspent, further to the above, the severable portion 25426 is not severed and the lockout circuit 25420 is complete, or closed. When the lockout circuit 25420 is complete (FIG. 121), the electromagnet 25421 receives power urging the lockout member 25430 to its unlocked position permitting the firing member to pass thereby. After the severable portion 25426 is severed, or cut, during a firing stroke of the firing member, the surgical instrument detects an incomplete circuit. An incomplete, or open, circuit indicates that the staple cartridge assembly 25410 is in a false configuration. This may be due to having a spent, or partially spent, cartridge installed or to not having a cartridge installed within the system 25400. When the circuit 25420 is incomplete (FIG. 122), for example, in a false configuration, the electromagnet 25421 loses power and releases the lockout member 25430 to its locked position (FIG. 122).

[0489] When the spent staple cartridge assembly 25410 is removed from the surgical instrument system 25400, the lockout circuit 25420 remains in an open state and the electromagnet 25421 remains unpowered. When an unspent

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staple cartridge assembly 25410 is fully seated in the system 25400, the lockout circuit 25420 is once again closed and the electromagnet 25421 is repowered to unlock the lockout member 25430. Notably, if a staple cartridge assembly 25410 is not fully seated in the system 25400, the legs 25425 will not be engaged with the contacts 25423 and the lockout circuit 25420 will remain in an open, unpowered state.

[0490] Another surgical instrument system 25500 is depicted in FIGS. 123 and 124. The system 25500 comprises a staple cartridge 25501 comprising a sled 25510 movable between an unfired position and a fired position. A firing member 25503 is configured to move the sled 255 10 from its the unfired position to its fired position to deploy a plurality of staples (not shown) stored within the cartridge 2550 1 via ramps 255 11. The system 25500 further comprises a circuit 25520 configured to indicate to the surgical instrument and/or the user of the system 25500 whether the cartridge installed within the system 25500 is spent, or partially spent, or whether the cartridge installed within the system 25500 is unspent and ready-to-fire. When the sled 255 10 is in its unfired position, the sled 255 10 completes the circuit 25520 and when the sled 255 10 is in its fired, or partially-fired, position, the sled 255 10 does not complete the circuit 25520 and the circuit 25520 is open.

[0491] The lockout circuit 25520 comprises a pair of conductors 25521 in electrical communication with a surgical instrument handle, for example, and a pair of electrical contacts 25522 positioned within a jaw portion of the surgical instrument system 25500 configured to support the staple cartridge 25501. The electrical contacts 25522 are positioned such that corresponding pads, or contacts, 25523 disposed on a proximal face 255 12 of the sled 255 10 contact the electrical contacts 25522 when the staple cartridge 25501 is fully seated in the system 25500 and the sled 255 10 is in its unfired position (FIG. 124). A tether portion, or conductor, 25524 connects, or electrically couples, the contacts 25523 and is attached to a proximal middle face 255 13 of the sled 255 10. The contacts 25522 extend to a bottom face of the sled in addition to the proximal face 255 12. When the sled 255 10 is in its unfired position, the contacts 25523 are engaged with the lockout circuit 25520 and the lockout circuit 25520 is complete indicating an unfired, ready-to-fire staple cartridge. When the lockout circuit 25520 is incomplete, the surgical instrument can be locked out using software and/or a mechanical feature such as those disclosed herein, for example. In at least one instance, the lockout circuit 25520 is in signal communication with a controller of the surgical instrument system 255500 which supplies power to an electric motor of the firing drive when the lockout circuit 25520 is in a closed state and prevents power from being supplied to the electric motor when the lockout circuit 25520 is open.

[0492] A firing member lockout arrangement of a system 25600 is depicted in FIGS. 125-129. The system 25600 comprises a firing member 25610, a lockout 25620, and a shaft spine 25601. The shaft spine 25601 houses the lockout 25620 and the firing member 25610. The firing member 25610 comprises a distally-presented cutting edge 2561 1 configured to incise tissue during a staple firing stroke of the firing member 25610. The lockout 25620 is configured to catch the firing member 25610 when the lockout 25620 is activated and permit the firing member 25610 to pass thereby. Further to the above, the lockout 25620 can be activated by a controller of the system 25600 when an unspent staple cartridge is not positioned in the system 25600.

[0493] The lockout 25620 comprises a solenoid 25621 and a mechanical linkage comprising a first link 25623 and a second link 25624. The links 25623, 25624 are attached at a pivot 25622. The solenoid 25621 is positioned within the spine 25601 such that the solenoid 25621 can apply a force to the linkage near the pivot 25622. The lockout 25620 is illustrated in its biased, locked position in FIGS. 125 and 126. The lockout 25620 further comprises a lock body, or

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cam plate, 25625 pivotably coupled with an end of the second link 25624. The cam plate 25625 is biased into a knife band window 25612 to catch the firing member 25610 when the solenoid 25621 is in its unactuated configuration as illustrated in FIGS. 125 and 126.

[0494] In various instances, multiple windows are provided in the firing member 25610. Another window, such as the window 25614, may comprise another proximal surface. The window 25614 may act as an intermediate lockout to lock the firing member 25610 in the midst of an operation. An event such as knife binding, for example, may trigger the solenoid 25621 to release the lockout 25620 into its locked position to prevent further actuation of the firing member 25610. In various instances, distal surfaces of the windows in the firing member 25610 may be configured such that when the firing member 25610 is retracted proximally, the cam plate 25625 may glide over the distal surfaces to prevent the locking of the firing member 25610 as the firing member 25610 is moved proximally. In other instances, locking the firing member 25610 as it moves proximally may be desirable.

[0495] In some instances, a lockout can be configured to permit movement in one direction but prevent movement in another direction. For example, slight retraction of the firing member 25610 may be desirable when the distal movement of the firing member 25610 has been locked out. When retracted proximally in such instances, the tissue in the area that caused the firing member 25610 to bind up may naturally decompress and, after a defined time period of waiting for the tissue to decompress, the solenoid 25621 may be activated to move the lockout 25620 into its unlocked position (FIGS. 127 and 128) thus permitting the firing member 25610 to be advanced distally again.

[0496] FIGS. 127-129 illustrate the lockout 25620 in its unlocked position. Upon comparing FIGS. 125 and 126 to FIGS. 127-129, it can be seen that, when actuated, the solenoid 25621 moves the mechanical linkage into a collinear configuration to slide, or urge, the cam plate 25625 out of the window 25612 to unlock the firing member 25610. Slider supports 25603 are provided within the spine 25601 to guide the cam plate 25625 as the solenoid 25621 moves the mechanical linkage. The slider supports 25603, in at least one instance, control the movement of the cam plate 25625 to a linear path, for example.

[0497] Various embodiments are disclosed herein which comprise a lockout configured to prevent a firing member from being advanced distally in certain instances. In many instances, the lockout is more than adequate to block the distal advancement of the firing member. In some instances, it may be desirable to have more than one lockout configured to block the distal advancement of the firing member. In such instances, a primary lockout and a secondary lockout can block the distal advancement of the firing member. As described in greater detail below, the secondary lockout can be actuated as a result of the primary lockout being actuated. For example, the primary lockout can block the distal advancement of the firing member because a staple cartridge jaw is missing from the loading unit, the staple cartridge jaw is improperly attached to the loading unit, and/or the staple cartridge jaw has previously been at least partially fired and, when the distal displacement of the firing member is impeded by the primary lockout, the secondary lockout can be actuated to assist the primary lockout in blocking the distal advancement of the firing member.

[0498] Turning now to FIGS. 141 and 142, a loading unit comprises a shaft 21730 and a firing member system extending through the shaft 21730. The firing member system comprises a first, or proximal, firing member 21760 and a second, or distal, firing member 21762. During a staple firing stroke of the firing member system, the proximal firing member 21760 is pushed distally by an electric motor and/or hand crank, for example. Likewise, the distal firing member 21762 is pushed distally by the proximal firing member 21760. The firing member system further comprises a

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lockout 21780 positioned intermediate the proximal firing member 21760 and the distal firing member 21762. The lockout 21780 is configured to transmit a firing force from the proximal firing member 21760 to the distal firing member 21762 during a staple firing stroke. In the event that the force transmitted through the lockout 21780 exceeds the firing force expected during the staple firing stroke, and/or exceeds a predetermined threshold force, the lockout 21780 moves into a locked configuration as illustrated in FIG. 142 and as described in greater detail further below.

[0499] The lockout 21780 comprises lock arms 21782 pivotably mounted to the proximal firing member 21760 at a pivot 21784. The lock arms 21782 are configured to abut drive surfaces 21768 defined on the proximal end of the firing member 21762 and push the firing member 21762 distally. In at least one instance, the drive surfaces 21768 form a conical surface, for example. The lockout 21780 further comprises a biasing member, or spring, 21785 configured to bias the lockout arms 21782 inwardly toward an unlocked configuration, as illustrated in FIG. 141, against the drive surfaces 21768. Each lock arm 21782 comprises a pin 21783 extending therefrom which is configured to mount an end of the spring 21785 thereto. When the lockout 21780 moves into a locked configuration, further to the above, the lock arms 21782 slide relative to the drive surfaces 21768 and splay, or rotate, outwardly into engagement with the shaft 21730. The shaft 21730 comprises a rack, or racks, of teeth 21781 defined therein which are engaged by the lock arms 21782 and prevent the proximal firing member 21760 from being advanced distally.

[0500] Further to the above, the spring 21785 is resiliently stretched when the lock arms 21782 are displaced outwardly. The stiffness of the spring 21785 is selected such that the spring 21785 can hold the lock arms 21782 in their unlocked configuration against the drive surfaces 21768 when the force transmitted from the proximal firing member 21760 to the distal firing member 21762 is below the threshold force yet permit the lock arms 21782 to displace outwardly when the force transmitted from the proximal firing member 21760 to the distal firing member 21762 exceeds the threshold force. The force transmitted between the proximal firing member 21760 and the distal firing member 21762 is below the threshold force when the firing system is firing the staples from a staple cartridge and above the threshold force when the distal firing member 21760 is blocked by a missing cartridge and/or spent cartridge lockout, for example. In such instances, the lockout 21780 is deployed in response to another lockout blocking the advancement of the staple firing system. Stated another way, the lockout 21780 can comprise a secondary lockout which co-operates with a primary lockout to block the advancement of the staple firing system.

[0501] In various instances, further to the above, the lockout 21780 can provide overload protection to the staple firing system. For instance, the staple firing system can become jammed during a firing stroke and the lockout 21780 can deploy to stop the staple firing stroke. In such instances, the lockout 21780 can transfer the firing force, or at least a portion of the firing force, to the shaft 21730 instead of the staple cartridge. As a result, the lockout 21780 can prevent the firing system and/or staple cartridge from being damaged, or at least further damaged. In such instances, the lockout 21780 is deployed in response to a condition of the stapling assembly other than a predefined lockout. Referring again to FIGS. 141 and 142, the teeth racks 21781 are the same length as, or longer than, the firing stroke of the staple firing system such that the lockout 21780 can engage the teeth racks 21781 at any point during the firing stroke.

[0502] When the force being transmitted from the proximal firing member 21760 to the distal firing member 21762 drops below the force threshold, the spring 21785 can resiliently return the lock arms 21782 to their unlocked configuration and into engagement with the drive surfaces 21768 of the distal firing member 21762. At such point, the

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firing stroke can be completed if the condition that caused the second lockout 21780 to actuate has abated. Otherwise, the proximal firing member 21760 can be retracted.

[0503] Turning now to FIGS. 151-154, a loading unit comprises a shaft 24530 and a staple firing system extending through the shaft 24530. The staple firing system comprises a proximal firing member 24560 and a distal firing member 24562. During a staple firing stroke of the staple firing system, the proximal firing member 24560 is pushed distally by an electric motor and/or hand crank, for example. Likewise, the distal firing member 24562 is pushed distally by the proximal firing member 24560. The staple firing system further comprises a lockout 24580 positioned intermediate the proximal firing member 24560 and the distal firing member 24562. The lockout 24580 is configured to transmit a firing force from the proximal firing member 24560 to the distal firing member 24562 during a staple firing stroke. In the event that the force transmitted through the lockout 24580 exceeds the firing force expected during the staple firing stroke, and/or exceeds a predetermined threshold force, the lockout 24580 moves into a locked configuration as illustrated in FIGS. 153 and 154.

[0504] Referring primarily to FIGS. 152 and 154, the lockout 24580 comprises a substantially C-shaped configuration, for example, which extends around a portion of the distal firing member 24562. The lockout 24580 comprises lock arms 24584 which grip the distal firing member 24562 when the lockout 24580 is in its unactuated, or unlocked, configuration, as illustrated in FIGS. 151 and 152. The lockout 24580 further comprises a drive tab 24582 which is contacted by the proximal firing member 24560 when the proximal firing member 24560 is driven distally during a staple firing stroke of the staple firing system. When the lockout 24580 is pushed distally by the proximal firing member 24560, the lockout 24580 abuts a drive surface 24564 defined on the distal firing member 24562 and pushes the distal firing member 24562 distally. As a result, the lockout 24580 transmits a pushing force from the proximal firing member 24560, through the lock arms 24584, and into the drive surface 24564.

[0505] Referring primarily to FIG. 151, the drive tab 24582 is not co-planar with the lock arms 24584; rather, the drive tab 24582 extends laterally from a plane defined by the lock arms 24584. More particularly, the drive tab 24582 comprises an elevated portion which is upset from the lock arms 24584, at least when the lockout 24580 is in its unactuated configuration. The lockout 24580 is configured to remain in its unactuated configuration so as long as the pushing force being transmitted through the lockout 24580 is below a threshold force. The pushing force required to complete the firing stroke is below this threshold force. When the pushing force transmitted through the lockout 24580 exceeds the threshold force, the lockout 24580 collapses into its actuated configuration as illustrated in FIGS. 153 and 154. The pushing force can exceed the threshold force when the distal firing member 24562 abuts a missing cartridge and/or spent cartridge lockout in the staple cartridge, for example.

[0506] Referring again to FIGS. 153 and 154, the lock arms 24584 splay radially outwardly to engage the shaft 24530 when the lockout 24580 moves into its actuated configuration. In at least one instance, the shaft 24530 can comprise a recess 24534 defined therein which is configured to receive the lock arms 24584. The recess 24534 is defined in the shaft 24530 such that the lock arms 24584 are aligned with the recess 24534 when the distal advancement of the firing system is blocked by a missing cartridge and/or spent cartridge lockout. Once the lock arms 24584 are in the recess 24534, the lockout 24580 can also block the distal advancement of the firing system. In various instances, the recess 24534 is positioned and arranged to stop the firing member 24560 before a cutting member of the firing drive incises tissue. When the proximal firing member 24560 is retracted and the pushing load being applied to the lockout

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24580 drops below the threshold force, the lockout 24580 can resiliently return back to its unactuated configuration. At such point, an unspent cartridge can be placed in the loading unit to defeat the missing cartridge and/or spent cartridge lockout such that the firing system can be advanced distally through its staple firing stroke. At any point, however, the proximal firing member 24560 can be retracted to retract the distal firing member 24562.

[0507] The threshold force of the lockouts described above can be actuated if the staple firing system is accelerated too quickly. Stated another way, an acceleration spike in a staple firing system can cause a force spike which exceeds a threshold force of the lockout which causes the lockout to stop the staple firing system. Such instances can arise when a firing trigger mechanically coupled to the staple firing system is squeezed too quickly and or a power supply is suddenly applied to an electric motor of the staple firing system, for example. In at least one instance, an acceleration spike can occur when the power applied to the electrical motor is improperly modulated and/or when a software fault has occurred in the motor controller, for example. Such acceleration spikes and force spikes are typically transient and the firing stroke can be completed once the force being transmitted through the staple firing system drops back below the threshold force.

[0508] Turning now to FIG. 143, a stapling assembly comprises a shaft 21830 and a firing member 21860 extending therethrough. The stapling assembly further comprises a lockout system 21880. The lockout system 21880 comprises lock arms 21882 rotatably mounted to the staple firing member 21860 about pivots 21884. Each lock arm 21882 is rotatable between an unactuated position, which is shown in solid lines in FIG. 143, and an actuated position, which is shown in phantom lines in FIG. 143. The lockout system 21880 further comprises cantilever springs 21885 mounted to the staple firing member 21860 configured to bias the lock arms 21882 into their unactuated positions. The stapling assembly further comprises an actuator 21862 mounted to the firing member 21860 which is configured to slide, or drag, against the housing of the shaft 21830 when the firing member 21860 is moved distally. When the firing member 21860 is accelerated too quickly, or above a threshold level, the drag force between the actuator 21862 and the shaft 21830 will slow or grip the actuator 21862 and allow the firing member 21860 to slide relative to the actuator 21862. In such instances, the relative movement between the actuator 21862 and the firing member 21860 drives the lock arms 21882 outwardly into engagement with racks of teeth 21881 defined in the shaft 21830 to stop, impeded, or slow the distal progression of the staple firing system.

[0509] Turning now to FIG. 144, a stapling assembly comprises a shaft 21930 and a firing member 21960 configured to be translated within the shaft 21930. The stapling assembly further comprises a lockout system 21980 including a lock arm 21982 rotatably mounted to the staple firing member 21960 about a pivot 21984. The lock arm 21982 is rotatable between an unactuated position, which is shown in solid lines in FIG. 144, and an actuated position, which is shown in phantom lines in FIG. 144. The lockout system 21980 further comprises a coil spring 21985 mounted to the staple firing member 21960 and the lock arm 21982 which is configured to bias the lock arm 21982 into its unactuated position. The lockout system 21980 further comprises an actuator, or weight, 21989 mounted to the lock arm 21982 which is configured to inertially rotate the lock arm 21982 when the firing member 21960 is accelerated distally. When the firing member 21960 is accelerated too quickly, or above a threshold level, the inertial force generated by the weight 21989 is sufficient to overcome the biasing force of the spring 21985 and rotate the lock arm 21982 into engagement with a rack of teeth 21981 defined in the shaft 21930. In such instances, the lockout system 21890 will stop, impede, or slow the distal progression of the staple firing system until the acceleration of the firing

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member 21960 drops below the threshold and the spring 21985 can pull the lock arm 21982 out of engagement with the rack of teeth 21981.

[0510] In addition to or in lieu of the above, a stapling assembly can comprise means for regulating the speed of a staple firing system which can, in various instances, reduce or smooth acceleration spikes generated within the staple firing system. Turning now to FIG. 155, a stapling assembly can comprise a shaft 22030 and a staple firing member 22060 configured to be translated within the shaft 22030. The stapling assembly further comprises a dampening system 22080 including a dampening member, or bumper, 22081 configured to slow the distal translation and/or proximal translation of the staple firing member 22060. The dampening member 22081 is comprised of a compliant and/or elastomeric material, such as rubber, for example, which is configured to generate a dampening force opposing the pushing force being applied to the firing member 22060 when the firing member 22060 contacts the dampening member 22081. The firing member 22060 extends through an aperture defined in the dampening member 22081 and comprises an annular ridge 22082 configured to engage the dampening member 22081. Although only one dampening member 22081 and shaft ridge 22082 are illustrated in FIG. 155, the stapling assembly can comprise any suitable number of dampening members 22081 and/or shaft ridges 22082, for example.

[0511] Further to the above, the bumper 22081 is positioned within the shaft 22030 such that the ridge 22082 contacts the bumper 22081 just before the firing member 22060 reaches a missing cartridge and/or spent cartridge lockout. In such instances, the dampening system 22080 can reduce the speed of the firing member 22060 before the firing member 22060 reaches a lockout and, as a result, reduce the possibility that the firing member 22060 crashes through, or unintentionally defeats, the lockout.

[0512] Turning now to FIG. 156, a stapling assembly can comprise a shaft 22130 and a staple firing member 22160 configured to be translated within the shaft 22130. The stapling assembly further comprises a hydraulic dampening system 22180 including a cylinder assembly configured to slow the firing member 22160 during its staple firing stroke. The cylinder assembly comprises an input piston 22181 slidably positioned in a chamber 22183 which is sealingly engaged with the sidewalls of the chamber 22183. The cylinder assembly further comprises an output piston 22184 slidably positioned in a chamber 22185 which is sealingly engaged with the sidewalls of the chamber 22185. As illustrated in FIG. 156, a portion of the chamber 22183 is in fluid communication with a portion of the chamber 22185 via a restricted orifice 22189. An incompressible, or substantially incompressible, fluid 22182 is contained in the chambers 22183 and 22185 between the input piston 22181 and the output piston 22184. In at least one instance, the fluid 22182 comprises hydraulic fluid, for example. In certain instances, the fluid 22182 comprises salt water, for example. When the firing member 22160 is advanced distally, the firing member 22160, or a shoulder defined on the firing member 22160, contacts a cam, or angled, surface defined on the input piston 22181 and drives the input piston downwardly into the chamber 22183. In such instances, the input piston 22181 displaces the fluid 22182 into the chamber 22185 which, in turn, displaces the output piston 22184 within the chamber 22185. The movement of the output piston 22184, the fluid 22182, and the input piston 22181 is resisted by a spring 22186 positioned in the chamber 22185. As a result of the above, the dampening system 22180 applies a drag force to the firing member 22160 which increases proportionately with an increase in the speed of the firing member 22160 and can limit the maximum speed of the firing member 22160. Similar to the above, the dampening system 22180 can be positioned in the shaft 22130 so

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that the firing member 22160 contacts the dampening system 22180 just before, or at least before, the firing member 22160 reaches a lockout.

[0513] Turning now to FIG. 158, a stapling assembly can comprise a shaft 22330 and a firing member 22360 slidable within the shaft 22330. The stapling assembly further comprises a pneumatic piston arrangement 22380 configured to apply a drag force to the firing member 22360. The firing member 22360 comprises a cylindrical, or at least substantially cylindrical, rod extending through a support defined in the shaft 22330 and an integrally-formed piston 22362 slideably positioned in a cylinder 22383 defined in the shaft 22330. The piston arrangement 22380 comprises one or more piston seals 22382 seated within seal grooves extending around the piston 22362. The piston seals 22382 are sealingly engaged with the piston 22362 and a cylinder wall 22381 of the cylinder 22383. The piston arrangement 22380 further comprises one or more seals 22361, seated in seal grooves defined in the shaft support, which are sealingly engaged with the shaft 22330 and the firing member 22360. In various instances, the seals 22361 and 22383 comprise compliant O-rings, for example. In any event, the distal displacement of the firing member 22360 compresses air in the cylinder 22383 and forces the compressed air through a vent 22363 defined in the shaft 22330. This arrangement applies a drag force to the firing member 22360 which increases proportionately with the speed of the firing member 22360.

[0514] Further to the above, the diameter and/or length of the vent 22363 can be selected to limit the speed of the firing member 22360 in a desired manner. Moreover, the seals 22382 are sealingly engaged with the shaft 22330 when the firing member 22360 is advanced distally and retracted proximally and, as a result, the piston arrangement 22380 applies a drag force to the firing member 22360 when the firing member 22360 is advanced distally and retracted proximally. In at least one embodiment, a valve, such as a one-way valve, for example, can be positioned and arranged relative to the vent 22363. The valve can provide an orifice having a smaller diameter when the firing member 22360 is being advanced distally and an orifice having a larger diameter when the firing member 22360 is retracted proximally. In such instances, the vent can apply a larger drag force to the firing member 22360 when the firing member 22360 is being advanced distally as compared to when the firing member 22360 is being retracted proximally for a given speed. As a result, the valve can provide different directional speed limits.

[0515] Turning now to FIG. 147, a stapling assembly can comprise a staple firing shaft 22060 which is displaced distally to eject staples from a staple cartridge. The stapling assembly further comprises means for applying an electromagnetic drag force and/or magnetic drag force to the staple firing shaft 22260. In at least one instance, the stapling assembly comprises a wound conductor coil 22280 which is energized by a power source, such as a battery, for example, such that a current flows through the coil 22280. The wound conductor coil 22280, once energized, creates a magnetic field which interacts with magnetic elements 22282 defined in and/or attached to the shaft 22260. In at least one instance, the magnetic elements 22282 comprise permanent magnets, for example. The polarity of the power source is applied to the coil 22280 such that coil 22280 generates a magnetic field which applies a repulsive force to the ferromagnetic elements 22282 as the firing member 22260 approaches the coil 22280 and, as a result, applies a drag force to the firing member 22360 during the staple firing stroke. The intensity or strength of the magnetic field created by the coil 22280 is stronger near the coil 22280 and, as a result, the drag force applied to the firing member 22360 will be greater near the coil 22280.

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[0516] In view of the above, the coil 22280, when energized, can act as a brake and, in certain instances, stop, or at least assist in stopping, the longitudinal movement of the firing member 22360 at the end of the staple firing stroke, for example. In certain instances, the voltage polarity applied to the coil 22280 can be reversed to reverse the flow of current through the coil 22280 during the retraction stroke of the firing member 22360. In such instances, the coil 22280 can apply a braking force to the firing member 22360 as the firing member 22360 is retracted away from the coil 22280. Although only one coil 22280 is illustrated in FIG. 147, a stapling assembly can comprise any suitable number of energizable coils. In addition to or in lieu of the above, a stapling assembly can comprise one or more permanent magnets mounted to the shaft of the stapling assembly which can apply a magnetic braking force to the staple firing member.

[0517] In at least one embodiment, referring again to FIG. 147, a power source is not applied to the coil 22280 and the coil 22280 can act as electric/inductive brake. In such embodiments, the movement of the magnetic elements 22282 through the coil 22280 generates a current in the coil 22280 which, in turn, generates a magnetic field which opposes the movement of the magnetic elements 22282. When the magnetic elements 22282 are moved slowly relative to the coil 22280, the opposing magnetic field exerts a negligible braking force on the firing member 22260. When the magnetic elements 22282 are moved quickly relative to the coil 22280, the opposing magnetic field is much stronger and applies a much stronger braking force to the firing member 22260. The coil 22280 and the magnetic elements 22282 can be positioned and arranged such that the braking force is applied to the firing member 22260 just before, or at least before, the firing member 22260 reaches a missing cartridge and/or spent cartridge lockout.

[0518] As discussed above, the firing member of a staple firing system can be driven by an electric motor. A motor controller, that may include a processor, and which can be implemented as a microcontroller, can be utilized to control the voltage supplied to the electric motor and, as a result, control the speed of the staple firing member. In certain instances, the motor controller can utilize pulse width modulation (PWM) and/or frequency modulation (FM), for example, to control the speed of the electric motor. In other instances, the motor controller may not modulate the power supplied to the electric motor. In either event, a stapling assembly can comprise a sensor system in communication with the motor controller which is configured to detect whether or not an unspent staple cartridge, or an unspent staple cartridge jaw, has been attached to the stapling assembly. In the event that the sensor system detects that an unspent staple cartridge is attached to the stapling assembly, the motor controller can recognize a signal from the sensor system indicating the presence of an unspent staple cartridge and operate the electric motor of the staple firing system when the user of the stapling assembly actuates the staple firing system. In the event that the sensor system does not detect an unspent staple cartridge attached to the stapling assembly, the motor controller receives a signal from the sensor system indicating that an unspent cartridge is not attached to the stapling assembly and prevents the electric motor from operating the staple firing system. Such an arrangement can comprise an electronic or software lockout.

[0519] In addition to or in lieu of the above, a stapling system can comprise a sensor system configured to track the displacement of a staple firing member. Referring to FIG. 149, a staple firing member 22460 of a stapling assembly 22400 is movable between a proximal, unfired position and a distal, fired position along a staple firing path 22463. A detectable magnetic element 22461, for example, is mounted to the staple firing member 22460 which moves along, or at least substantially along, the staple firing path 22463. In at least one instance, the magnetic element 22461 is a permanent magnet, for example, which is comprised of iron, nickel, and/or any other suitable material. The sensor

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system comprises a first, or proximal, sensor 2240 1' and a second, or distal, sensor 2240 1 which are configured to detect the magnetic element 22461 as it moves along the staple firing path 22463 with the translatable member 22460. The first sensor 2240 Γ and the second sensor 22401 each comprise a Hall Effect sensor; however, the sensors 2240 Γ and 22401 can comprise any suitable sensor. The sensors 2240 Γ and 22401 output a voltage that varies depending on their respective distances from the magnetic element 2246 1 (a higher voltage is output when the distance is small and a lesser voltage is output when the distance is great).

[0520] Further to the above, the sensor system comprises a sensor circuit including, among other things, a voltage source 22403, for example, in communication with the sensors 2240 1' and 2240 1 which supplies power to the sensors 2240 1' and 2240 1. The sensor circuit further comprises a first switch 22405' in communication with the first sensor 2240 1' and a second switch 22405 in communication with the second sensor 2240 1. In at least one instance, the switches 2240 1' and 2240 1 each comprise a transistor, such as a FET, for example. The outputs of the sensors 2240 1', 22401 are connected to the central (gate) terminal of the switches 22405', 22405, respectively. Prior to the firing stroke of the staple firing member 22460, the output voltages from the sensors 2240 1', 2240 1 are high so that the first switch 22405' and the second switch 22405 are in closed conditions.

[0521] When the magnetic element 2246 1 passes by the first sensor 2240 1', the voltage output of the first sensor 2240 1' is sufficient to change the first switch between a closed condition and an open condition. Similarly, the voltage output of the second sensor 22401 is sufficient to change the second switch 22405 between a closed condition and an open condition when the magnetic element 2246 1 passes by the second sensor 2240 1. When both of the switches 22405' and 22405 are in an open condition, a ground potential is applied to an operational amplifier circuit 22406. The operational amplifier circuit 22406 is in signal communication with an input channel of a microcontroller 22490 of the motor controller and, when a ground potential is applied to the operational amplifier circuit 22406, the microcontroller 22490 receives a ground signal from the circuit 22406.

[0522] When the microcontroller 22490 receives a ground signal from the circuit 22406, the microcontroller 22490 can determine that the staple firing stroke has been completed and that the staple cartridge positioned in the stapling assembly 22400 has been completely spent. Other embodiments are envisioned in which the sensor system is configured to detect a partial firing stroke of the staple firing member 22460 and supply a signal to the microcontroller 22490 that indicates that the staple cartridge has been at least partially spent. In either event, the motor controller can be configured to prevent the firing member 22460 from performing another firing stroke until the staple cartridge has been replaced with an unspent cartridge. In at least one instance, further to the above, the sensor system comprises a sensor configured to detect whether the spent cartridge has been detached from the stapling assembly and/or whether an unspent cartridge has been assembled to the stapling assembly.

[0523] Further to the above, the sensor system can be configured to detect whether the firing member 22460 has been retracted along a retraction path 22462. In at least one instance, the magnetic element 2246 1 can be detected by the sensor 22401 as the magnetic element 22461 is retracted along the path 22462 and change the second switch 22405 back into a closed condition. Similarly, the magnetic element 2246 1 can be detected by the sensor 2240 1' as the magnetic element 22461 is retracted along the path 22463 and change the first switch 22405' back into a closed condition. By closing the switches 22405 and 22405', the voltage polarity from the battery 22403 is applied to the circuit 22406 and, as a result, the microprocessor 22490 receives a Vcc signal from the circuit 22406 on its input

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channel. In various instances, the motor controller can be configured to prevent the electric motor from being operated to perform another staple firing stroke until the firing member 22460 has been fully retracted.

[0524] A stapling assembly 25700 comprising a staple cartridge 25730, a firing member 25760, and a lockout 25780 is illustrated in FIGS. 130-133. The staple cartridge 25730 comprises a sled 25770 which is pushed distally by the firing member 25760 during a staple firing stroke of the firing member 25760. During the staple firing stroke, the firing member 25760 pushes the sled 25770 distally from a proximal, unfired position (FIGS. 130 and 131) toward a distal, fired position (FIGS. 132 and 133). The sled 25770 is configured to slide under staples removably stored in staple cavities defined in the staple cartridge 25730 and eject the staples from the staple cavities. In various instances, the staple cartridge 25730 comprises staple drivers which, one, support the staples in the staple cartridge and, two, are driven by the sled 25770 to eject the staples from the staple cavities. After the staple firing stroke of the firing member 25760 has been completed, the firing member 25760 is retracted proximally. Notably, the sled 25770 is not retracted proximally with the firing member 25760.

[0525] Further to the above, the lockout 25780 comprises lock arms 25782. Each lock arm 25782 comprises a cantilever beam including a first end mounted to a shaft of the stapling assembly 25700 and a movable second end configured to engage the firing member 25760. The firing member 25760 comprises lock apertures 25762 defined therein which are configured to receive the second ends of the lock arms 25782. When the sled 25770 is in its proximal, unfired position (FIGS. 130 and 131), however, the sled 25770 deflects the lock arms 25782 laterally away from the firing member 25760 and holds the lock arms 25782 out of the lock apertures 25762. As a result, the lockout 25780 does not prevent the firing member 25760 from performing a staple firing stroke when a staple cartridge 25730 is positioned in the stapling assembly 25700 and the sled 25770 of that staple cartridge 25730 is in its unfired position. When the firing member 25760 is advanced distally during its staple firing stroke, the lock apertures 25762 defined in the firing member 25760 are no longer aligned with the lock arms 25782 and, as a result, the lock arms 25782 do not interfere with the stapling firing stroke once it has begun. After the staple firing stroke of the firing member 25760, the firing member 25760 is retracted proximally to its unfired position, as illustrated in FIGS. 132 and 133. At such point, the lock apertures 25762 are re-aligned with the lock arms 25782 and, as the sled 25770 was not returned to its unfired position, the lock arms 25782 can enter into the lock apertures 25762 and lockout the firing member 25760.

[0526] As a result of the above, the lockout 25780 comprises a missing cartridge lockout and a spent cartridge lockout. Alternative embodiments are envisioned in which the staple cartridge 25730 is not removable from the stapling assembly 25700. In such embodiments, the lockout 25780 would comprise a spent cartridge lockout.

[0527] Referring to FIGS. 134 and 135, a stapling assembly 25800 comprises a staple cartridge 25830 including a cartridge body 25831, a sled 25870 movable distally within the cartridge body 25831, and staple drivers 25880. The cartridge body comprises staple cavities 25832 defined therein and staples removably stored in the staple cavities 25832. The sled 25870 is translatable distally between a proximal, unfired position (FIG. 134) and a distal, fired position during a staple firing stroke. During the staple firing stroke, the sled 25870 contacts the staple drivers 25880 and drives the staple drivers 25880 upwardly within the staple cavities 25832, as illustrated in FIG. 135. Notably, the cartridge body 25831 comprises several longitudinal rows of staple cavities 25832 defined therein and the staple drivers 25880 are arranged in longitudinal rows which are aligned with the longitudinal rows of staple cavities 25832. During the staple firing stroke of the sled 25870, the staple drivers 25880 and the staples are driven sequentially as the sled

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25870 is advanced distally. Stated another way, the proximal-most staples drivers 25880 and staples are fired before the distal-most drivers 25880 and staples are fired. In various instances, the firing of the proximal-most staple drivers 25880 marks the beginning of the staple firing stroke.

[0528] Referring again to FIGS. 134 and 135, the staple cartridge 25830 comprises a lockout circuit configured to detect when the staple cartridge 25830 has been at least partially fired. A portion of the lockout circuit extends through the cartridge body 2583 1 and includes electrical contacts 25834. Another portion of the lockout circuit extends through the proximal-most staple driver 25880 and includes electrical contacts 25884 which are aligned with the electrical contacts 25834. When the staple cartridge 25830 is in its unfired condition (FIG. 134), the driver contacts 25884 abut the cartridge body contacts 25834 and, as a result, the lockout circuit is in a closed condition. When the proximal-most staple driver 25880 is lifted upwardly by the sled 25870, the driver contacts 25884 are disengaged from the cartridge body contacts 25834 and the lockout circuit is opened. The lockout circuit is in signal communication with a controller of the stapling assembly 25800 which is configured to interpret that the opening of the lockout circuit means that the staple cartridge 25830 in the stapling assembly 25800 has been at least partially fired and that the staple firing system should not be operated a second, or additional, time without the staple cartridge 25830 being replaced with an unspent staple cartridge 25830. Once an unspent staple cartridge 25830 has been positioned in the stapling assembly 25800 and the lockout circuit is closed by the unspent staple cartridge 25830, the controller can permit the staple firing system to be operated once again.

[0529] In various instances, referring again to FIG. 135, the proximal-most staple driver 25880 is in a slight friction-fit engagement with the sidewalls of a staple cavity 25832. As a result, the proximal-most staple driver 25880 stays in its fired position after it has been lifted upwardly by the sled 25870 and, as such, the driver contacts 25884 are held out of contact with the cartridge body contacts 25834 once the lockout circuit is opened and the possibility of the lockout circuit re-closing is reduced.

[0530] As described above, the staple firing stroke of the staple cartridge 25830 opens the lockout circuit. In alternative embodiments, the staple firing stroke of a staple cartridge can close a lockout circuit. In such embodiments, the controller of the stapling assembly can interpret that the closing of the lockout circuit means that the staple cartridge has been at least partially fired and that the staple firing system should not be operated a second, or additional, time without the staple cartridge being replaced with an unspent staple cartridge.

[0531] In addition to or in lieu of the above, a stapling assembly can include a detection circuit configured to detect when the distal-most staple driver 25880 and staple have been fired. In at least one such instance, the distal-most staple driver 25880 can have the contact arrangement described above, and/or any other suitable arrangement, which changes the condition of the detection circuit. The controller of the stapling assembly can interpret that the change in condition of the detection circuit means that the staple cartridge has been completely fired and that the staple firing system should be retracted, for instance.

[0532] Turning now to FIGS. 136 and 137, a stapling assembly 25900 comprises a shaft 25910, an anvil jaw 25920, and a staple cartridge jaw which is removably attachable to a frame of the shaft 25910. The stapling assembly 25900 further comprises an articulation joint 25940 configured to permit the anvil jaw 25920 and the staple cartridge jaw to articulate relative to the shaft 25910. Similar to the embodiments described herein, the staple cartridge jaw is movable between an open position and a closed position to clamp the tissue of a patient against the anvil jaw 25920.

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[0533] The stapling assembly 25900 further comprises a lockout circuit 25980 configured to detect when the staple cartridge jaw is in its closed position. The lockout circuit 25980 comprises conductors 25984 extending through the shaft 25910 and an electrode pad 25982 positioned in the anvil jaw 25920. The conductors 25984 place the electrode pad 25982 in communication with a controller of the stapling assembly 25900 and, in various instances, the controller can apply a voltage potential across the conductors 25984 to create a monitoring current within the lockout circuit 25980. As described in greater detail below, the controller is configured to evaluate the impedance and/or resistivity of the lockout circuit 25980 and monitor for changes in the impedance and/or resistivity of the lockout circuit 25980 via the monitoring current.

[0534] Further to the above, referring primarily to FIG. 137, the staple cartridge jaw comprises a pin 25932 configured to puncture and/or deform the electrode pad 25982 when the staple cartridge jaw is moved into its closed position. The pin 25932 is comprised of stainless steel, for example, and disrupts the impedance and/or resistivity of the lockout circuit 25980 which is detected by the controller. Such a disruption can inform the controller that, one, a staple cartridge jaw has been attached to the stapling assembly 25900 and, two, the staple cartridge jaw has been closed. At such point, the controller can electronically unlock the staple firing system and permit the staple firing system to perform its staple firing stroke. In at least one such instance, the staple firing system comprises an electric motor and a battery, wherein the controller comprises an electronic or software lockout that prevents the battery from supplying sufficient power to the electric motor to perform the staple firing stroke until the controller detects that a sufficient change in a parameter of the lockout circuit 25980 has occurred. As a result, the staple firing system of the stapling assembly 25900 cannot be operated until the staple cartridge jaw has been closed.

[0535] Referring again to FIG. 136, the lockout circuit 25980 extends through the shaft 25910 and the anvil jaw 25920, but not the staple cartridge jaw. While the pin 25932 of the staple cartridge jaw disrupts the lockout circuit 25980, as described above, the pin 25932 is electrically insulated within the staple cartridge jaw and does not close or open the lockout circuit 25980.

[0536] Alternatively, referring again to FIGS. 136 and 137, the pin 25932 is part of the lockout circuit 25980 and the electrode pad 25982 comprises a contact which is punctured by the pin 25932. In such embodiments, the pin 25932 closes the lockout circuit when the pin 25932 engages the electrode pad 25982 such that a sensing current can flow between the pin 25932 and the electrode pad 25982. In at least one instance, the electrode pad 25982 can be comprised of a self-healing material, such as a conductive gel, for example. In various instances, the pin 25932 may puncture tissue before entering into the electrode pad 25982. Referring again to FIG. 136 the electrode pad 25982 can comprise a wipe pad 25983 configured to at least partially clean the pin 25932 before the pin 25932 enters into the electrode pad 25982.

[0537] Referring to FIGS. 138 and 139, the shaft 25910 comprises an outer housing 25911 including a longitudinal slot 25912 defined therein which is configured to slidably receive a firing member 25960. The longitudinal slot 25912 extends through the articulation joint 25940 and into the anvil jaw 25920 and the staple cartridge jaw. When the anvil jaw 25920 and the staple cartridge jaw are in an unarticulated orientation, the longitudinal slot 25912 is straight, or does not include a change in direction. When the anvil jaw 25920 and the staple cartridge jaw are in an articulated orientation, the longitudinal slot 25912 comprises a change in direction. As a result, the firing member 25960 needs to be sufficiently flexible to pass through the articulation joint 25940. Such flexibility of the firing member 25960,

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however, may cause the firing member 25960 to buckle during the staple firing stroke. To prevent or reduce such buckling, the stapling assembly 25900 further comprises anti-buckling, or anti-blowout, plates 25944 positioned on opposite sides of the firing member 25960 which are configured to support the firing member 25960 within and/or adjacent to the articulation joint 25940. In at least one instance, the anti-buckling plates 25944 are positioned in the shaft 25910 proximally with respect to the articulation joint 25940.

[0538] Further to the above, the shaft 25910 and the articulation joint 25940 include routing channels defined therein configured to receive the conductors 25984 of the lockout circuit 25980. For instance, the shaft 25910 comprises channels 25915 defined in the outer housing 25911 of the shaft 25910. In at least one such instance, a first conductor 25984 extends through a first channel 25915 and a second conductor 25984 extends through a second channel 25915. Moreover, each anti-buckling plate 25984 comprises a channel 25945 defined therein configured to receive a conductor 25984. The channels 25945 are aligned, or at least substantially aligned, with the channels 25915.

[0539] Referring to FIG. 140, a staple cartridge 26230 comprises a longitudinal slot 26231 and longitudinal rows of staple cavities 26232 defined therein. During a staple firing stroke, a firing member, such as the firing member 25960, for example, is configured to slide within the longitudinal slot 26231 to push a sled, such as sled 25770, for example, distally to eject staples from the staple cavities 26232. Similar to the above, the firing member 25960 and the sled 25770 sequentially eject the staples from the staple cavities 26232 and, as a result, sequentially deform the staples against an anvil, such as the anvil 25920, for example. The pushing force transmitted through the firing member 25960 to sequentially deform the staples is rarely, if ever, constant. Rather, the pushing force typically includes a series of spikes which are coincident with the staples being deformed against the anvil. FIG. 141A illustrates such force spikes. More particularly, FIG. 141A illustrates a typical force profile 26260 of the pushing force (F) experienced by the firing member 25960 over the length (L) of the staple firing stroke. The force profile 26260 comprises peaks 26261 and valleys 26262 between the peaks 26261.

[0540] In various instances, further to the above, the controller of a stapling assembly can be configured to monitor the pushing force being applied to the firing member 25960. In at least one instance, the staple firing system comprises an electric motor configured to drive the firing member 25960 and, in such instances, the current drawn by the electric motor during the staple firing stroke can be monitored as a proxy for the pushing force being applied to the firing member 25960. In fact, a chart comparing the current drawn by the electric motor over the staple firing stroke may look very similar to the force profile 26260 illustrated in FIG. 140A. In certain embodiments, a force transducer can be utilized to monitor the pushing force. In any event, the controller can count the peaks 26261 of the force profile 26260 during the firing stroke and stop the staple firing stroke after a predetermined count threshold has been reached. In at least one such instance, a staple cartridge can comprise 100 staples removably stored therein and, after the controller has counted 100 force and/or current spikes, the controller can interrupt the power to the electric motor, for example, as it can be assumed that the staple firing stroke has been completed.

[0541] In various instances, further to the above, a stapling assembly can be configured for use with staple cartridges having different lengths and/or different quantities of staples stored therein. For example, the stapling assembly can be usable with a first staple cartridge configured to apply an approximately 45 mm staple line and a second staple cartridge configured to apply an approximately 60 mm staple line. The first staple cartridge comprises a first quantity of staples removably stored therein and the second staple cartridge comprises a second quantity of staples

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removably stored therein which is more than the first quantity. When the first staple cartridge is being used with the stapling assembly, the controller is configured to stop the staple firing stroke after the controller identifies a first number of force spikes and, similarly, the controller is configured to stop the staple firing stroke after the controller identifies a second number of force spikes when the second staple cartridge is being used with the stapling assembly. Stated another way, the controller can be configured to evaluate the force profile of the first cartridge, such as force profile 26260, for example, and the force profile of the second cartridge, such as force profile 26260', for example. Moreover, the controller can be configured to monitor the force profiles of any suitable number of staple cartridges.

[0542] Further to the above, the staple cartridges that can be used with a stapling assembly can comprise unique identifiers that can assist the controller of the stapling assembly in identifying the type of staple cartridge that is attached to the stapling assembly. In at least one instance, the staple cartridges have unique RFID tags which can communicate with the controller of the stapling assembly, for example. In certain instances, the staple cartridges have bar codes thereon which can be scanned before they are used with the stapling assembly, for example. Once the controller identifies the type of staple cartridge attached to the stapling assembly, the controller can determine the appropriate length of the staple firing stroke. In at least one instance, information regarding the appropriate firing stroke length for a staple cartridge can be stored in a memory device, for example, in communication with a microprocessor of the controller.

[0543] In addition to or in lieu of the above, a staple cartridge, such as the staple cartridge 26230, for example, can be configured to create detectable force spikes in the pushing force and/or current spikes being drawn by the electric motor at the end of the staple firing stroke. Referring to FIG. 140, the staple cartridge 26230 comprises one or more bridges 26233 extending across the longitudinal slot 2623 1 near the distal end of the longitudinal slot 2623 1, i.e., near the distal end of the staple firing stroke. As the firing member 26260 is advanced distally, the firing member 26260 contacts the bridges 26233 and breaks and/or incises the bridges 26233 which creates spikes in the pushing force and/or supply current which are different that the spikes created when the staples are deformed. In at least one instance, the spikes created by defeating the bridges 26233 are much larger than the spikes created by deforming the staples and the controller is configured to discern the difference in such spikes. Once the controller identifies that certain spikes have been created by the bridges, the controller can stop the staple firing stroke. As the reader should appreciate, such an arrangement would allow the controller to stop the staple firing system at the appropriate moment regardless of the length of the staple cartridge attached to the stapling assembly and/or regardless of the number of staples stored in the staple cartridge, for example.

[0544] While various details have been set forth in the foregoing description, it will be appreciated that the various aspects of the mechanisms for compensating for drivetrain failure in powered surgical instruments may be practiced without these specific details. For example, for conciseness and clarity selected aspects have been shown in block diagram form rather than in detail. Some portions of the detailed descriptions provided herein may be presented in terms of instructions that operate on data that is stored in a computer memory. Such descriptions and representations are used by those skilled in the art to describe and convey the substance of their work to others skilled in the art. In general, an algorithm refers to a self-consistent sequence of steps leading to a desired result, where a "step" refers to a manipulation of physical quantities which may, though need not necessarily, take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It is common usage to refer to these signals

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as bits, values, elements, symbols, characters, terms, numbers, or the like. These and similar terms may be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

[0545] Unless specifically stated otherwise as apparent from the foregoing discussion, it is appreciated that, throughout the foregoing description, discussions using terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0546] It is worthy to note that any reference to "one aspect" or "an aspect," means that a particular feature, structure, or characteristic described in connection with the aspect is included in at least one aspect. Thus, appearances of the phrases "in one aspect" or "in an aspect" in various places throughout the specification are not necessarily all referring to the same aspect. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner in one or more aspects.

[0547] Although various aspects have been described herein, many modifications, variations, substitutions, changes, and equivalents to those aspects may be implemented and will occur to those skilled in the art. Also, where materials are disclosed for certain components, other materials may be used. It is therefore to be understood that the foregoing description and the appended claims are intended to cover all such modifications and variations as falling within the scope of the disclosed aspects. The following claims are intended to cover all such modification and variations.

[0548] Some or all of the aspects described herein may generally comprise technologies for mechanisms for compensating for drivetrain failure in powered surgical instruments, or otherwise according to technologies described herein. In a general sense, those skilled in the art will recognize that the various aspects described herein which can be implemented, individually and/or collectively, by a wide range of hardware, software, firmware, or any combination thereof can be viewed as being composed of various types of "electrical circuitry." Consequently, as used herein "electrical circuitry" includes, but is not limited to, electrical circuitry having at least one discrete electrical circuit, electrical circuitry having at least one integrated circuit, electrical circuitry having at least one application specific integrated circuit, electrical circuitry forming a general purpose computing device configured by a computer program (e.g., a general purpose computer configured by a computer program which at least partially carries out processes and/or devices described herein, or a microprocessor configured by a computer program which at least partially carries out processes and/or devices described herein), electrical circuitry forming a memory device (e.g., forms of random access memory), and/or electrical circuitry forming a communications device (e.g., a modem, communications switch, or optical-electrical equipment). Those having skill in the art will recognize that the subject matter described herein may be implemented in an analog or digital fashion or some combination thereof.

[0549] The foregoing detailed description has set forth various aspects of the devices and/or processes via the use of block diagrams, flowcharts, and/or examples. Insofar as such block diagrams, flowcharts, and/or examples contain one or more functions and/or operations, it will be understood by those within the art that each function and/or operation within such block diagrams, flowcharts, or examples can be implemented, individually and/or collectively, by a wide range of hardware, software, firmware, or virtually any combination thereof. In one aspect, several portions of the subject matter described herein may be implemented via Application Specific Integrated Circuits (ASICs), Field

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Programmable Gate Arrays (FPGAs), digital signal processors (DSPs), or other integrated formats. Those skilled in the art will recognize, however, that some aspects of the aspects disclosed herein, in whole or in part, can be equivalently implemented in integrated circuits, as one or more computer programs running on one or more computers (e.g., as one or more programs running on one or more computer systems), as one or more programs running on one or more processors (e.g., as one or more programs running on one or more microprocessors), as firmware, or as virtually any combination thereof, and that designing the circuitry and/or writing the code for the software and or firmware would be well within the skill of one of skill in the art in light of this disclosure. In addition, those skilled in the art will appreciate that the mechanisms of the subject matter described herein are capable of being distributed as a program product in a variety of forms, and that an illustrative aspect of the subject matter described herein applies regardless of the particular type of signal bearing medium used to actually carry out the distribution. Examples of a signal bearing medium include, but are not limited to, the following: a recordable type medium such as a floppy disk, a hard disk drive, a Compact Disc (CD), a Digital Video Disk (DVD), a digital tape, a computer memory, etc.; and a transmission type medium such as a digital and/or an analog communication medium (e.g., a fiber optic cable, a waveguide, a wired communications link, a wireless communication link (e.g., transmitter, receiver, transmission logic, reception logic, etc.), etc.).

[0550] Many of the surgical instrument systems described herein are motivated by an electric motor; however, the surgical instrument systems described herein can be motivated in any suitable manner. In various instances, the surgical instrument systems described herein can be motivated by a manually-operated trigger, for example. In certain instances, the motors disclosed herein may comprise a portion or portions of a robotically controlled system. Moreover, any of the end effectors and/or tool assemblies disclosed herein can be utilized with a robotic surgical instrument system. U.S. Patent Application Serial No. 13/118,241, entitled SURGICAL STAPLING INSTRUMENTS WITH ROTATABLE STAPLE DEPLOYMENT ARRANGEMENTS, now U.S. Patent No. 9,072,535, for example, discloses several examples of a robotic surgical instrument system in greater detail. The entire disclosure of U.S. Patent Application Serial No. 13/118,241, entitled SURGICAL STAPLING INSTRUMENTS WITH ROTATABLE STAPLE DEPLOYMENT ARRANGEMENTS, now U.S. Patent No. 9,072,535 is incorporated by reference herein.

[0551] The entire disclosures of:

European Patent Application No. EP 795298, entitled LINEAR STAPLER WITH IMPROVED FIRING STROKE, which was filed on March 12, 1997;

U.S. Patent No. 5,605,272, entitled TRIGGER MECHANISM FOR SURGICAL INSTRUMENTS, which issued on February 25, 1997;

U.S. Patent No. 5,697,543, entitled LINEAR STAPLER WITH IMPROVED FIRING STROKE, which issued on December 16, 1997;

U.S. Patent Application Publication No. 2005/0246881, entitled METHOD FOR MAKING A SURGICAL STAPLER, which published on November 10, 2005;

U.S. Patent Application Publication No. 2007/0208359, entitled METHOD FOR STAPLING TISSUE, which published on September 6, 2007;

U.S. Patent No. 4,527,724, entitled DISPOSABLE LINEAR SURGICAL STAPLING INSTRUMENT, which issued on July 9, 1985;

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U.S. Patent No. 5,137,198, entitled FAST CLOSURE DEVICE FOR LINEAR SURGICAL STAPLING INSTRUMENT, which issued on August 11, 1992;

U.S. Patent No. 5,405,073, entitled FLEXIBLE SUPPORT SHAFT ASSEMBLY, which issued on April 11, 1995;

U.S. Patent No. 8,360,297, entitled SURGICAL CUTTING AND STAPLING INSTRUMENT WITH SELF ADJUSTING ANVIL, which issued on January 29, 2013;

U.S. Patent Application Serial No. 14/813,242, entitled SURGICAL INSTRUMENT COMPRISING SYSTEMS FOR ASSURING THE PROPER SEQUENTIAL OPERATION OF THE SURGICAL INSTRUMENT, which was filed on July 30, 2015;

U.S. Patent Application Serial No. 14/813,259, entitled SURGICAL INSTRUMENT COMPRISING SEPARATE TISSUE SECURING AND TISSUE CUTTING SYSTEMS, which was filed on July 30, 2015;

U.S. Patent Application Serial No. 14/813,266, entitled SURGICAL INSTRUMENT COMPRISING SYSTEMS FOR PERMITTING THE OPTIONAL TRANSECTION OF TISSUE, which was filed on July 30, 2015;

U.S. Patent Application Serial No. 14/813,274, entitled SURGICAL INSTRUMENT COMPRISING A SYSTEM FOR BYPASSING AN OPERATIONAL STEP OF THE SURGICAL INSTRUMENT; which was filed on July 30, 2015;

U.S. Patent No. 5,403,312, entitled ELECTRO SURGICAL HEMOSTATIC DEVICE, which issued on April 4, 1995;

U.S. Patent No. 7,000,818, entitled SURGICAL STAPLING INSTRUMENT HAVING SEPARATE DISTINCT CLOSING AND FIRING SYSTEMS, which issued on February 21, 2006;

U.S. Patent No. 7,422,139, entitled MOTOR-DRIVEN SURGICAL CUTTING AND FASTENING INSTRUMENT WITH TACTILE POSITION FEEDBACK, which issued on September 9, 2008;

U.S. Patent No. 7,464,849, entitled ELECTRO-MECHANICAL SURGICAL INSTRUMENT WITH CLOSURE SYSTEM AND ANVIL ALIGNMENT COMPONENTS, which issued on December 16, 2008;

U.S. Patent No. 7,670,334, entitled SURGICAL INSTRUMENT HAVING AN ARTICULATING END EFFECTOR, which issued on March 2, 2010;

U.S. Patent No. 7,753,245, entitled SURGICAL STAPLING INSTRUMENTS, which issued on July 13, 2010;

U.S. Patent No. 8,393,514, entitled SELECTIVELY ORIENTABLE IMPLANTABLE FASTENER CARTRIDGE, which issued on March 12, 2013;

U.S. Patent Application Serial No. 11/343,803, entitled SURGICAL INSTRUMENT HAVING RECORDING CAPABILITIES; now U.S. Patent No. 7,845,537;

U.S. Patent Application Serial No. 12/031,573, entitled SURGICAL CUTTING AND FASTENING INSTRUMENT HAVING RF ELECTRODES, filed February 14, 2008;

U.S. Patent Application Serial No. 12/031,873, entitled END EFFECTORS FOR A SURGICAL CUTTING AND STAPLING INSTRUMENT, filed February 15, 2008, now U.S. Patent No. 7,980,443;

U.S. Patent Application Serial No. 12/235,782, entitled MOTOR-DRIVEN SURGICAL CUTTING INSTRUMENT, now U.S. Patent No. 8,210,411;

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U.S. Patent Application Serial No. 12/249,117, entitled POWERED SURGICAL CUTTING AND STAPLING APPARATUS WITH MANUALLY RETRACTABLE FIRING SYSTEM, now U.S. Patent No. 8,608,045;

U.S. Patent Application Serial No. 12/647,100, entitled MOTOR-DRIVEN SURGICAL CUTTING INSTRUMENT WITH ELECTRIC ACTUATOR DIRECTIONAL CONTROL ASSEMBLY, filed December 24, 2009; now U.S. Patent No. 8,220,688;

U.S. Patent Application Serial No. 12/893,461, entitled STAPLE CARTRIDGE, filed September 29, 2012, now U.S. Patent No. 8,733,613;

U.S. Patent Application Serial No. 13/036,647, entitled SURGICAL STAPLING INSTRUMENT, filed February 28, 2011, now U.S. Patent No. 8,561,870;

U.S. Patent Application Serial No. 13/118,241, entitled SURGICAL STAPLING INSTRUMENTS WITH ROTATABLE STAPLE DEPLOYMENT ARRANGEMENTS, now U.S. Patent No. 9,072,535;

U.S. Patent Application Serial No. 13/524,049, entitled ARTICULATABLE SURGICAL INSTRUMENT COMPRISING A FIRING DRIVE, filed on June 15, 2012; now U.S. Patent No. 9,101,358;

U.S. Patent Application Serial No. 13/800,025, entitled STAPLE CARTRIDGE TISSUE THICKNESS SENSOR SYSTEM, filed on March 13, 2013, now U.S. Patent Application Publication No. 2014/0263551;

U.S. Patent Application Serial No. 13/800,067, entitled STAPLE CARTRIDGE TISSUE THICKNESS SENSOR SYSTEM, filed on March 13, 2013, now U.S. Patent Application Publication No. 2014/0263552;

U.S. Patent Application Publication No. 2007/0175955, entitled SURGICAL CUTTING AND FASTENING INSTRUMENT WITH CLOSURE TRIGGER LOCKING MECHANISM, filed January 31, 2006; and

U.S. Patent Application Publication No. 2010/0264194, entitled SURGICAL STAPLING INSTRUMENT WITH AN ARTICULATABLE END EFFECTOR, filed April 22, 2010, now U.S. Patent No. 8,308,040, are hereby incorporated by reference herein.

[0552] The surgical instrument systems described herein have been described in connection with the deployment and deformation of staples; however, the embodiments described herein are not so limited. Various embodiments are envisioned which deploy fasteners other than staples, such as clamps or tacks, for example. Moreover, various embodiments are envisioned which utilize any suitable means for sealing tissue. For instance, an end effector in accordance with various embodiments can comprise electrodes configured to heat and seal the tissue. Also, for instance, an end effector in accordance with certain embodiments can apply vibrational energy to seal the tissue.

[0553] All of the above-mentioned U.S. patents, U.S. patent application publications, U.S. patent applications, foreign patents, foreign patent applications, non-patent publications referred to in this specification and/or listed in any Application Data Sheet, or any other disclosure material are incorporated herein by reference, to the extent not inconsistent herewith. As such, and to the extent necessary, the disclosure as explicitly set forth herein supersedes any conflicting material incorporated herein by reference. Any material, or portion thereof, that is said to be incorporated by reference herein, but which conflicts with existing definitions, statements, or other disclosure material set forth herein will only be incorporated to the extent that no conflict arises between that incorporated material and the existing disclosure material.

[0554] One skilled in the art will recognize that the herein described components (e.g., operations), devices, objects, and the discussion accompanying them are used as examples for the sake of conceptual clarity and that various

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configuration modifications are contemplated. Consequently, as used herein, the specific exemplars set forth and the accompanying discussion are intended to be representative of their more general classes. In general, use of any specific exemplar is intended to be representative of its class, and the non-inclusion of specific components (e.g., operations), devices, and objects should not be taken limiting.

[0555] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations are not expressly set forth herein for sake of clarity.

[0556] The herein described subject matter sometimes illustrates different components contained within, or connected with, different other components. It is to be understood that such depicted architectures are merely exemplary, and that in fact many other architectures may be implemented which achieve the same functionality. In a conceptual sense, any arrangement of components to achieve the same functionality is effectively "associated" such that the desired functionality is achieved. Hence, any two components herein combined to achieve a particular functionality can be seen as "associated with" each other such that the desired functionality is achieved, irrespective of architectures or intermedial components. Likewise, any two components so associated can also be viewed as being "operably connected," or "operably coupled," to each other to achieve the desired functionality, and any two components capable of being so associated can also be viewed as being "operably couplable," to each other to achieve the desired functionality. Specific examples of operably couplable include but are not limited to physically mateable and/or physically interacting components, and/or wirelessly interactable, and/or wirelessly interacting components, and/or logically interacting, and/or logically interactable components.

[0557] Some aspects may be described using the expression "coupled" and "connected" along with their derivatives. It should be understood that these terms are not intended as synonyms for each other. For example, some aspects may be described using the term "connected" to indicate that two or more elements are in direct physical or electrical contact with each other. In another example, some aspects may be described using the term "coupled" to indicate that two or more elements are in direct physical or electrical contact. The term "coupled," however, also may mean that two or more elements are not in direct contact with each other, but yet still co-operate or interact with each other.

[0558] In some instances, one or more components may be referred to herein as "configured to," "configurable to," "operable/operative to," "adapted/adaptable," "able to," "conformable/conformed to," etc. Those skilled in the art will recognize that "configured to" can generally encompass active-state components and/or inactive-state components and/or standby-state components, unless context requires otherwise.

[0559] While particular aspects of the subject matter described herein have been shown and described, it will be apparent to those skilled in the art that, based upon the teachings herein, changes and modifications may be made without departing from the subject matter described herein and its broader aspects and, therefore, the appended claims are to encompass within their scope all such changes and modifications as are within the true spirit and scope of the subject matter described herein. It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as "open" terms (e.g., the term "including" should be interpreted as "including but not limited to," the term "having" should be interpreted as "having at least," the term "includes" should be interpreted as "includes but is not limited to," etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent

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will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to claims containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (e.g., "a" and/or "an" should typically be interpreted to mean "at least one" or "one or more"); the same holds true for the use of definite articles used to introduce claim recitations.

[0560] In addition, even if a specific number of an introduced claim recitation is explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean at least the recited number (e.g., the bare recitation of "two recitations," without other modifiers, typically means at least two recitations, or two or more recitations). Furthermore, in those instances where a convention analogous to "at least one of A, B, and C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, and C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to "at least one of A, B, or C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, or C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that typically a disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms unless context dictates otherwise. For example, the phrase "A or B" will be typically understood to include the possibilities of "A" or "B" or "A and B."

[0561] With respect to the appended claims, those skilled in the art will appreciate that recited operations therein may generally be performed in any order. Also, although various operational flows are presented in a sequence(s), it should be understood that the various operations may be performed in other orders than those which are illustrated, or may be performed concurrently. Examples of such alternate orderings may include overlapping, interleaved, interrupted, reordered, incremental, preparatory, supplemental, simultaneous, reverse, or other variant orderings, unless context dictates otherwise. Furthermore, terms like "responsive to," "related to," or other past-tense adjectives are generally not intended to exclude such variants, unless context dictates otherwise.

[0562] In certain cases, use of a system or method may occur in a territory even if components are located outside the territory. For example, in a distributed computing context, use of a distributed computing system may occur in a territory even though parts of the system may be located outside of the territory (e.g., relay, server, processor, signal-bearing medium, transmitting computer, receiving computer, etc. located outside the territory).

[0563] A sale of a system or method may likewise occur in a territory even if components of the system or method are located and/or used outside the territory. Further, implementation of at least part of a system for performing a method in one territory does not preclude use of the system in another territory.

[0564] Although various aspects have been described herein, many modifications, variations, substitutions, changes,

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and equivalents to those aspects may be implemented and will occur to those skilled in the art. Also, where materials are disclosed for certain components, other materials may be used. It is therefore to be understood that the foregoing description and the appended claims are intended to cover all such modifications and variations as falling within the scope of the disclosed aspects. The following claims are intended to cover all such modification and variations.

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CLAIMS

WHAT IS CLAIMED IS:

1. A method of compensating for a battery pack failure in a powered surgical instrument, the method comprising:

generating, by an electric motor, a rotational motion to motivate a firing assembly to deploy staples into a captured tissue during a firing sequence;

determining, by a control circuit, whether a subset of rechargeable battery cells is damaged during the firing sequence based on a measurement performed by a battery-cell health indicator; and

stepping-up, by the control circuit coupled to a voltage converter, an output voltage of the battery pack to complete the firing sequence in response to a determination that a subset of the rechargeable battery cells is damaged.

2. The method of Claim 1, further comprising storing, by the control circuit coupled to a memory, a damaged status of the power pack in the memory in response to a determination that a subset of the rechargeable battery cells is damaged.

3. The method of Claim 2, further comprising clearing, by the control circuit, the damaged status after the damaged subset of the rechargeable battery cells is replaced with undamaged battery cells.

4. The method of Claim 1, further comprising deactivating, by the control circuit, the surgical instrument after completion of the firing sequence in response to a determination that a subset of the rechargeable battery cells is damaged.

5. A method of compensating for drivetrain failure in a powered surgical instrument, the method comprising:

generating, by an electric motor, a mechanical output to motivate a drivetrain to transmit a motion to a jaw assembly of the surgical instrument;

activating, by a control circuit, a safe mode in response to an acute failure of the drivetrain; and

activating, by the control circuit, a bailout mode in response to a catastrophic failure of the drivetrain.

6. The method of Claim 5, further comprising modulating, by the control circuit, the mechanical output of the electric motor in response to the acute failure.

7. The method of Claim 6, wherein modulating the mechanical output of the electric motor comprises slowing the mechanical output.

8. The method of Claim 5, further comprising generating, by a power source, a motor input voltage.

9. The method of Claim 8, further comprising modulating, by the control circuit, the motor input voltage in response to the acute failure.

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10. The method of Claim 9, wherein modulating the motor input voltage comprises delivering the motor input voltage in pulses.

11. The method of Claim 9, wherein modulating the motor input voltage comprises reducing the motor input voltage.

12. The method of Claim 5, further comprising disabling, by the control circuit, the electric motor in response to the catastrophic failure.

13. The method of Claim 8, further comprising, employing, by the control circuit, a feedback element to provide bailout instructions in response to the catastrophic failure.

14. A method of compensating for drivetrain failure in a powered surgical instrument, the method comprising:

driving, by an electric motor, a drivetrain comprising gear components to perform operations of the surgical instrument;

sensing, by a vibration sensor positioned relative to the drivetrain, vibration information from the drivetrain;

recording, by a processor coupled to a memory, the vibration information sensed by the vibration sensor;

generating, by the vibration sensor, an output signal based on the vibration information; and

determining a status of the surgical instrument based on the output signal.

15. The method of Claim 14, further comprising:

filtering, by a filter, the output signal of the vibration sensor; and

generating, by the filter, a filtered signal based on the received output signal.

16. The method of apparatus of Claim 14, further comprising generating, by the processor, a processed signal based on the filtered signal.

17. The method Claim 16, further comprising comparing, by the processor, a predetermined threshold value to a corresponding value of the processed signal.

18. The method of Claim 17, further comprising detecting, by the processor, a malfunction of the surgical instrument when the predetermined threshold value is equal to or less than the corresponding value of the processed signal.

19. The method of Claim 16, further comprising generating the predetermined threshold value from a test output signal of the vibration sensor or a previously processed signal.

MassagerPriorArt0002971

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20. The method of Claim 19, further comprising:

sensing, by the vibration sensor, test vibration information during a testing procedure of the surgical instrument; and

recording, by the memory, a test output signal based on the test vibration information sensed by the vibration sensor.

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Petitioner Therabody Ex-1004, 0615

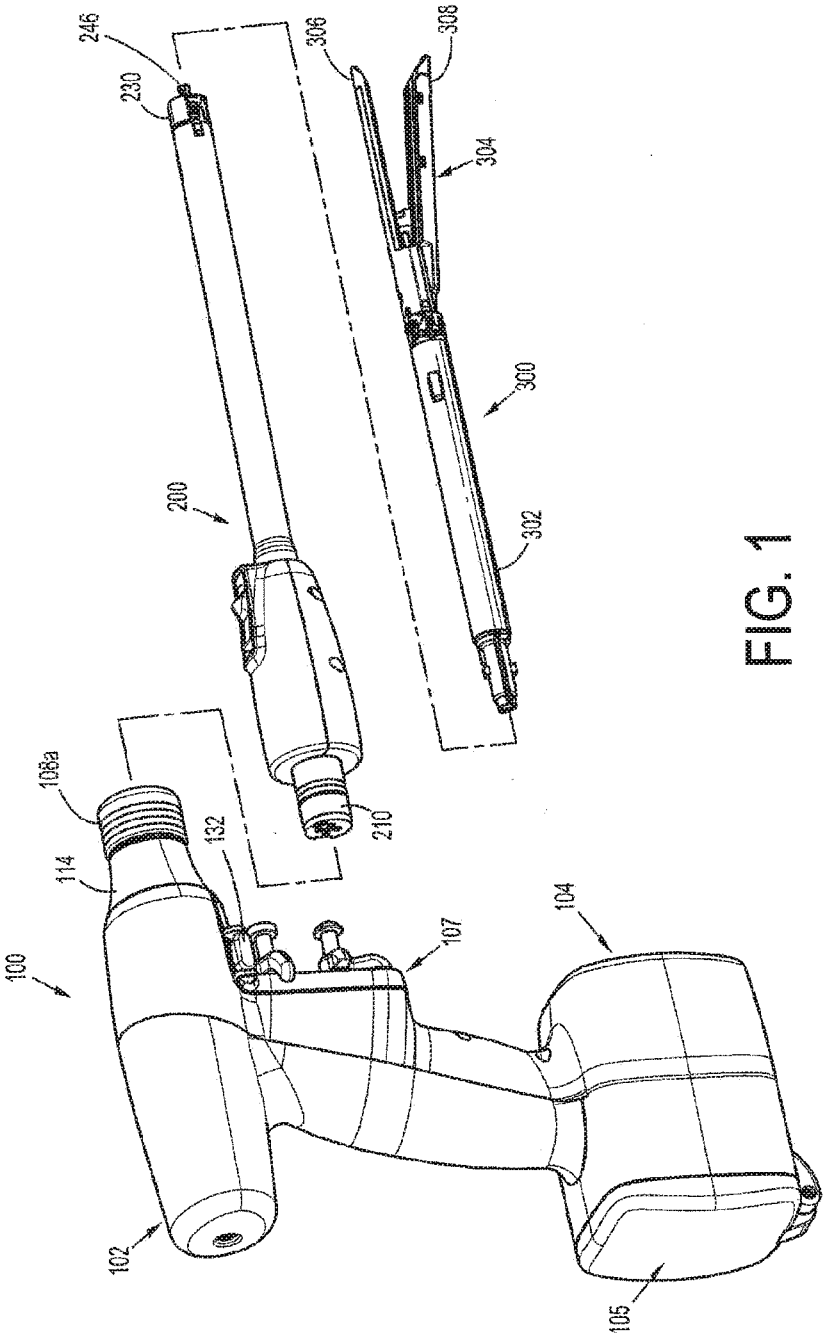


FIG. 1

Petitioner Therabody Ex-1004, 0616

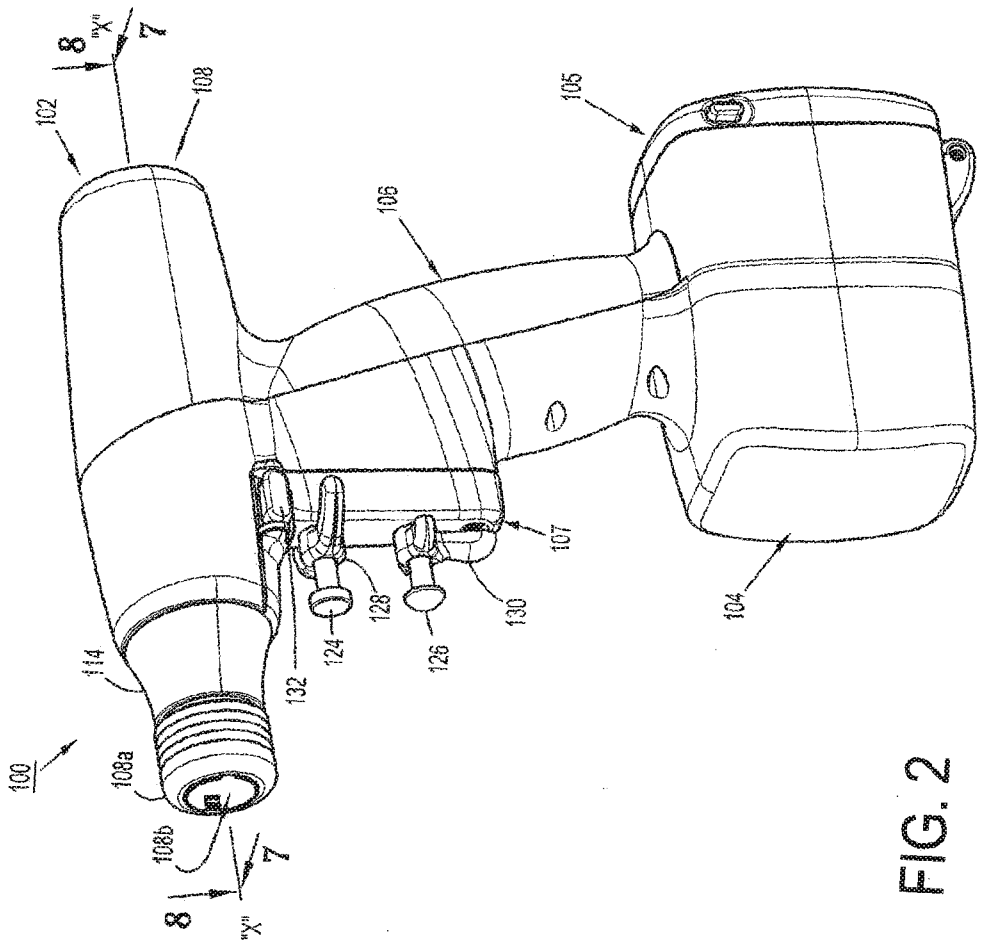

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114
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108b
7
8
"X"

FIG. 2

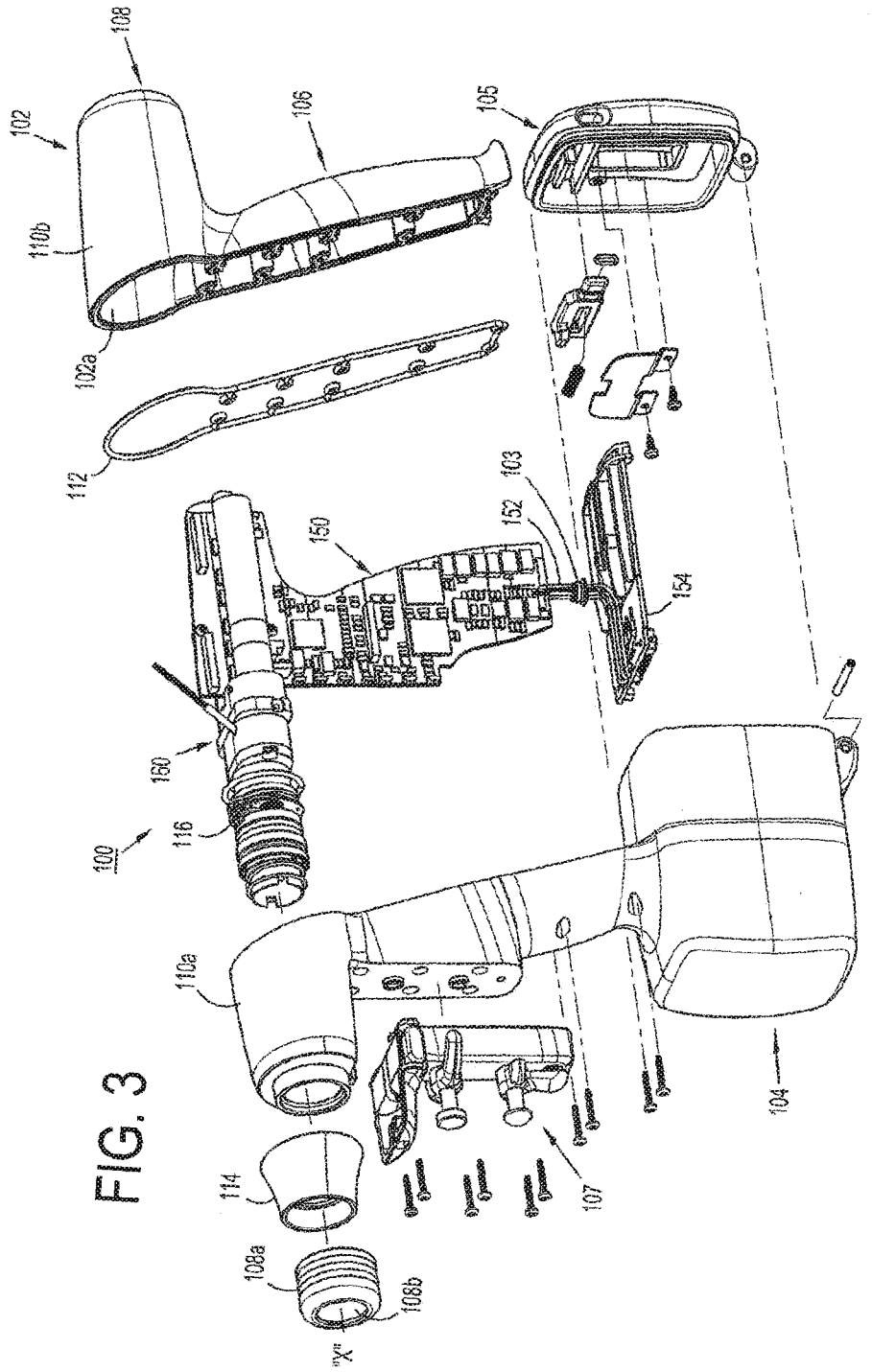

108
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106
105
110b
102a
112
103
152
150
154
160
116
100
110a
104
114
107
108a
108b
"X"

FIG. 3

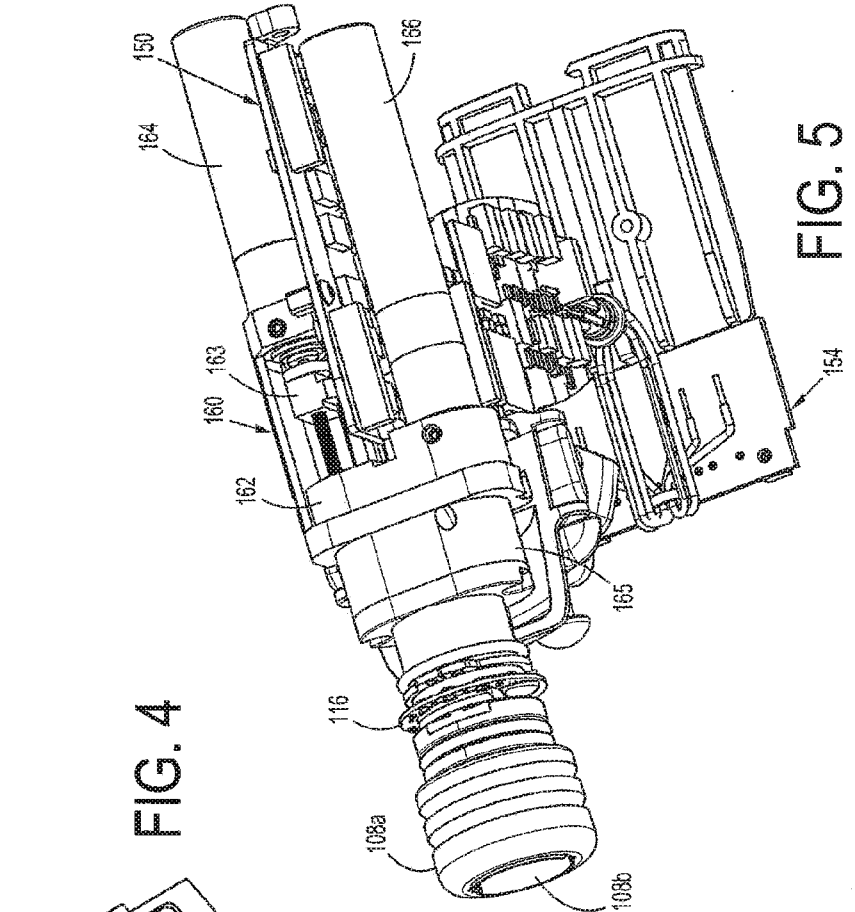


FIG. 5

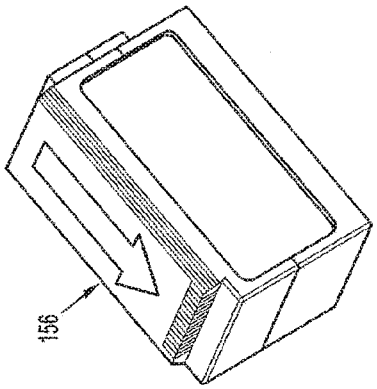


FIG. 4

Petitioner Therabody Ex-1004, 0619

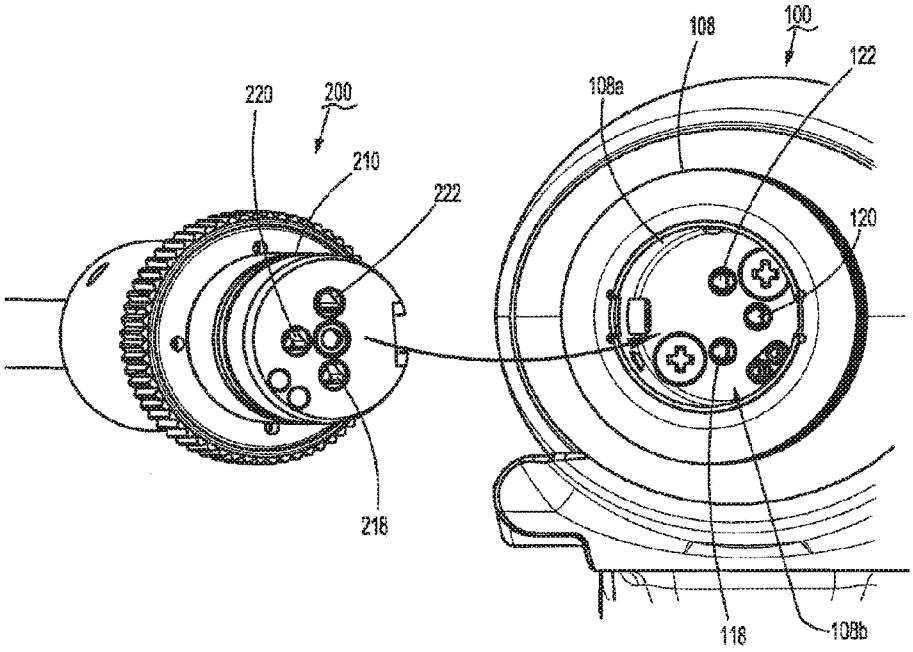


FIG. 6

Petitioner Therabody Ex-1004, 0620

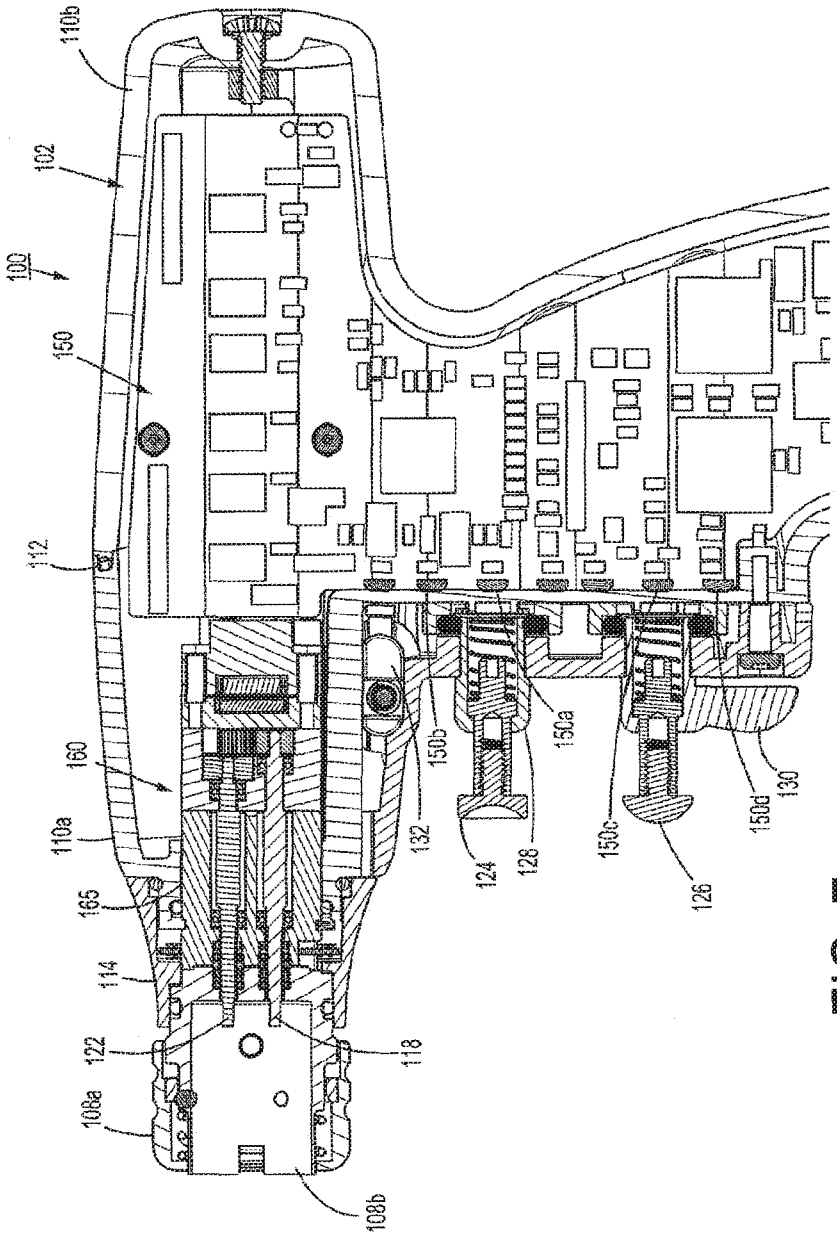


FIG. 7

MassagerPriorArt0002978

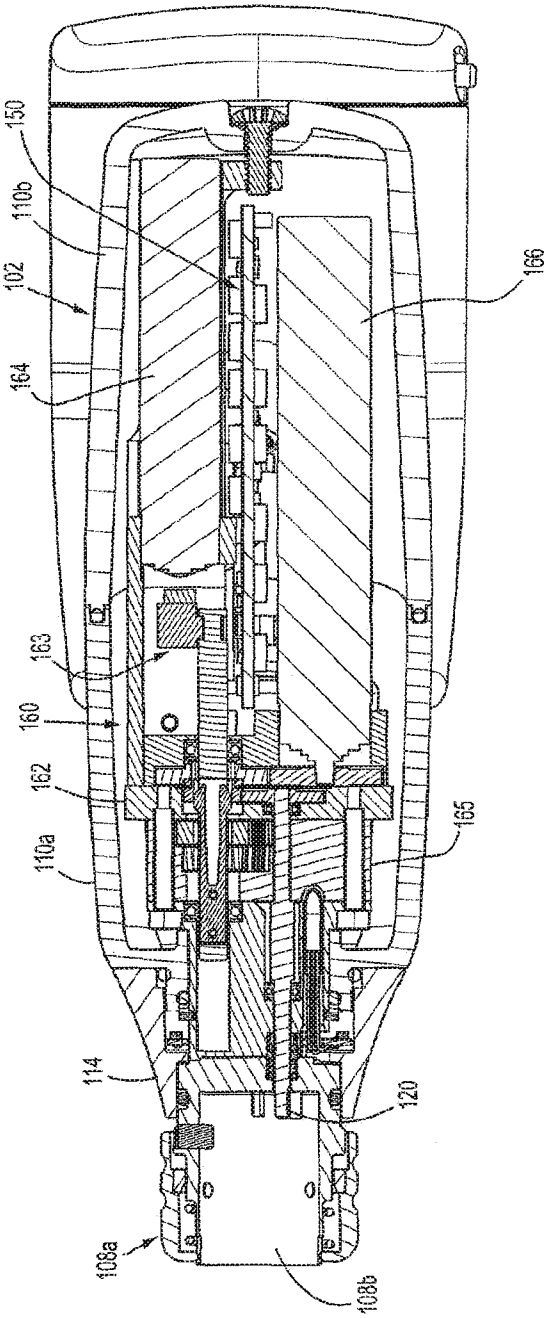


FIG. 8

Petitioner Therabody Ex-1004, 0622

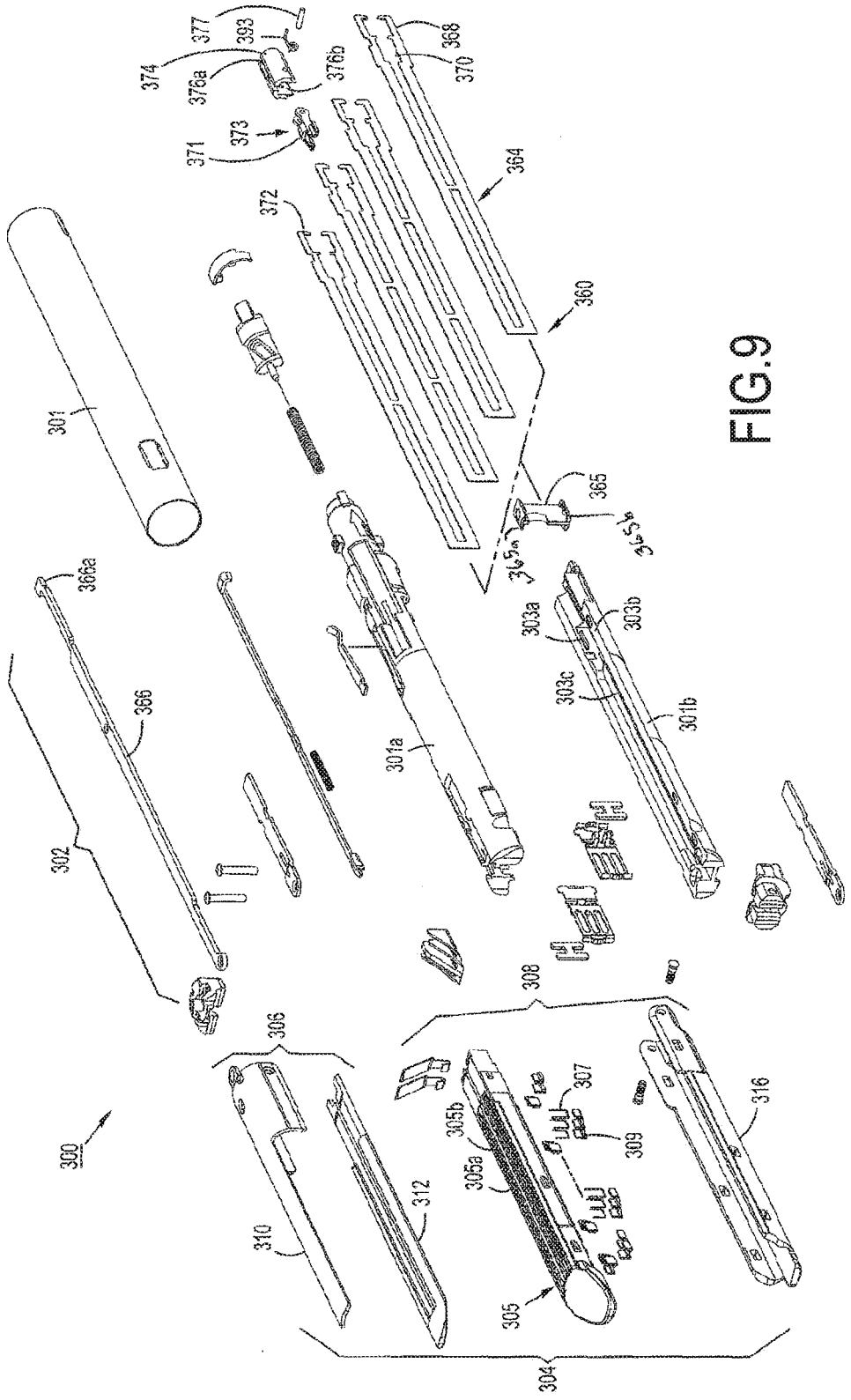


FIG.9

MassagerPriorArt0002980

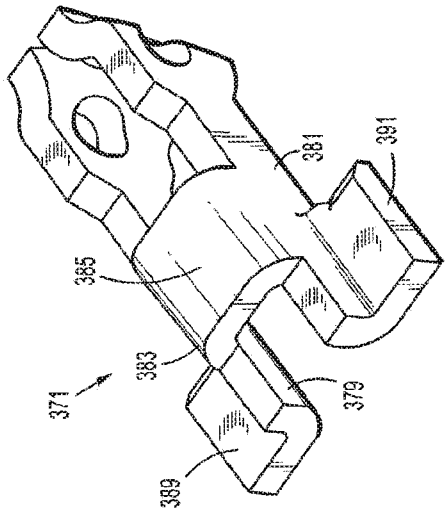


FIG. 10B

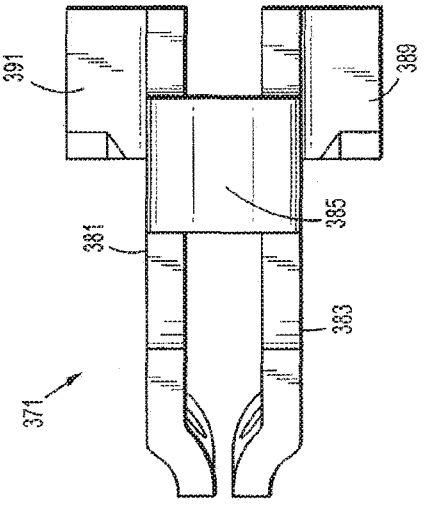


FIG. 10A

Petitioner Therabody Ex-1004, 0624

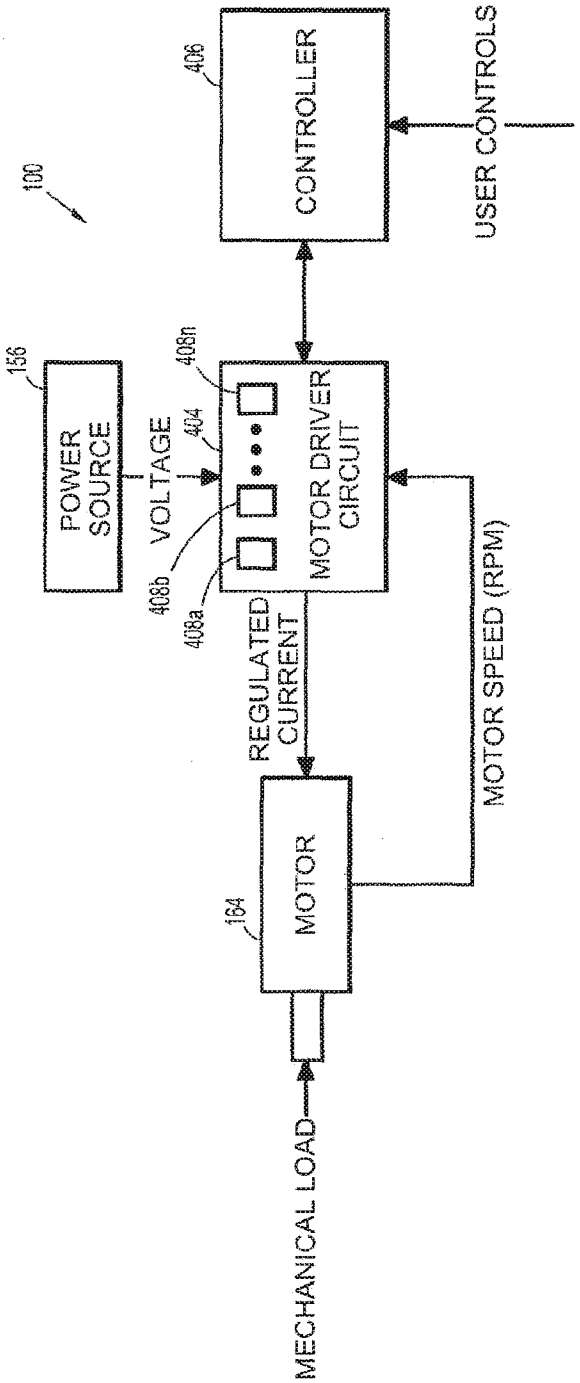


FIG. 11

Petitioner Therabody Ex-1004, 0625

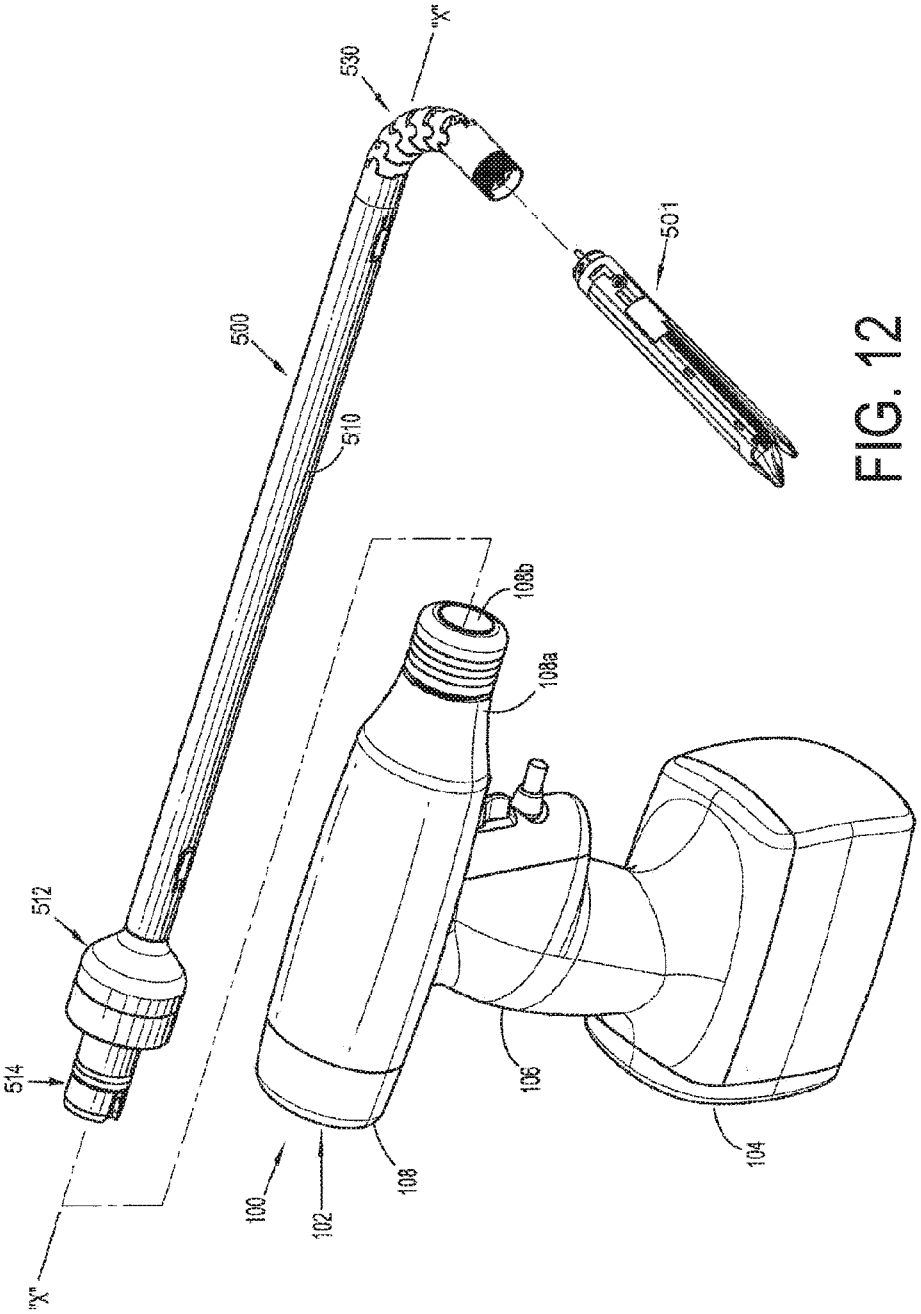


FIG. 12

Petitioner Therabody Ex-1004, 0626

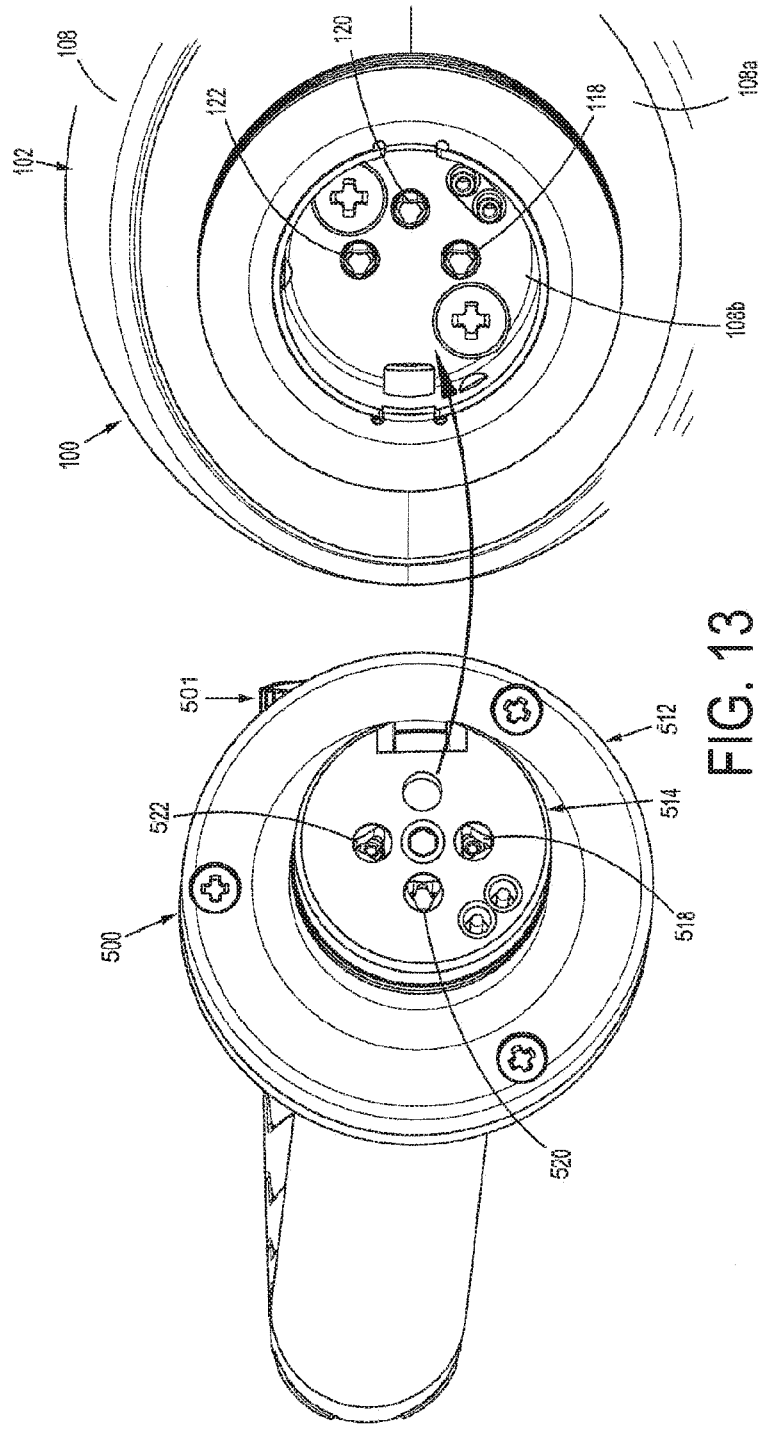


FIG. 13

Petitioner Therabody Ex-1004, 0627

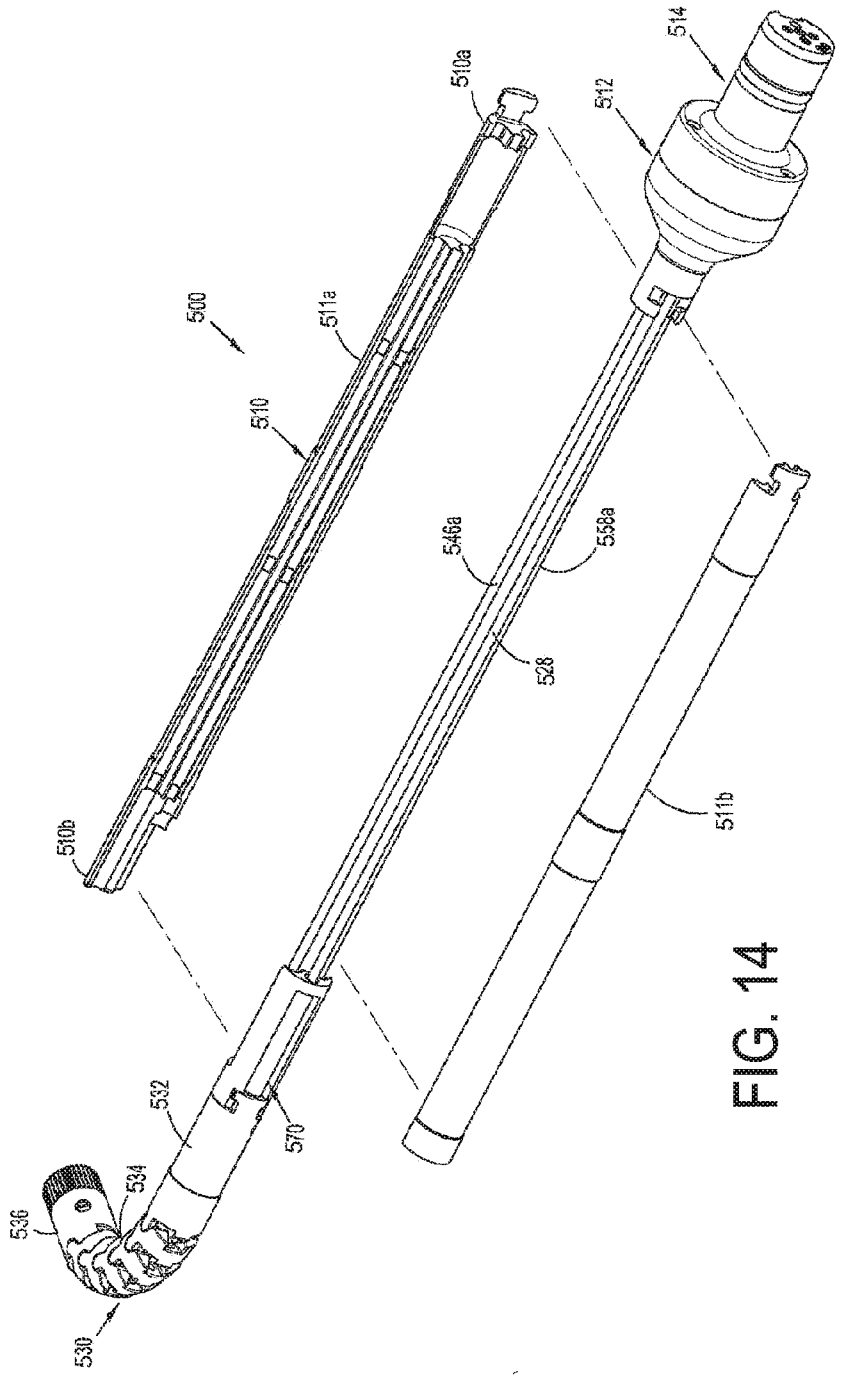


FIG. 14

Petitioner Therabody Ex-1004, 0628

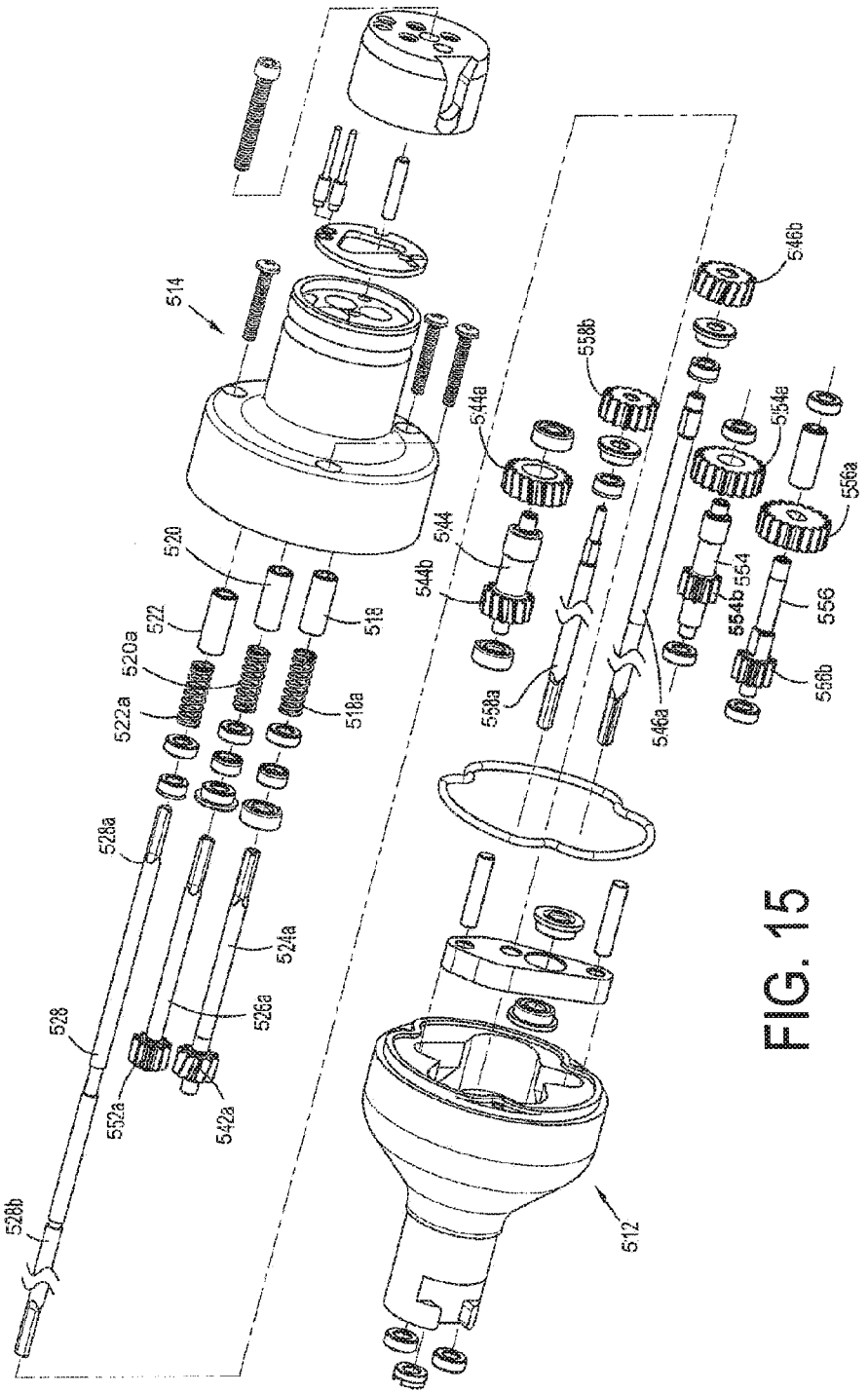


FIG. 15

Petitioner Therabody Ex-1004, 0629

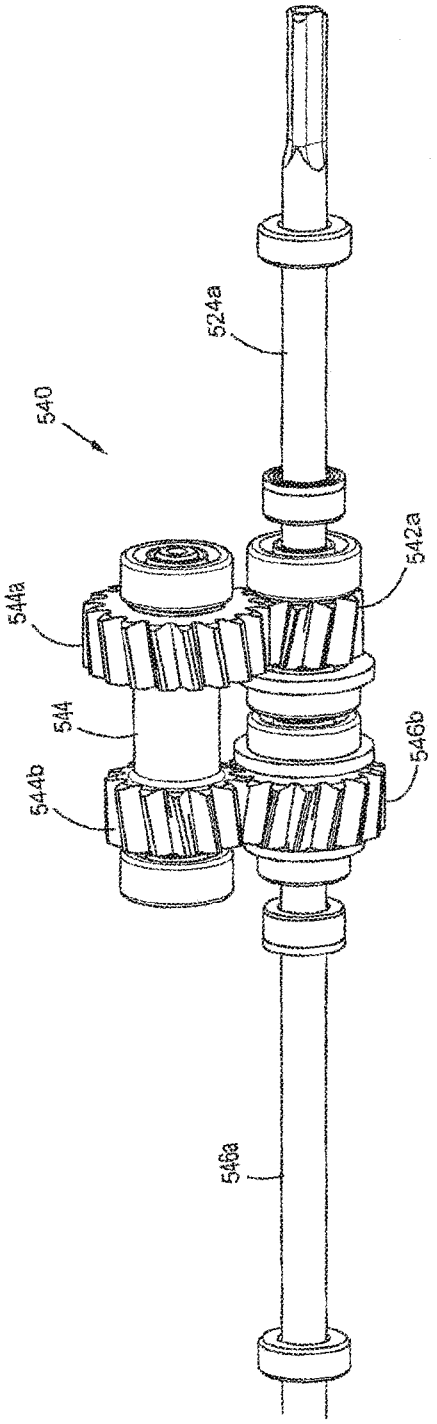


FIG. 16

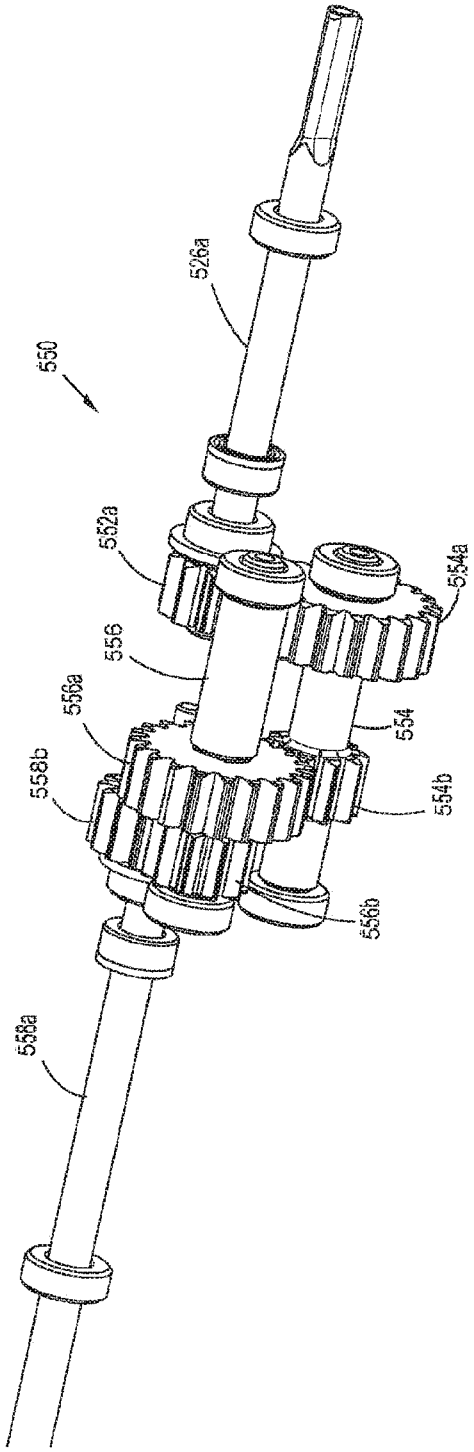


FIG. 17

MassagerPriorArt0002988

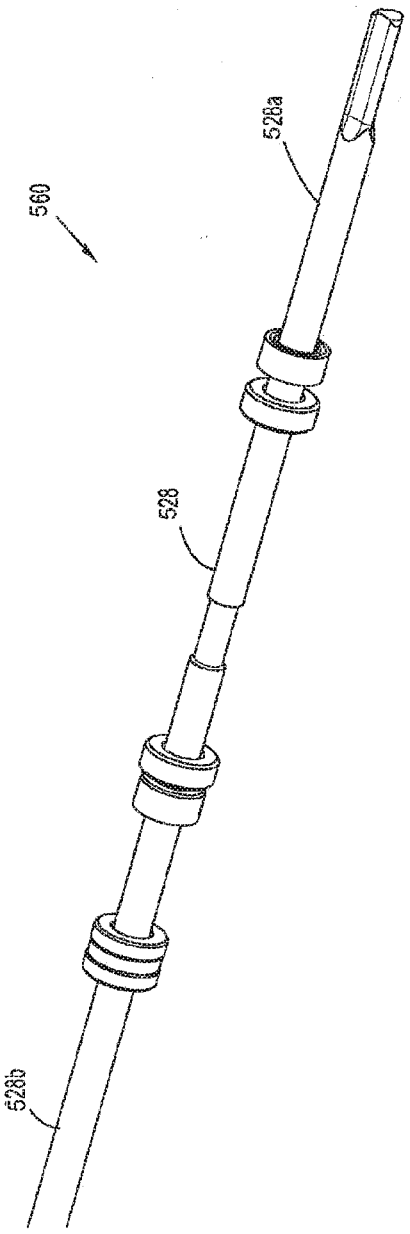


FIG. 18

Petitioner Therabody Ex-1004, 0632

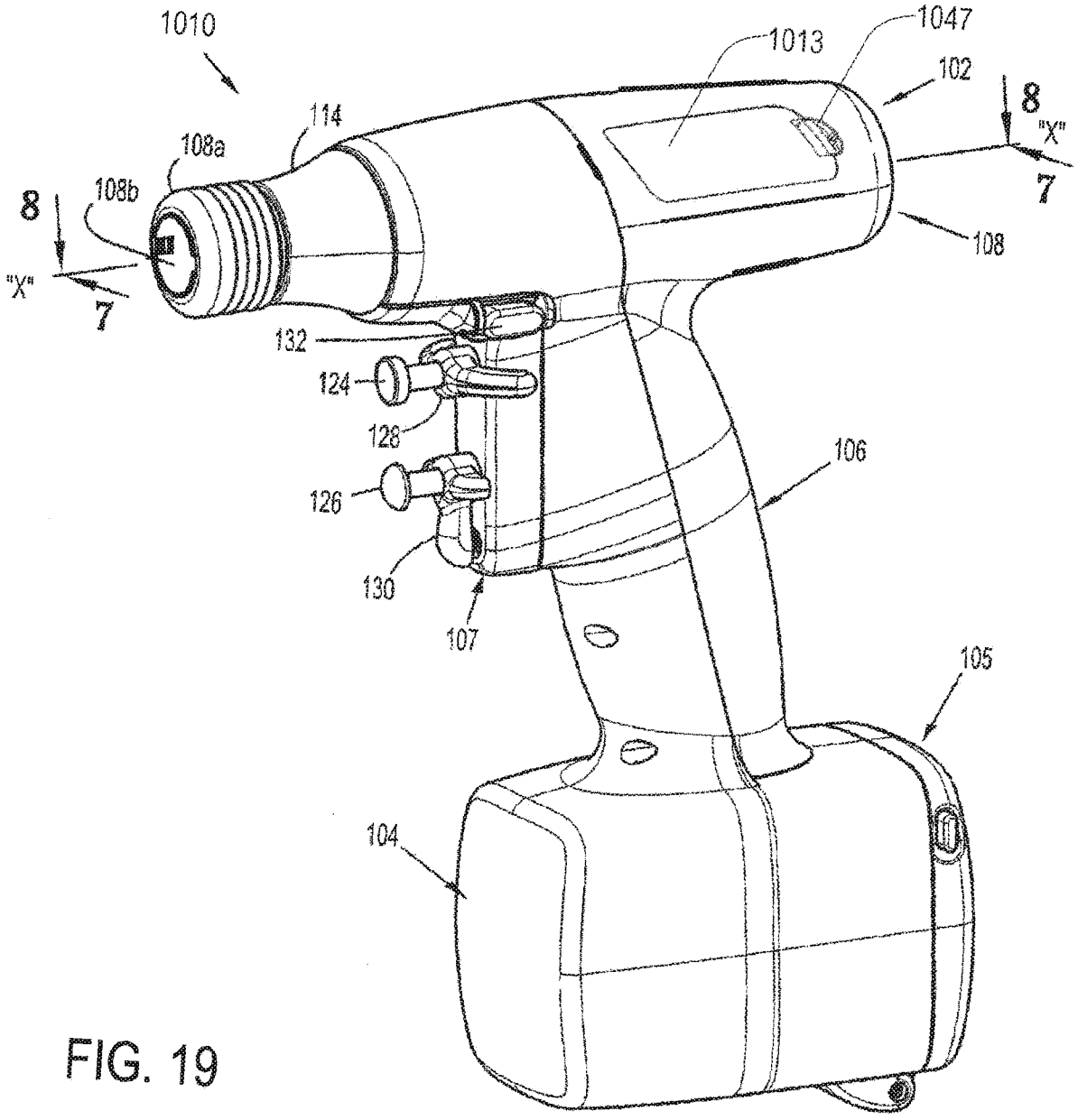

1010
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FIG. 19

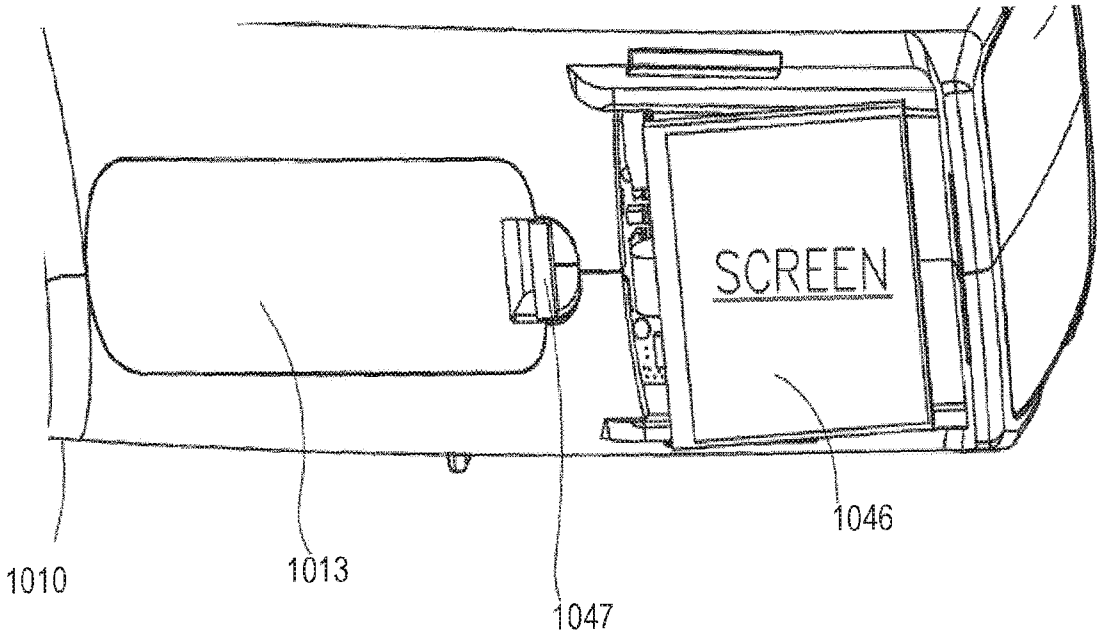


FIG. 19A

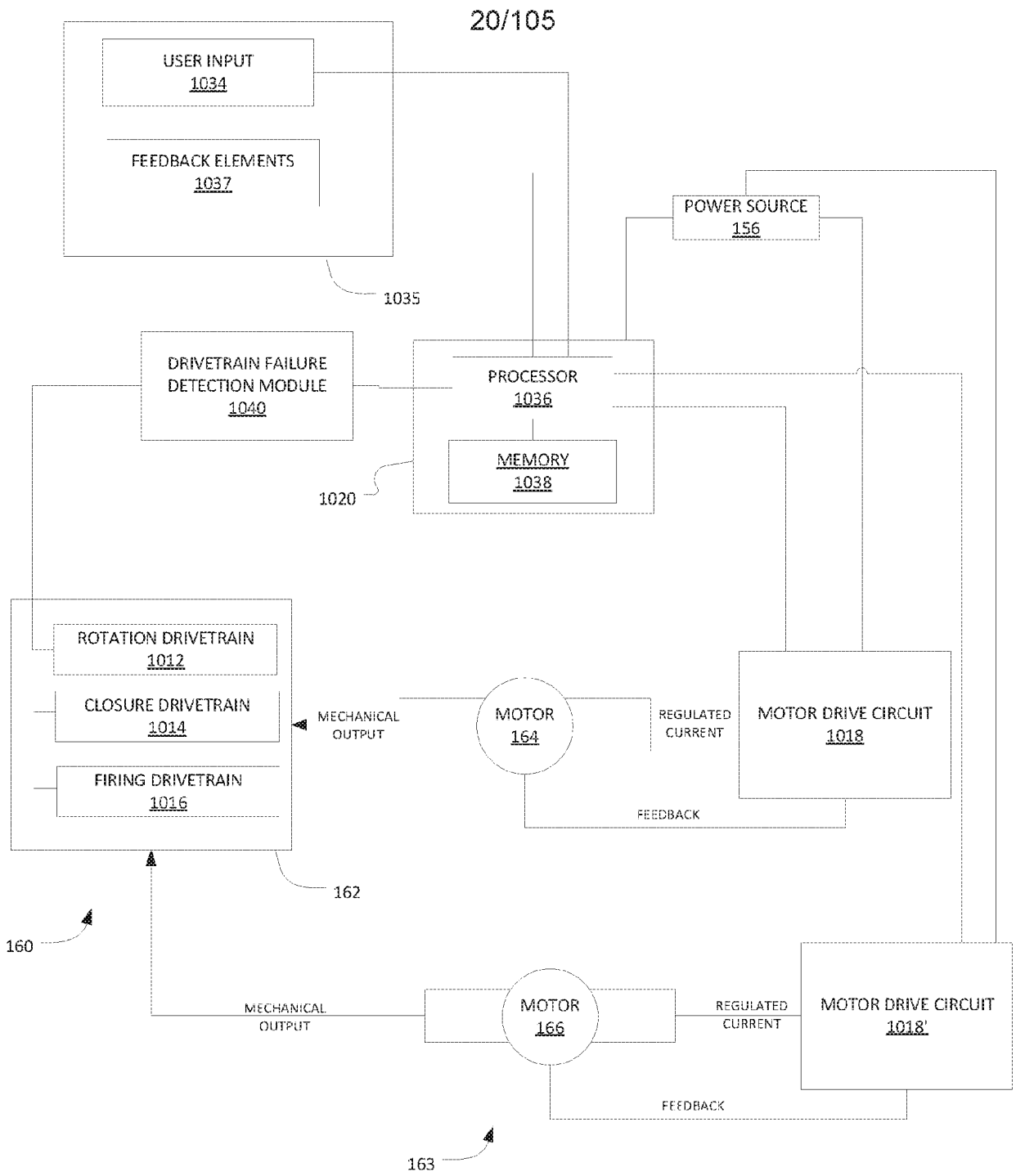

20/105
USER INPUT
1034
FEEDBACK ELEMENTS
1037
1035
POWER SOURCE
156
DRIVETRAIN FAILURE
DETECTION MODULE
1040
PROCESSOR
1036
MEMORY
1038
1020
ROTATION DRIVETRAIN
1012
CLOSURE DRIVETRAIN
1014
FIRING DRIVETRAIN
1016
MECHANICAL
OUTPUT
MOTOR
164
REGULATED
CURRENT
MOTOR DRIVE CIRCUIT
1018
FEEDBACK
162
160
MECHANICAL
OUTPUT
MOTOR
166
REGULATED
CURRENT
MOTOR DRIVE CIRCUIT
1018'
FEEDBACK
163

FIG. 20

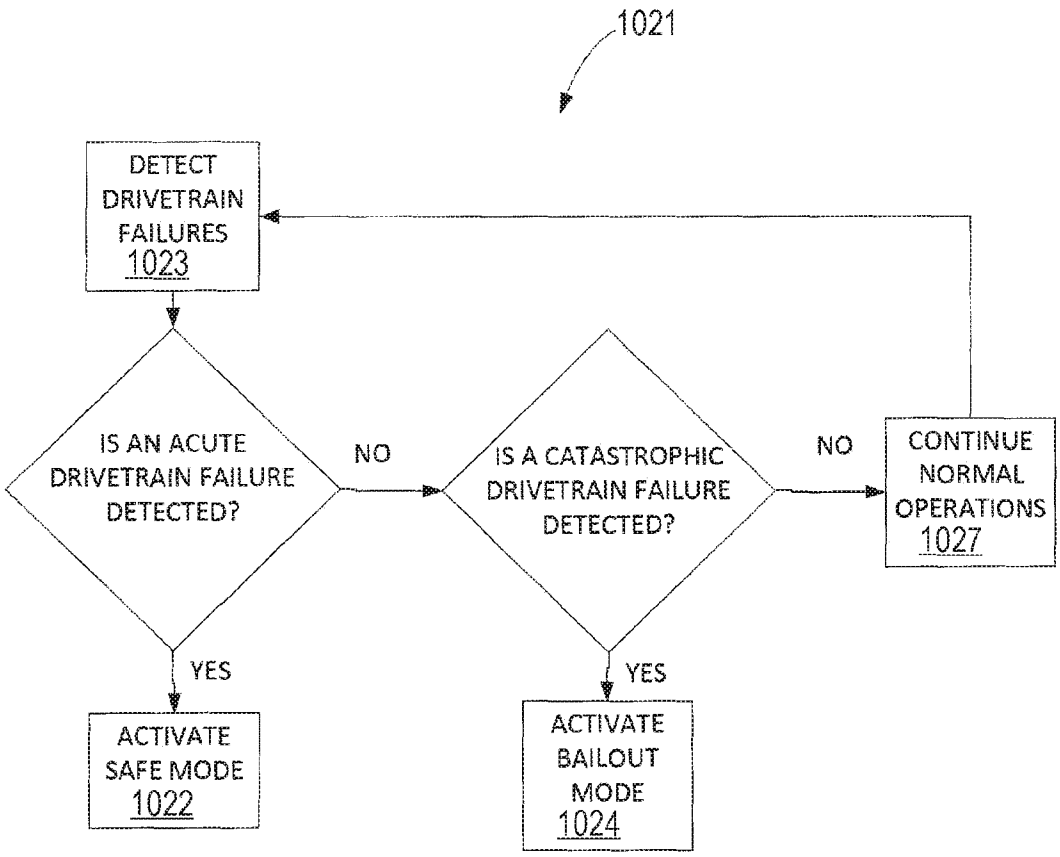


FIG. 21

Petitioner Therabody Ex-1004, 0636

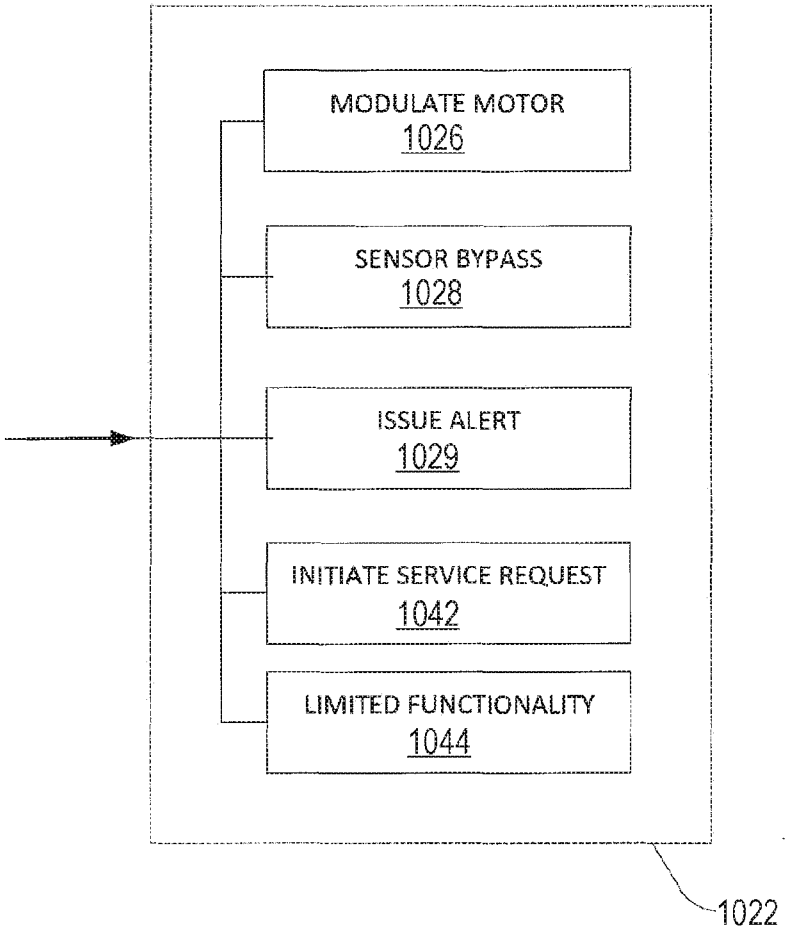


FIG. 22

Petitioner Therabody Ex-1004, 0637

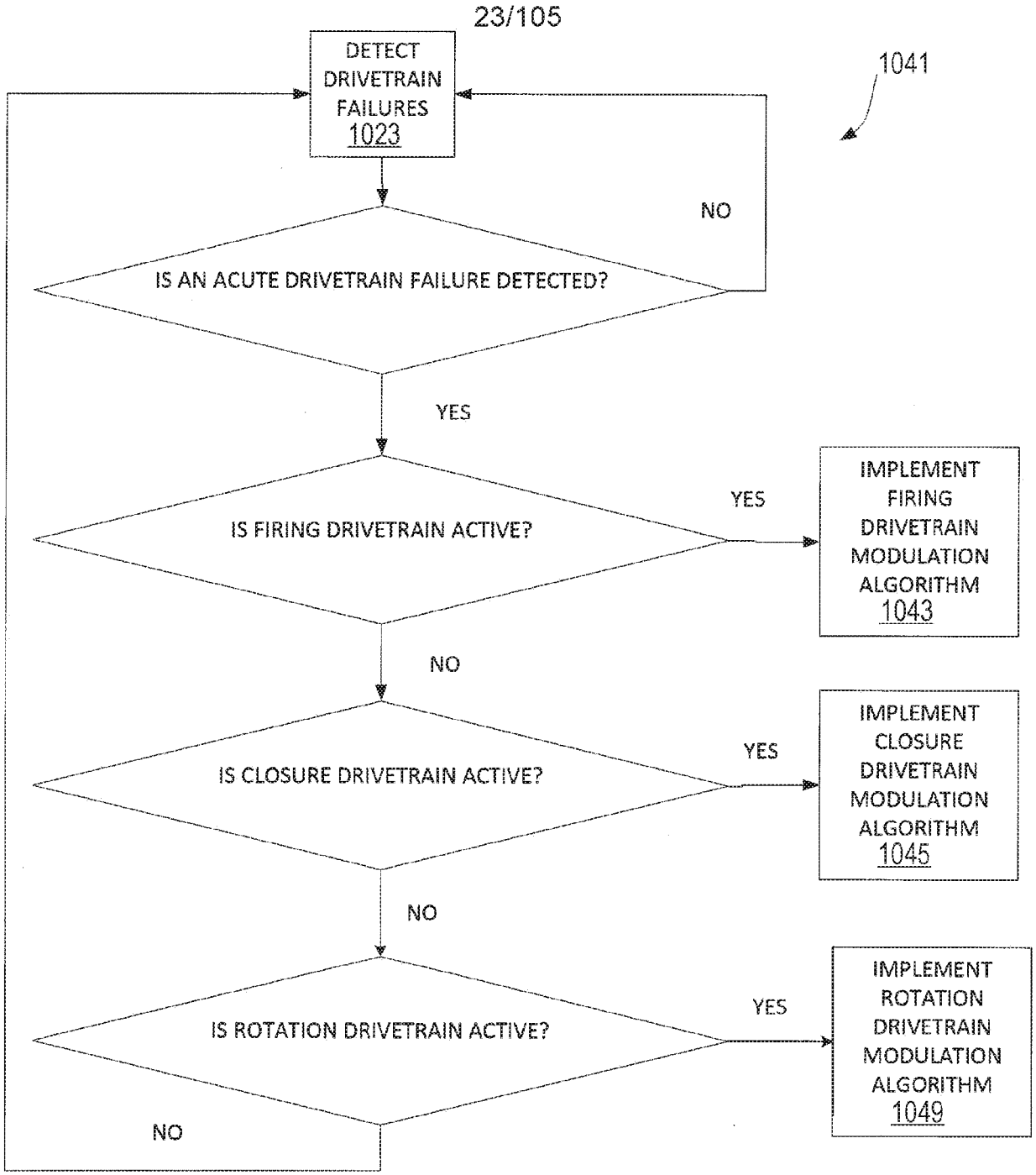


FIG. 22A

Petitioner Therabody Ex-1004, 0638

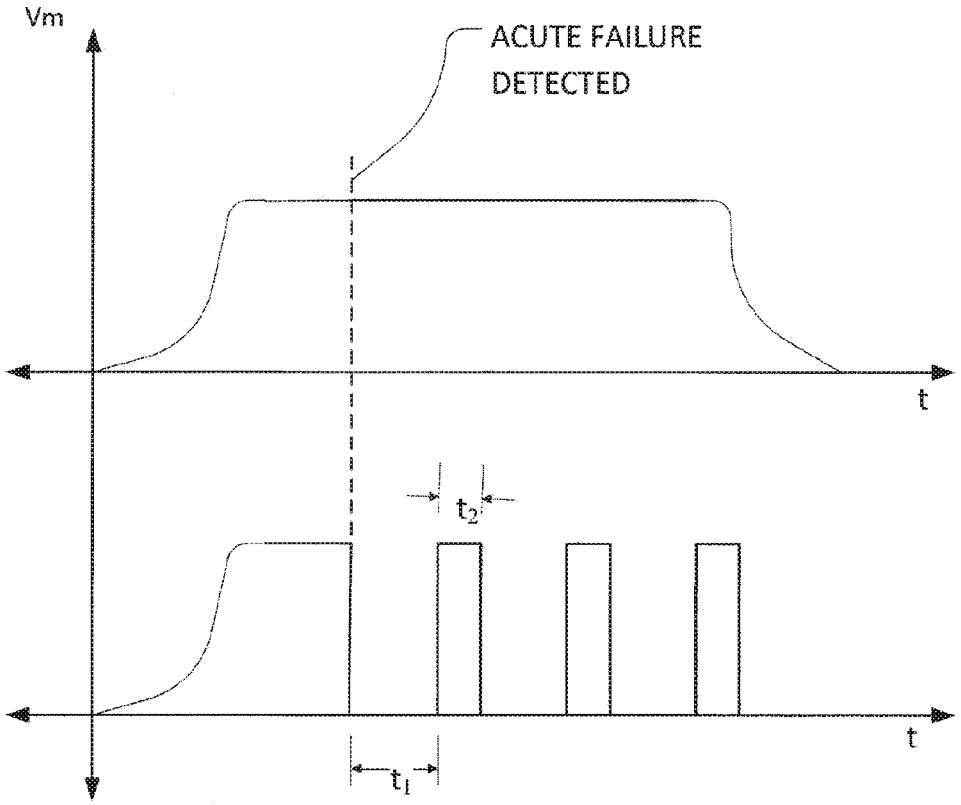


FIG. 23

Petitioner Therabody Ex-1004, 0639

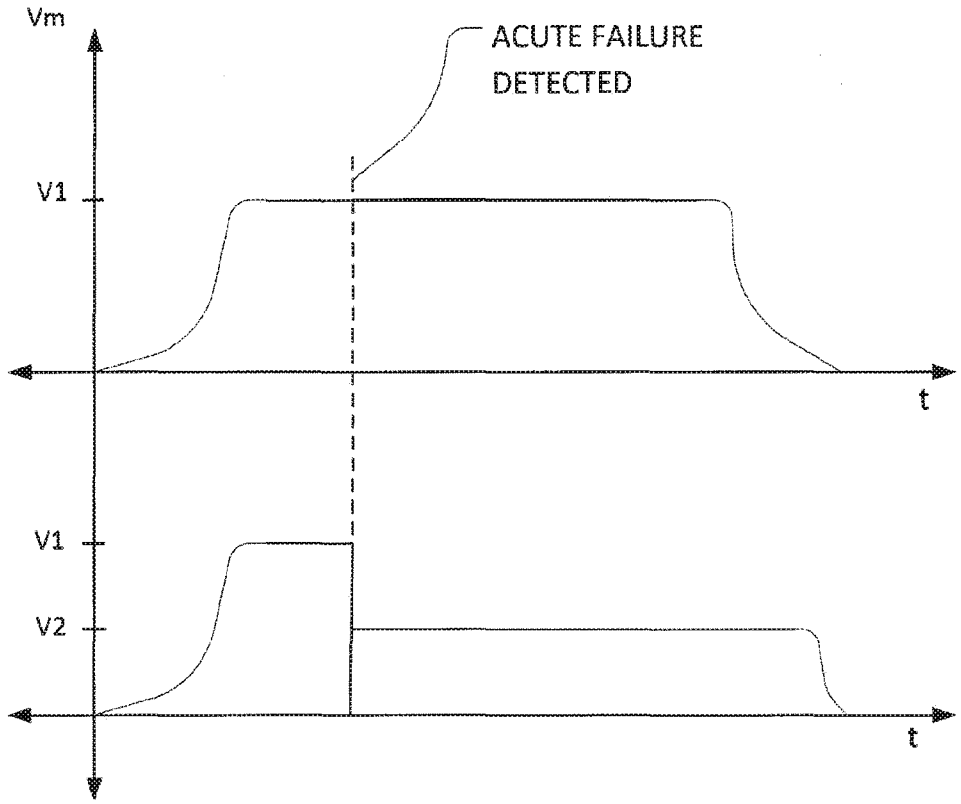


FIG. 23A

Petitioner Therabody Ex-1004, 0640

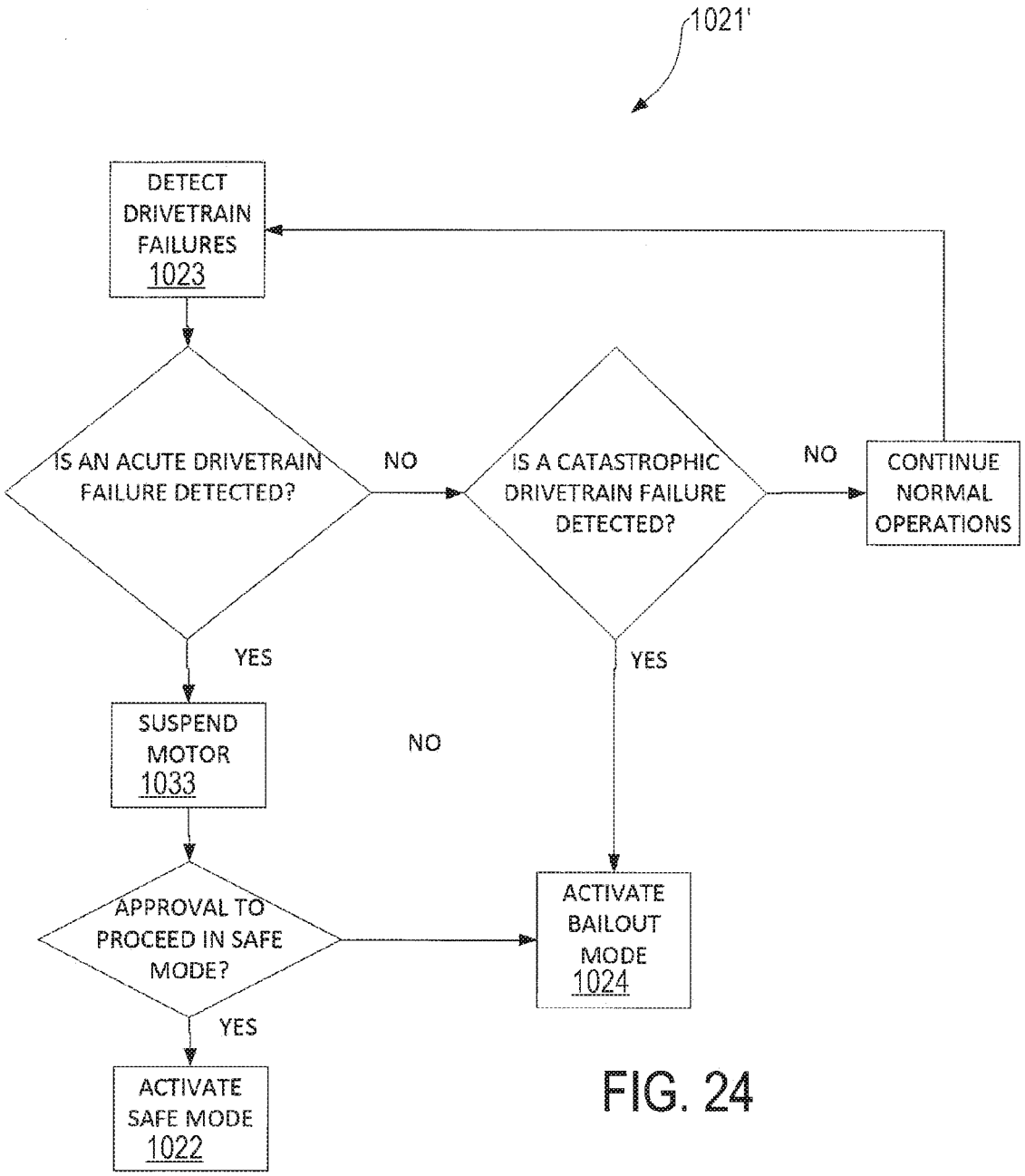


FIG. 24

Petitioner Therabody Ex-1004, 0641

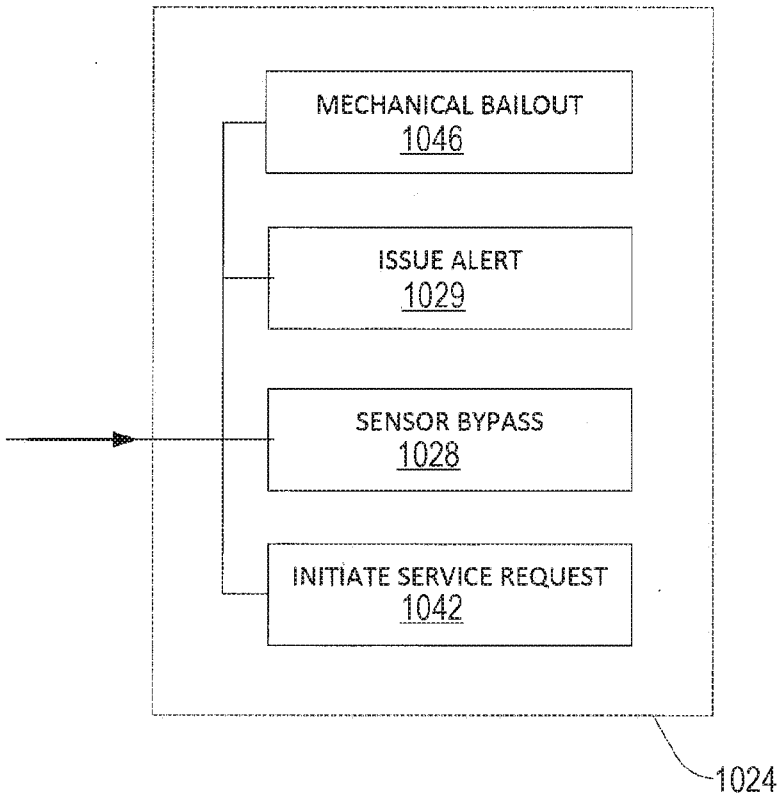


FIG. 25

Petitioner Therabody Ex-1004, 0642

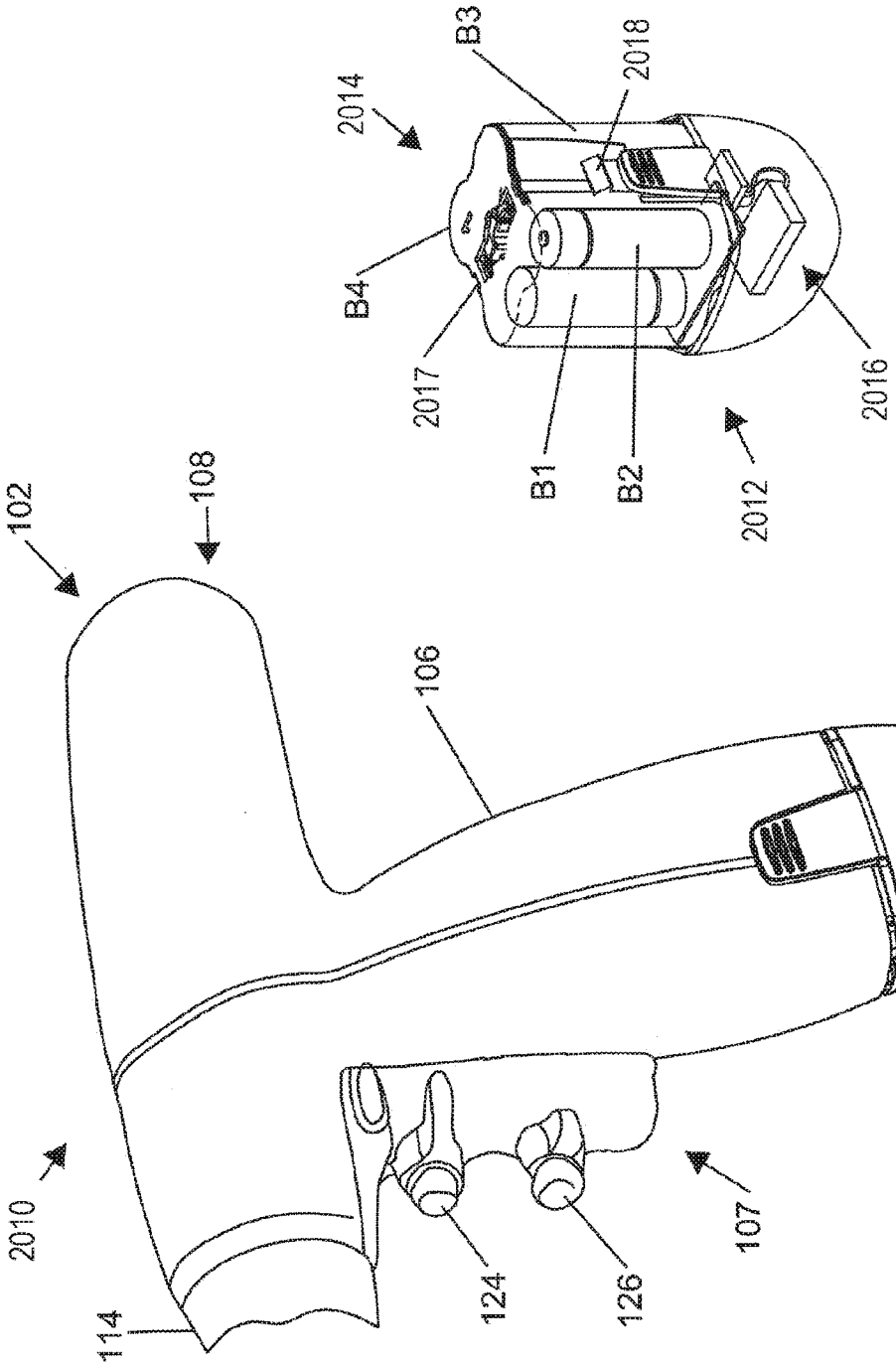


FIG. 26A

FIG. 26B

Petitioner Therabody Ex-1004, 0643

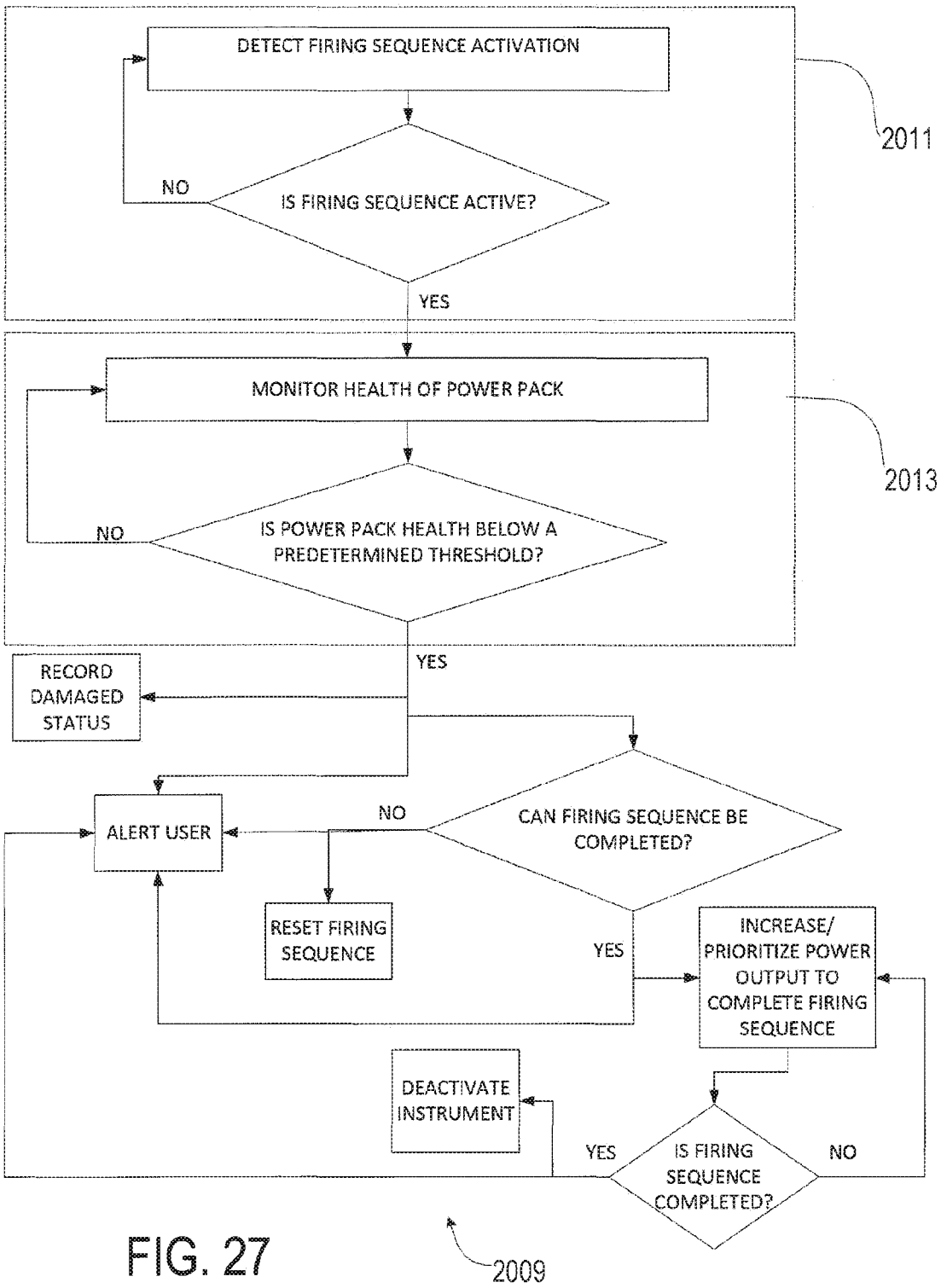


FIG. 27

Petitioner Therabody Ex-1004, 0644

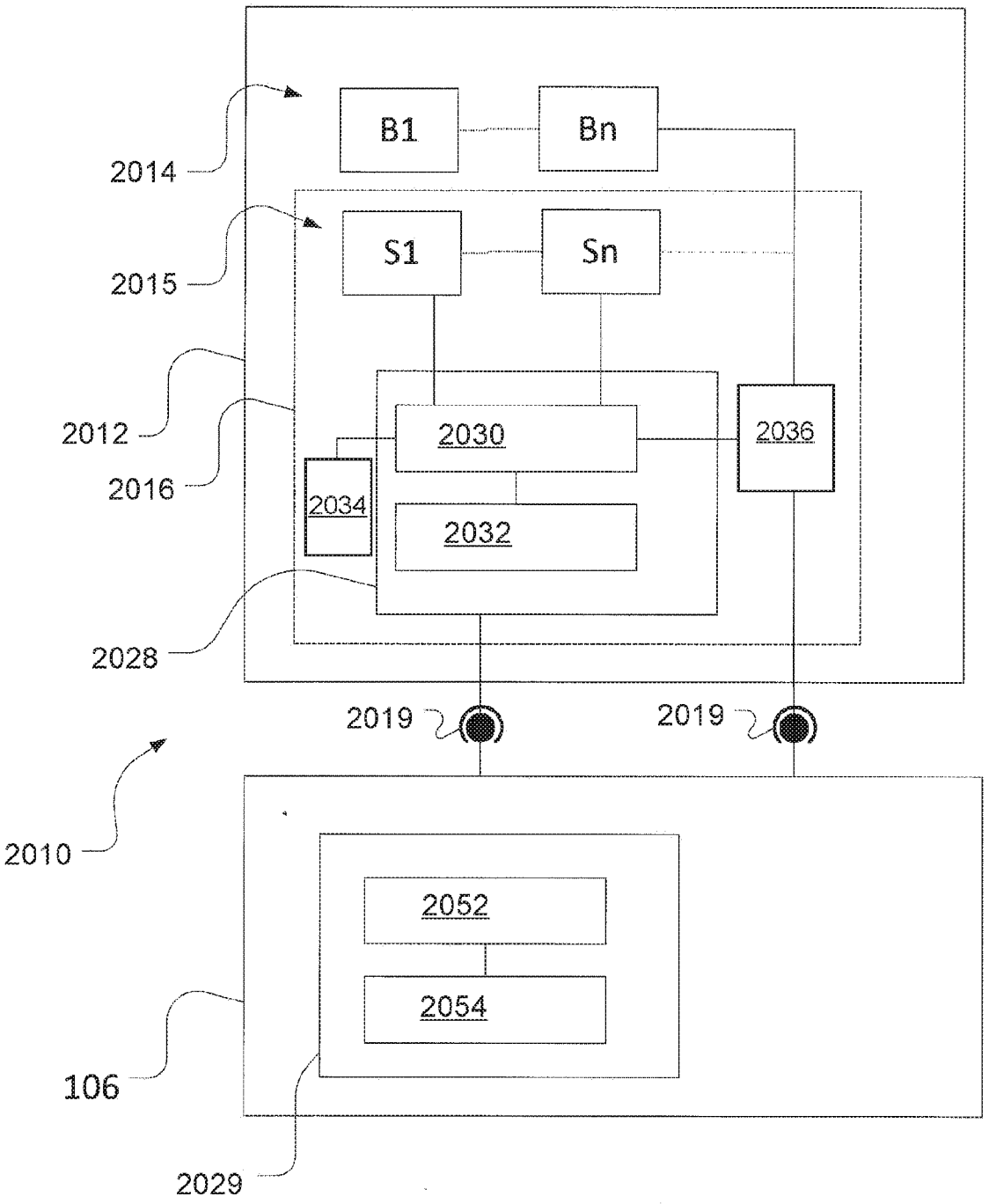


FIG. 28

Petitioner Therabody Ex-1004, 0645

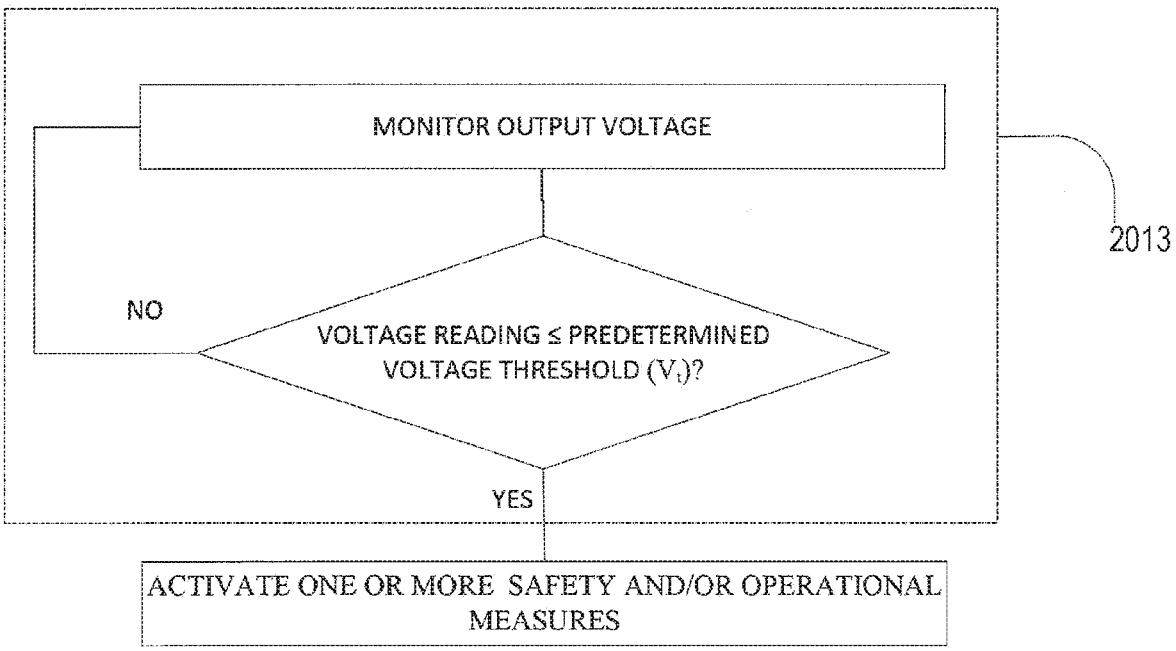


FIG. 29

Petitioner Therabody Ex-1004, 0646

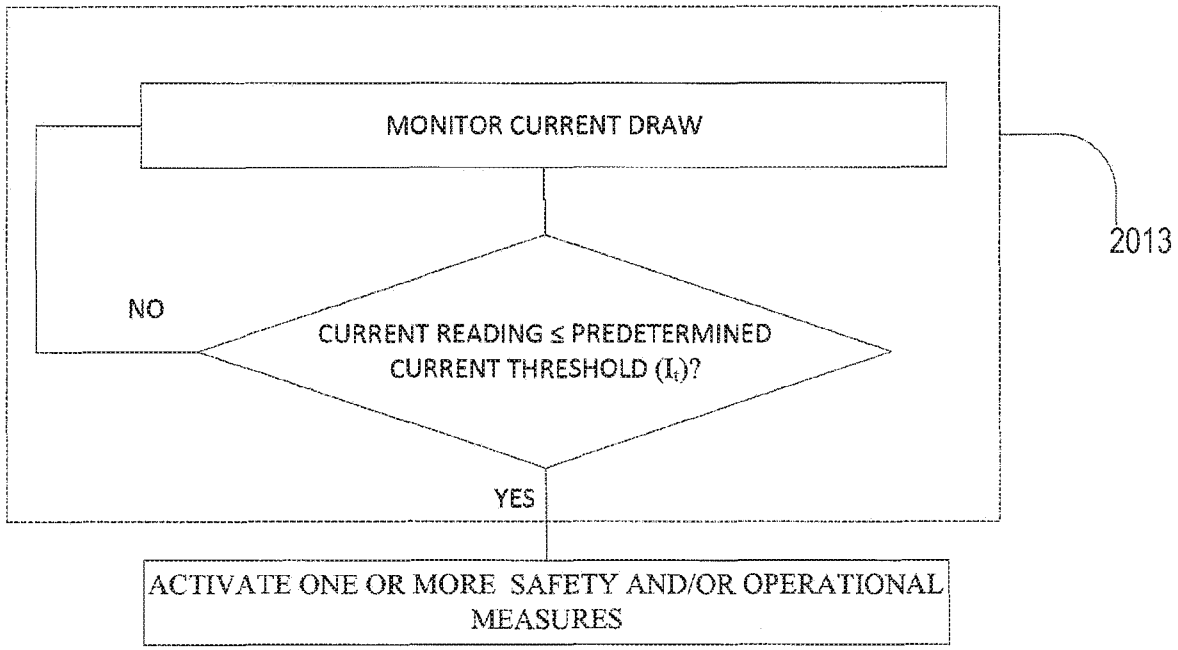


FIG. 30

MassagerPriorArt0003004

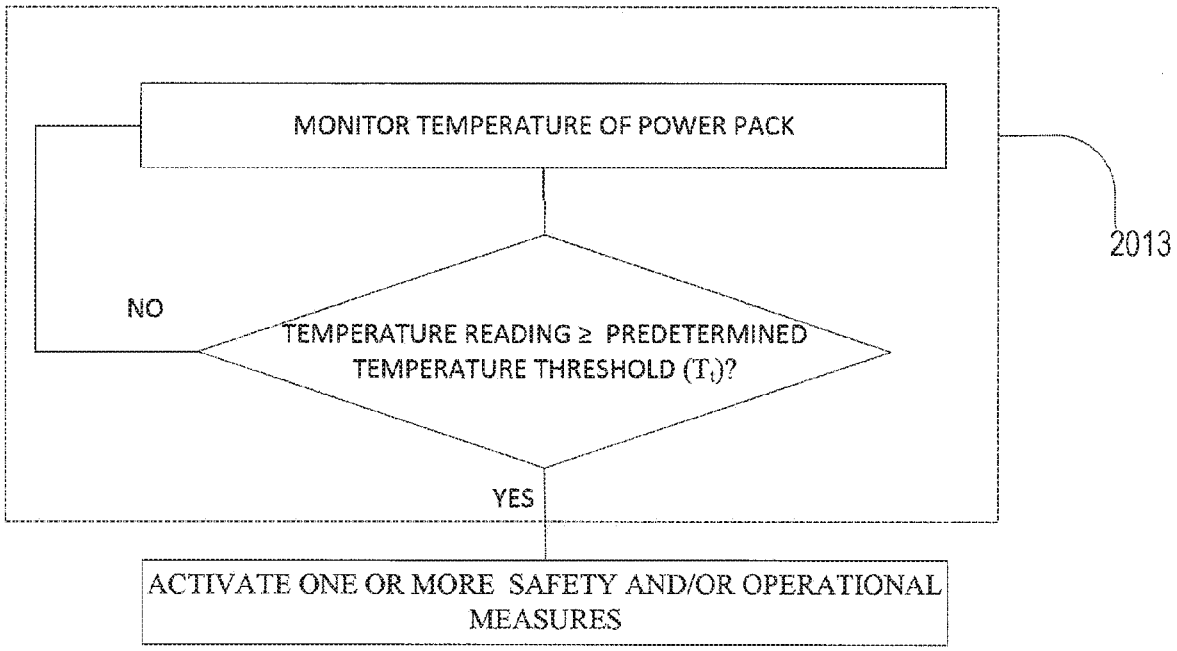


FIG. 31

Petitioner Therabody Ex-1004, 0648

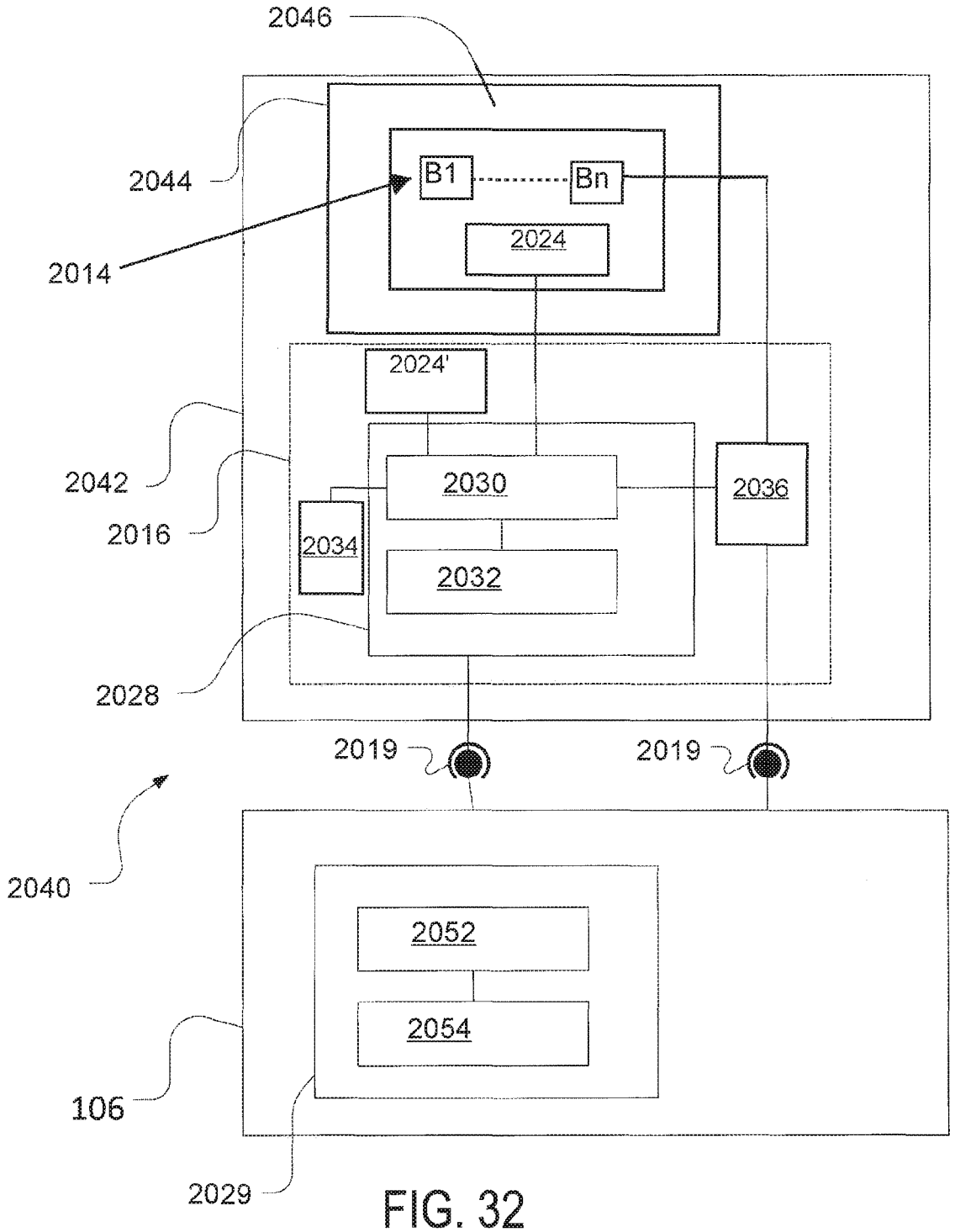


FIG. 32

Petitioner Therabody Ex-1004, 0649

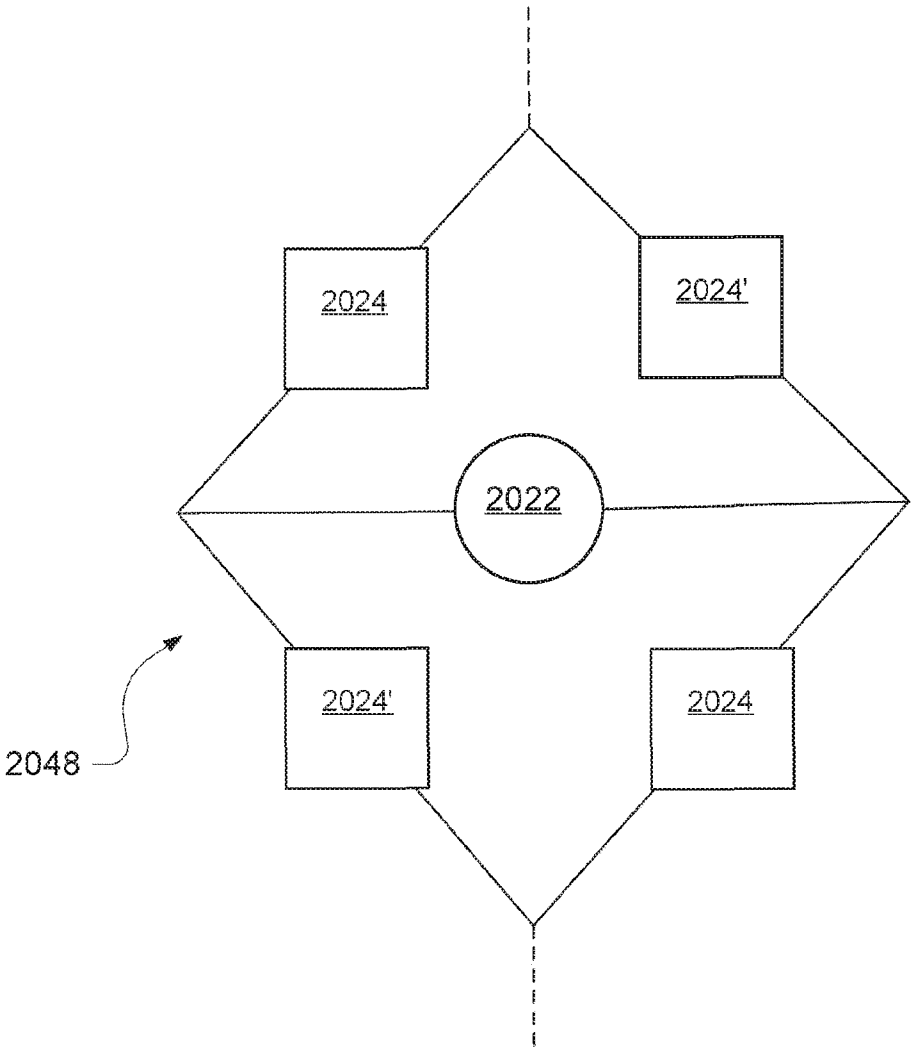


FIG. 33

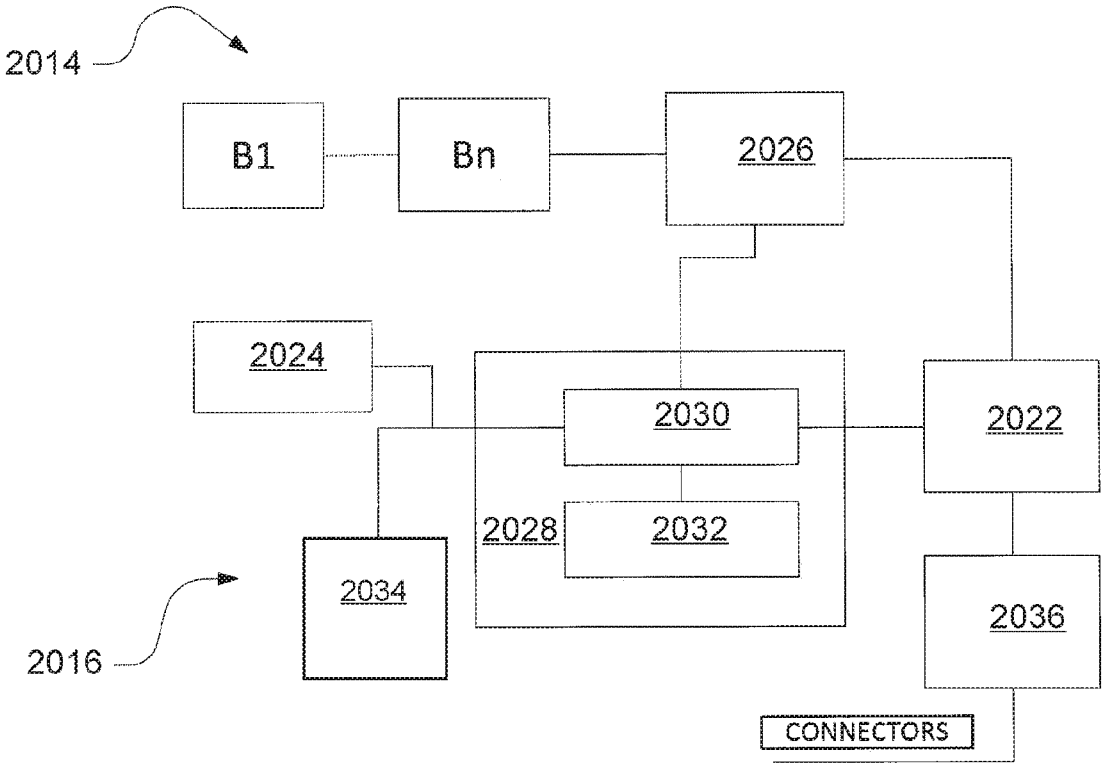


FIG. 34

Petitioner Therabody Ex-1004, 0651

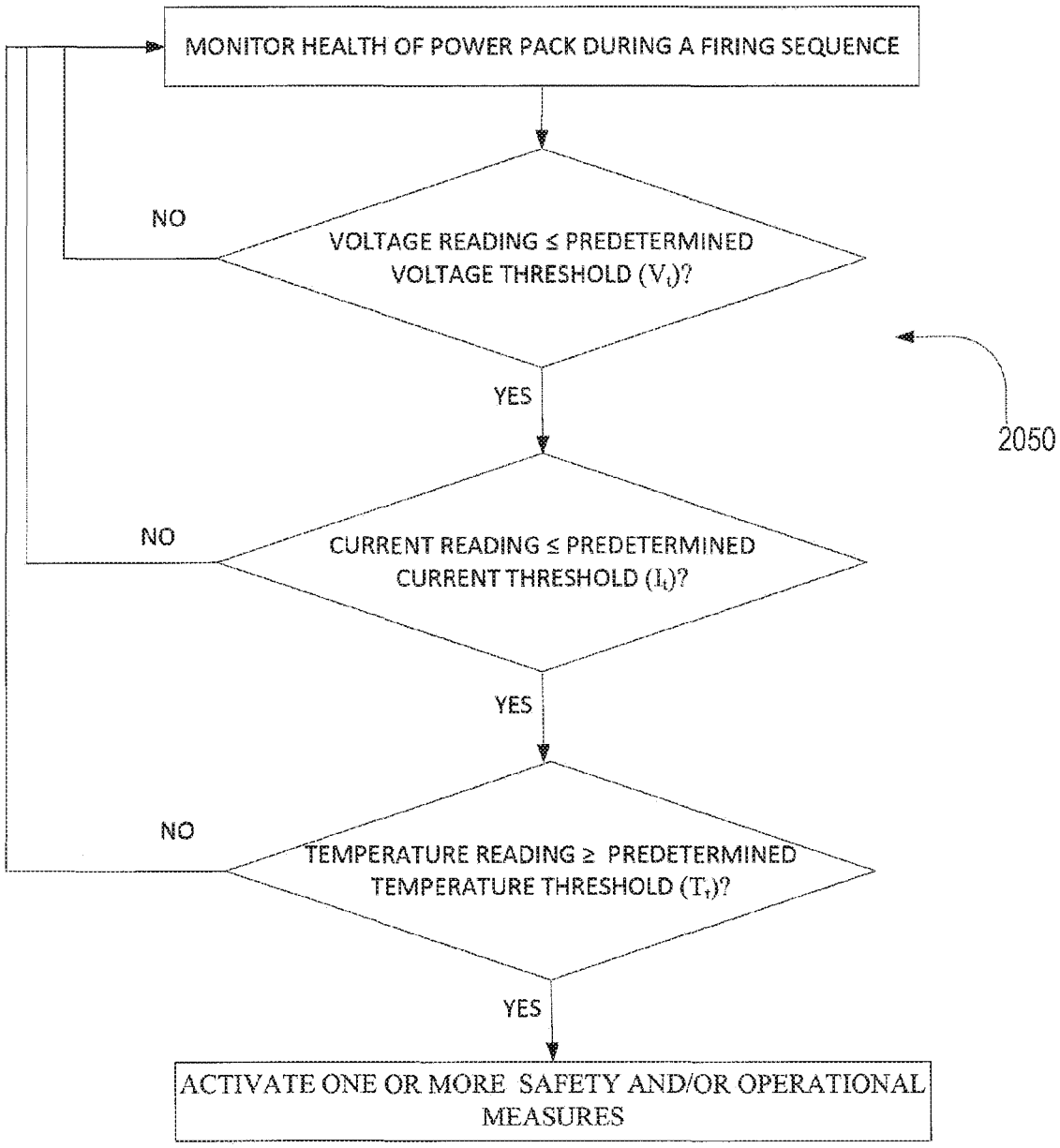


FIG. 35

Petitioner Therabody Ex-1004, 0652

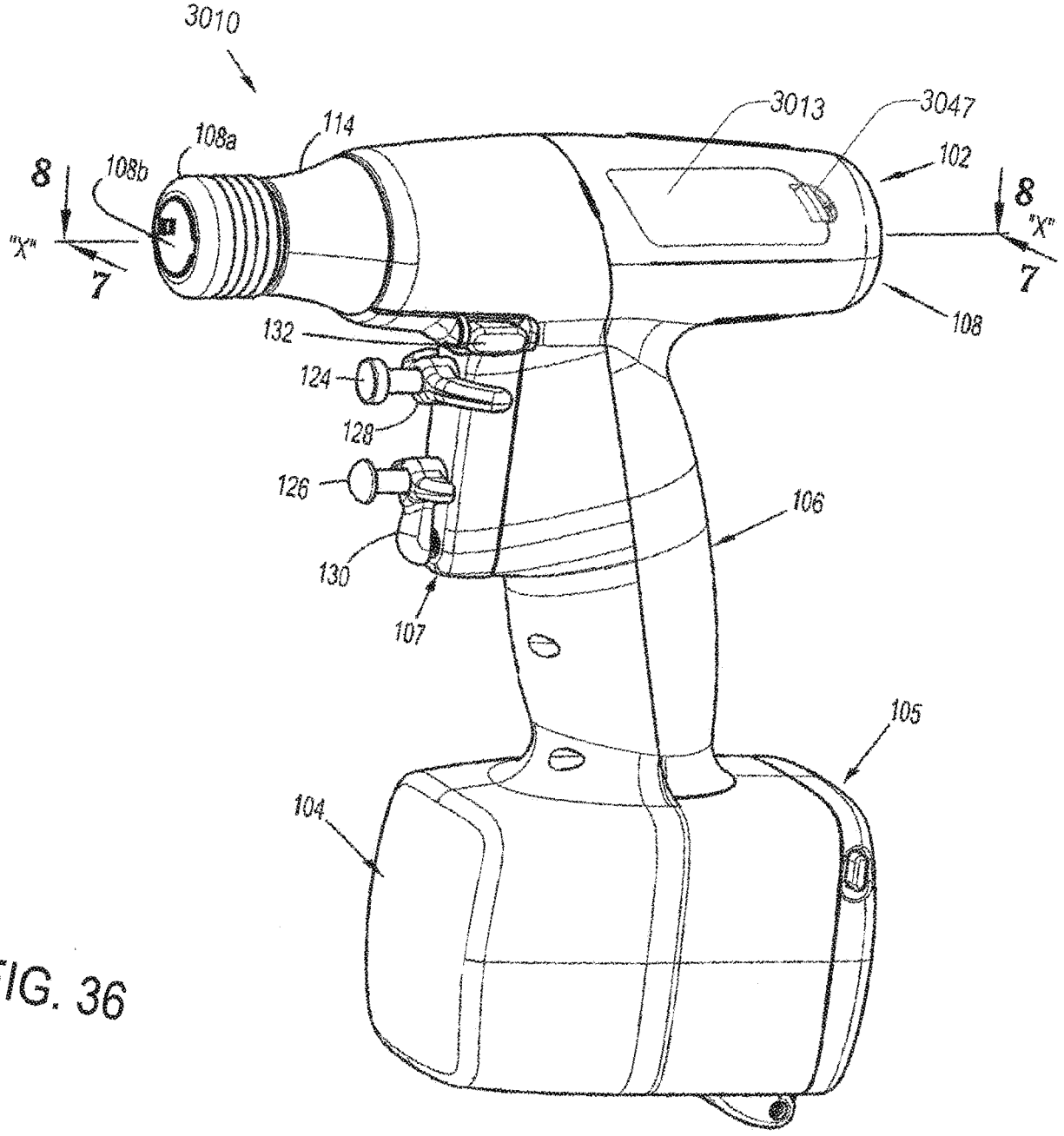

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FIG. 36

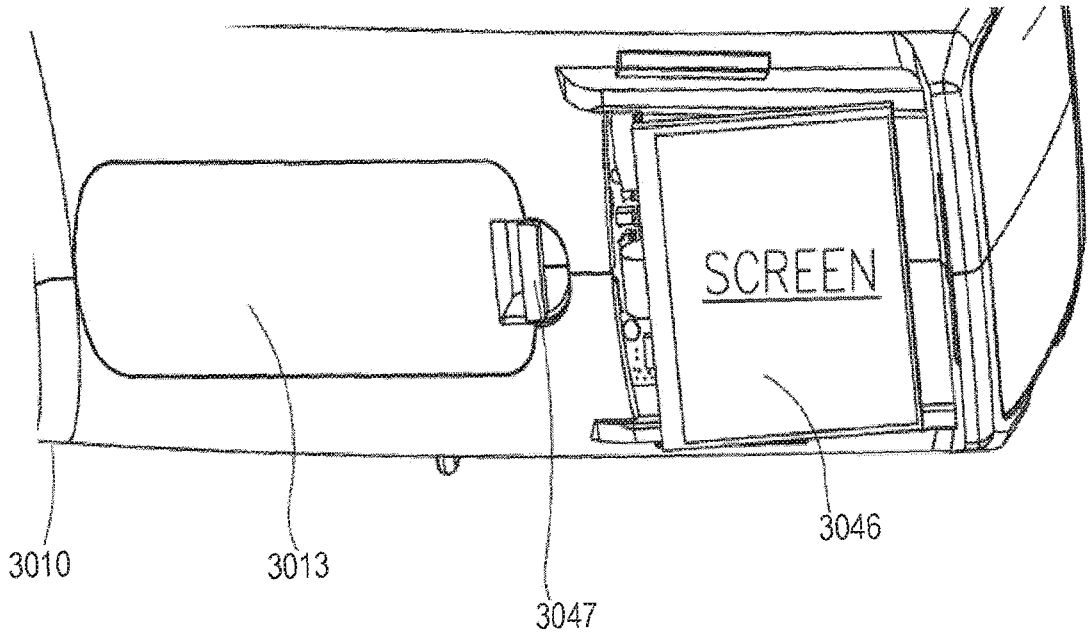


FIG. 36A

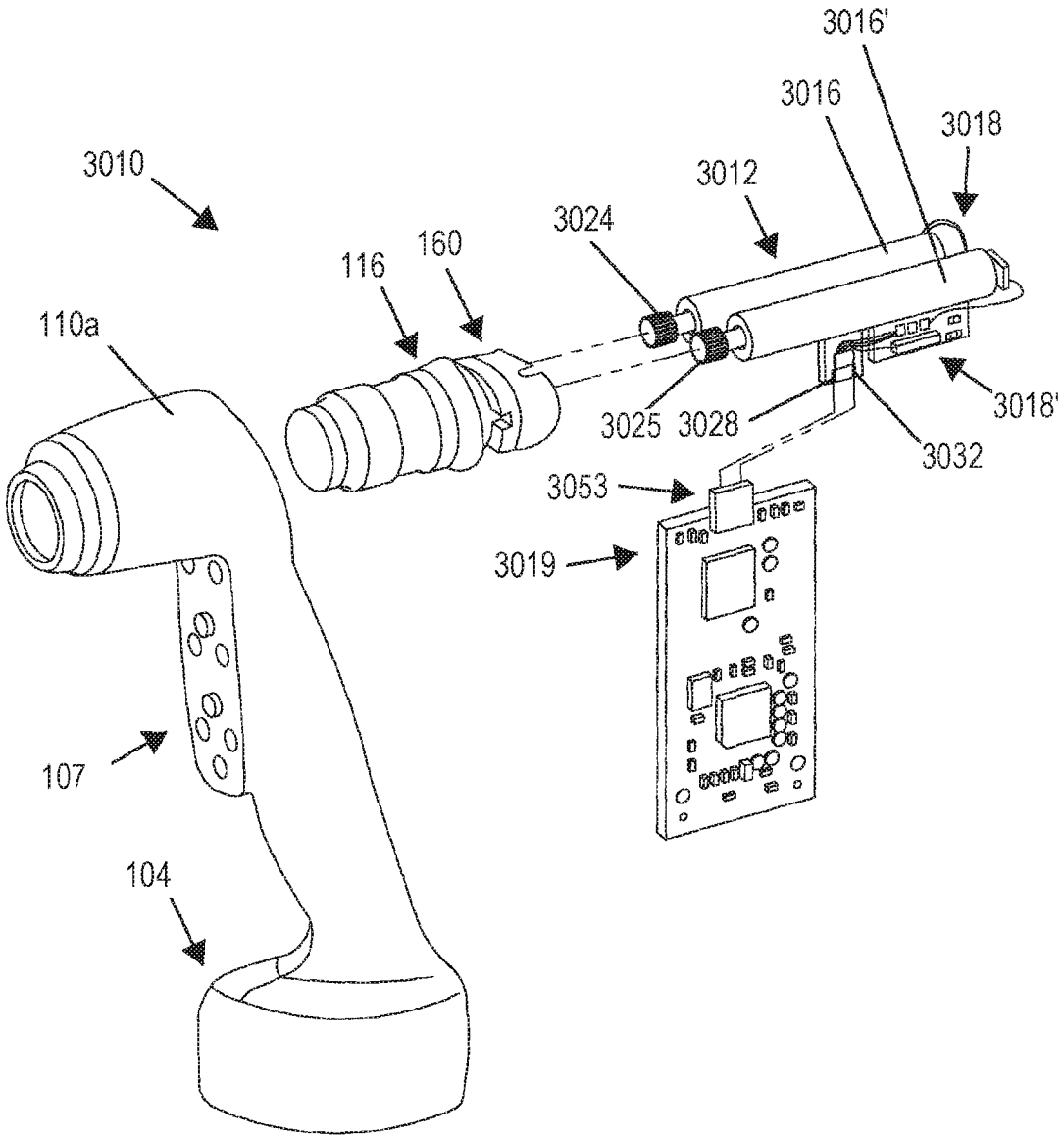


FIG. 36B

Petitioner Therabody Ex-1004, 0655

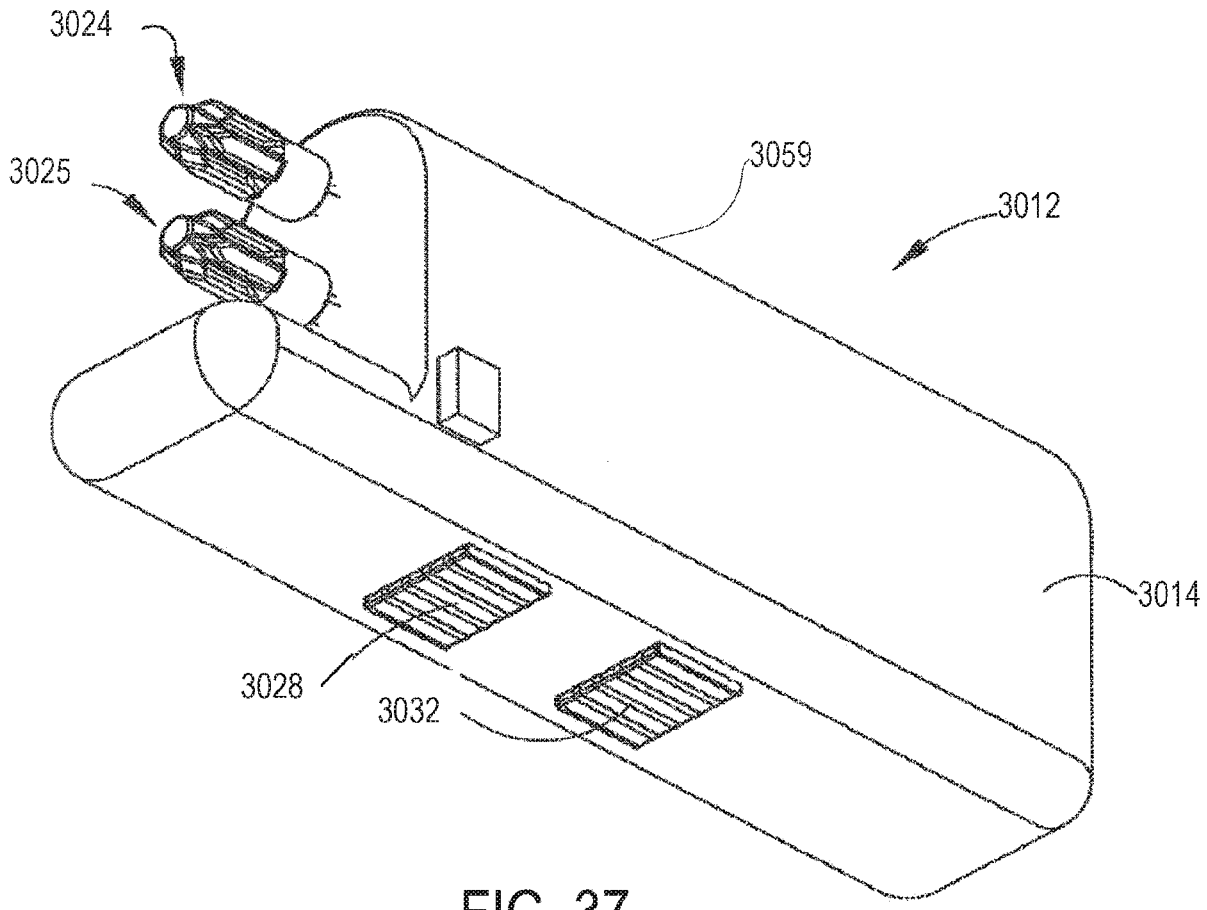


FIG. 37

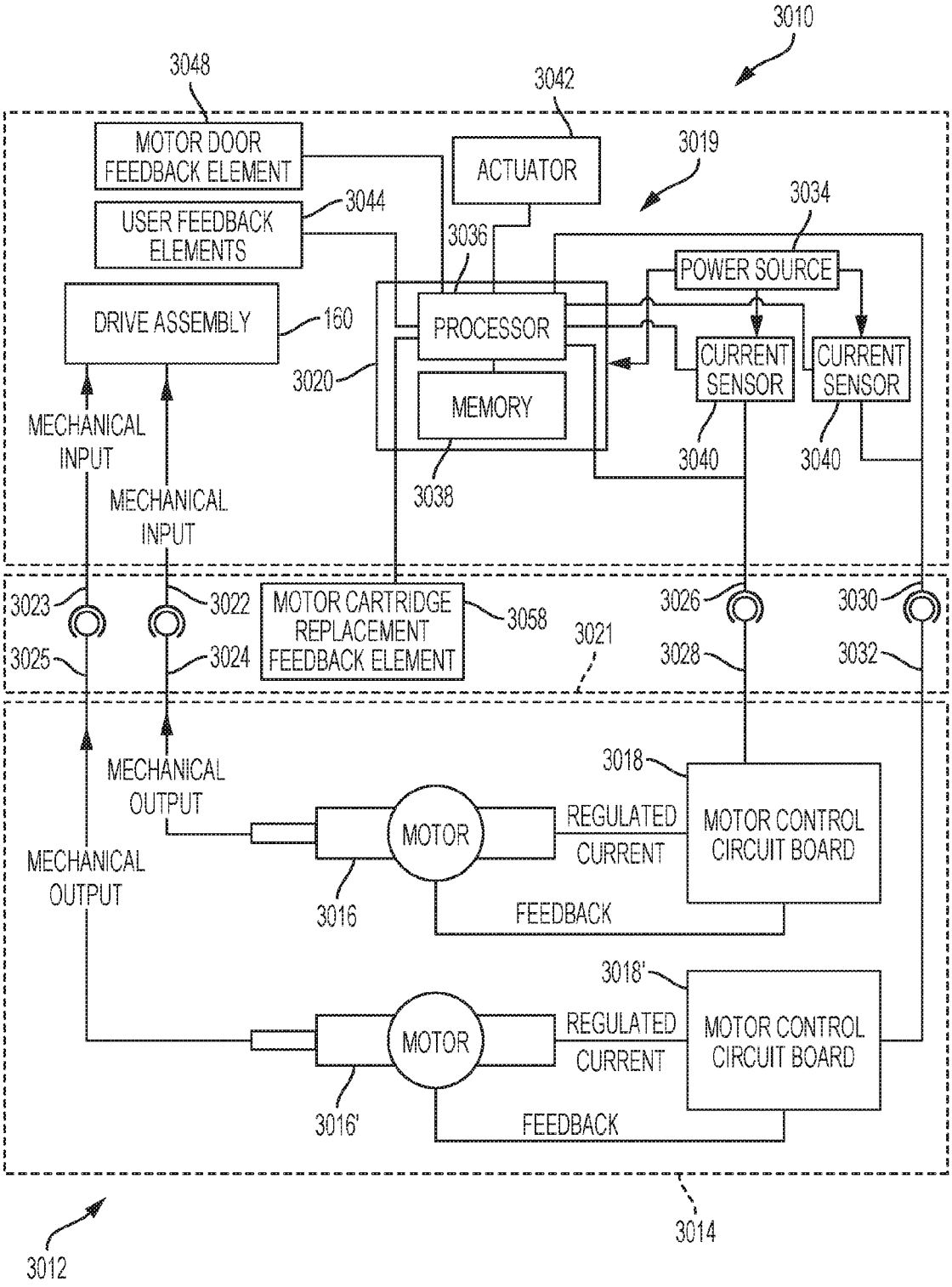


FIG. 38

MassagerPriorArt0003014

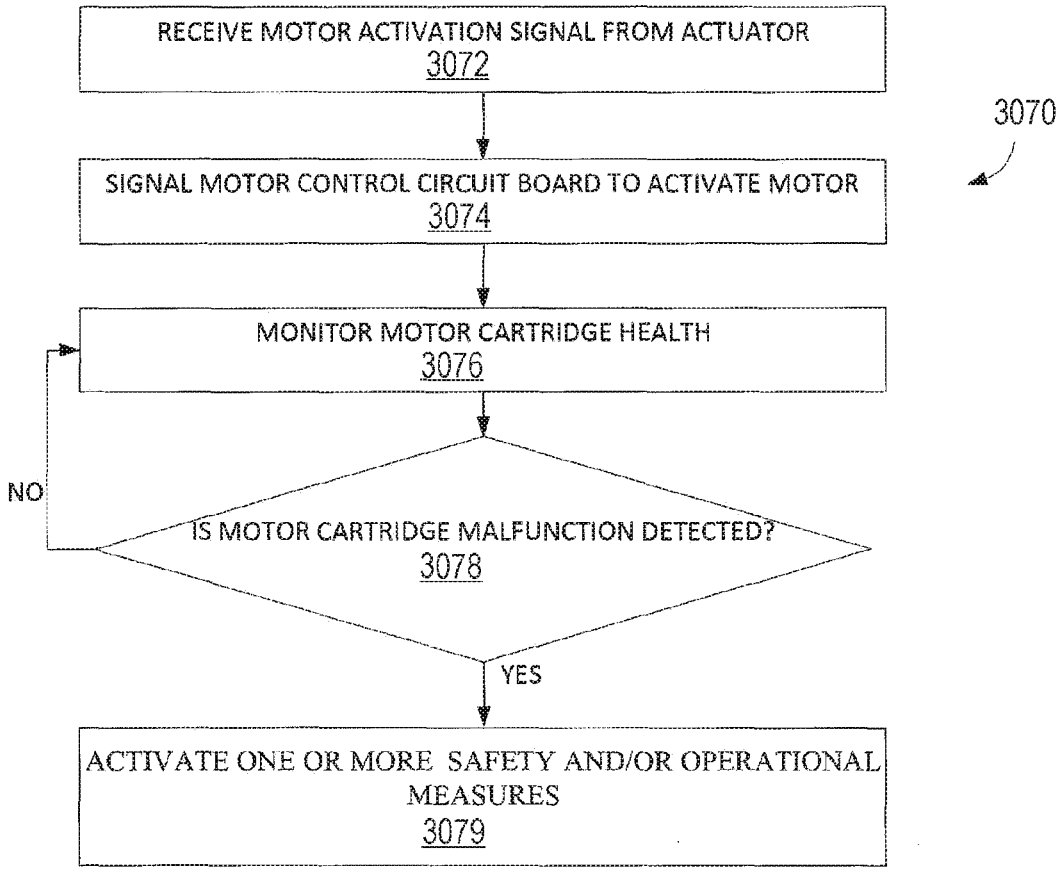


FIG. 39

Petitioner Therabody Ex-1004, 0658

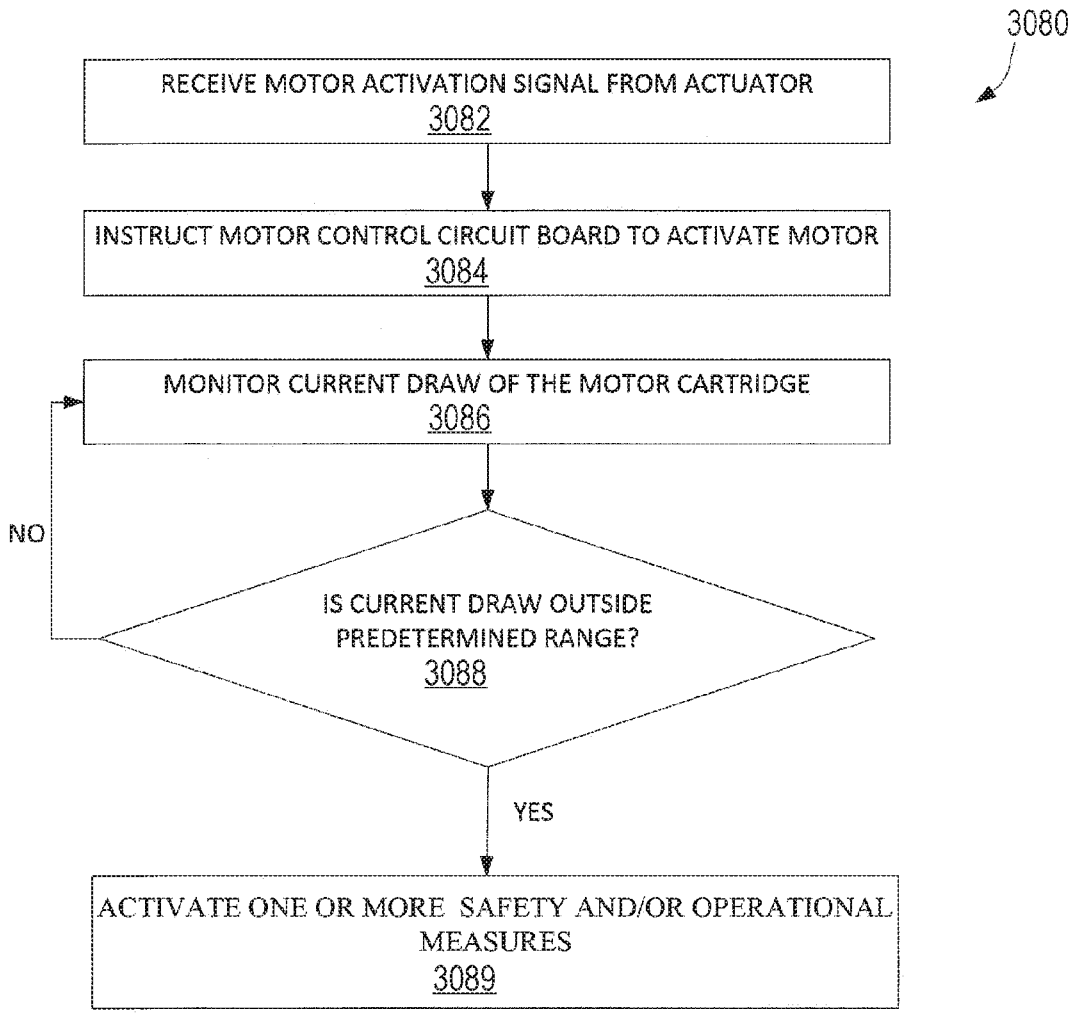


FIG. 40

Petitioner Therabody Ex-1004, 0659

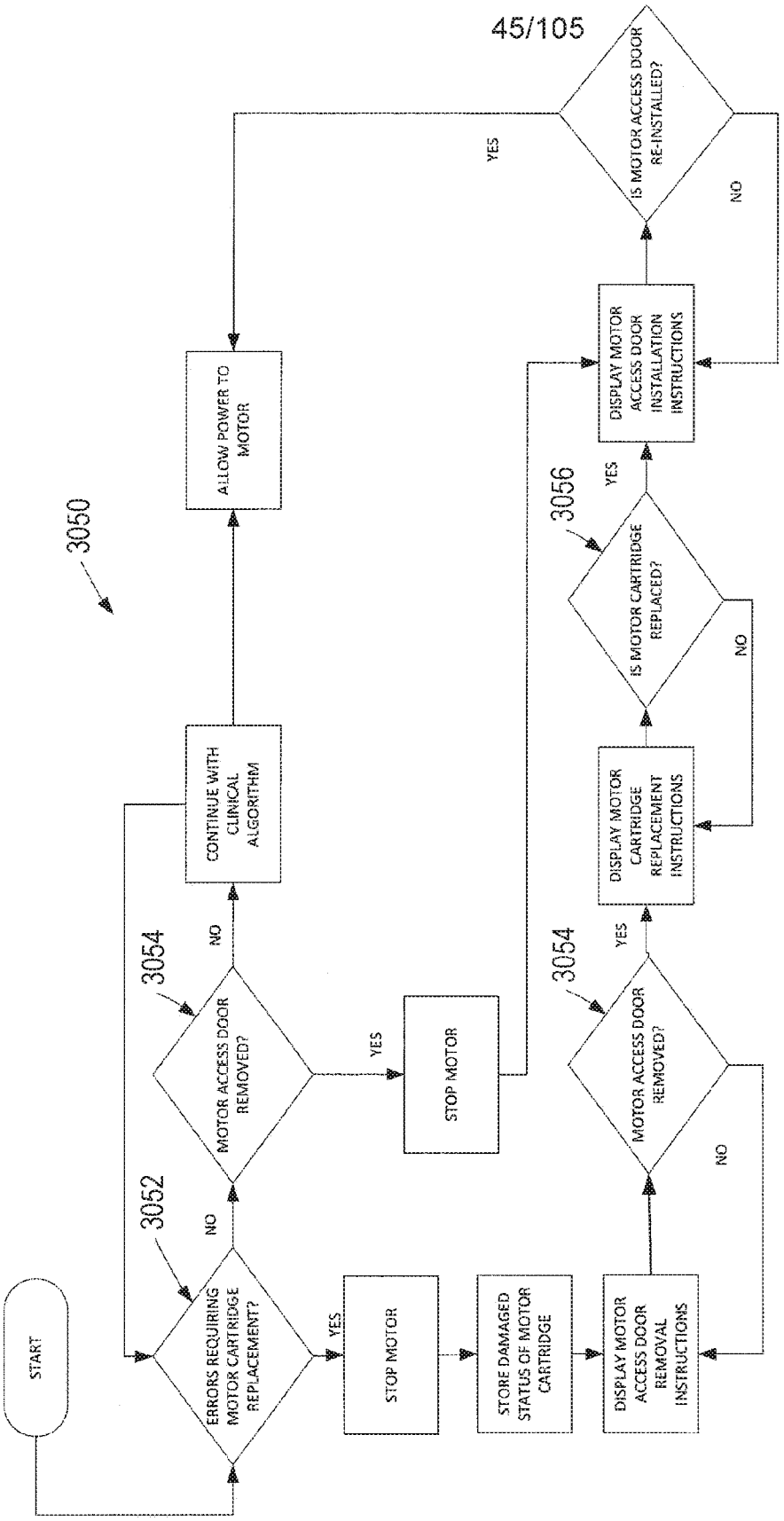


FIG. 41

Petitioner Therabody Ex-1004, 0660

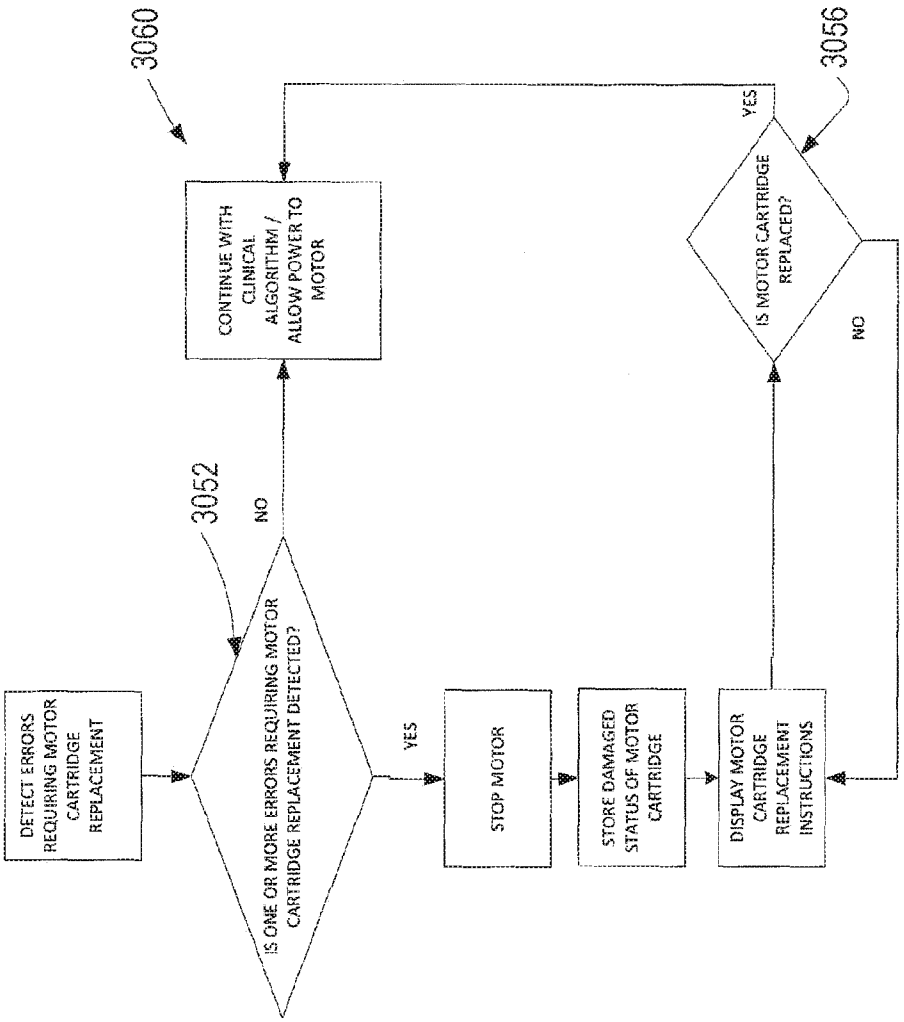


FIG. 42

Petitioner Therabody Ex-1004, 0661

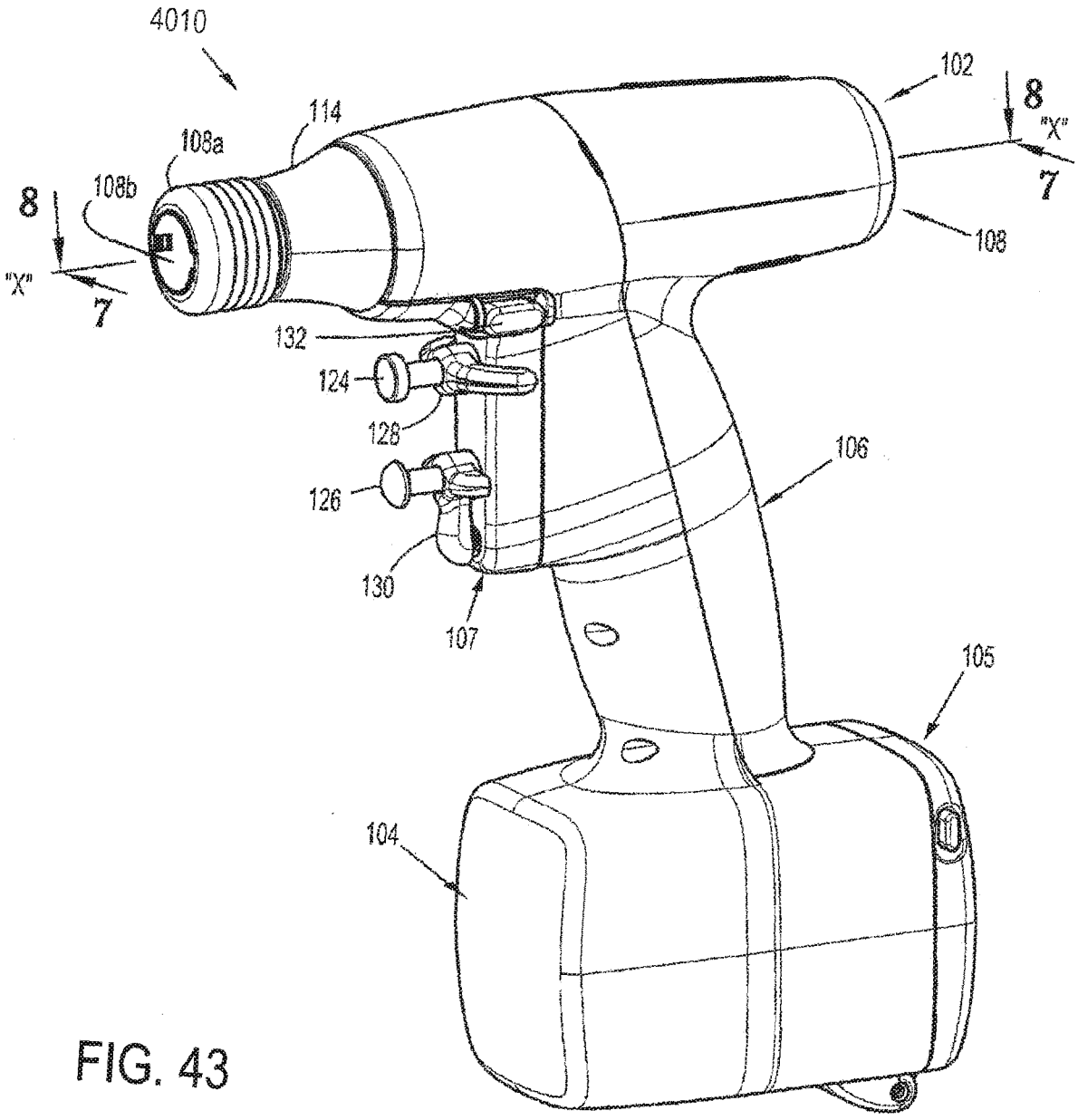

4010
102
8
"X"
7
114
108a
108b
8
"X"
7
108
132
124
128
106
126
130
107
105
104

FIG. 43

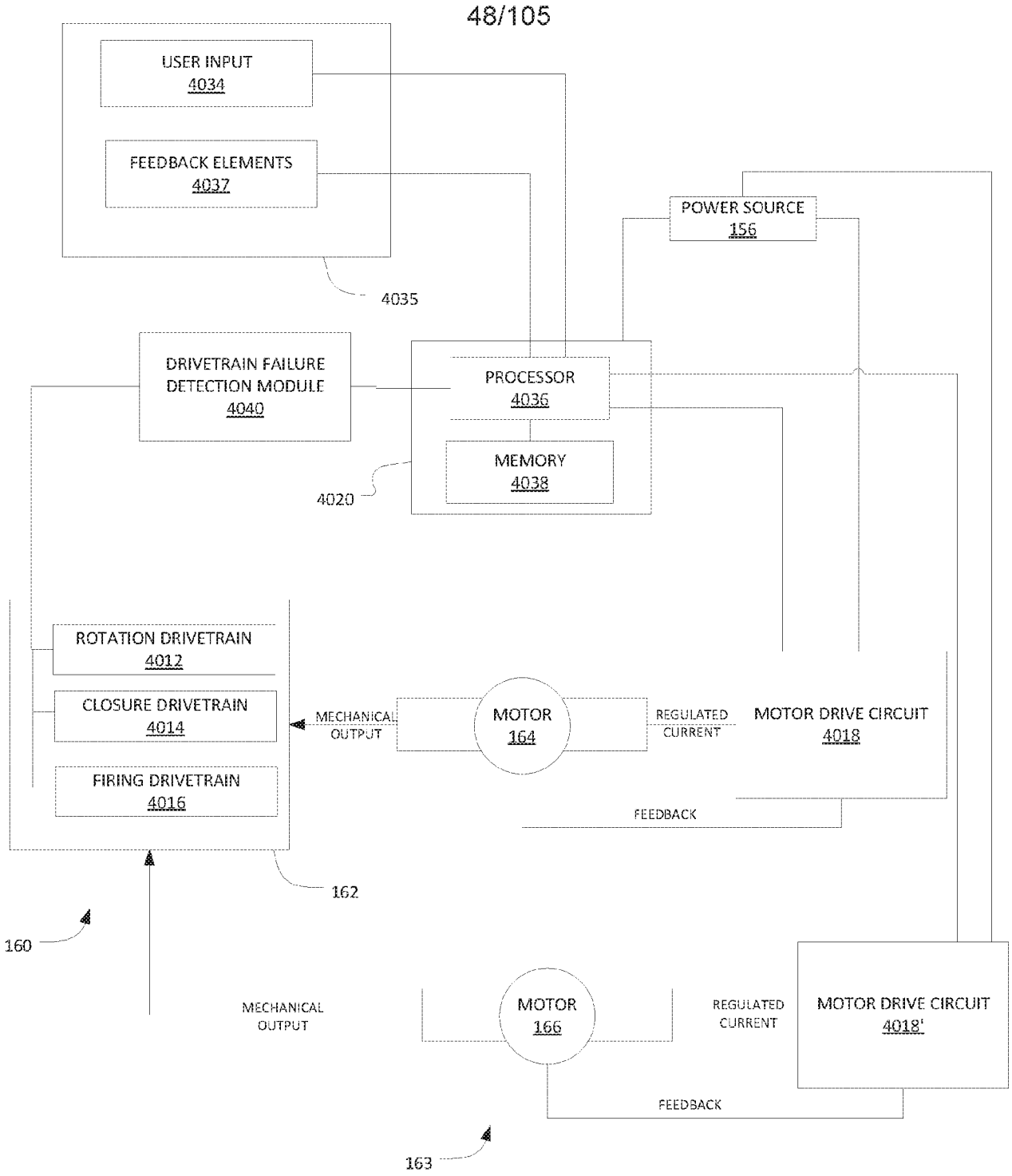


FIG. 44

Petitioner Therabody Ex-1004, 0663

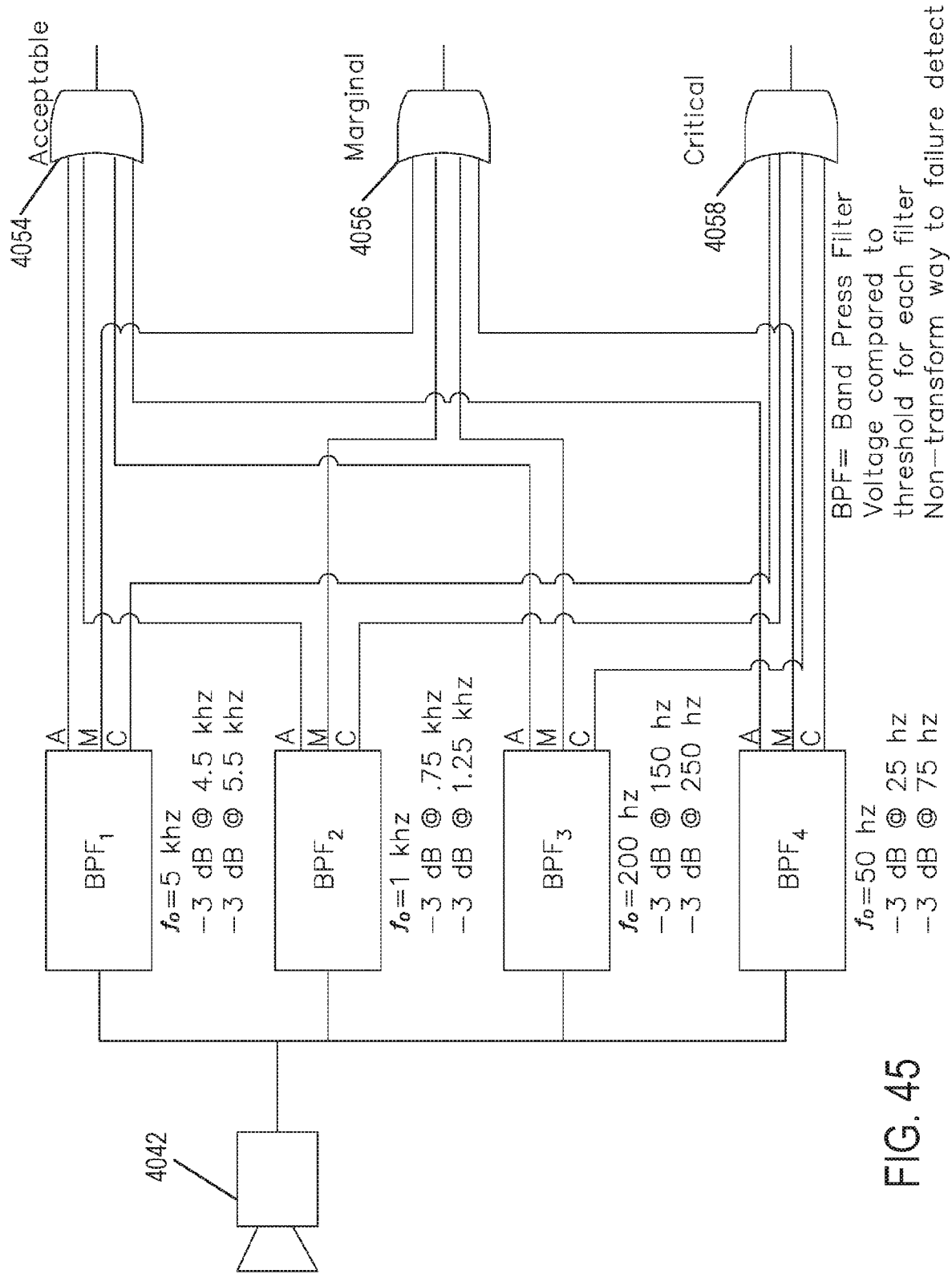


FIG. 45

Petitioner Therabody Ex-1004, 0664

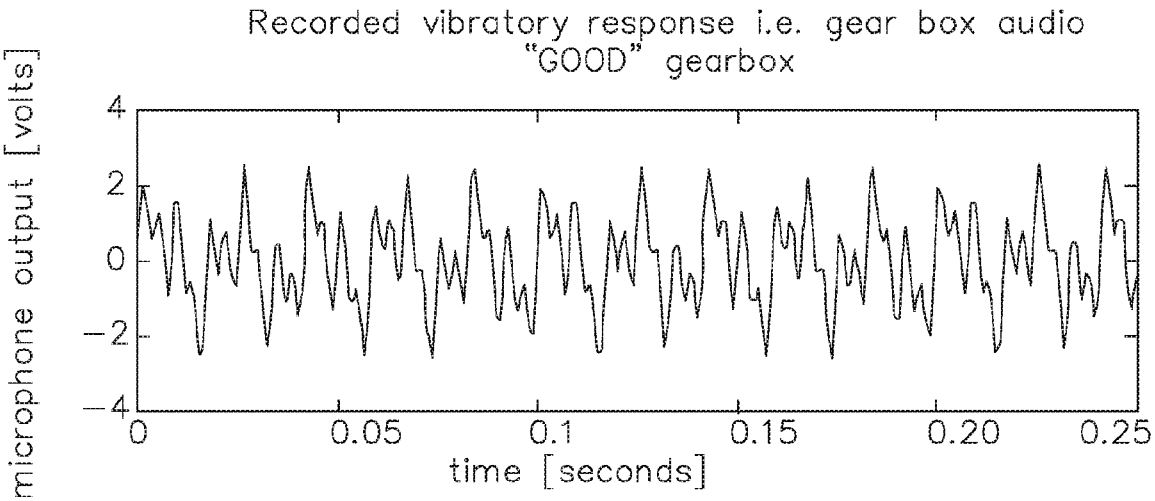


FIG. 46

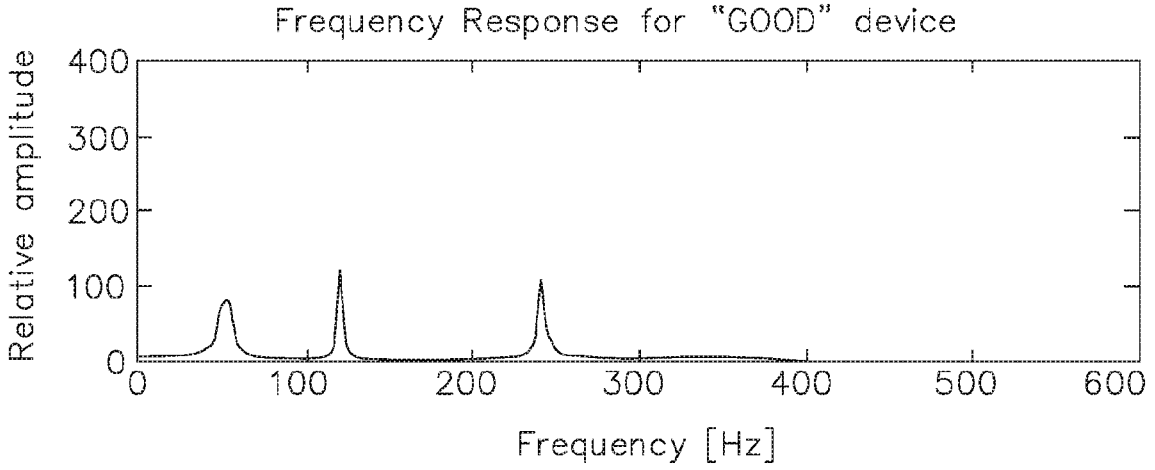


FIG. 46A

Petitioner Therabody Ex-1004, 0665

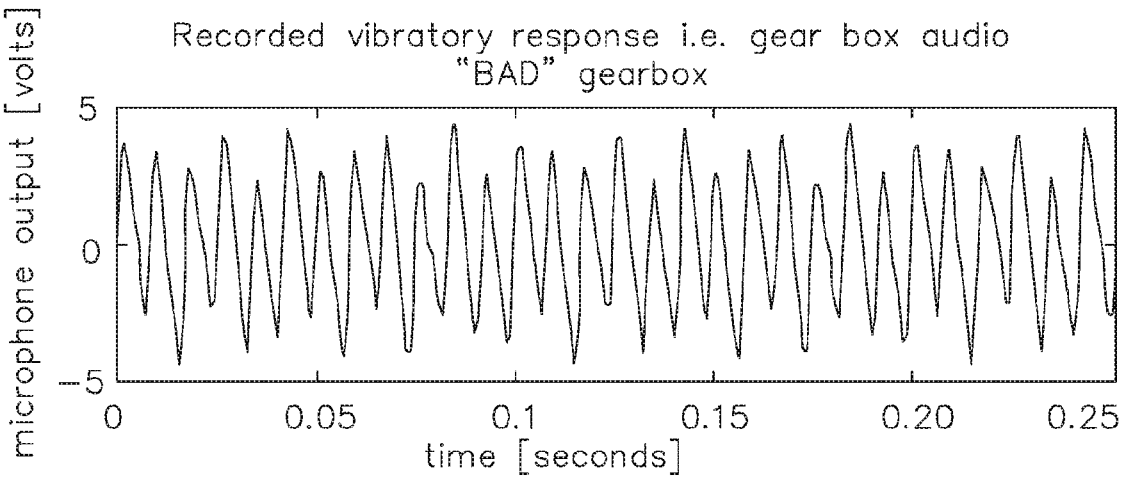


FIG. 47

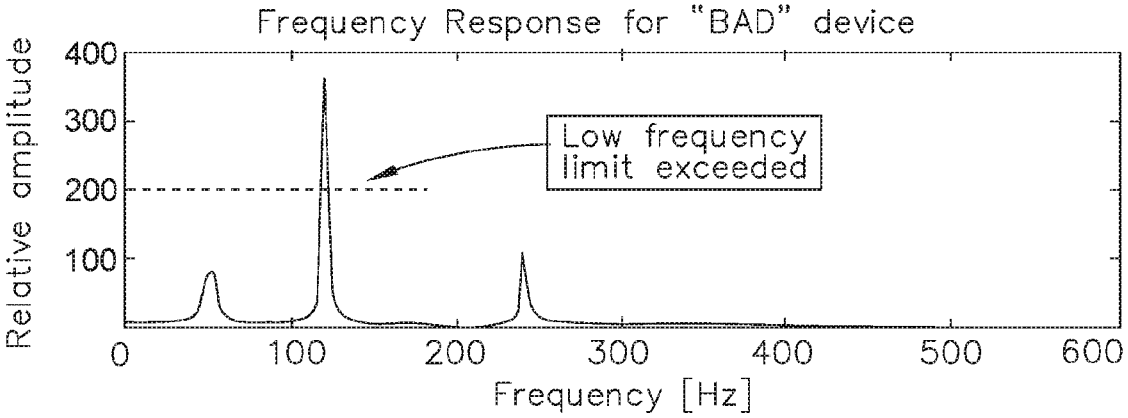


FIG. 47A

Petitioner Therabody Ex-1004, 0666

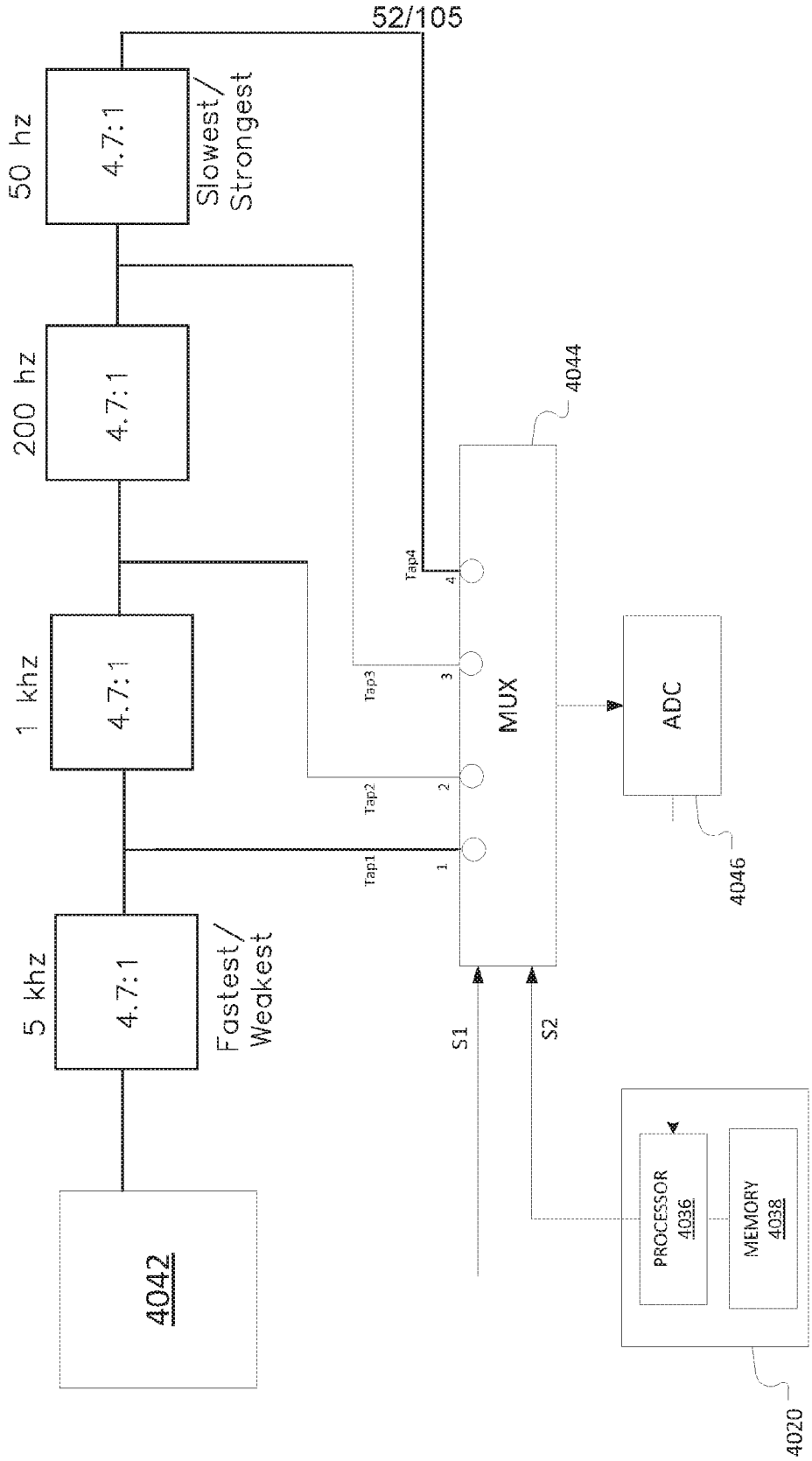


FIG. 48

MassagerPriorArt0003024

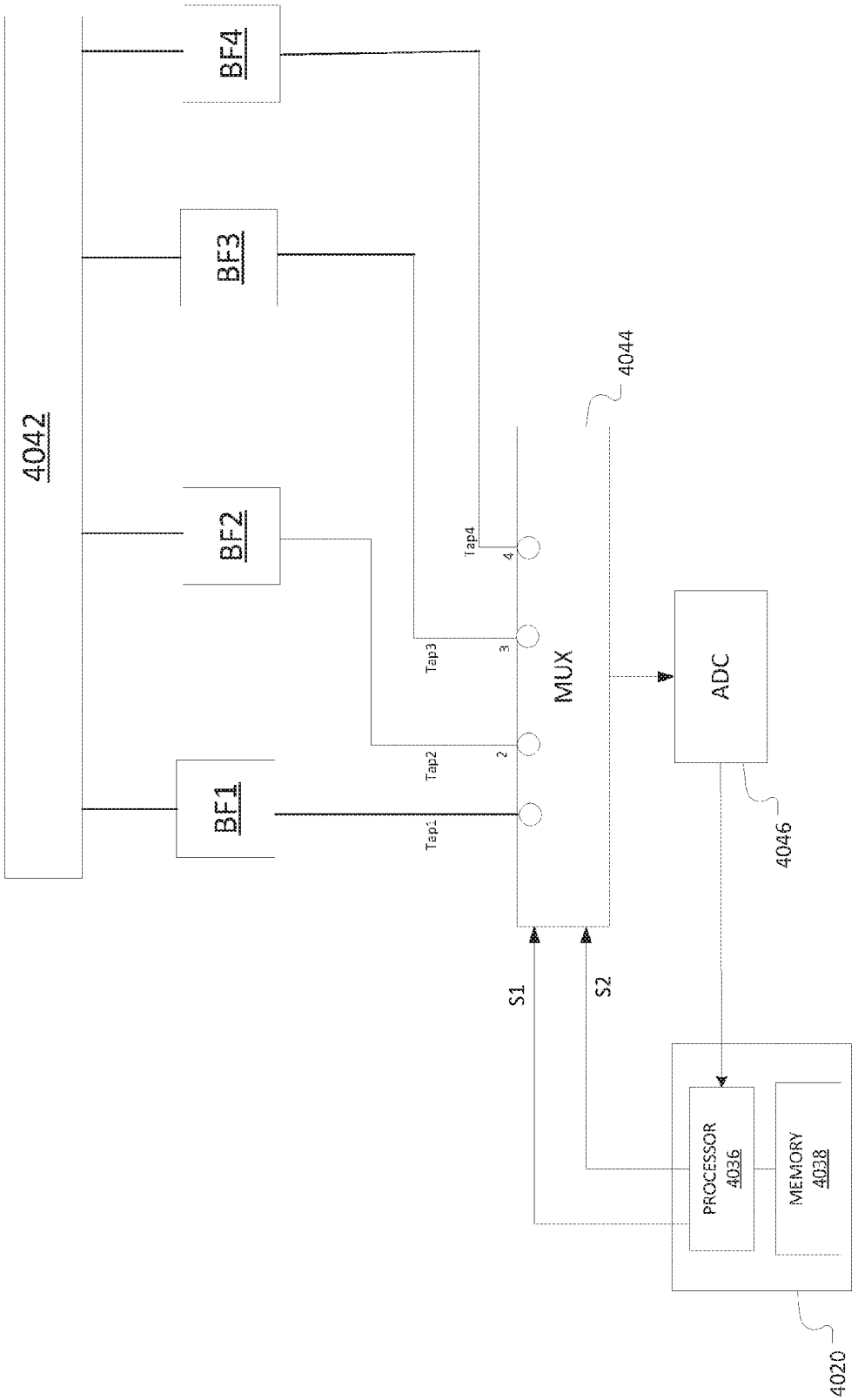

BF4
BF3
BF2
BF1
4042
Tap4
Tap3
Tap2
Tap1
4
3
2
MUX
4044
ADC
4046
S1
S2
PROCESSOR 4036
MEMORY 4038
4020

FIG. 48A

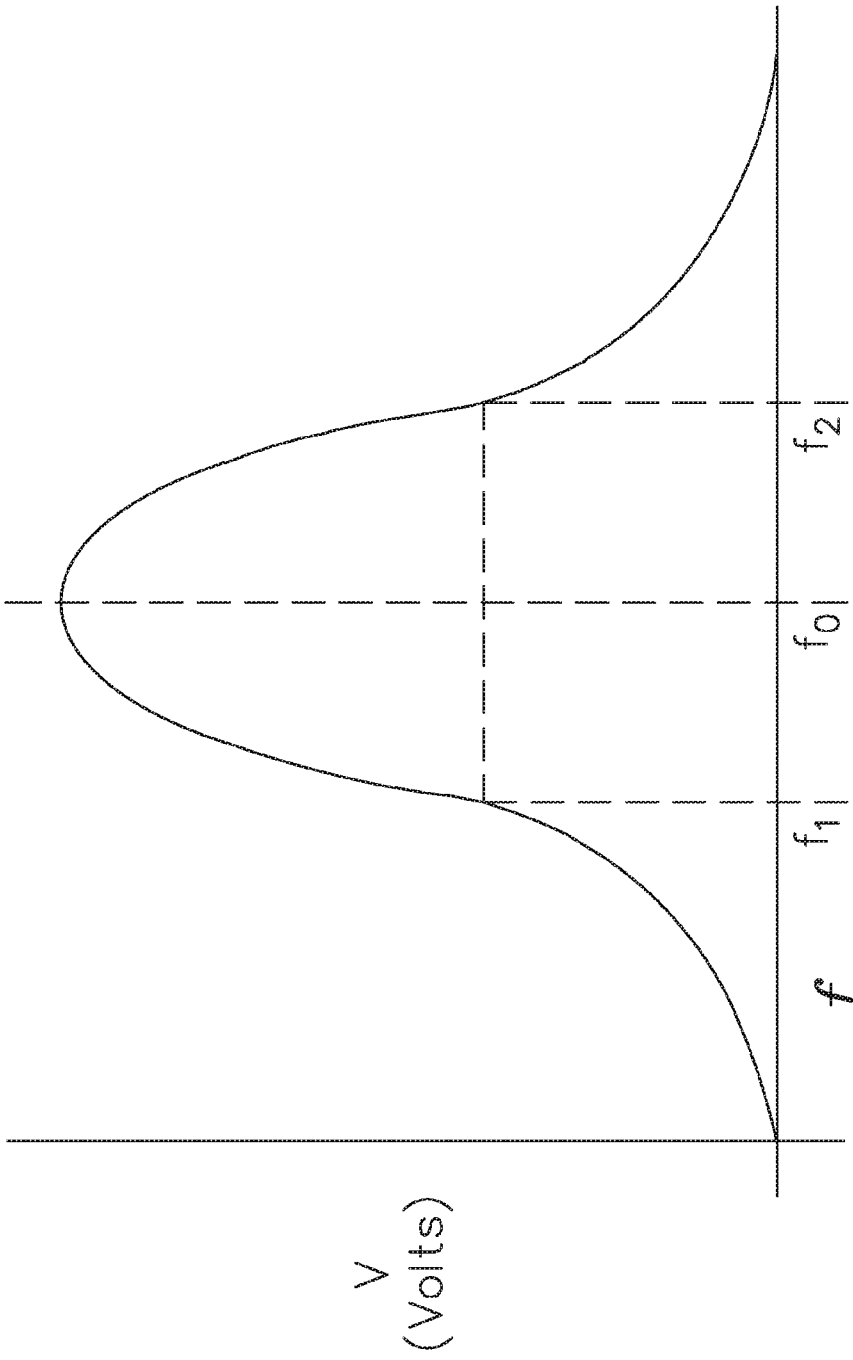


FIG. 48B



FIG. 48C

Petitioner Therabody Ex-1004, 0670

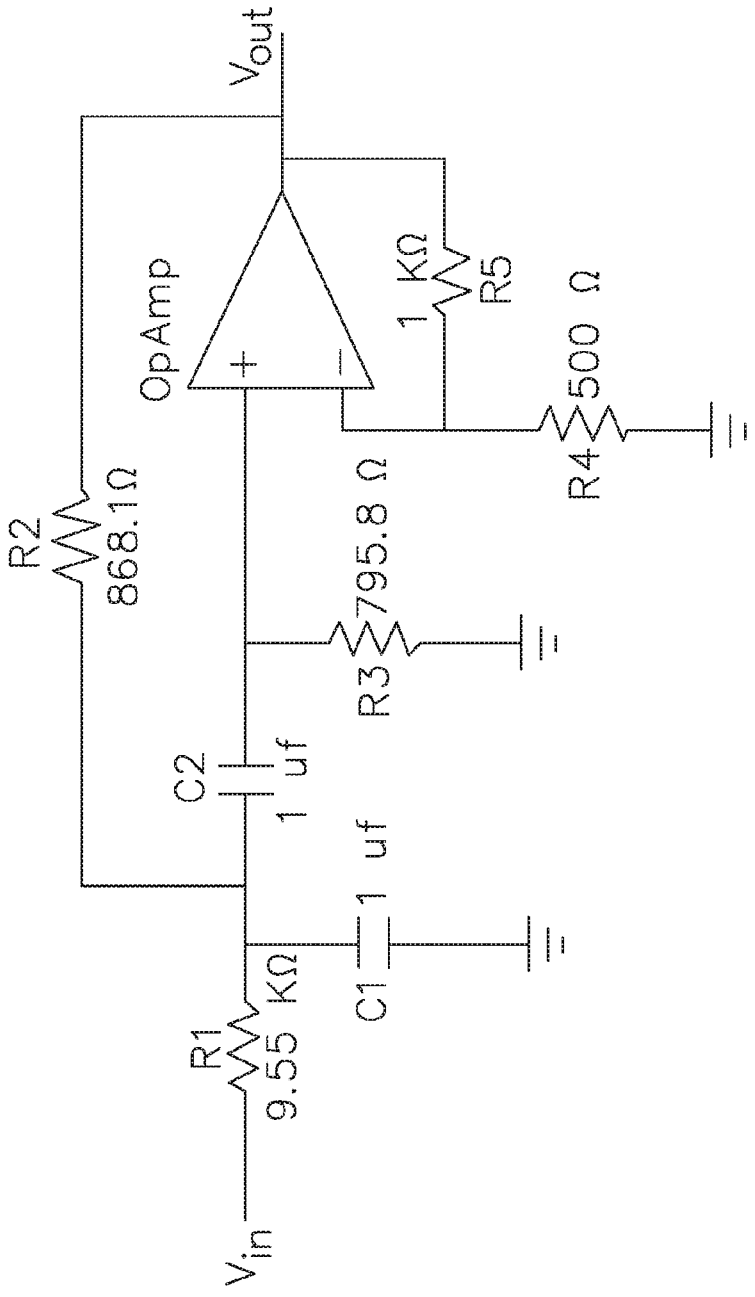

Vout
OpAmp
+
−
1 KΩ
R5
500 Ω
R4
R2
868.1Ω
795.8 Ω
R3
C2
1 uf
1 uf
C1
R1
9.55 KΩ
Vin

FIG. 48D

FIG. 49

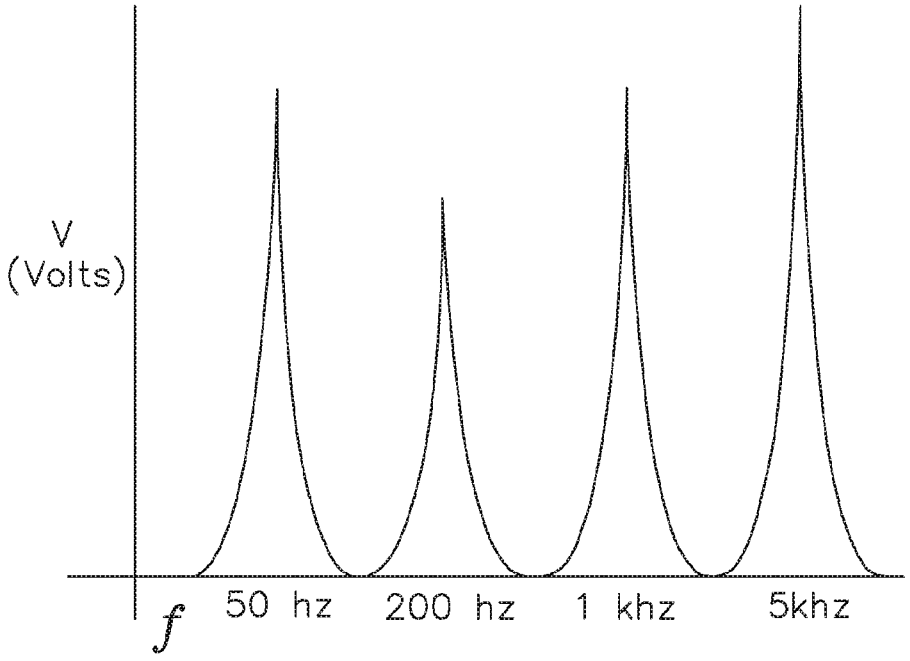
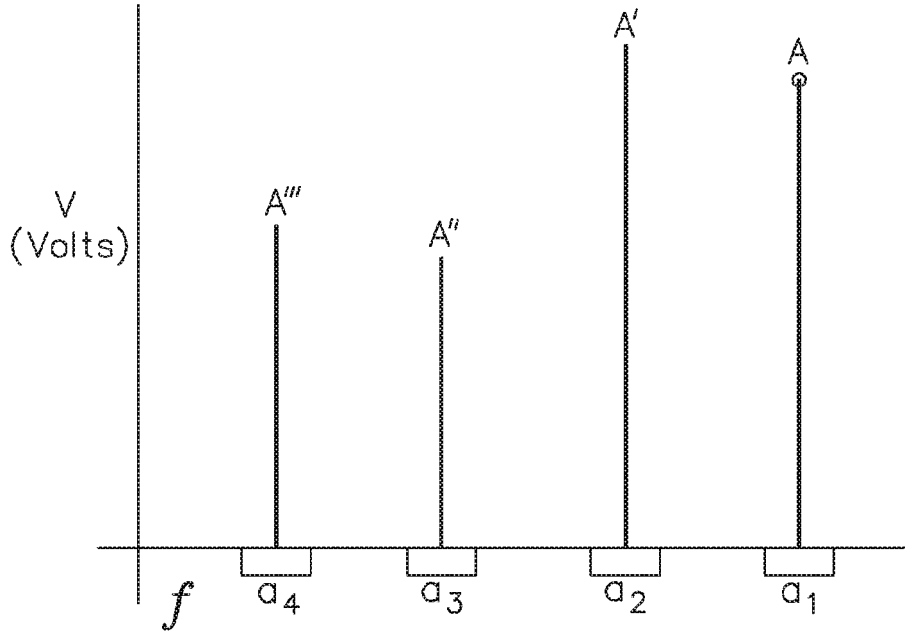


FIG. 50



Petitioner Therabody Ex-1004, 0672

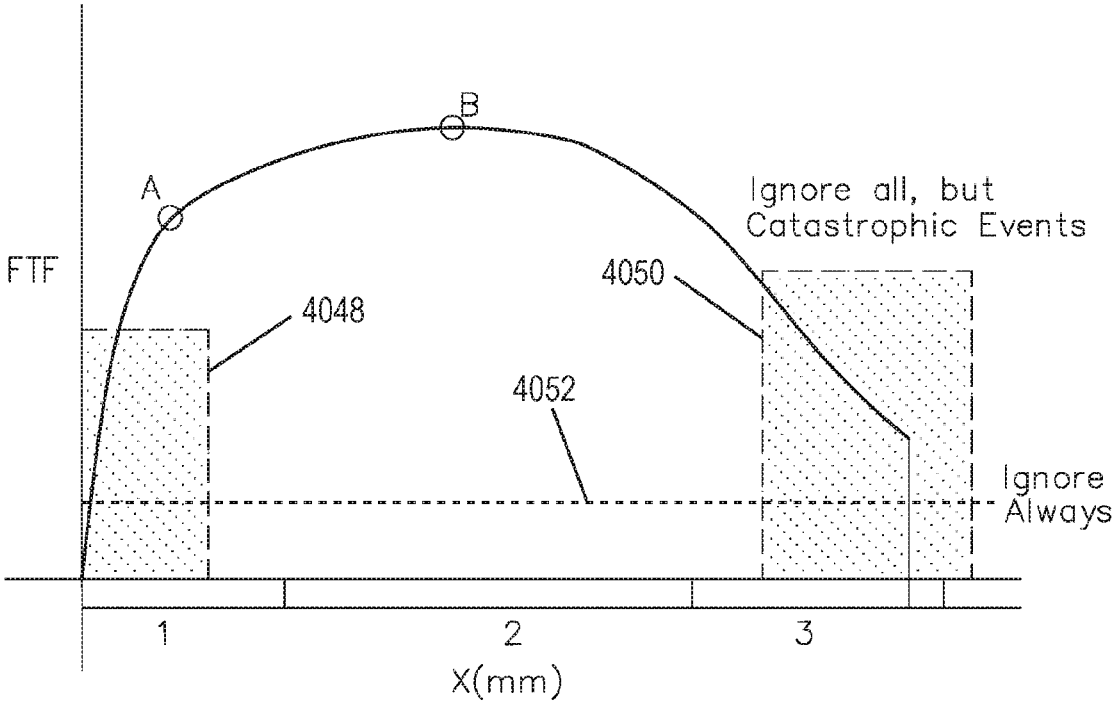


FIG. 51

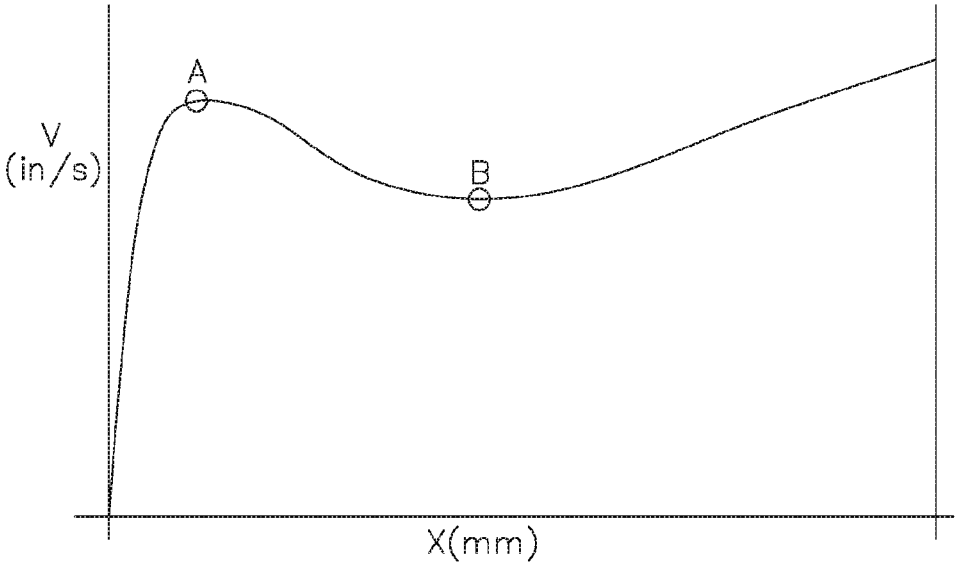


FIG. 52

Petitioner Therabody Ex-1004, 0673

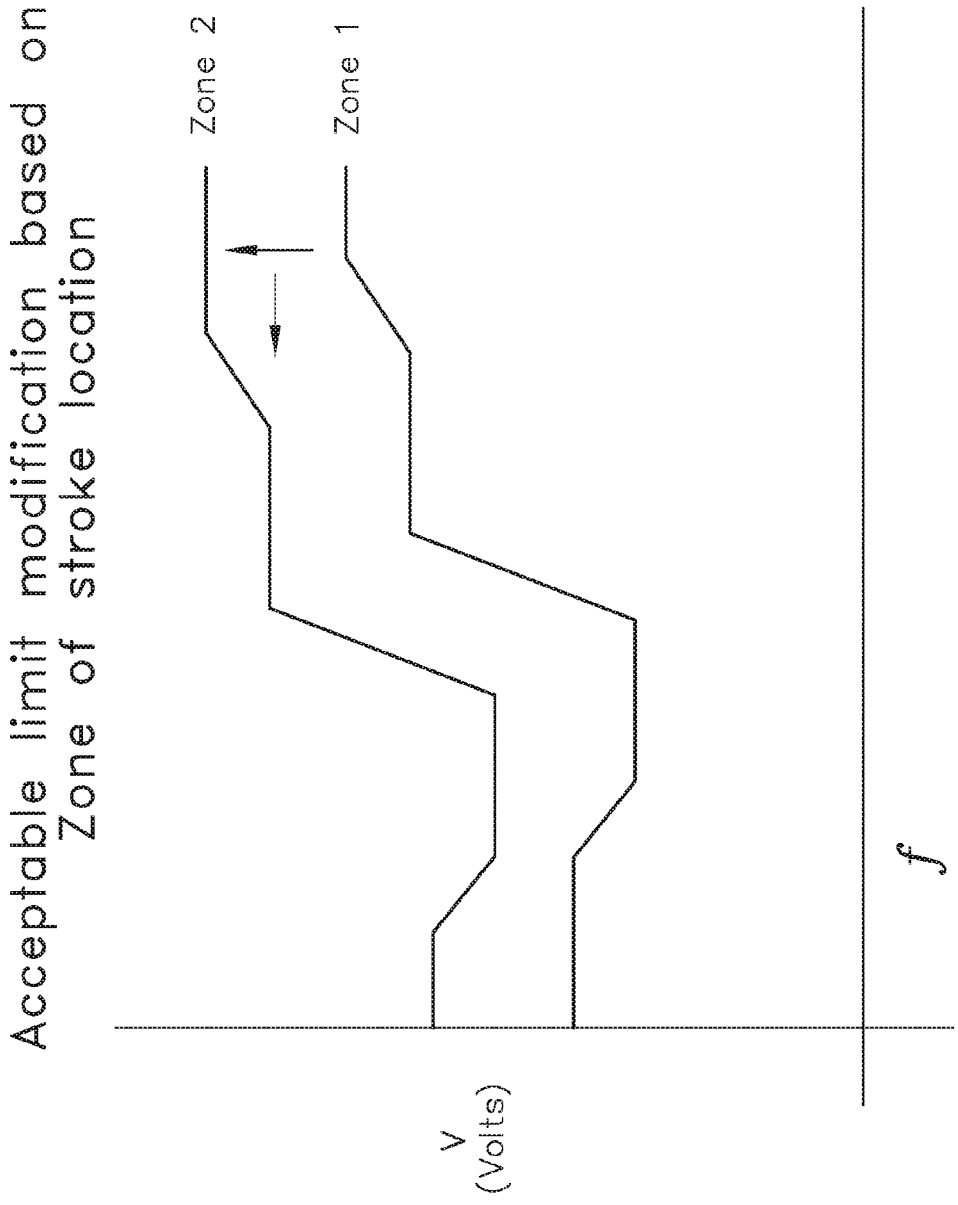


FIG. 53

Petitioner Therabody Ex-1004, 0674

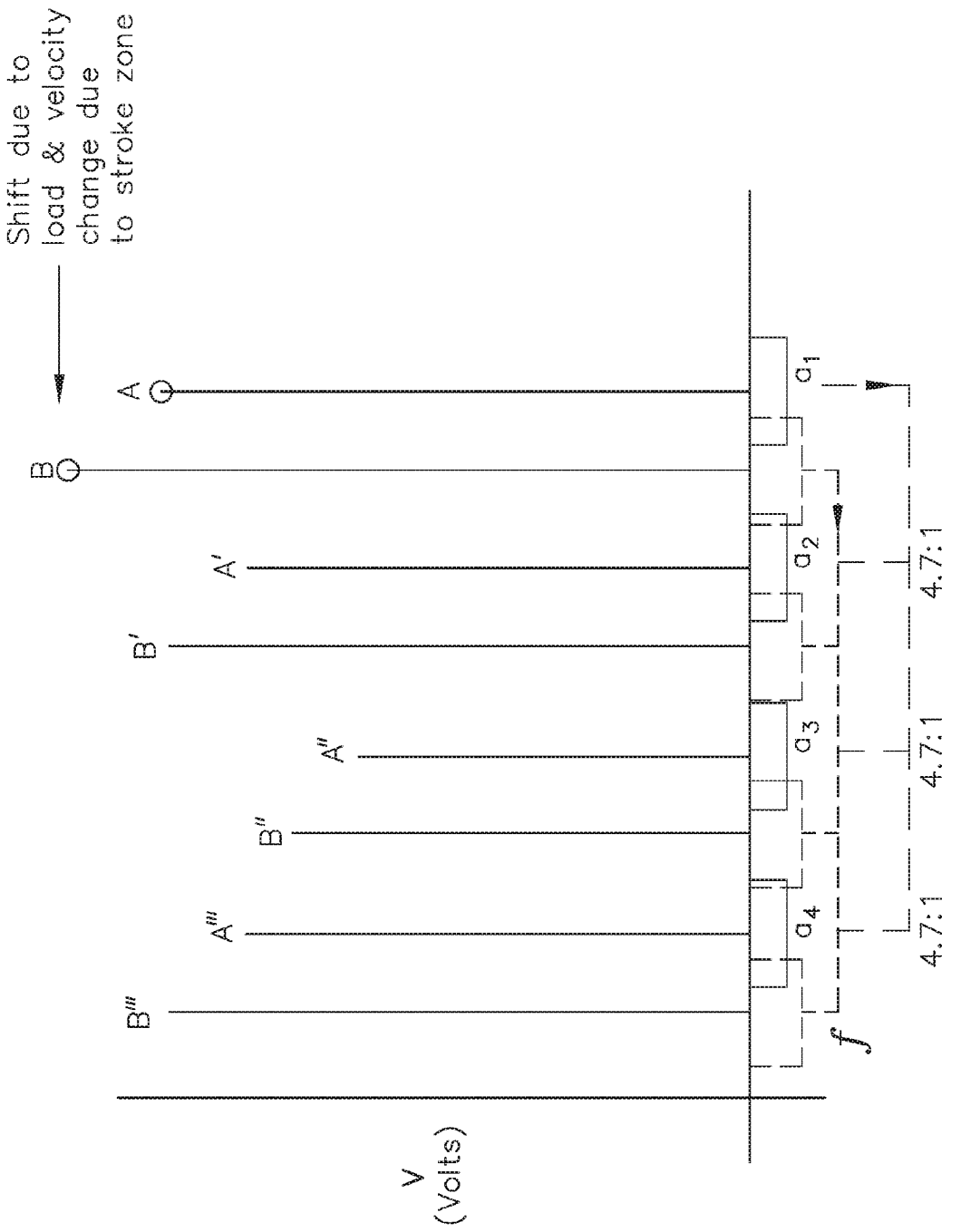


FIG. 54

MassagerPriorArt0003032

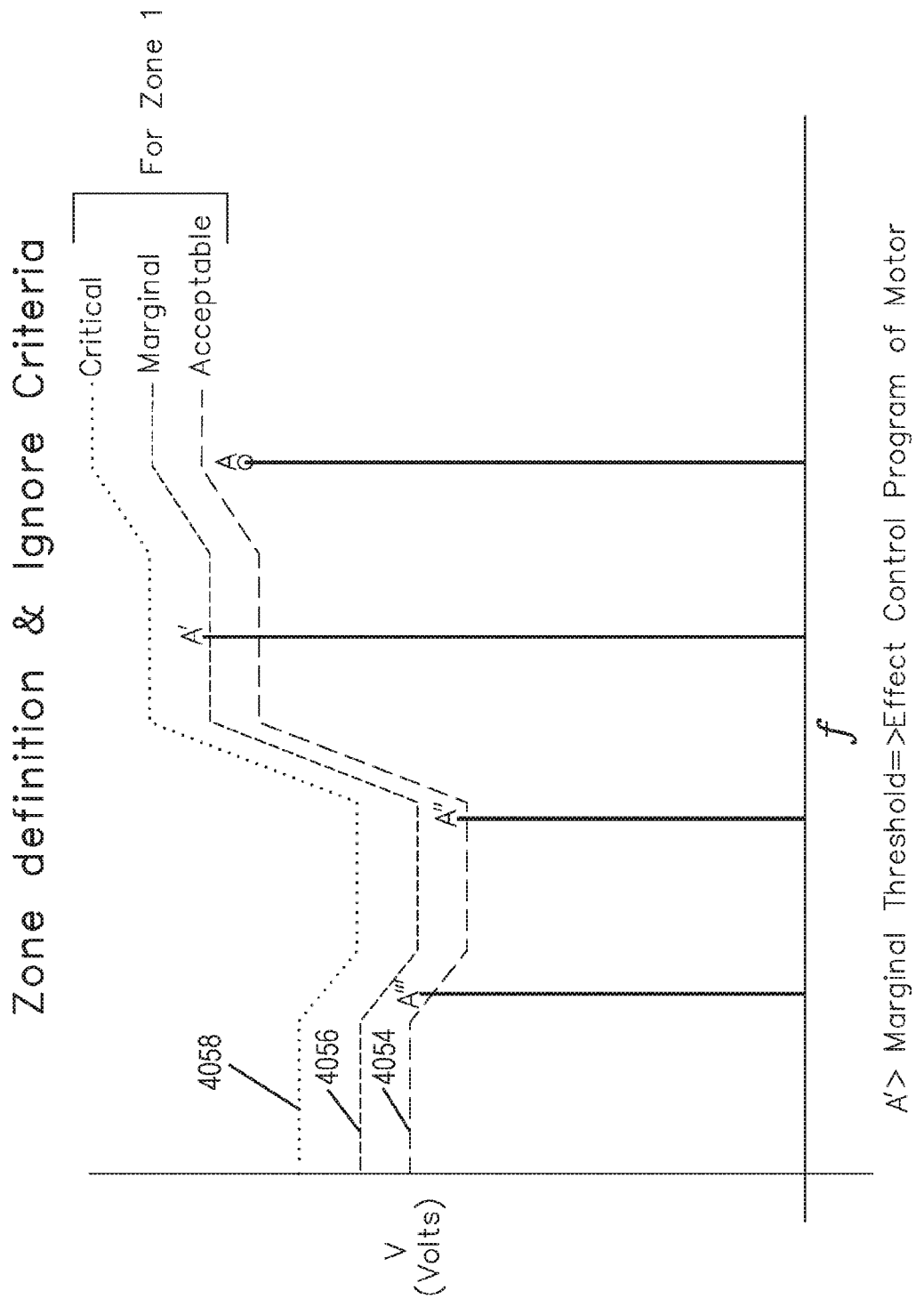

Zone definition & Ignore Criteria
For Zone 1
Critical
Marginal
Acceptable
A
A'
A''
A'''
4058
4056
4054
V
(Volts)
f
A'> Marginal Threshold=>Effect Control Program of Motor

FIG. 55

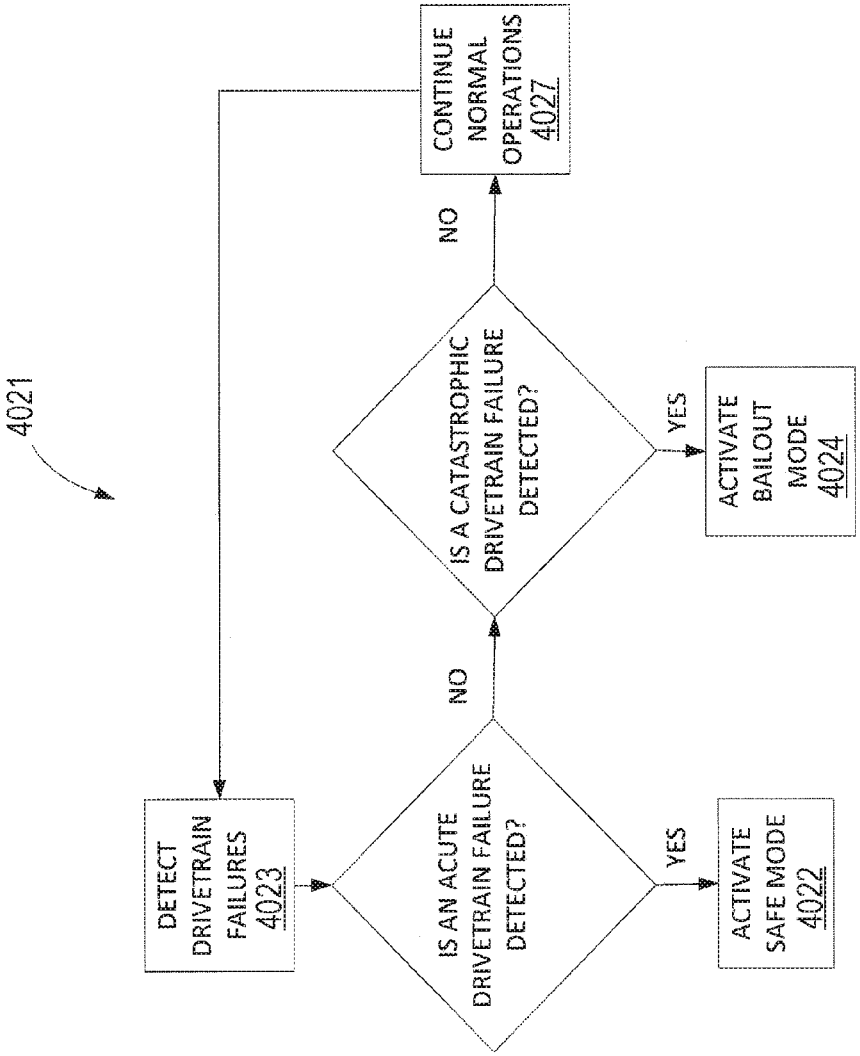


FIG. 56

Petitioner Therabody Ex-1004, 0677

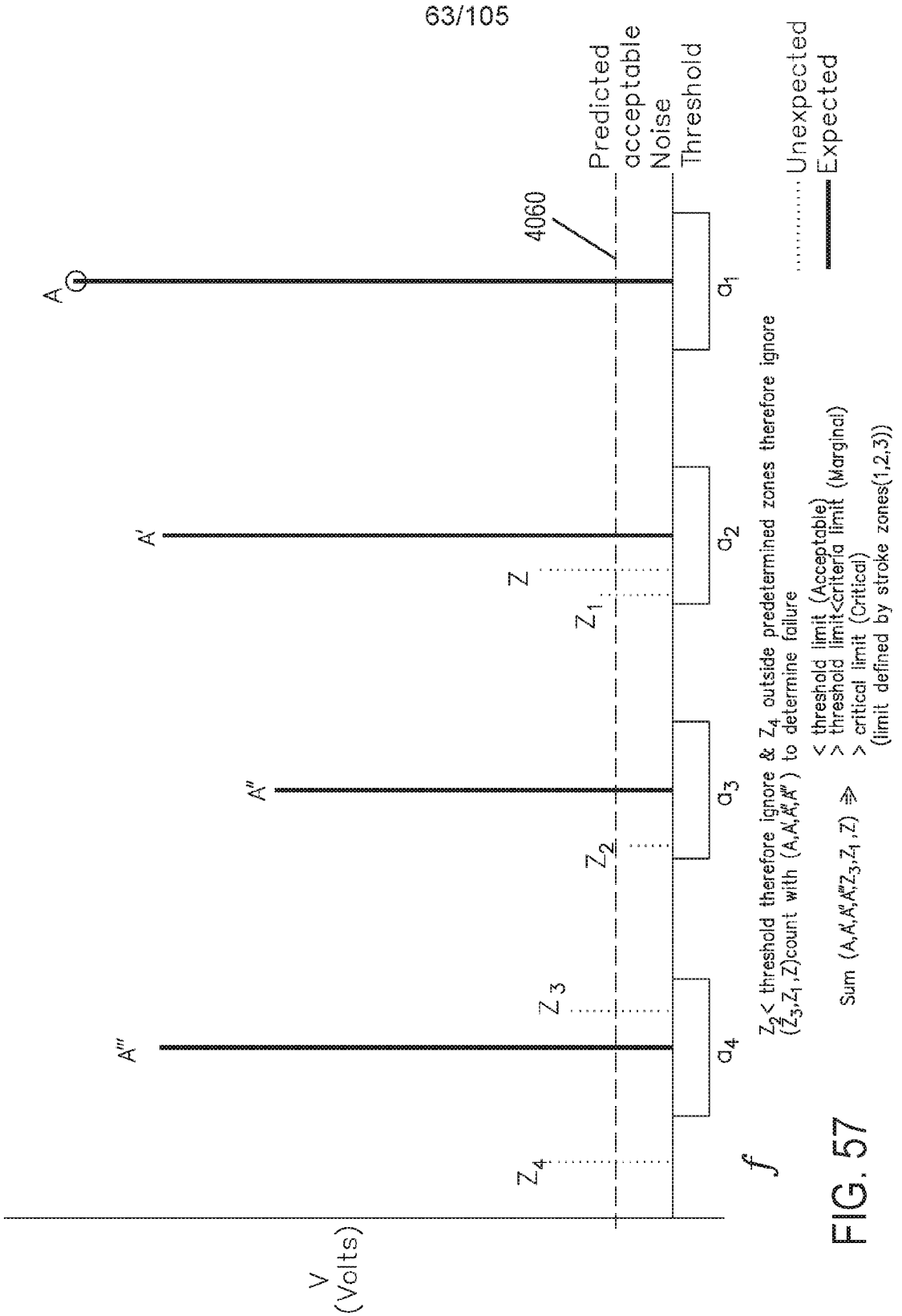


FIG. 57

Petitioner Therabody Ex-1004, 0678

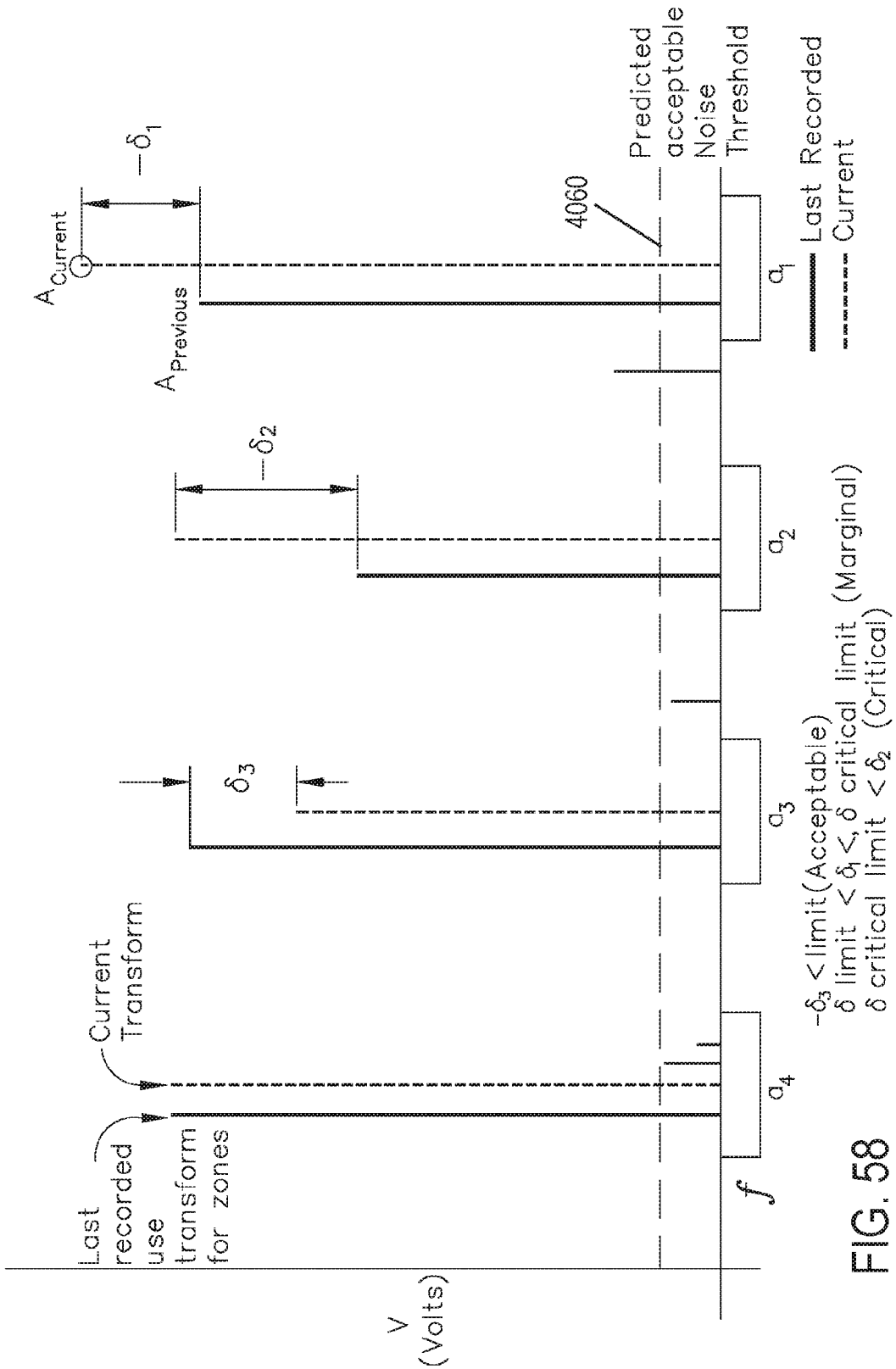


FIG. 58

Petitioner Therabody Ex-1004, 0679

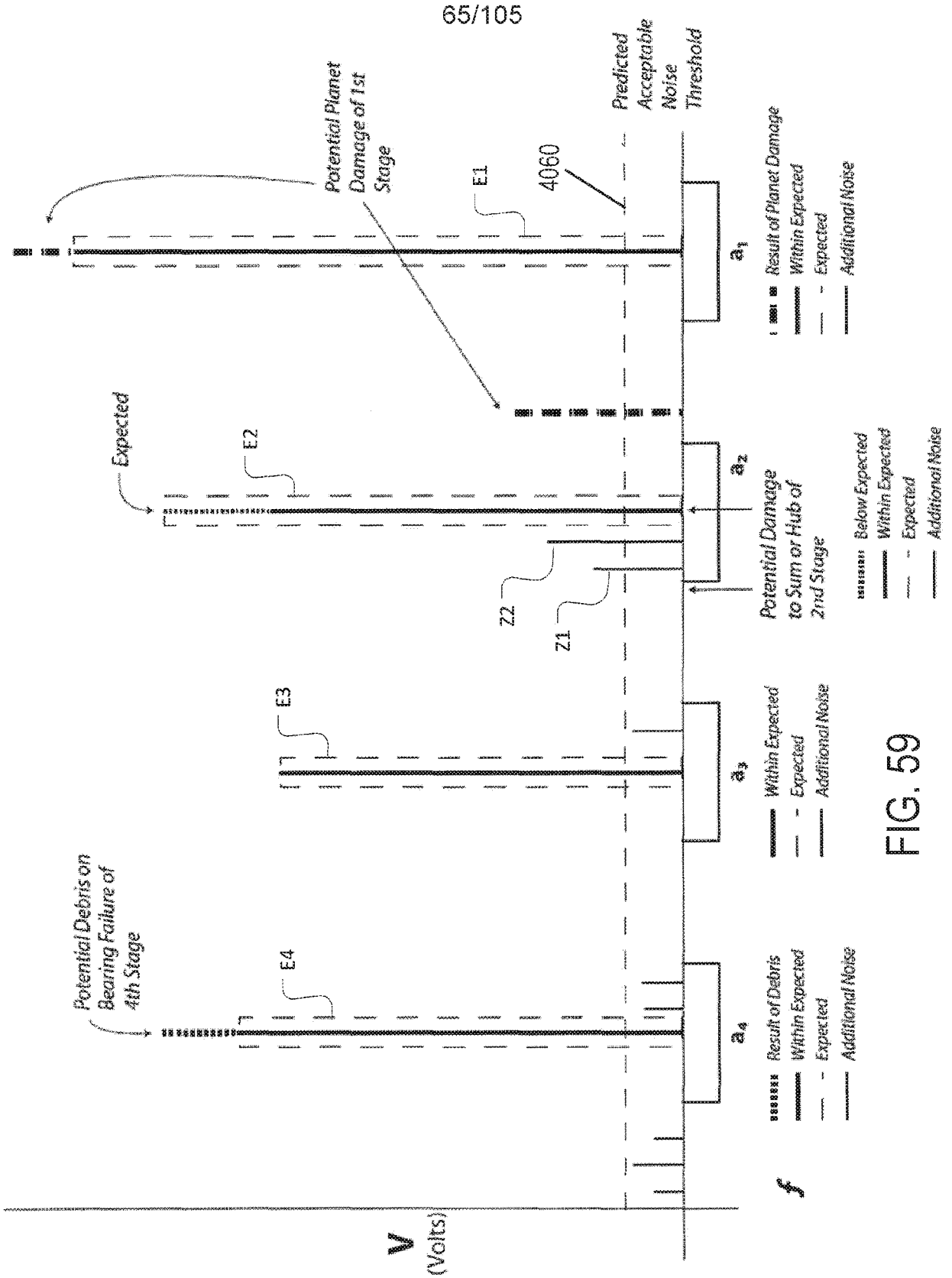


FIG. 59

Petitioner Therabody Ex-1004, 0680

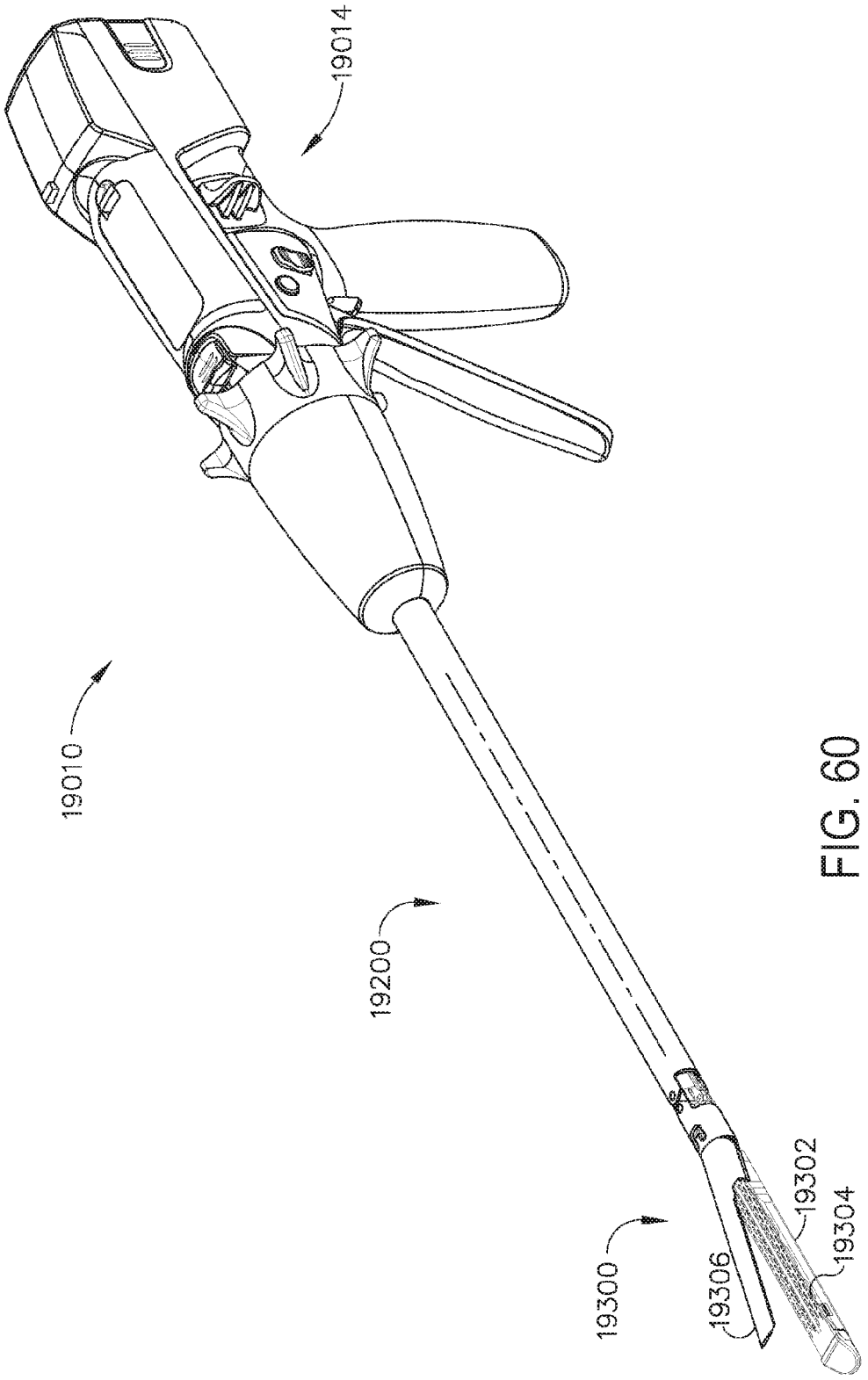


FIG. 60

MassagerPriorArt0003038

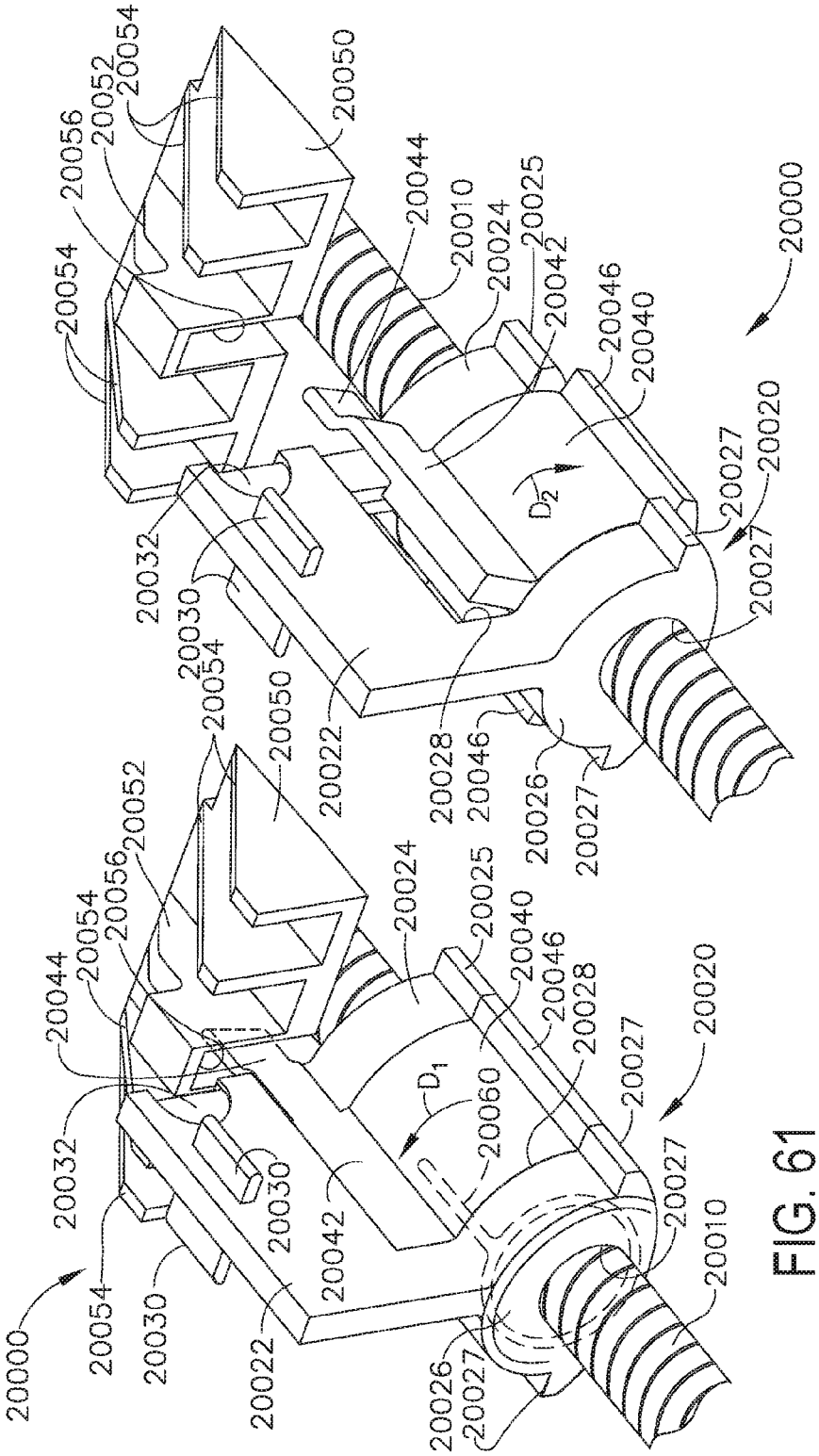


FIG. 61

FIG. 62

MassagerPriorArt0003039

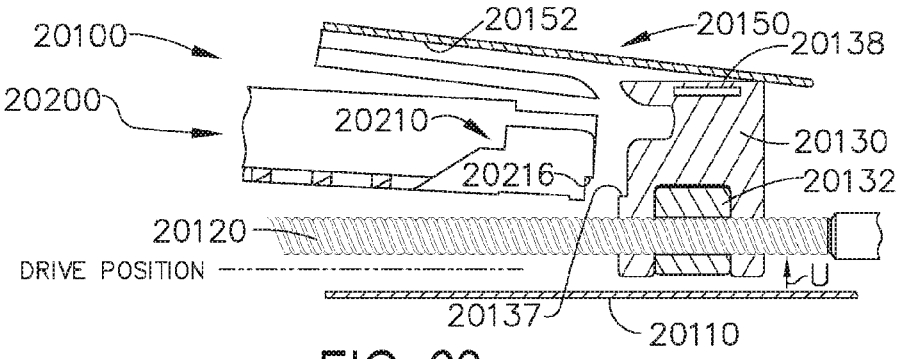


FIG. 63

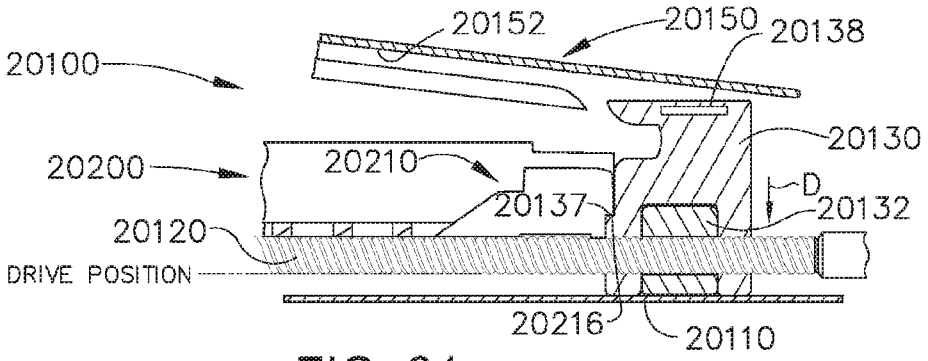


FIG. 64

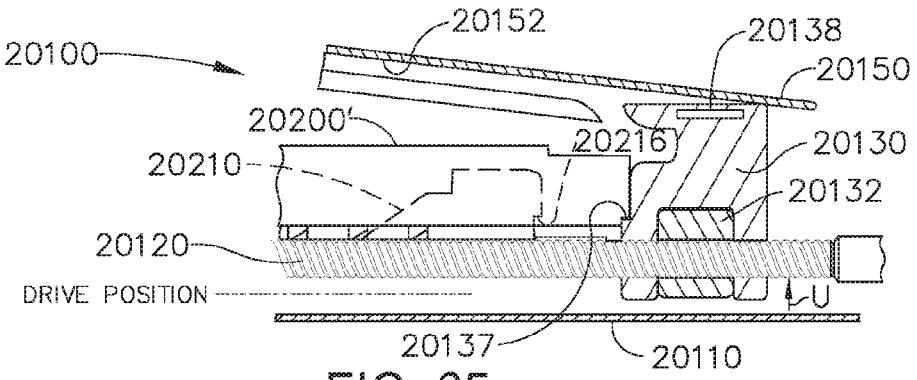


FIG. 65

Petitioner Therabody Ex-1004, 0683

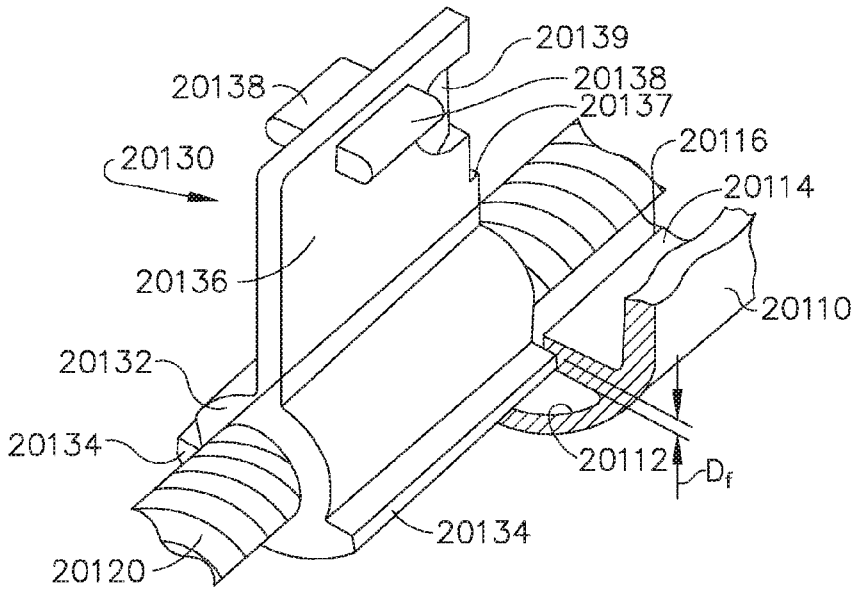


FIG. 66

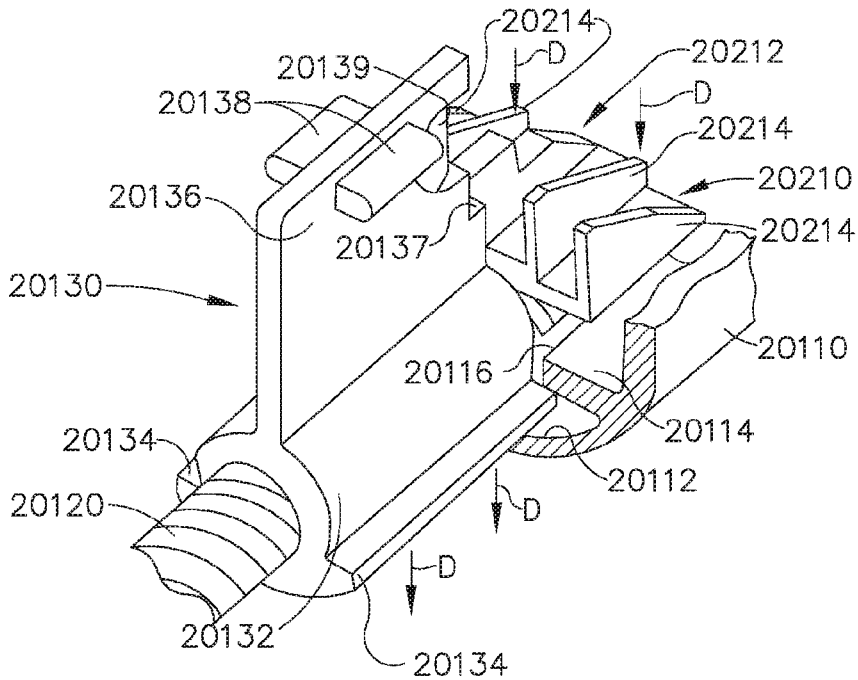


FIG. 67

MassagerPriorArt0003041

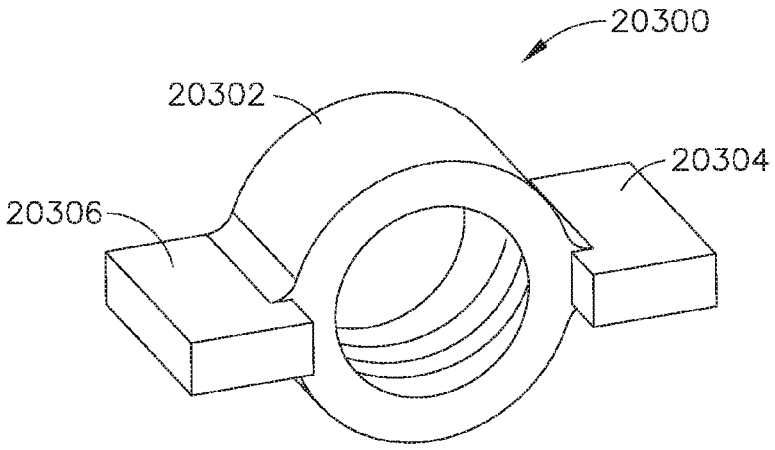


FIG. 68

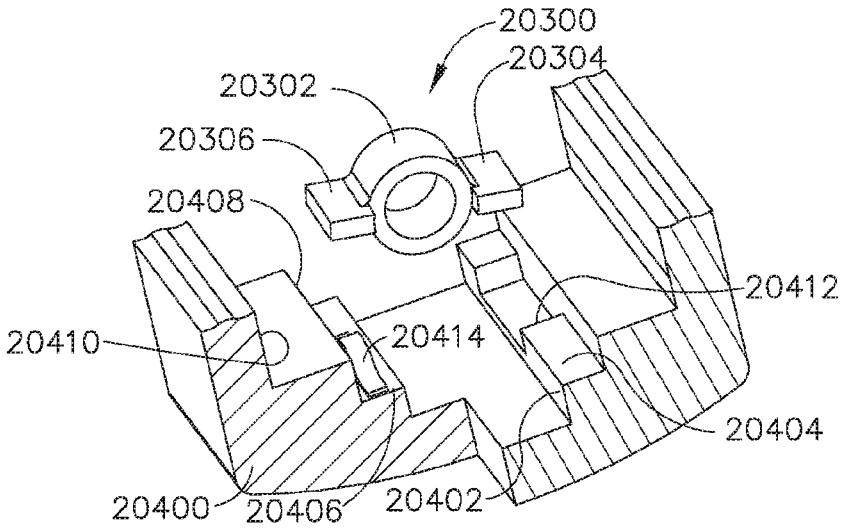


FIG. 69

Petitioner Therabody Ex-1004, 0685

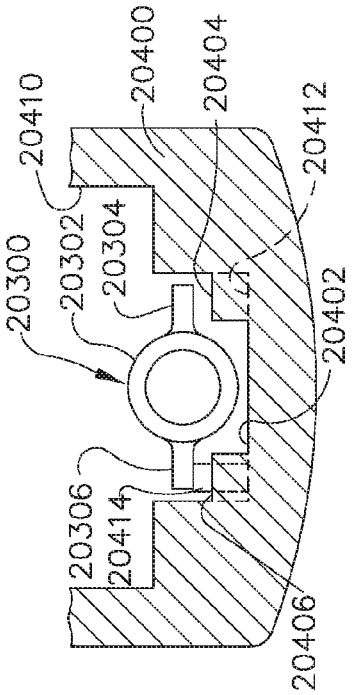


FIG. 71

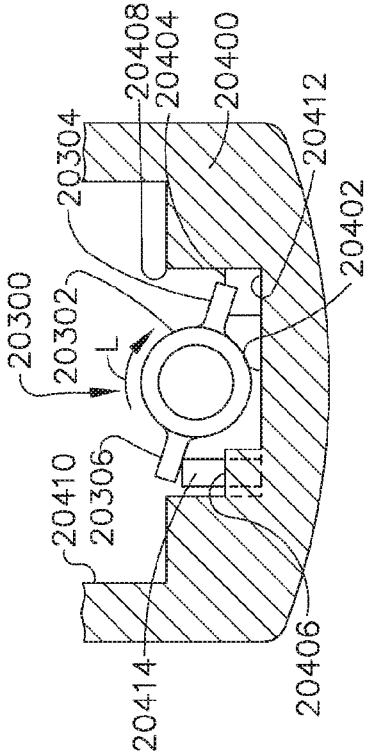


FIG. 70

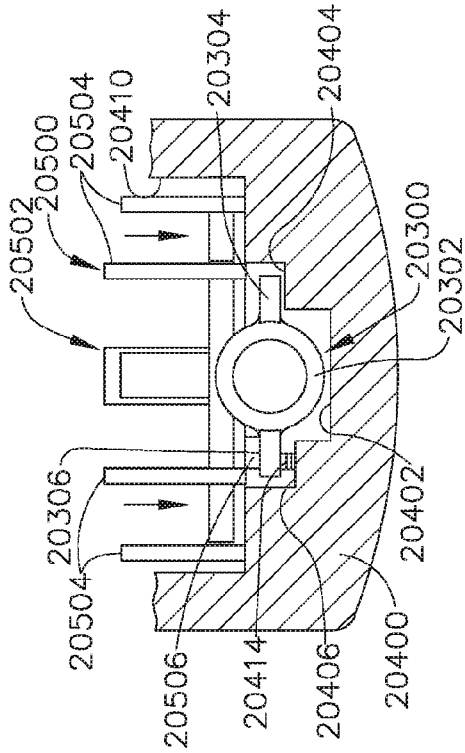


FIG. 73

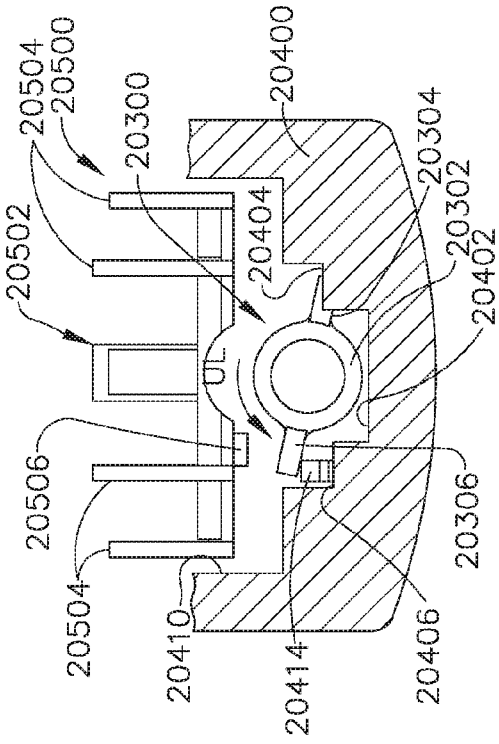


FIG. 72

MassagerPriorArt0003043

Petitioner Therabody Ex-1004, 0686

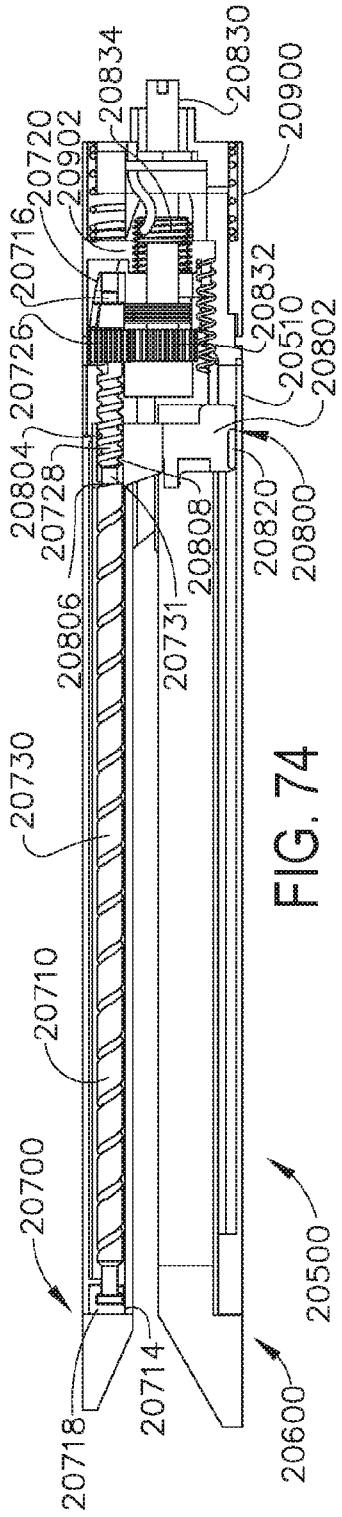


FIG. 74

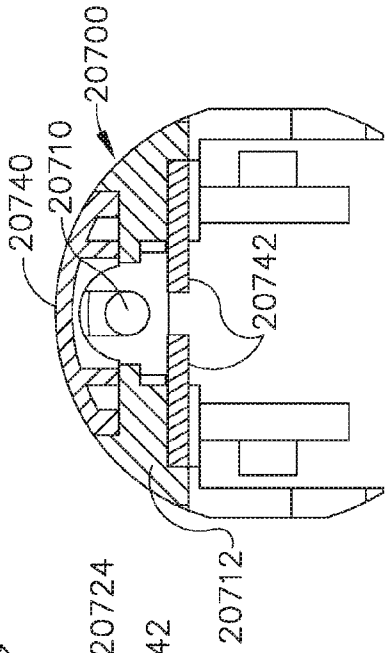


FIG. 76

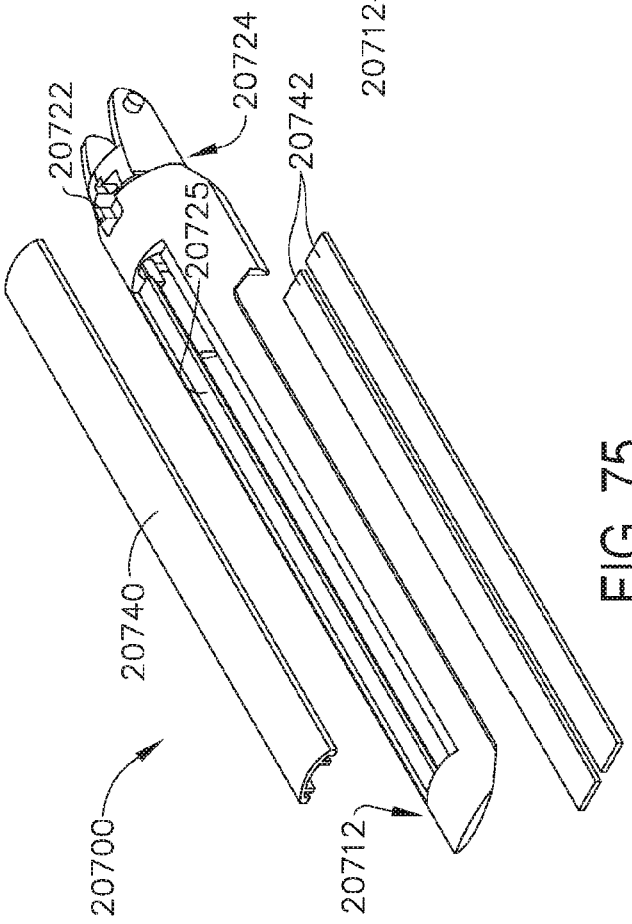


FIG. 75

MassagerPriorArt0003044

Petitioner Therabody Ex-1004, 0687

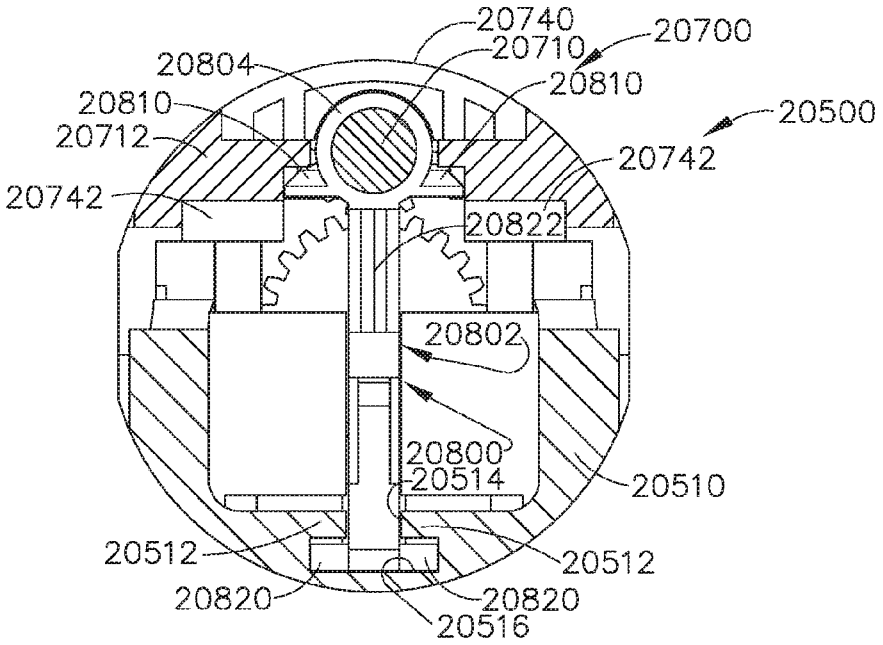


FIG. 77

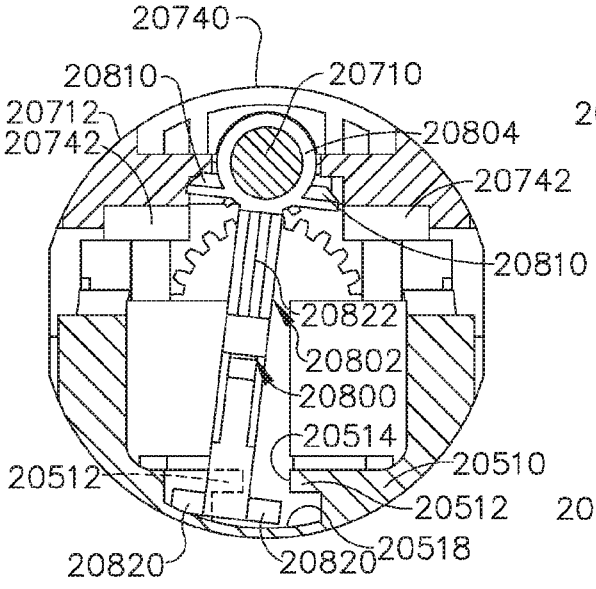


FIG. 78

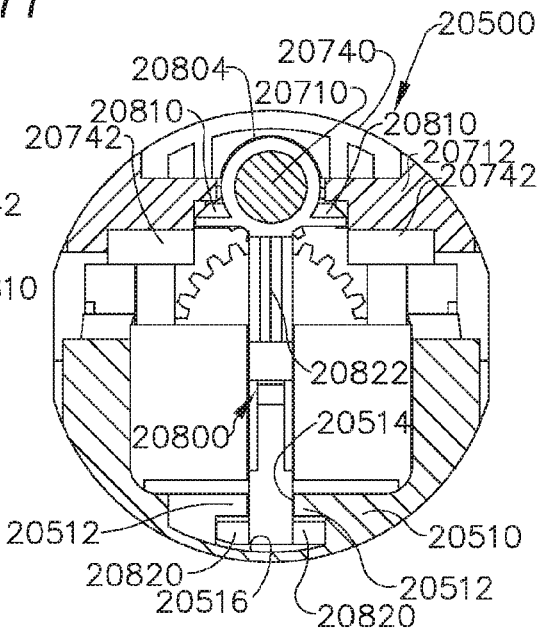


FIG. 79

MassagerPriorArt0003045

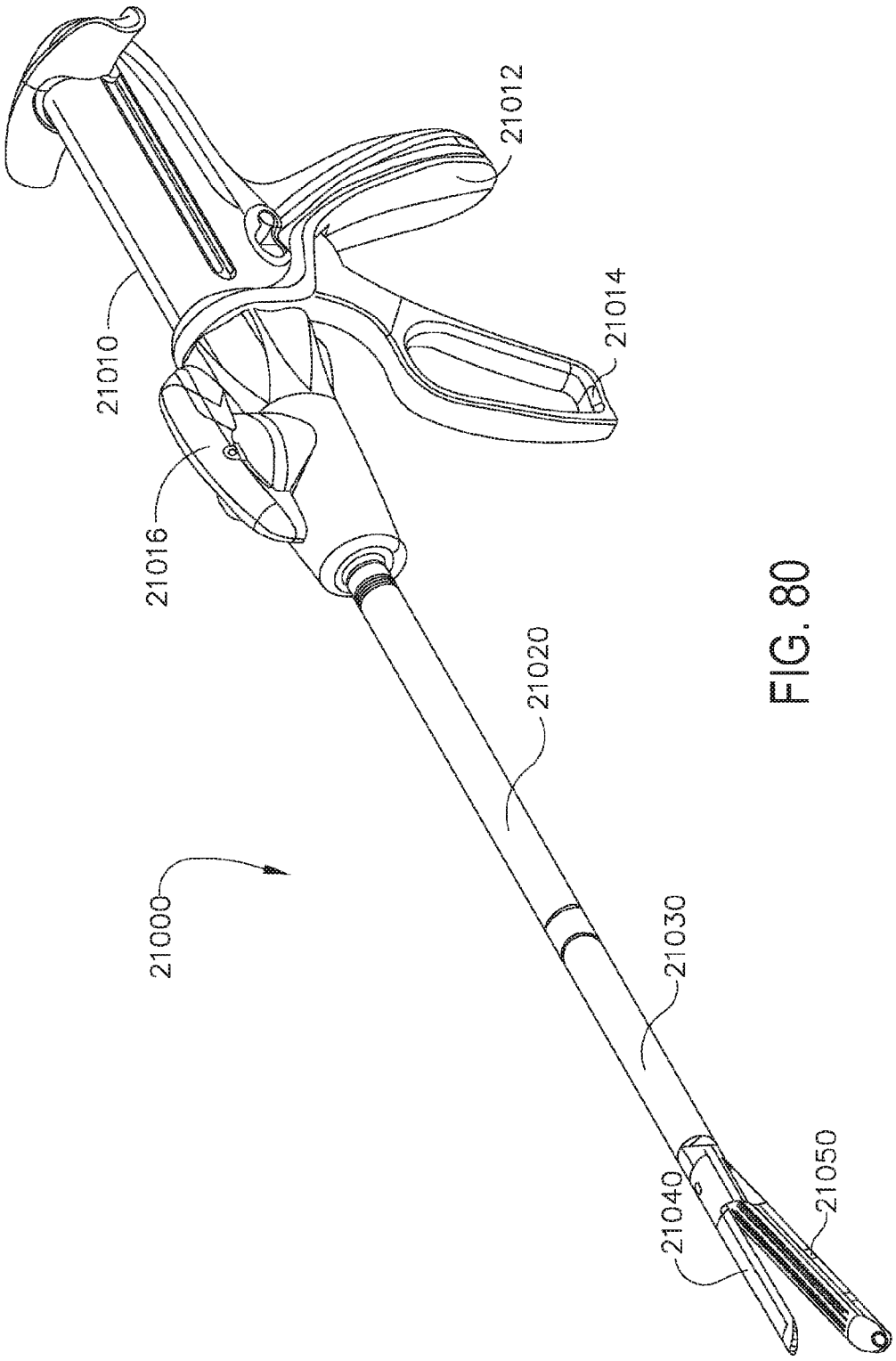


FIG. 80

MassagerPriorArt0003046

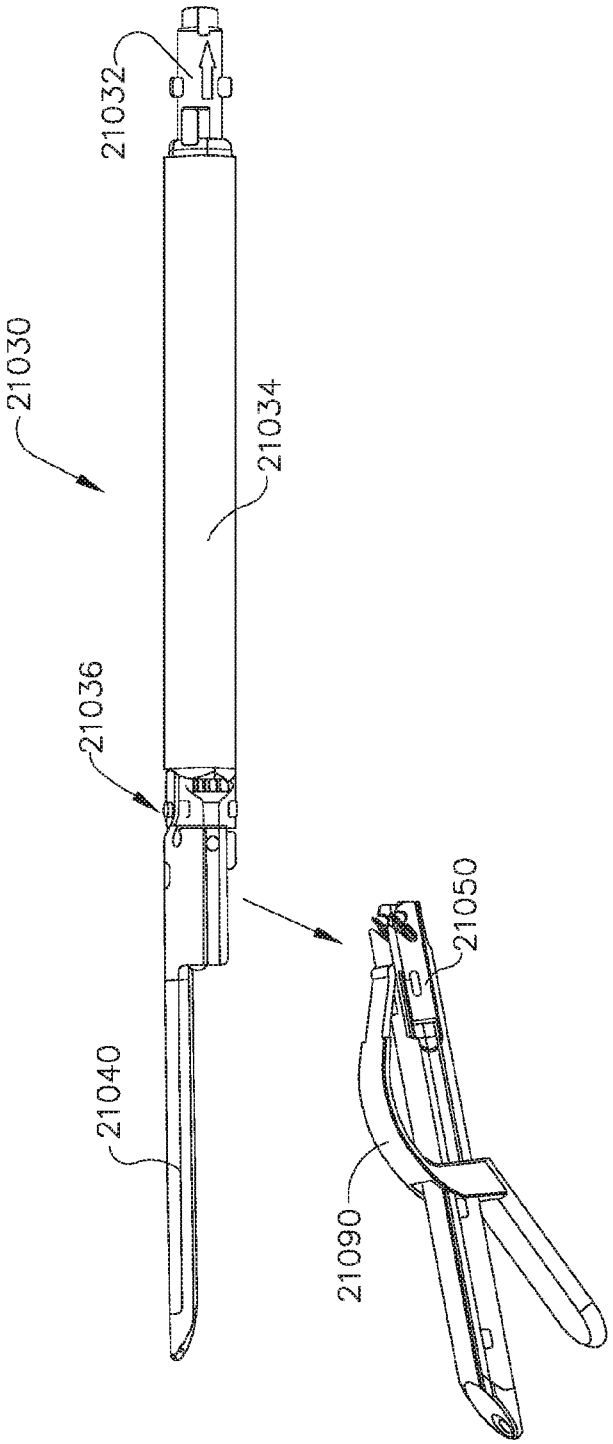


FIG. 81

Petitioner Therabody Ex-1004, 0690

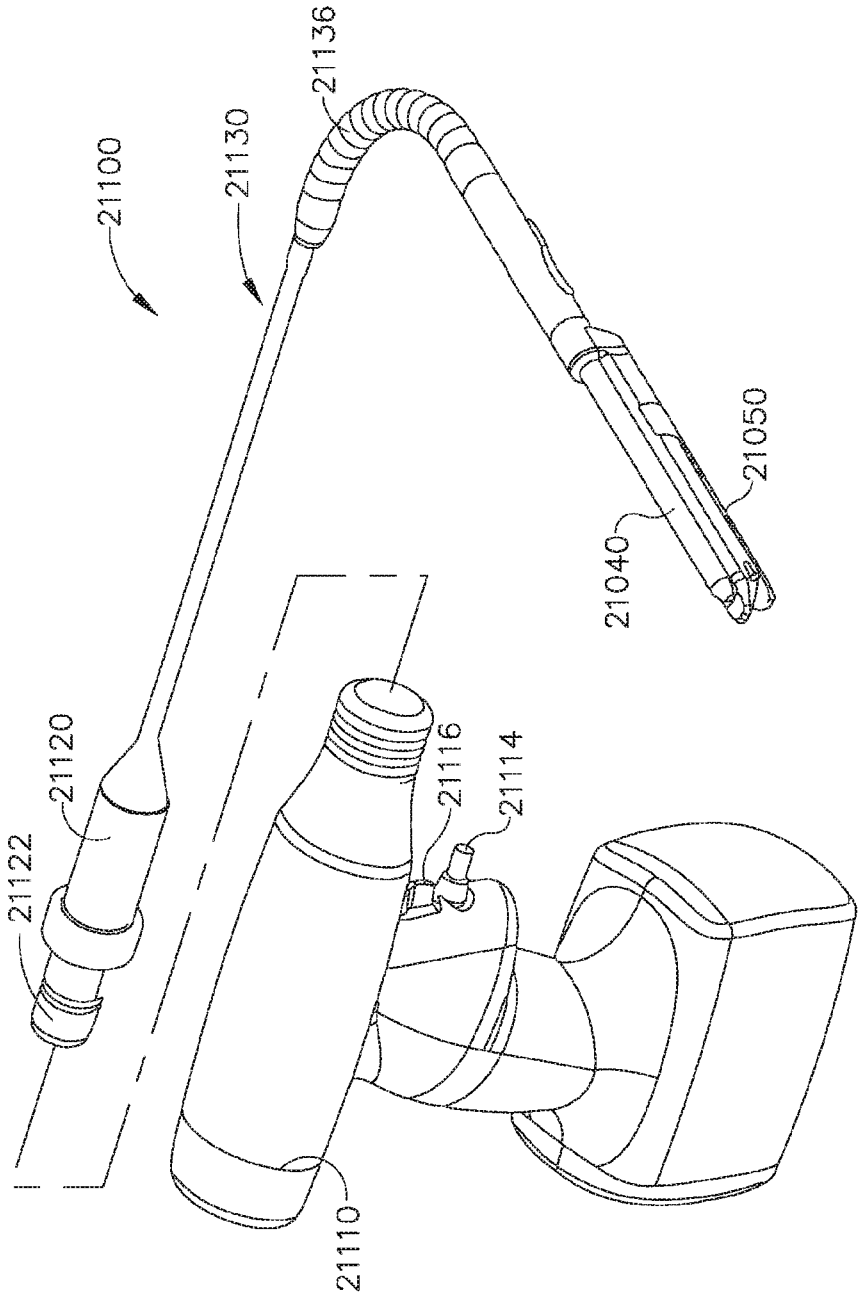


FIG. 82

MassagerPriorArt0003048

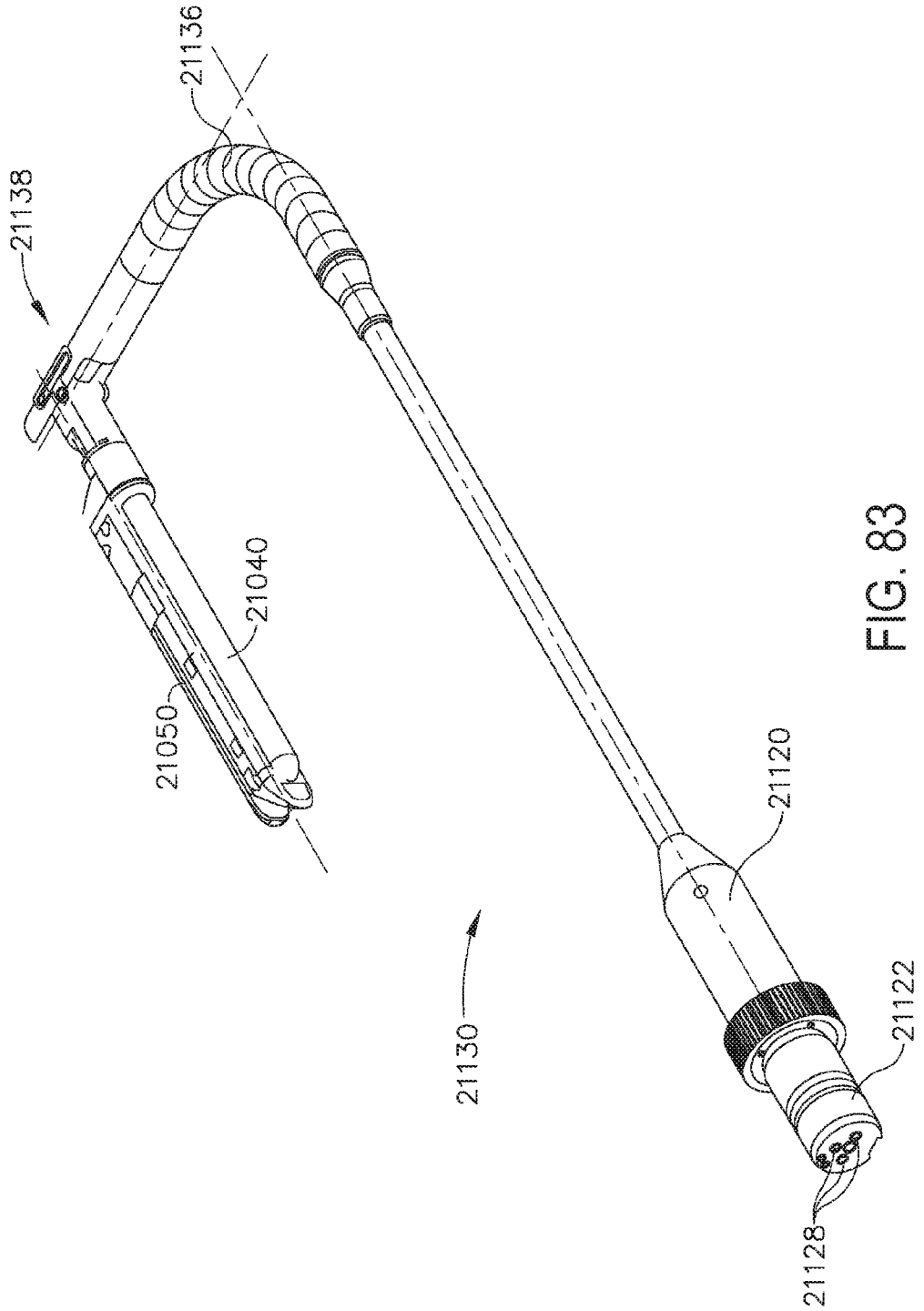


FIG. 83

MassagerPriorArt0003049

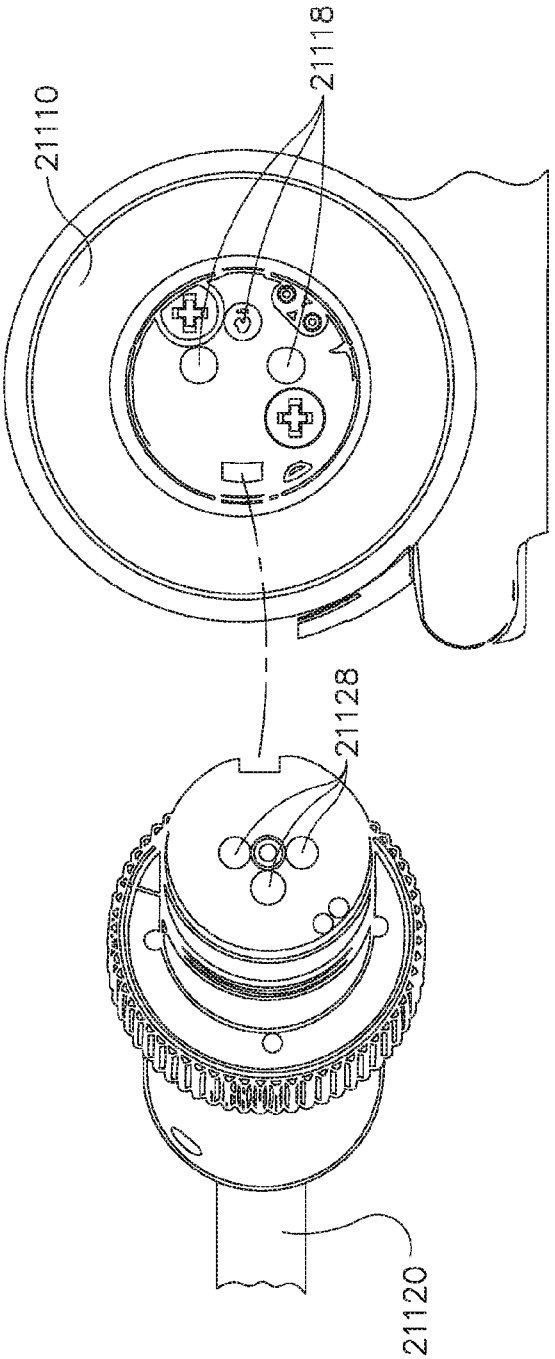


FIG. 84

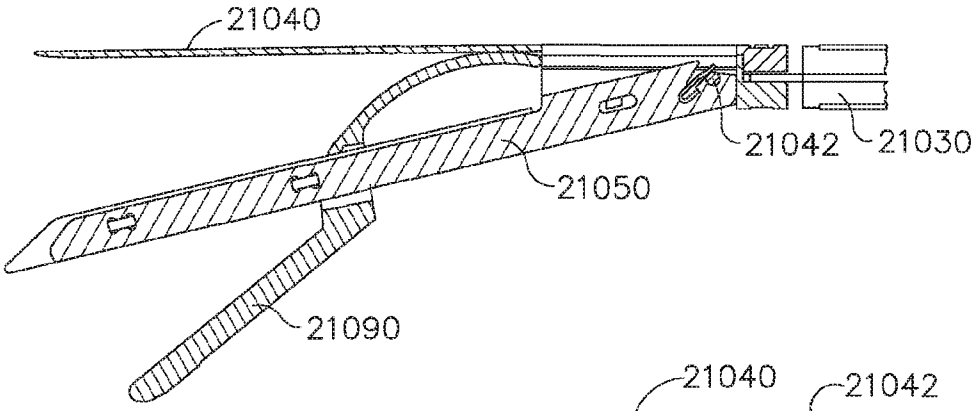


FIG. 85

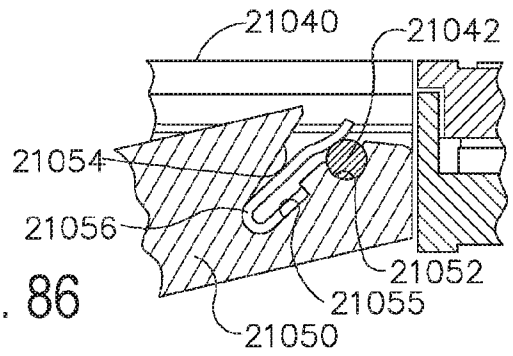


FIG. 86

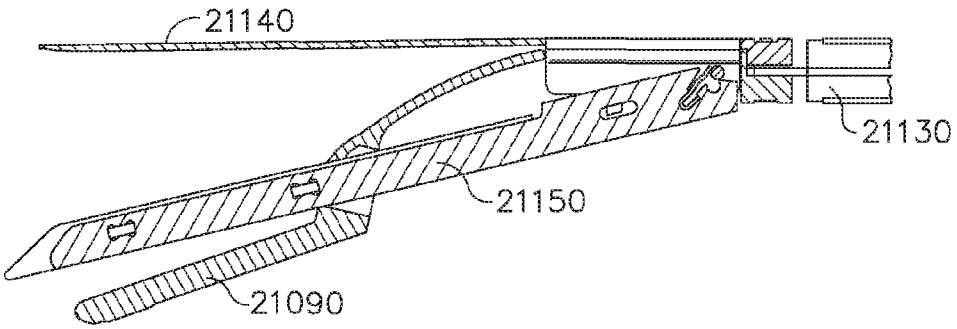


FIG. 87

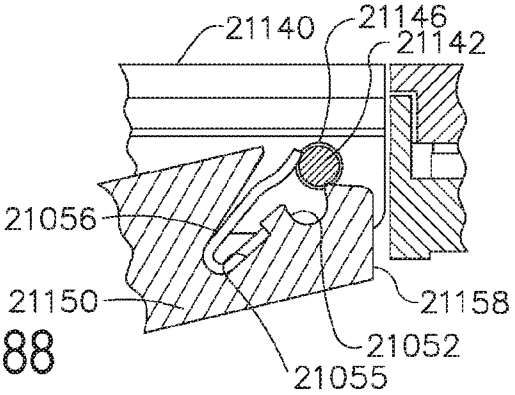


FIG. 88

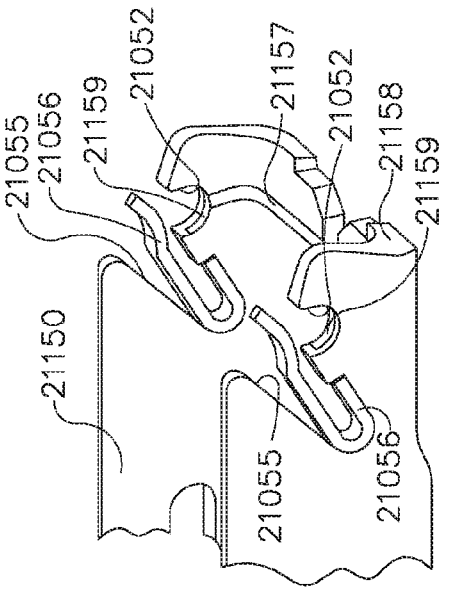


FIG. 90

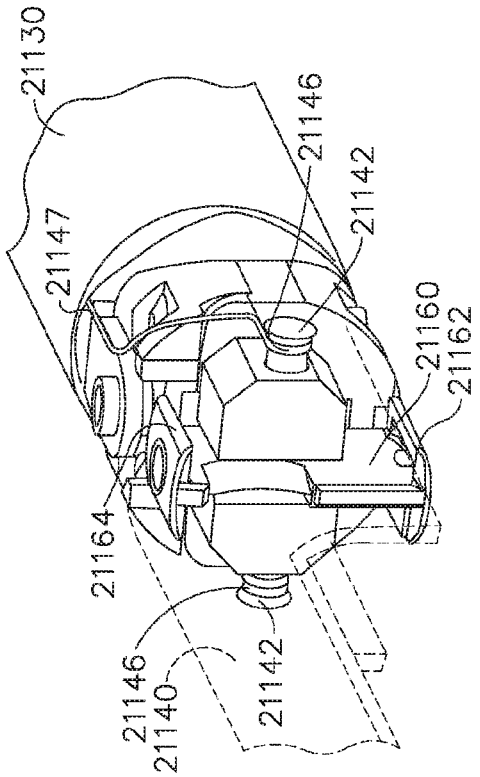


FIG. 89

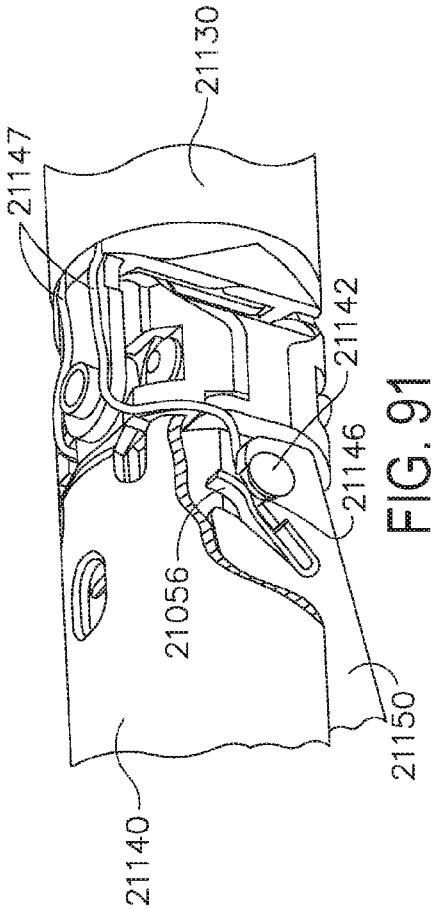


FIG. 91

Petitioner Therabody Ex-1004, 0695

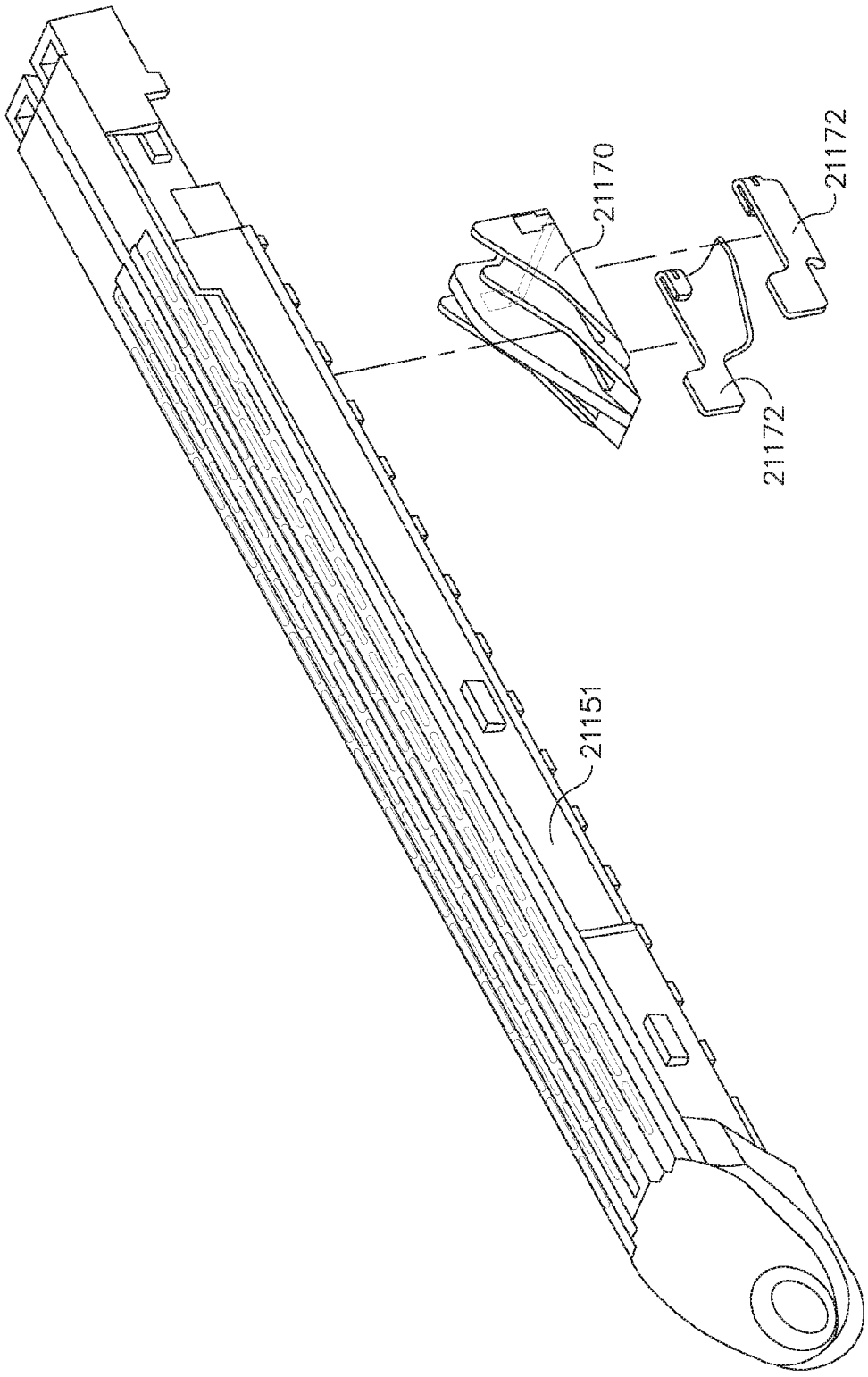


FIG. 92

Petitioner Therabody Ex-1004, 0696

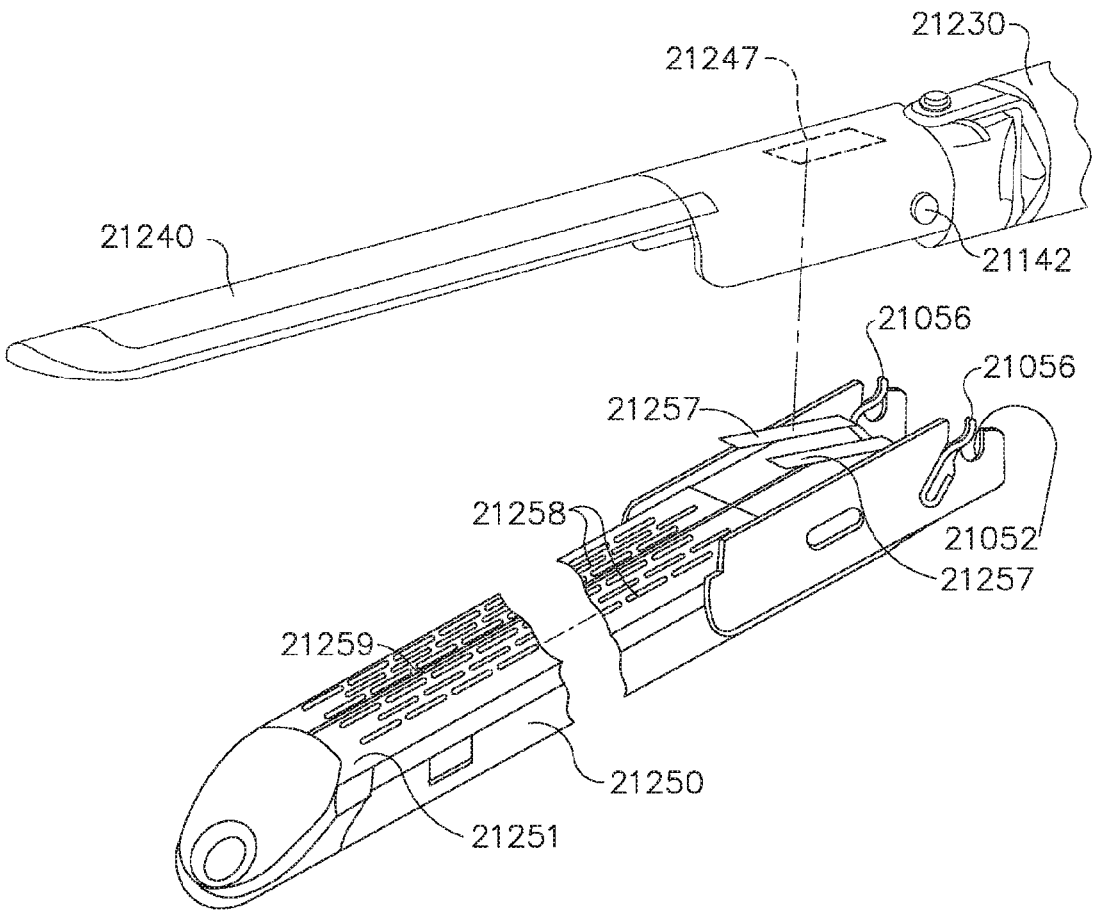


FIG. 93

Petitioner Therabody Ex-1004, 0697

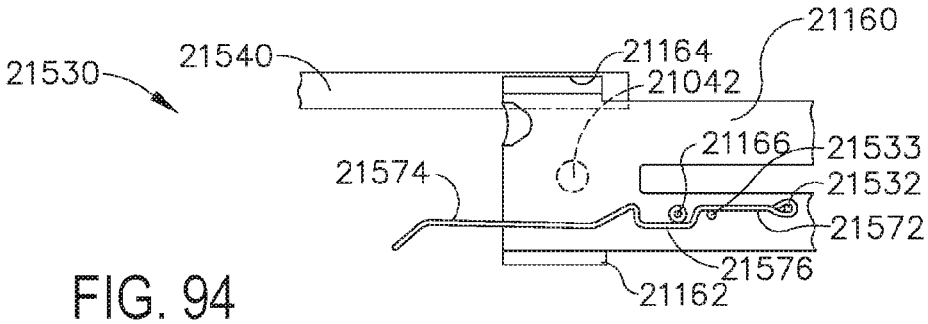


FIG. 94

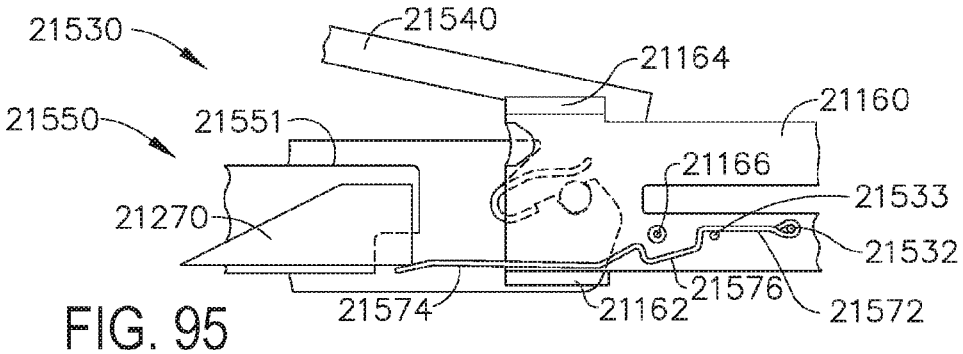


FIG. 95

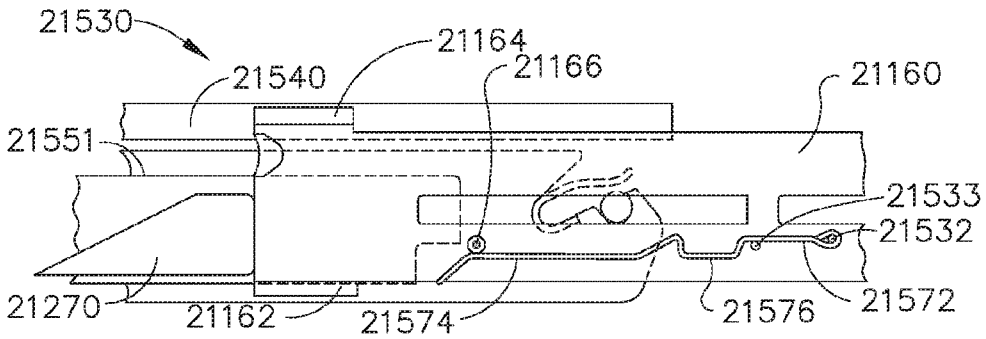


FIG. 96

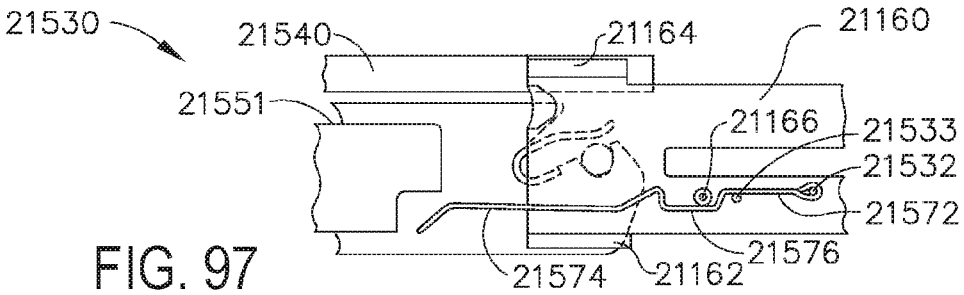


FIG. 97

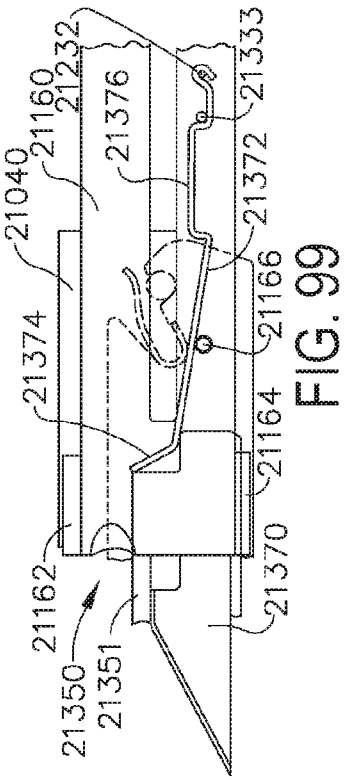


FIG. 99

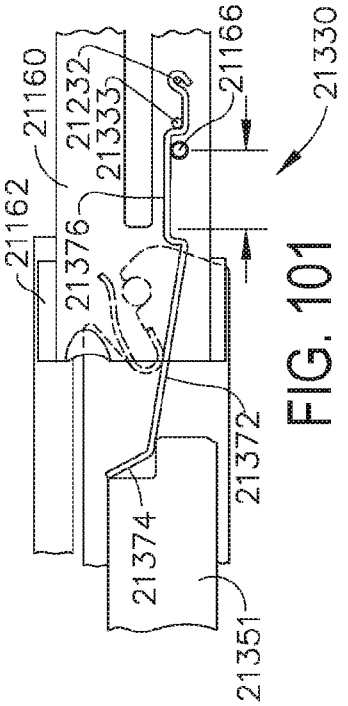


FIG. 101

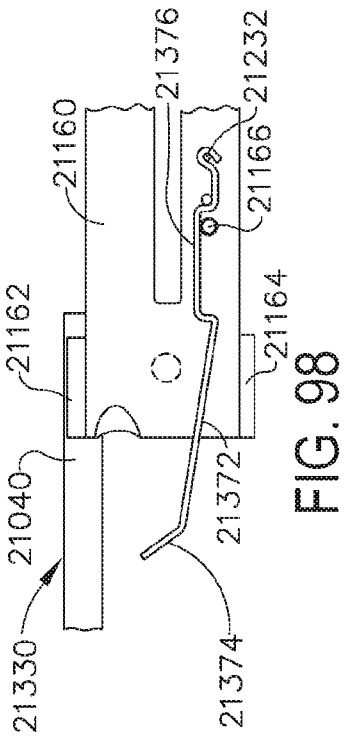


FIG. 98

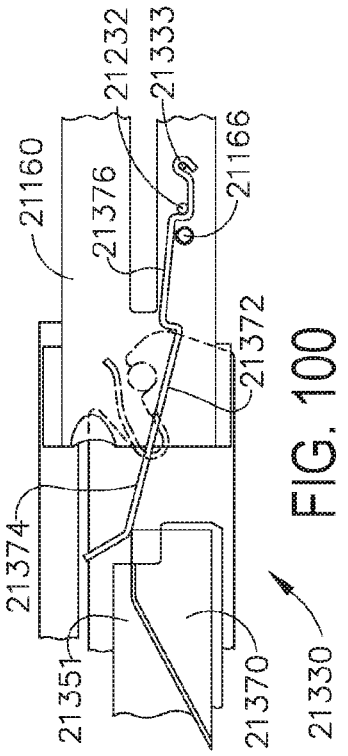


FIG. 100

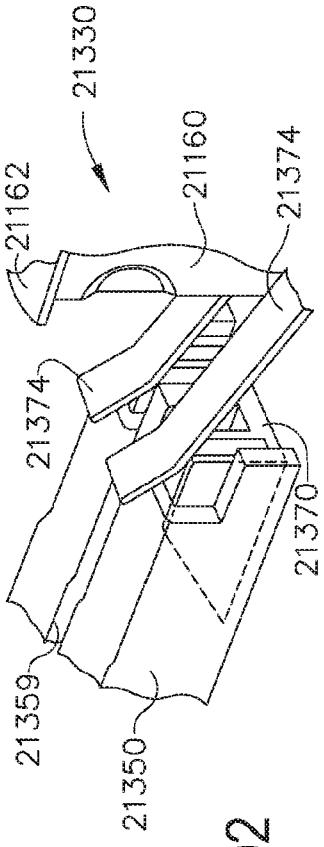


FIG. 102

MassagerPriorArt0003056

Petitioner Therabody Ex-1004, 0699

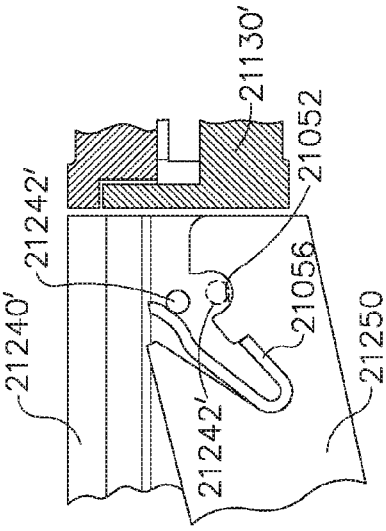


FIG. 104

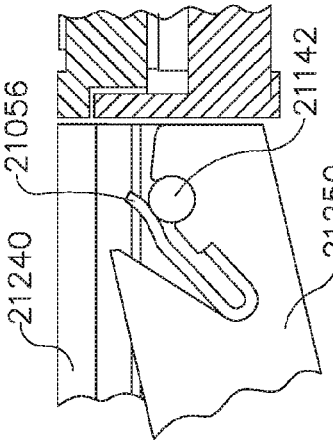


FIG. 105

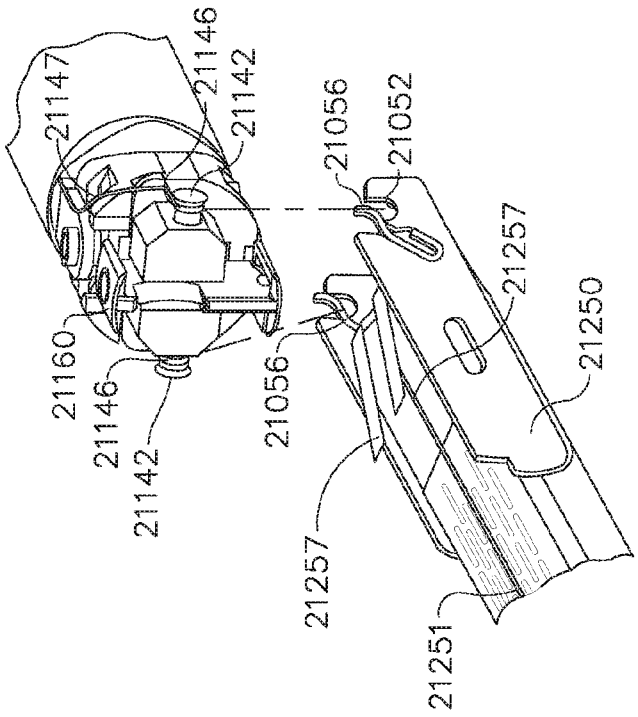


FIG. 103

Petitioner Therabody Ex-1004, 0700

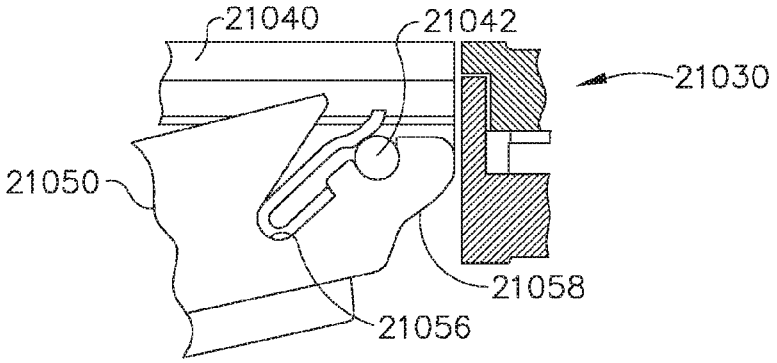


FIG. 106

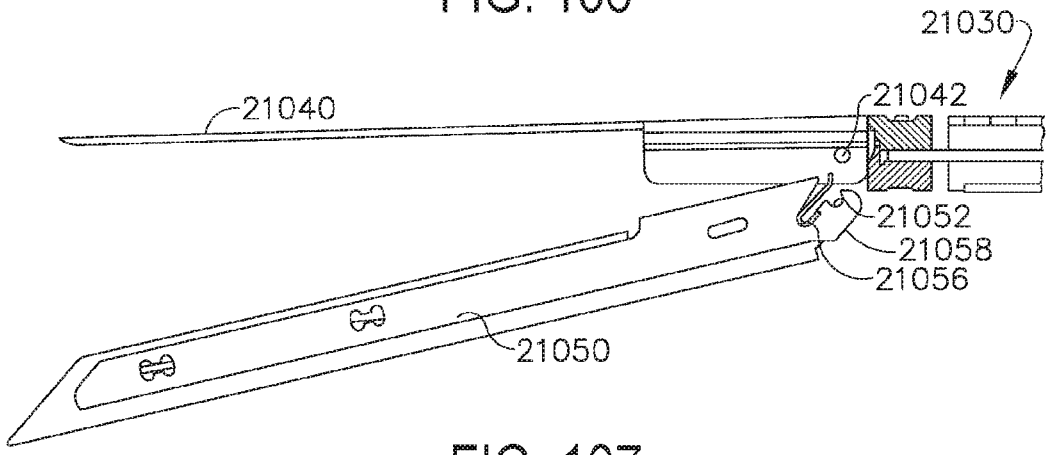


FIG. 107

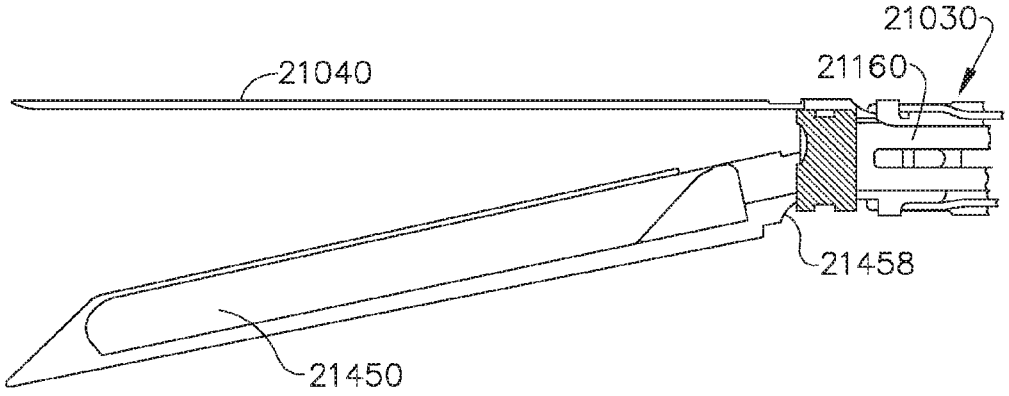


FIG. 108

Petitioner Therabody Ex-1004, 0701

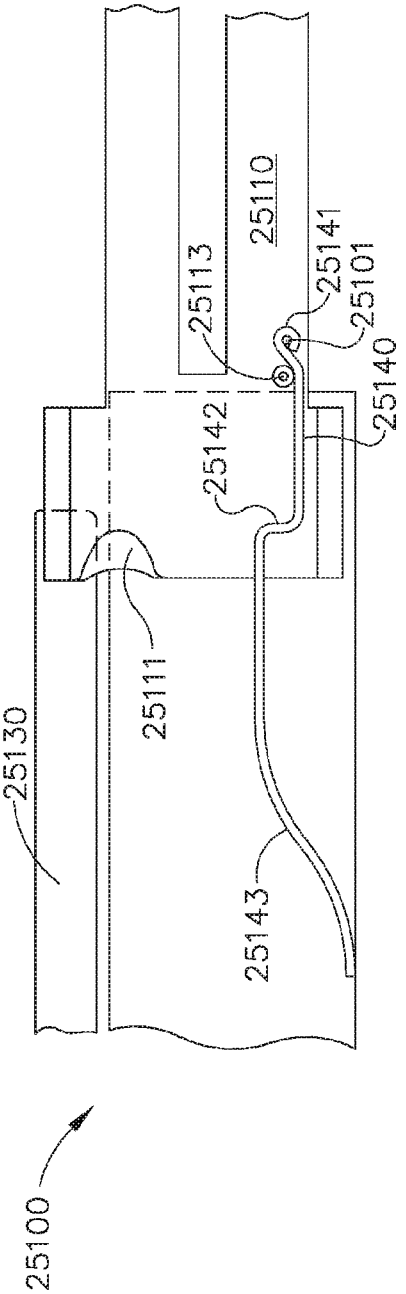


FIG. 109

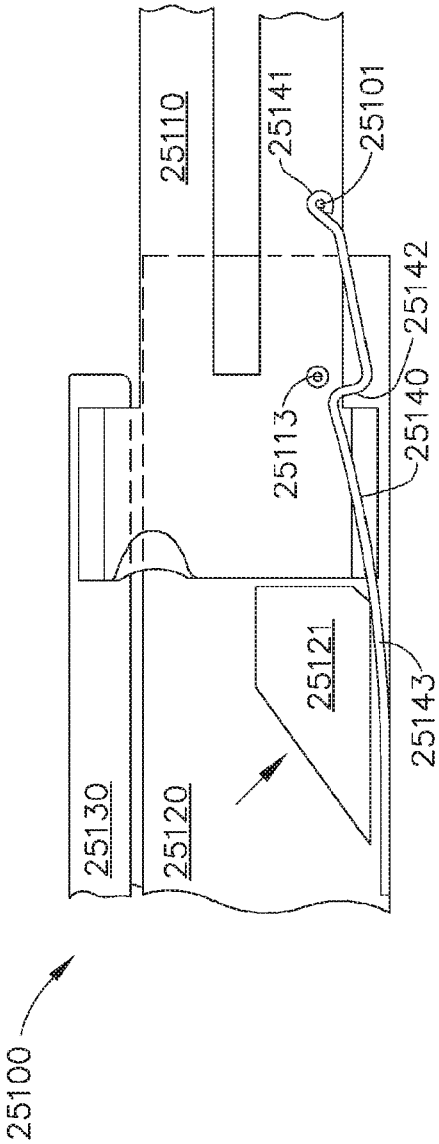


FIG. 110

Petitioner Therabody Ex-1004, 0702

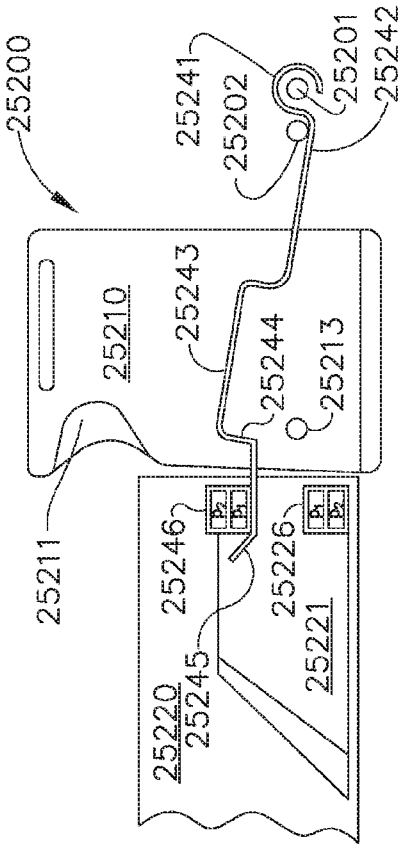


FIG. 112

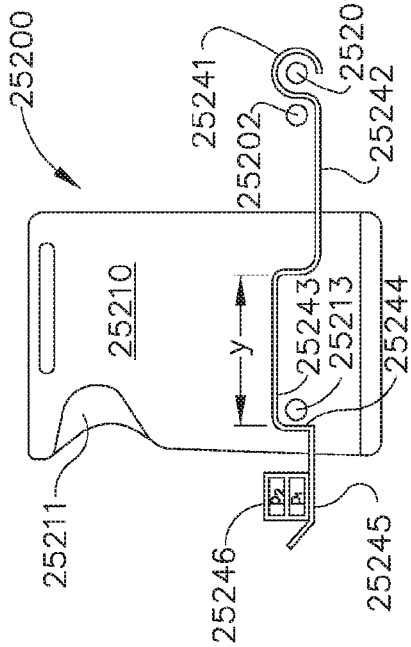


FIG. 111

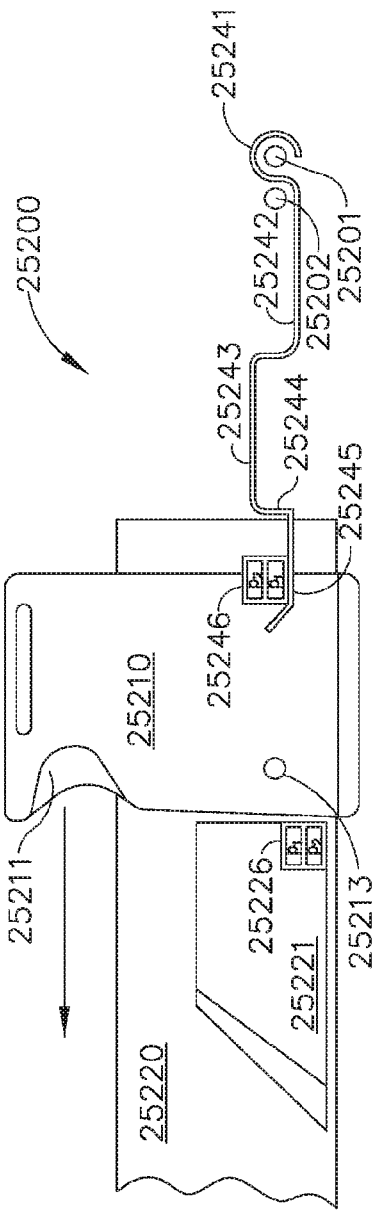


FIG. 113

Petitioner Therabody Ex-1004, 0703

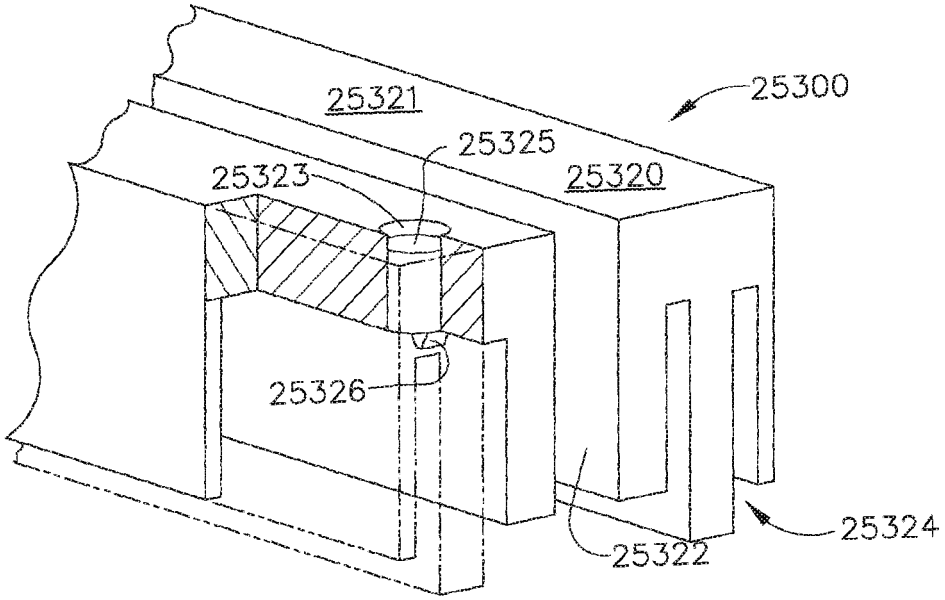


FIG. 114

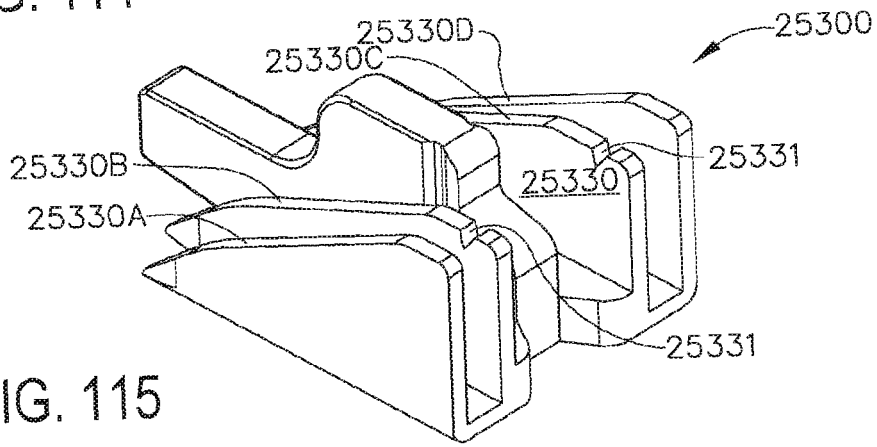


FIG. 115

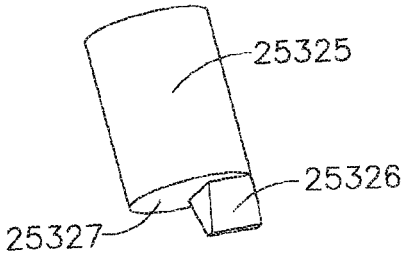


FIG. 116

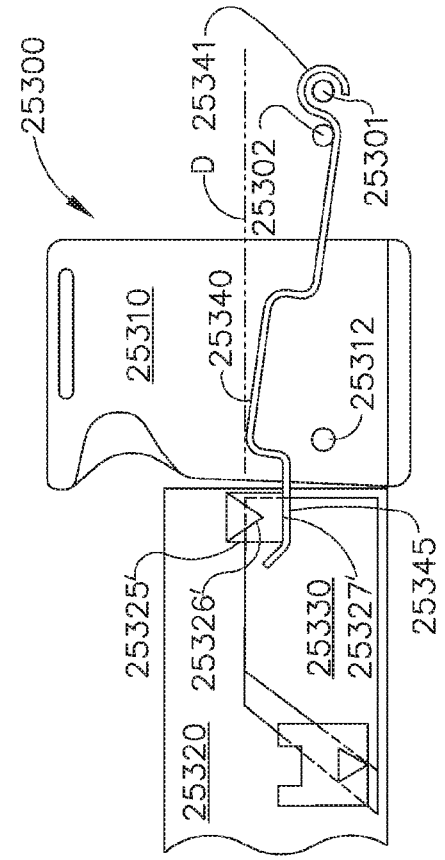


FIG. 118

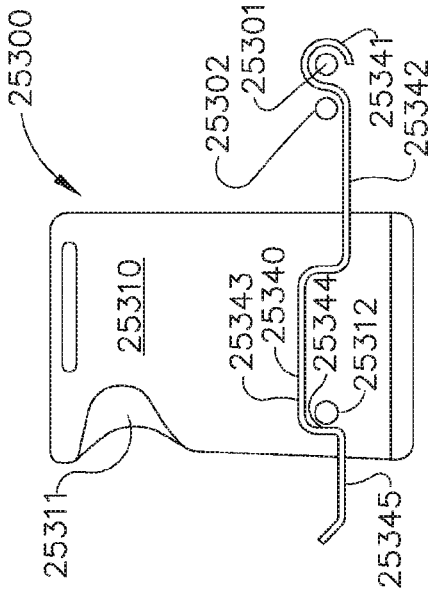


FIG. 117

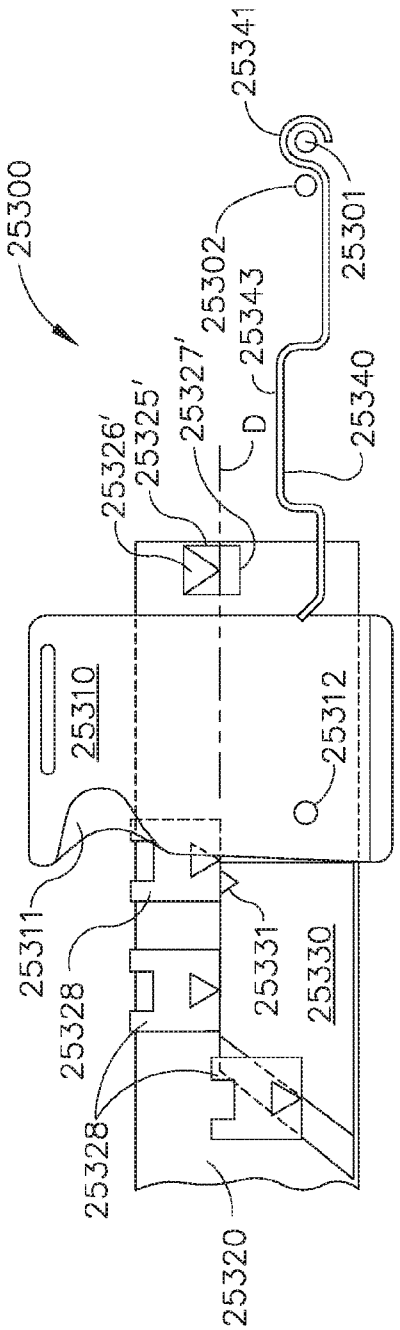


FIG. 119

MassagerPriorArt0003062

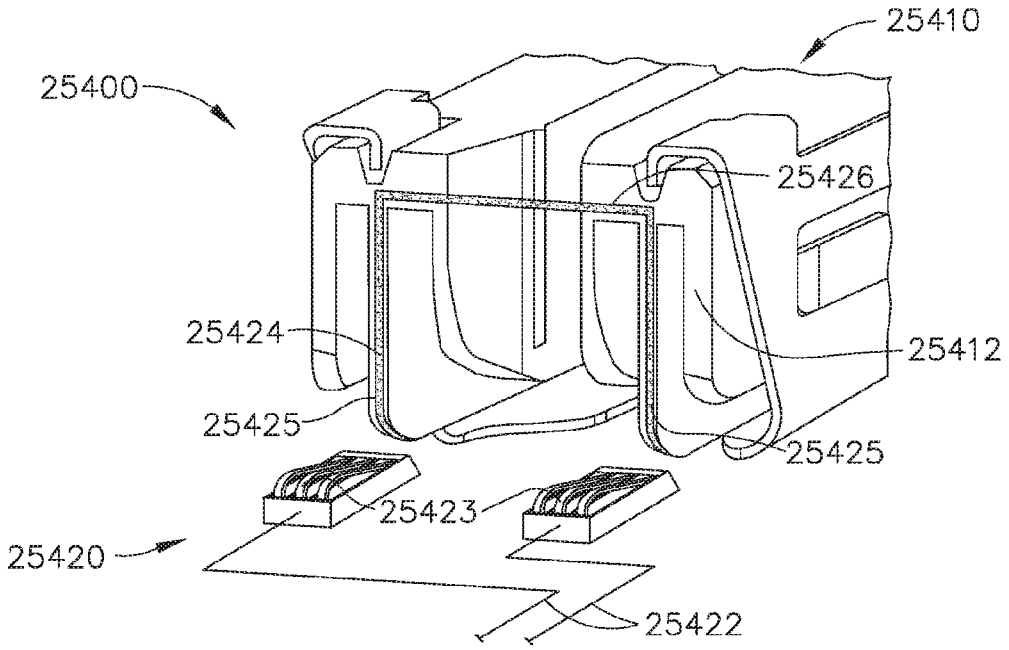


FIG. 120

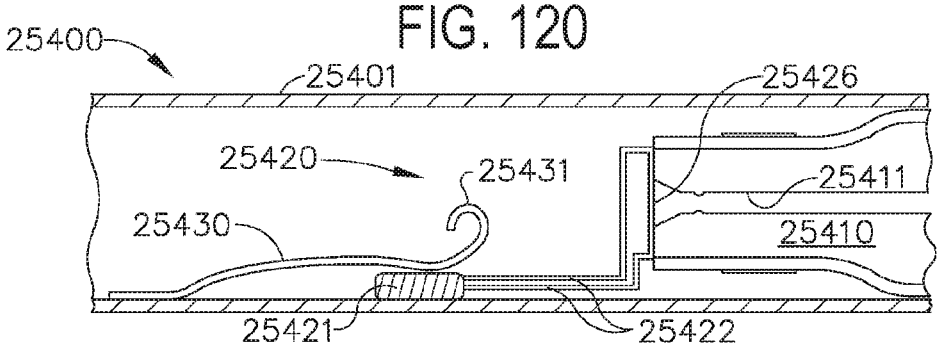


FIG. 121

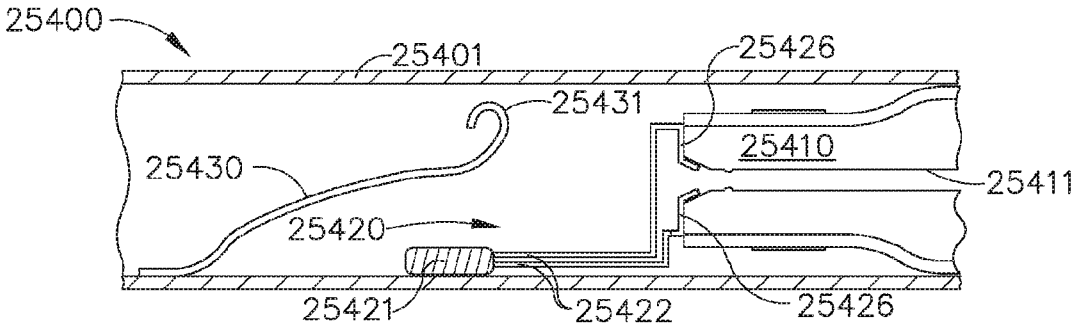


FIG. 122

Petitioner Therabody Ex-1004, 0706

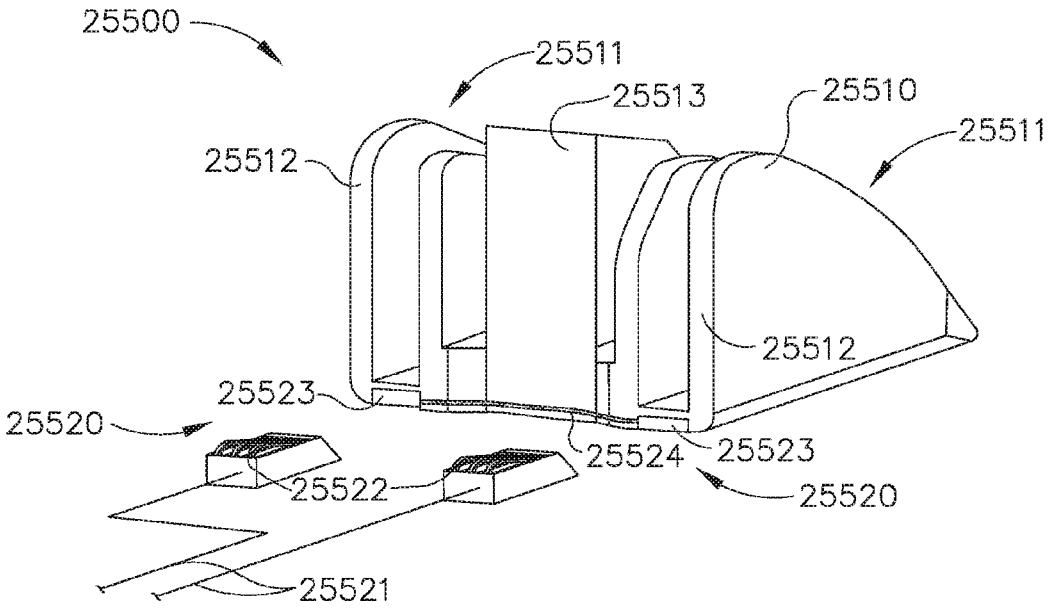


FIG. 123

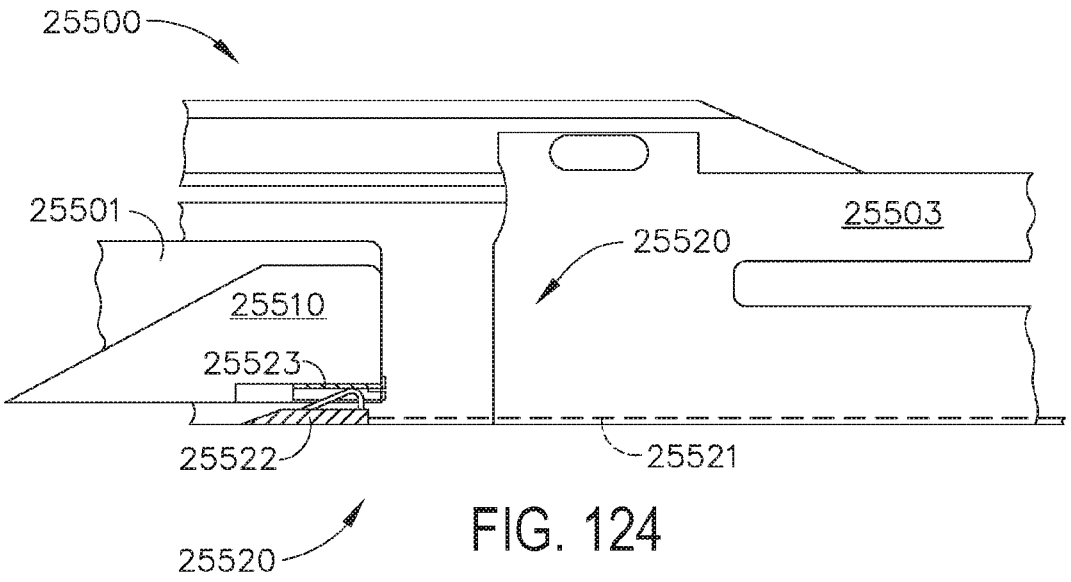


FIG. 124

Petitioner Therabody Ex-1004, 0707

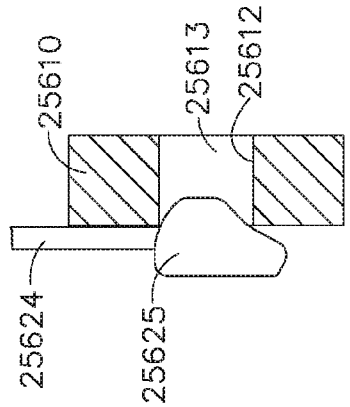


FIG. 126

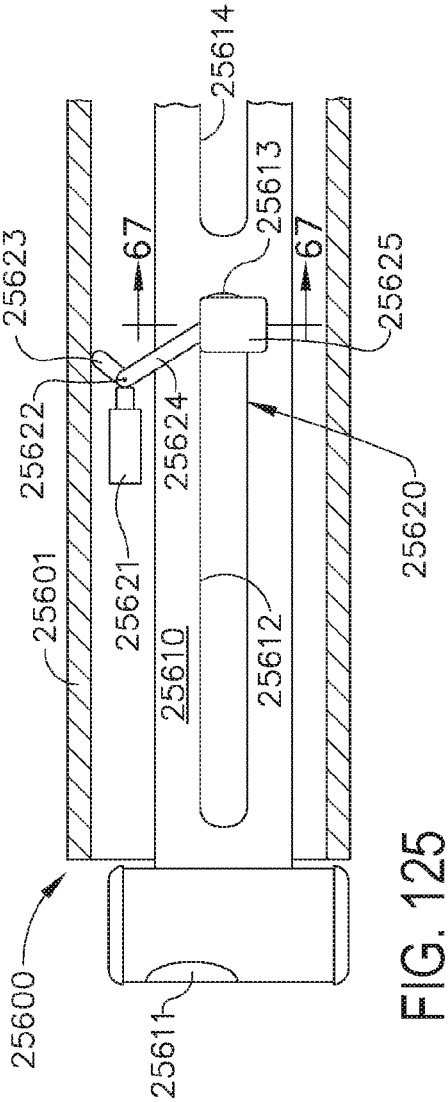


FIG. 125

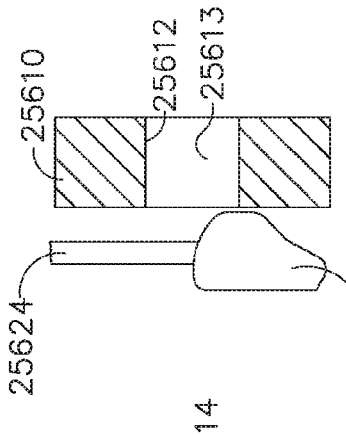


FIG. 128

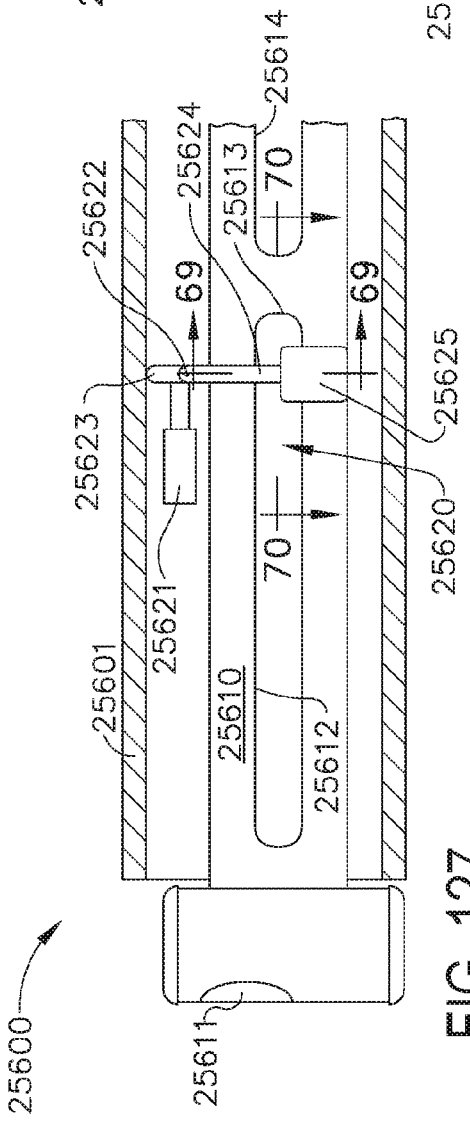


FIG. 127

MassagerPriorArt0003065

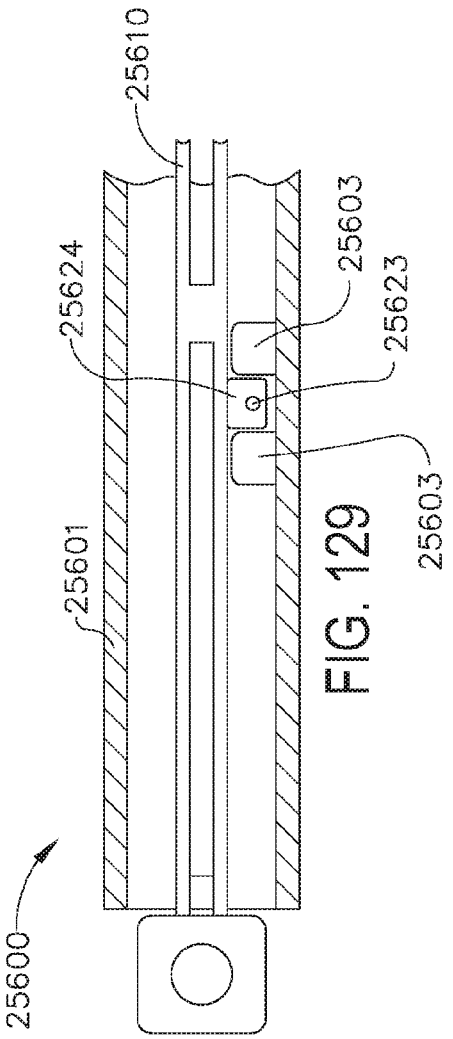


FIG. 129

Petitioner Therabody Ex-1004, 0709

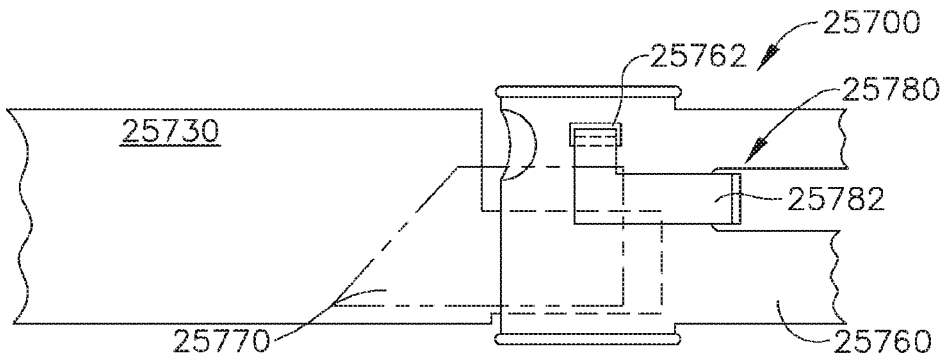


FIG. 130

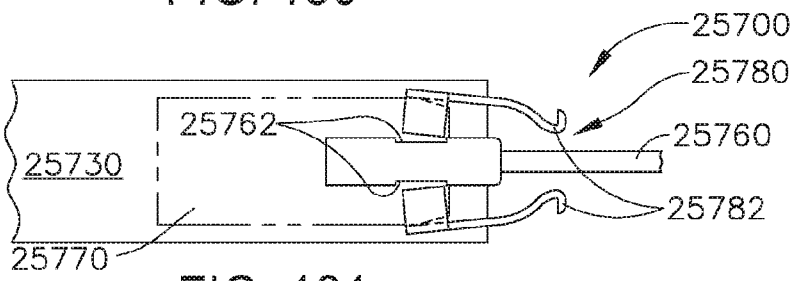


FIG. 131

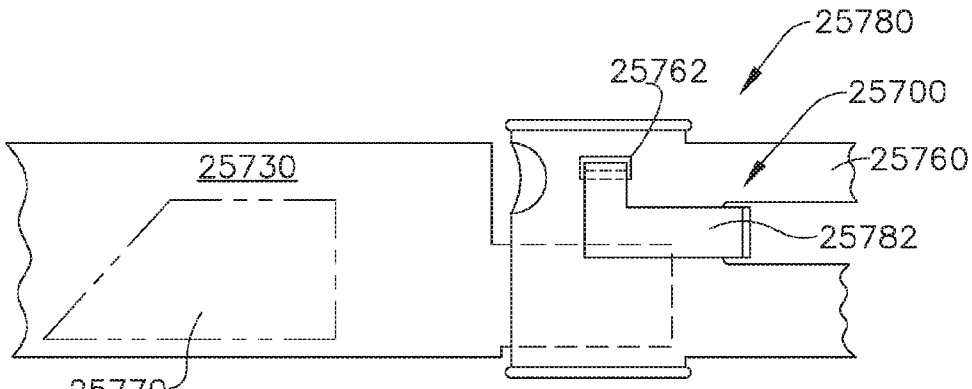


FIG. 132

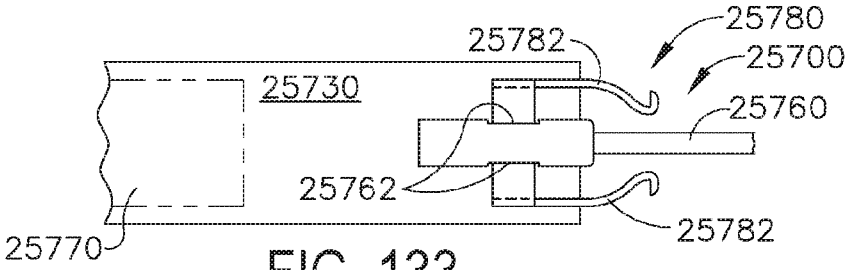


FIG. 133

Petitioner Therabody Ex-1004, 0710

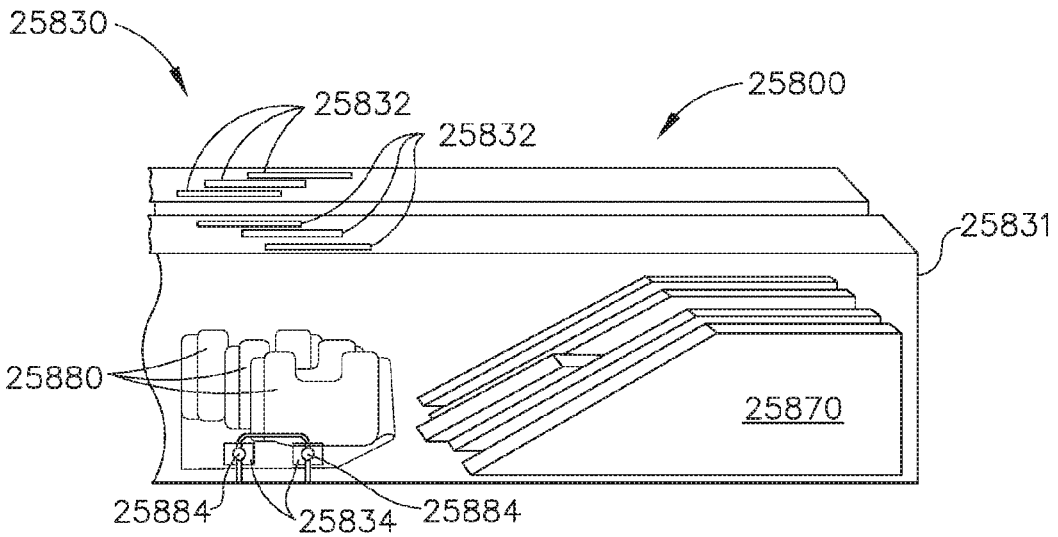


FIG. 134

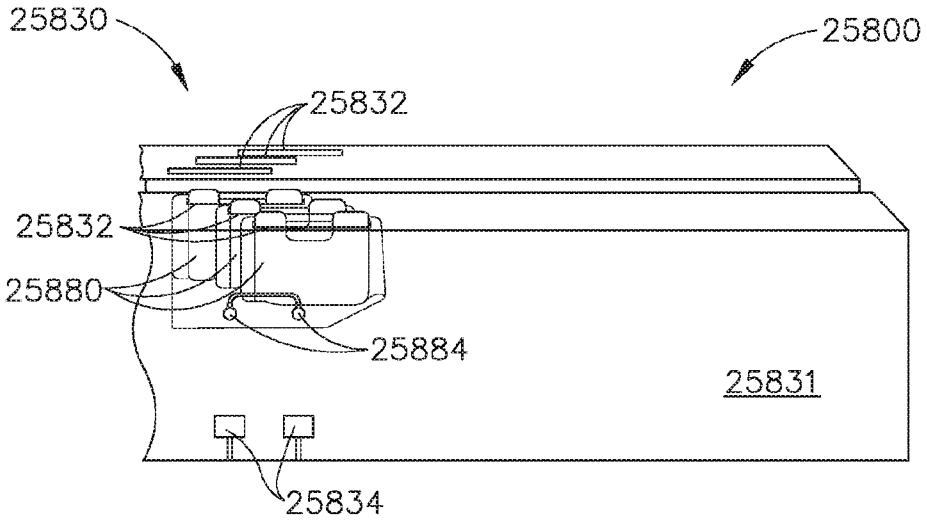


FIG. 135

Petitioner Therabody Ex-1004, 0711

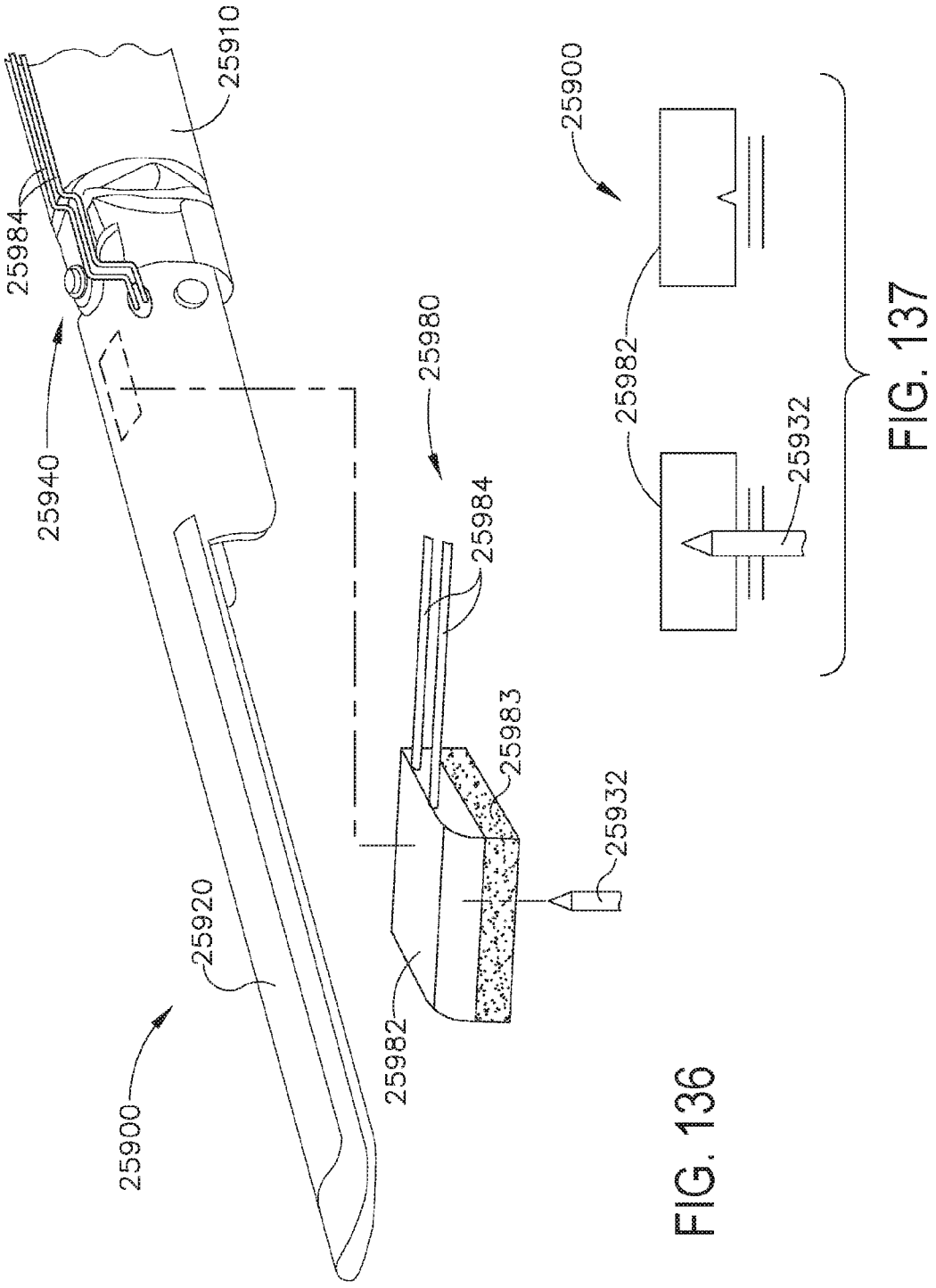


FIG. 136

FIG. 137

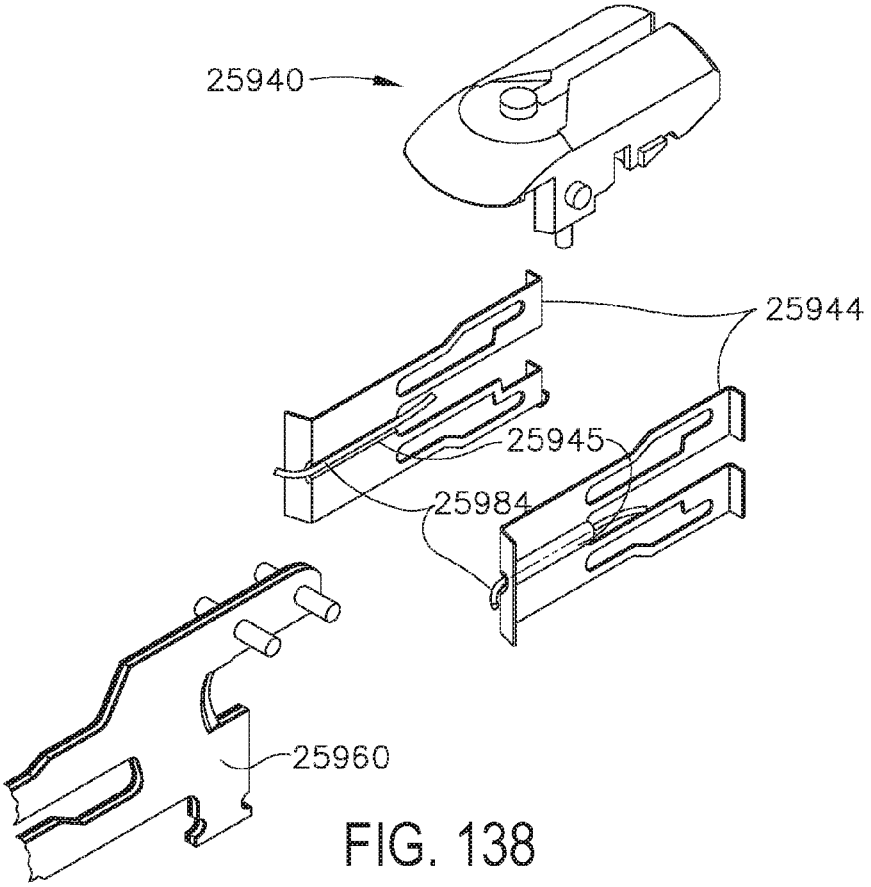


FIG. 138

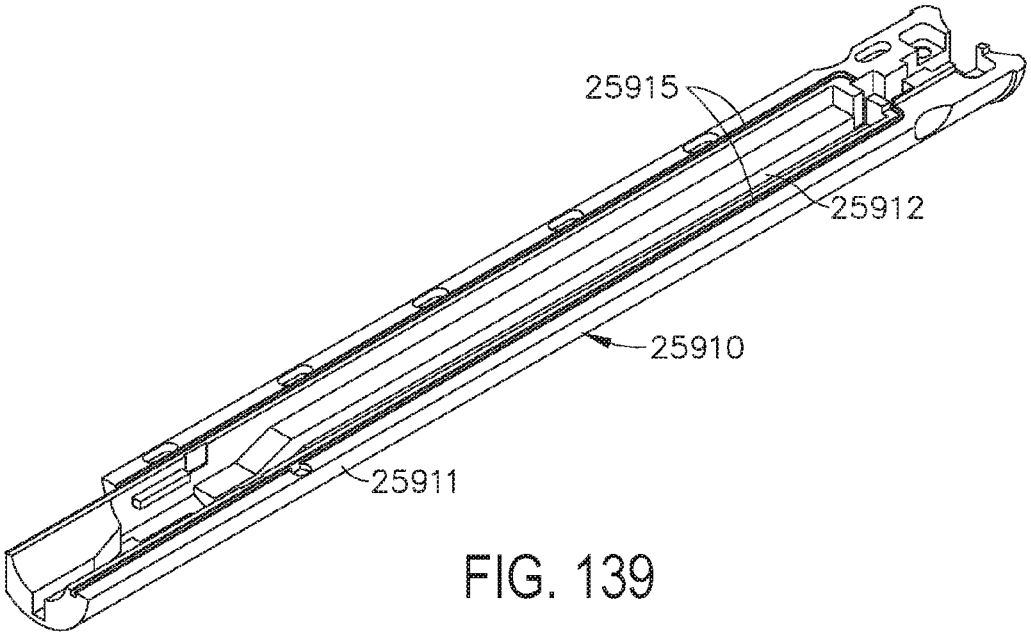


FIG. 139

Petitioner Therabody Ex-1004, 0713

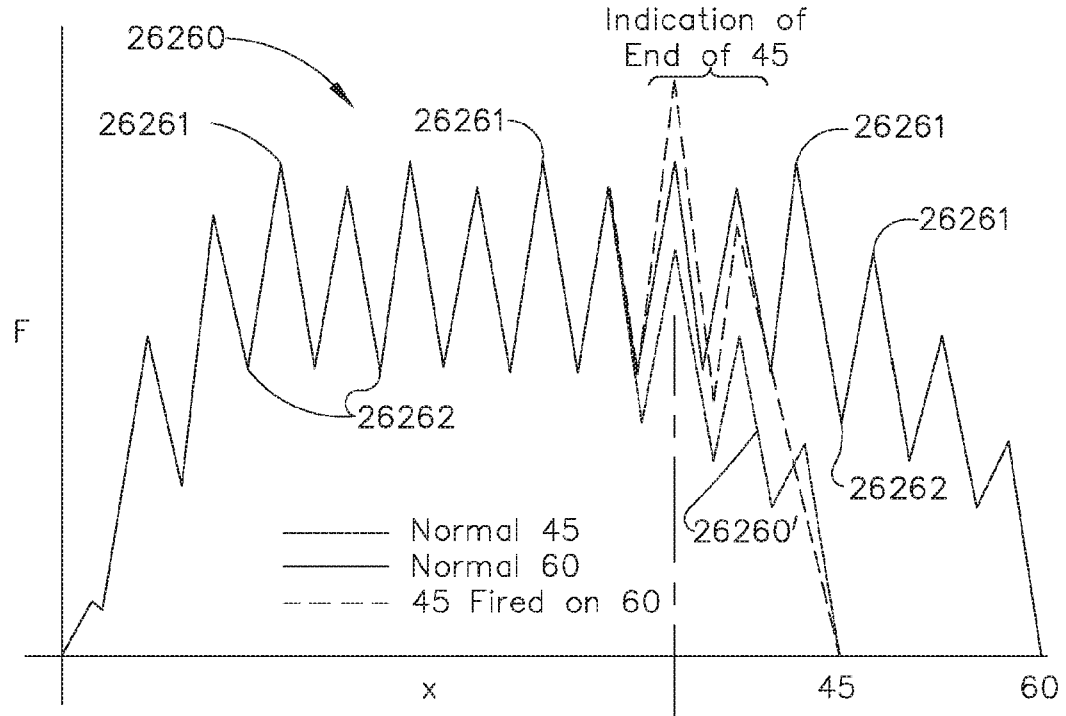


FIG. 140A

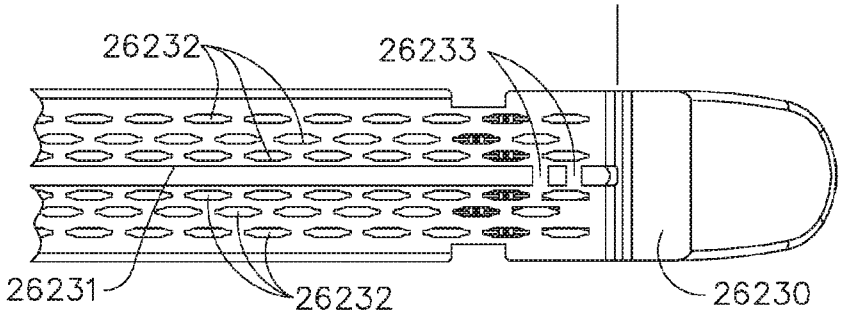


FIG. 140

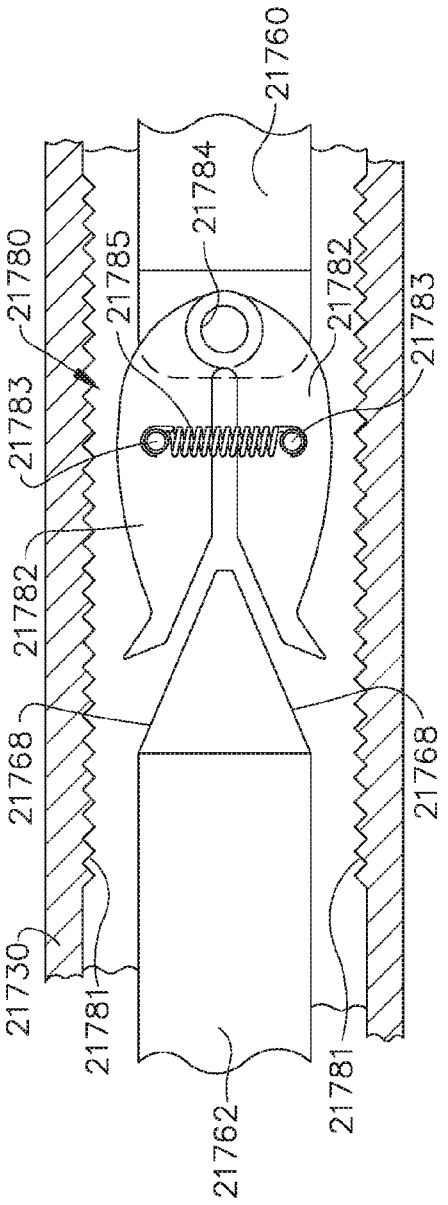


FIG. 141

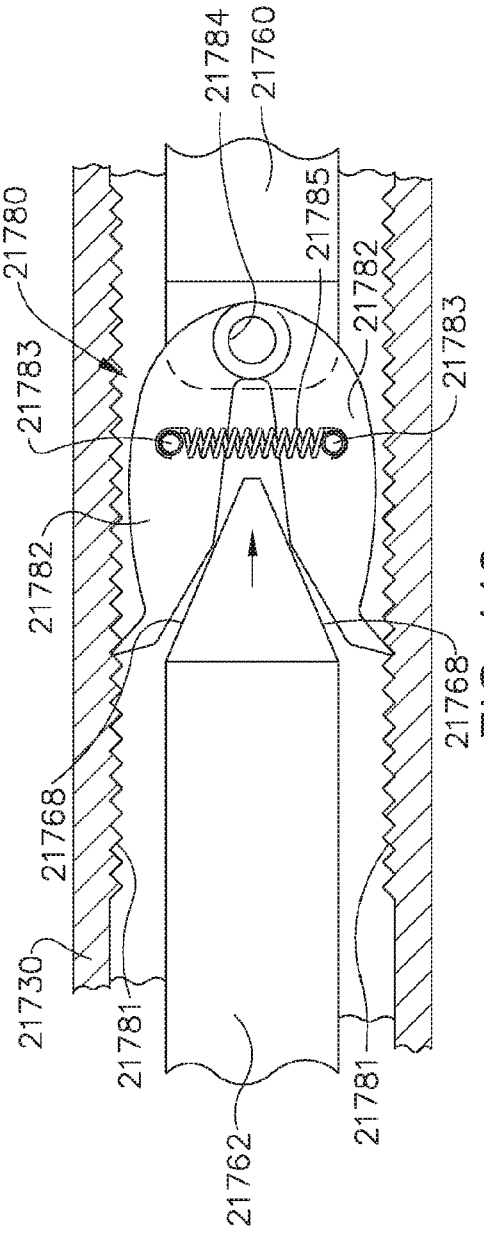


FIG. 142

Petitioner Therabody Ex-1004, 0715

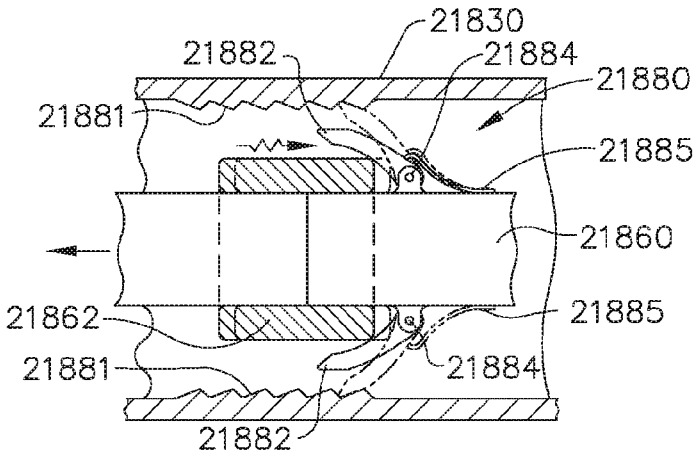


FIG. 143

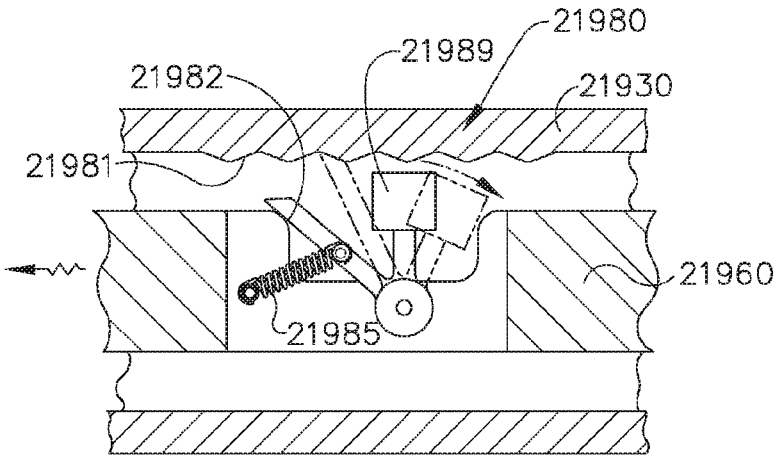


FIG. 144

Petitioner Therabody Ex-1004, 0716

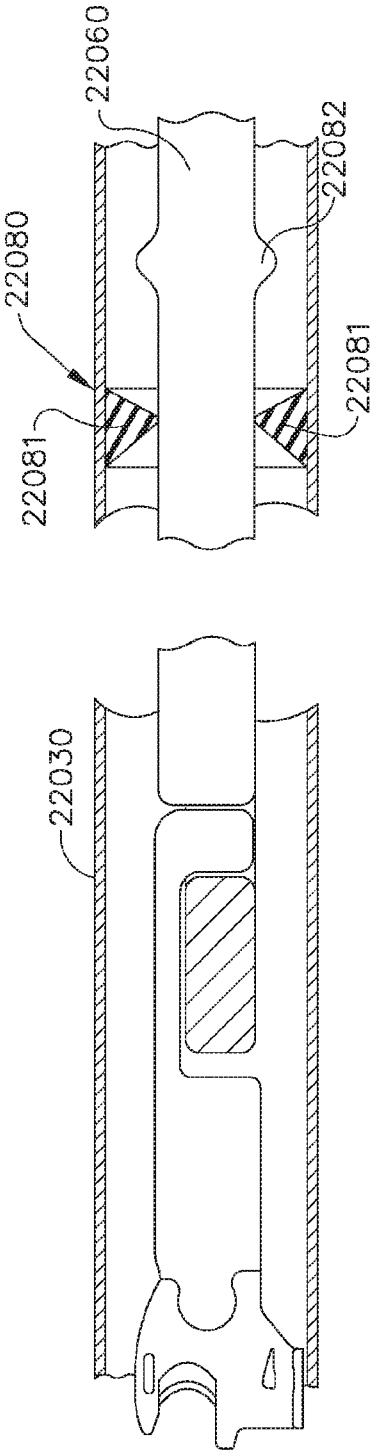


FIG. 145

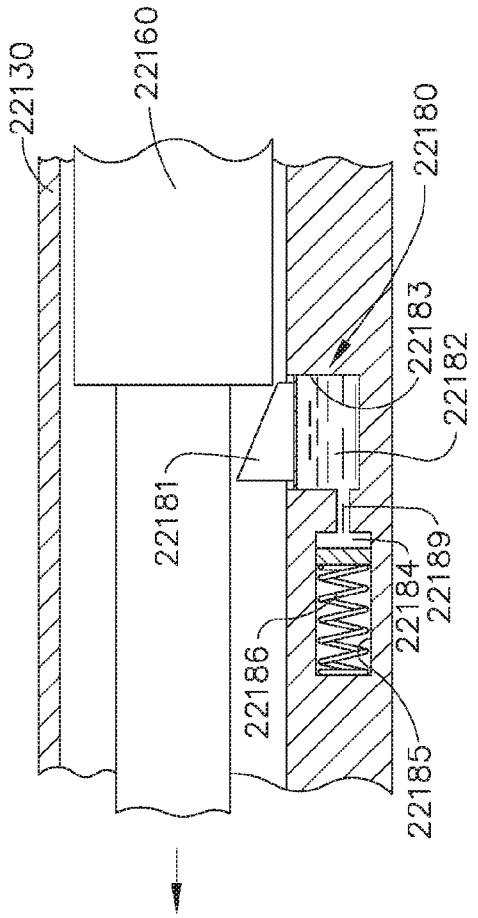


FIG. 146

Petitioner Therabody Ex-1004, 0717

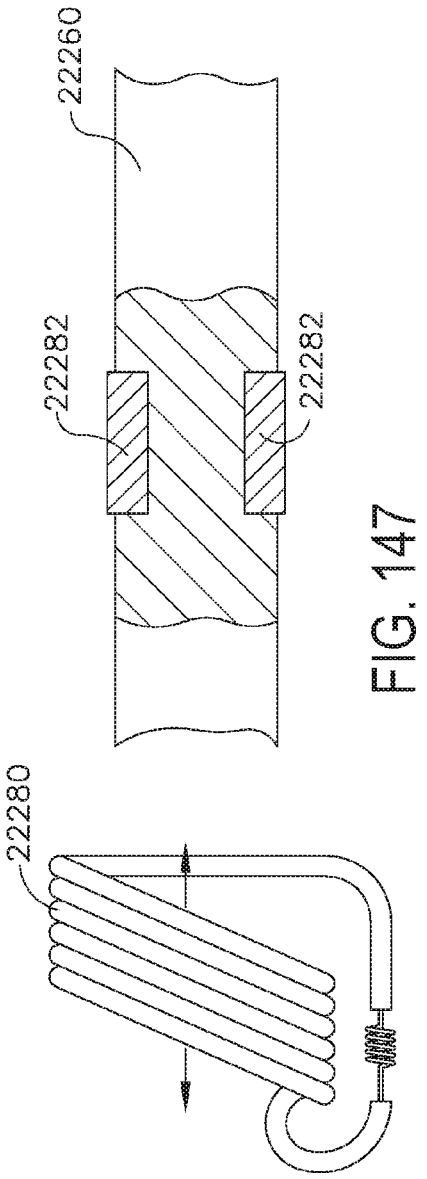


FIG. 147

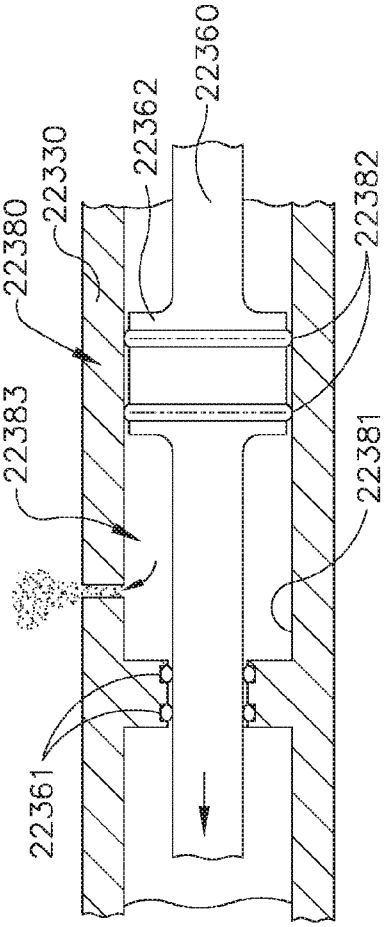


FIG. 148

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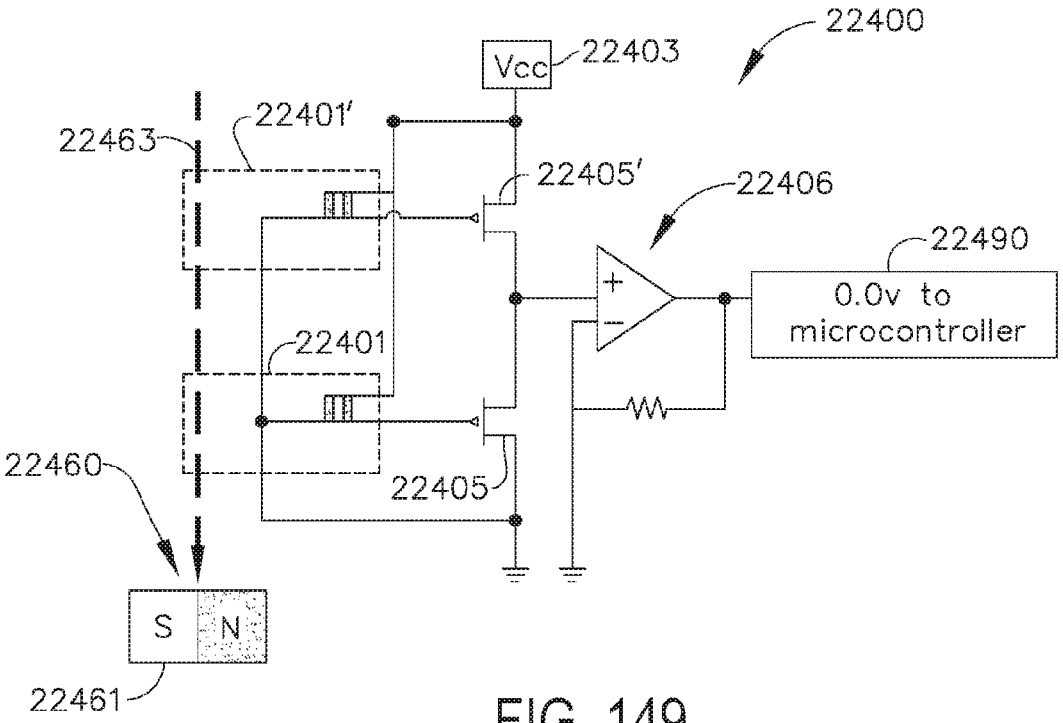


FIG. 149

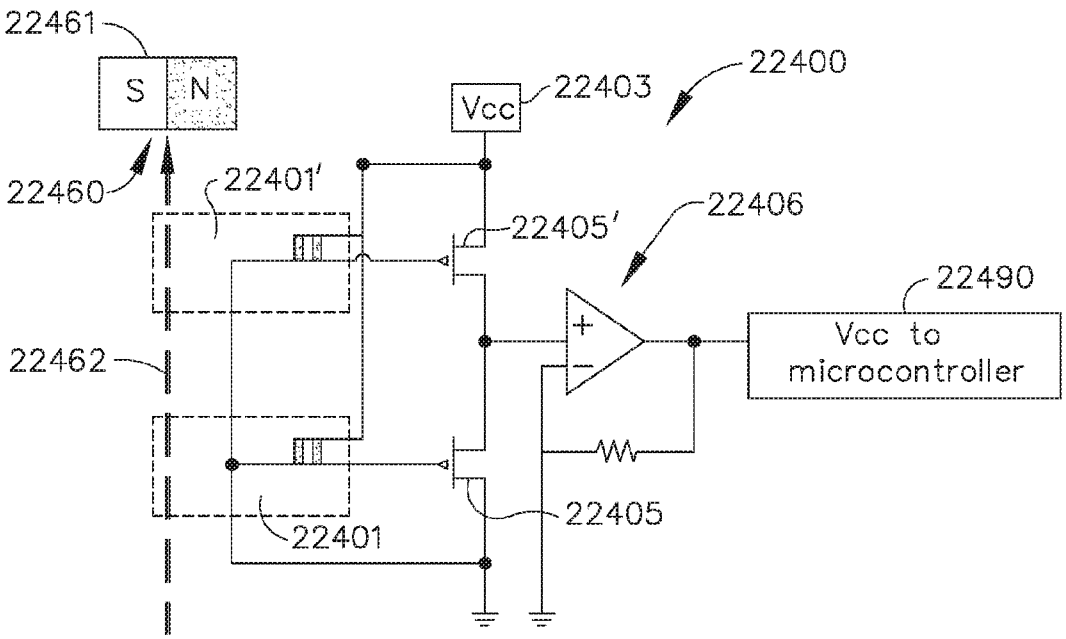


FIG. 150

Petitioner Therabody Ex-1004, 0719

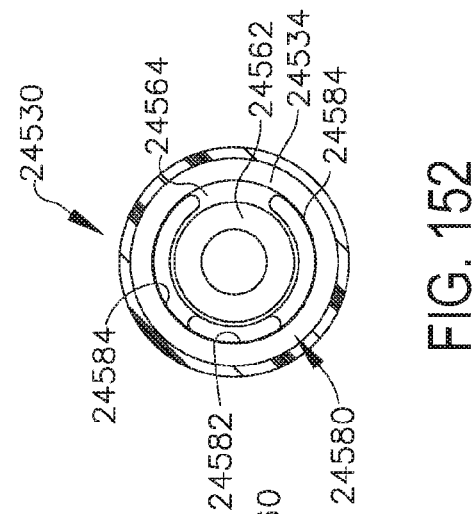


FIG. 152

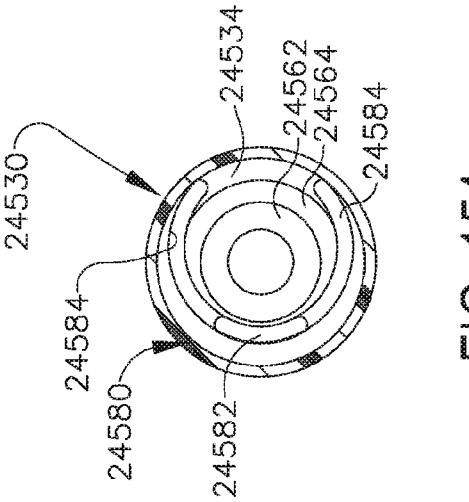


FIG. 154

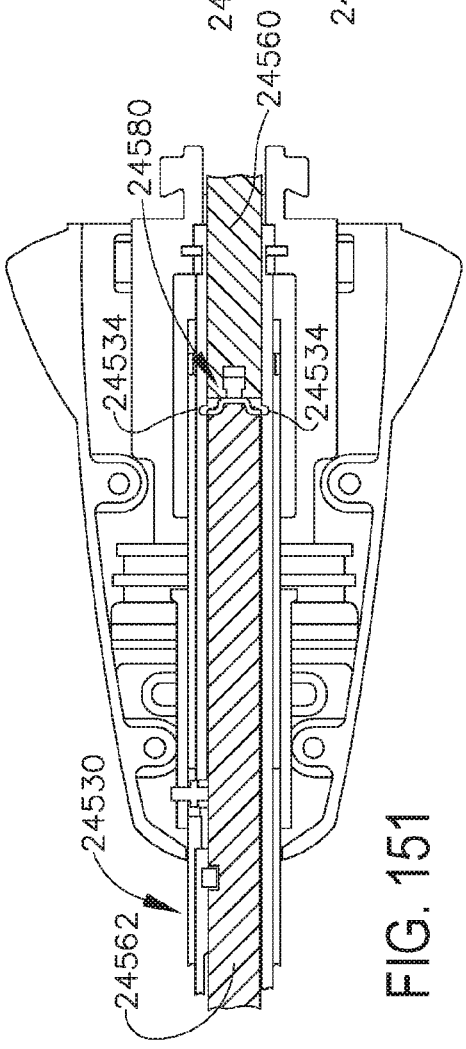


FIG. 151

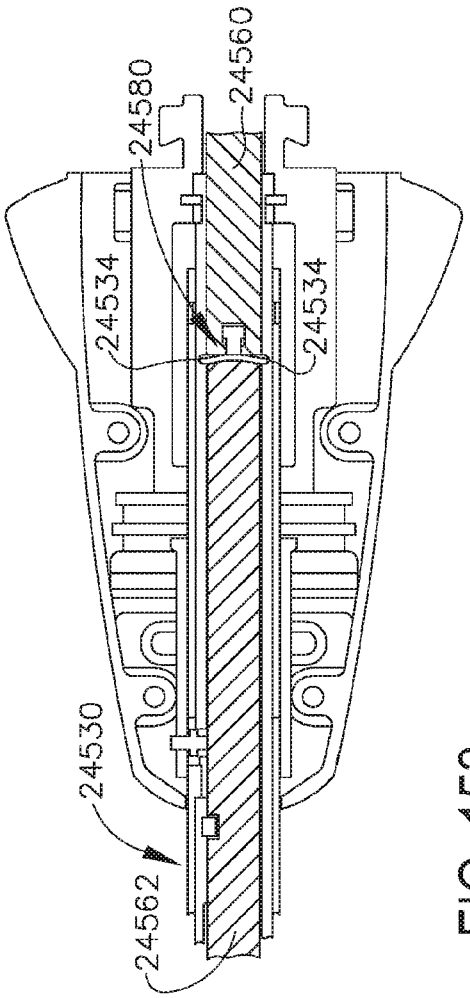


FIG. 153

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[19] Intellectual Property Office of the Republic of China

[12] Publication of Utility Model

[11] Certificate Number: TW M402573U1

[45] Date of Announcement: April 21, Republic of China 100 (2011)

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[72] INVENTOR

HUANG, CHIH KAN（TW）

Number of claims: 7 Number of drawings: 4 23 pages in total

[54] INVENTION TITLE

Power Display Structure of Wireless Microphone

[57] ABSTRACT

The present utility model relates to a power display structure of a wireless microphone, and particularly to a power display structure of a wireless microphone which is beneficial to detect a power condition and has a high quality, and comprises a holder for holding, a circuit frame for assembling electrical components, a connector locked on a top end of the holder, and a net head mounted on the top end of the holder through the connector. The holder has a battery seat therein for providing a power source, and the circuit frame is provided inside the holder, while the circuit frame has a light-emitting circuit board at a corresponding connector, the light-emitting circuit board being provided with one or more first and second light-emitting elements of different colors at an inner edge of the corresponding connector, the connector having an exposed light-transmitting display ring, whereby when the power is sufficient, the circuit board can start the first light-emitting element to emit light, whereas when the power is insufficient, the circuit board extinguishes the first light-emitting element and starts the second light-emitting element, so that the user can judge the power consumption condition of the microphone by using chromatic aberration, while since the light-transmitting display ring of the connector is a complete ring design, it can greatly improve the convenience of viewing and avoid other problems caused by insufficient power.

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V Description of the utility model

Power Display Structure of Wireless Microphone

Technical Field

The present utility model relates to the technical field of a wireless microphone, and more particularly, to a power display structure of a wireless microphone, so that a user can easily distinguish a power condition of the wireless microphone.

Background Art

According to the present utility model, a microphone is an electronic product for receiving the sound of speaking or singing, and transmitting the sound to a receiver and an amplifier to amplify and output, or recording and storing the sound. The conventional microphone is mainly provided with a sound head covered by a net head at a top end of a handle, and a signal line connected to the amplifier is connected at a bottom end of the handle. The signal line can transmit a sound signal and provide a power source for the microphone, but is limited by the signal line, which affects the convenience and range of the user's movement. Therefore, a wireless microphone has been developed.

Generally, a wireless microphone is adapted to be held by a user within a certain range, namely, during use, the wireless microphone is completely powered by an internal battery, so that a battery is provided on the wireless microphone to provide a required power source. In other words, the effectiveness of the use of the wireless microphone is completely dependent on the power of the battery, that is to say, when the power of the battery is insufficient, it may directly affect the quality and effect of the reception, and cause the problem that the audio is interrupted or the microphone is unable to sound, thus affecting the convenience of use.

In the existing wireless microphone, in order to remind the user that the battery shall be replaced in time when the power is insufficient, a power indicator lamp is usually provided on the wireless microphone. Through the circuit design, when the indicator lamp is gradually turned off or turned on, it is available for the user to view. However, since it is only a bright spot, the holding posture and orientation and even continuously moving or dancing of the user, in the process of use, will directly affect the user's viewing and the purpose of warning the power shortage would be lost, resulting in the wireless microphone being interrupted or having defects in the reception due to the lack of power supplied by the battery.

In other words, the electric power warning of the existing wireless microphone cannot meet the requirements of practical use, resulting in the problem that it is difficult to

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view and inconvenient to use, so it is necessary to further improve it.

Therefore, the inventor deeply explores the problems faced by the use of the above-mentioned existing wireless microphone, actively seeks a solution by many years of manufacturing and development experience in relevant industries, and finally creates a power display structure of a wireless microphone through continuous research and trials, thereby overcoming the problems and inconveniences caused by the poor power display effect of the existing wireless microphone.

Summary of the Utility Model

Accordingly, it is an object of the present utility model to provide a power display structure of a wireless microphone, which enables a user to clearly recognize a power condition regardless of a holding posture, an orientation, or a shaking, thereby ensuring the quality of reception and improving convenience of use.

Accordingly, the present utility model has been made to achieve the above-mentioned objects and effects through the following technical means: comprising a holder, a circuit frame, a light-transmitting connector and a sound reception unit,

the holder is a hollow, long handle body, a battery seat for accommodating a battery being formed on a lower section of the holder, and a power source key and a functional key being respectively formed on the holder,

the circuit frame being arranged in the holder, and the circuit frame being provided with one or more circuit boards powered by a battery, the circuit board being provided with at least a power source circuit and a function circuit, etc. corresponding to the power source key and the functional key, and a top end of the circuit frame being provided with a light-emitting circuit board connected to the circuit board, and the light-emitting circuit board being provided with one or more second light-emitting elements defined as power shortage indication lamps,

the light-transmitting connector being locked at a top end of the holder, a middle section of the light-transmitting connector having a light-transmitting display ring with a full circumference, and the light-transmitting display ring corresponding to the second light-emitting element, and the light-transmitting display ring is able to be exposed outside the holder,

the sound reception unit having a net head selectively locked on the light-transmitting connector, and a sound head connected to the circuit board being provided in the net head.

Thereby, by means of the above-mentioned technical means, the power display structure of a wireless microphone of the present utility model can start the first

light-emitting element to emit light when the electric power is sufficient, whereas when the electric power is insufficient, the first light-emitting element is extinguished and the second light-emitting element is synchronously started, so that the user can judge the electric power condition of the microphone by using the chromatic aberration of the first light-emitting element and the second light-emitting element. At the same time, since the light-transmitting display ring of the connector is in a full circumference design, regardless of the user's holding posture, orientation, or even continuously moving or dancing during use, the user's view is not affected, so as to maintain the validity of the power warning thereof. Ensuring the quality of the reception and improving the convenience of use increases the added value of the product and increases its economic efficiency.

A more detailed understanding of the present utility model may be obtained by the examiner by reference to the following further description of a preferred embodiment, given by way of example, in combination with the accompanying drawings and reference numbers.

Detailed Description of the Utility Model

The present utility model is a power display structure of a wireless microphone. In the specific embodiment of the power display structure of a wireless microphone and the components thereof illustrated in the accompanying drawings, all references to front and rear, left and right, top and bottom, upper and lower, and horizontal and vertical are merely for convenience of description and are not intended to limit the utility model, nor are they intended to limit the components thereof to any position or spatial orientation. The dimensions specified in the drawings and the description may be varied according to the design and requirements of the particular embodiment of the present utility model without departing from the scope of the present utility model.

The present utility model relates to a power display structure of a wireless microphone, and as shown in figures 1 and 2, the power display structure of a wireless microphone is composed of a holder (10), a circuit frame (20), a light-transmitting connector (30) and a sound reception unit (40).

With regard to the preferred embodiment of the power display structure of a wireless microphone, as disclosed in figures 1, 2 and 3, the holder (10) is a hollow, long handle body, and a locking part (100) is formed at an outer edge of a middle section of the holder (10) for selectively locking a tail sleeve (15) having a corresponding locking part (150), and a locking part (101) is formed at an inner edge of a top end of the holder (10) for selectively locking the light-transmitting connector (30). Furthermore,

a battery seat (11) for accommodating a battery is formed on a lower section of the holder (10), a battery cover (12) capable of being selectively covered is provided on the battery seat (11) for limiting the battery, and a power source key (16) and a functional key (18) are respectively formed on the holder (10) for turning on or off a wireless microphone or adjusting the function.

The circuit frame (20) is arranged in the holder (10), and one or more circuit boards (21) powered by a battery are arranged on the circuit frame (20), and the circuit board (21) has at least a power supply circuit (22) and a functional circuit (23) etc. corresponding to the power supply key (16) and the functional key (18).

Specification of Utility Model

(The format and sequence of this specification shall not be changed arbitrarily, the sections with the mark ※ shall not be filled in)

※ Application number: 99220396

※ Date of application: 99.10.21.

※ IPC Classification: H04R 1/00

I. Title of the utility model: (Chinese/English)

Power Display Structure of Wireless Microphone

II. Chinese abstract of the utility model

The present utility model relates to a power display structure of a wireless microphone, and particularly to a power display structure of a wireless microphone which is beneficial to detect a power condition and has a high quality, and comprises a holder for holding, a circuit frame for assembling electrical components, a connector locked on a top end of the holder, and a net head mounted on the top end of the holder through the connector. The holder has a battery seat therein for providing a power source, and the circuit frame is provided inside the holder, while the circuit frame has a light-emitting circuit board at a corresponding connector, the light-emitting circuit board being provided with one or more first and second light-emitting elements of different colors at an inner edge of the corresponding connector, the connector having an exposed light-transmitting display ring, whereby when the power is sufficient, the circuit board can start the first light-emitting element to emit light, whereas when the power is insufficient, the circuit board extinguishes the first light-emitting element and starts the second light-emitting element, so that the user can judge the power consumption condition of the microphone by using chromatic aberration, while since the light-transmitting display ring of the connector is a complete ring design, it can greatly improve the convenience of viewing and avoid other problems caused by insufficient power.

III. English abstract of the utility model:

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VI Claims

1. A power display structure of a wireless microphone, comprising comprising a holder, a circuit frame, a light-transmitting connector and a sound reception unit,

the holder is a hollow, long handle body, a battery seat for accommodating a battery being formed on a lower section of the holder, and a power source key and a functional key being respectively formed on the holder,

the circuit frame being arranged in the holder, and the circuit frame being provided with one or more circuit boards powered by a battery, the circuit board being provided with at least a power source circuit and a function circuit, etc. corresponding to the power source key and the functional key, and a top end of the circuit frame being provided with a light-emitting circuit board connected to the circuit board, and the light-emitting circuit board being provided with one or more second light-emitting elements defined as power shortage indication lamps,

the light-transmitting connector being locked at a top end of the holder, a middle section of the light-transmitting connector having a light-transmitting display ring with a full circumference, and the light-transmitting display ring corresponding to the second light-emitting element, and the light-transmitting display ring is able to be exposed outside the holder,

the sound reception unit having a net head selectively locked on the light-transmitting connector, and a sound head connected to the circuit board being provided in the net head,

accordingly, the power display structure of a wireless microphone, which is capable of displaying a power condition and beneficial for recognition, being constructed.

2. The power display structure of a wireless microphone according to claim 1, wherein a locking part is formed at an outer edge of a middle section of the holder for selectively locking a tail sleeve having a corresponding locking part to cover the battery seat.

3. The power display structure of a wireless microphone according to claim 1, wherein a locking part is formed at an inner edge of a top end of the holder, and the locking part is able to selectively lock the light-transmitting connector having the corresponding locking part.

4. The power display structure of a wireless microphone according to claim 1, wherein a battery cover capable of being selectively covered is provided on the battery seat for the holder for limiting the battery.

5. The power display structure of a wireless microphone according to claim 1, wherein the light-emitting circuit board is provided with one or more first

light-emitting elements defined as power sufficient indication lamps on a same peripheral edge of the second light-emitting elements, and the first and second light-emitting elements are respectively selected from light-emitting elements of different colors.

6. The power display structure of a wireless microphone according to claim 1 or 5, wherein the second light-emitting element is a red light-emitting diode (R-LED).

7. The power display structure of a wireless microphone according to claim 5, wherein the first light-emitting element is a blue light-emitting diode (B-LED).

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IV. Designated representative drawing:

(I) The designated representative drawing of the present disclosure is figure 2.

(II) Brief description of the reference numbers of the representative drawing"

(10) holder

(101) locking part

(12) battery cover

(150) locking part

(18) functional key

(21) circuit board

(23) functional circuit

(26) first light-emitting element

(30) light-transmitting connector

(32) locking part

(40) sound reception unit

(45) sound head

(100) locking part

(11) battery seat

(15) tail sleeve

(16) power source key

(20) circuit frame

(22) power circuit

(25) light-emitting circuit board

(28) second light-emitting element

(31) locking part

(35) light-transmitting display ring

(41) net head

A light-emitting circuit board (25) corresponding to the light-transmitting connector (30) is provided on a top end of the circuit frame (20), and the light-emitting circuit board (25) is connected to the circuit board (21) and is controlled thereby. Furthermore, at least one or more first light-emitting elements (26) defined as sufficient power indication lamps and one or more second light-emitting elements (28) defined as insufficient power indication lamps are provided on the light-emitting circuit board (25), and the first and second light-emitting elements (26, 28) are selected from light-emitting elements of different colors. For example, the first light-emitting element (26) is a blue light-emitting diode (B-LED), and the second light-emitting element (28) is a red light-emitting diode (R-LED).

Two ends of the light-transmitting connector (30) respectively have a locking part (31, 32) for selectively locking or separating the holder (10) and the sound reception unit (40). Furthermore, the middle section of the light-transmitting connector (30) has a light-transmitting display ring (35) with a full circumference, and the light-transmitting display ring (35) not only corresponds to the first and second light-emitting elements (26, 28) of the circuit frame (20), but also can be exposed outside the whole holder (10), so that a user can directly see same.

In addition, the sound reception unit (40) has a net head (41) which can be selectively locked to the locking part (32) of the light-transmitting connector (30), and the net head (41) is provided therein with a sound head (45) connected to the circuit board (21), and the sound head (45) has a sound receiving function of the microphone.

Thereby, the power display structure of a wireless microphone capable of displaying a power condition and being beneficial for recognition is constructed.

According to the above-mentioned design, when the wireless microphone is actually used, as shown in figures 1-4, when the battery of the wireless microphone is in a sufficient power status, when the user presses the power source key (16) to start the use, the circuit on the circuit board (21) can start the first light-emitting element (26), which represents sufficient power, on the light-emitting circuit board (25) after detecting that the battery power is sufficient, so that the light is transmitted through the light-transmitting display ring (35) of the light-transmitting connector (30), so that the user and equipment personnel can have a clear recognition.

On the other hand, when the battery of the wireless microphone is in a power shortage status, after the user presses the power source key (16) to start use, the circuit on the circuit board (21) immediately detects the power shortage of the battery, while the second light-emitting element (28), representing the power shortage, on the

light-emitting circuit board (25) is started, and simultaneously the first light-emitting element (26) representing sufficient power is turned off, so that the light of the second light-emitting element (28) is emitted from the light-transmitting display ring (35) of the light-transmitting connector (30), so that the user and equipment personnel can clearly recognize the power shortage of the wireless microphone, and a new battery can be replaced in time to ensure the effectiveness and convenience of using the wireless microphone.

Through the above-mentioned structural design and action description, the electric power display structure of a wireless microphone can activate the representative light-emitting element when electric power is insufficient, so as to remind the user or equipment personnel to pay attention and timely replace the battery, so that the user can easily judge the electric power condition of the microphone, while since the light-transmitting display ring of the connector is a of a full circumference design, regardless of the user's holding posture, orientation, or even continuously moving or dancing during use, the user's viewing will not be affected, so as to maintain the effectiveness of electric power warning, ensure the quality of sound reception, greatly improve the convenience of use, and also increase the added value of products and improve their economic benefits.

With this, it can be understood that the present disclosure is a utility model creation with excellent creativity, has numerous functional enhancements, and there is no identical or similar product creation or public use in the same technical field, so the present utility model has met the requirements of “novelty” and “inventive step” related to a utility model, and a utility model patent is proposed according to law.

[Brief Description of the Drawings]

Figure 1 is a schematic perspective view of a power display structure for a wireless microphone of the present utility model.

Figure 2 is an exploded schematic view of the power display structure of a wireless microphone of the present utility model, revealing the main components and their relative relationships.

Figure 3 is an internal cross-sectional schematic view of composition of the power display structure of a wireless microphone of the present utility model.

Figure 4 is a design diagram of the power display structure of a wireless microphone of the present utility model in practical use.

[Description of Main Reference Numbers]

(10) holder

(101) locking part

(12) battery cover

(150) locking part

(18) functional key

(21) circuit board

(23) functional circuit

(26) first light-emitting element

(30) connector

(32) locking part

(40) sound reception unit

(45) sound head

(100) locking part

(11) battery seat

(15) tail sleeve

(16) power source key

(20) circuit frame

(22) power circuit

(25) light-emitting circuit board

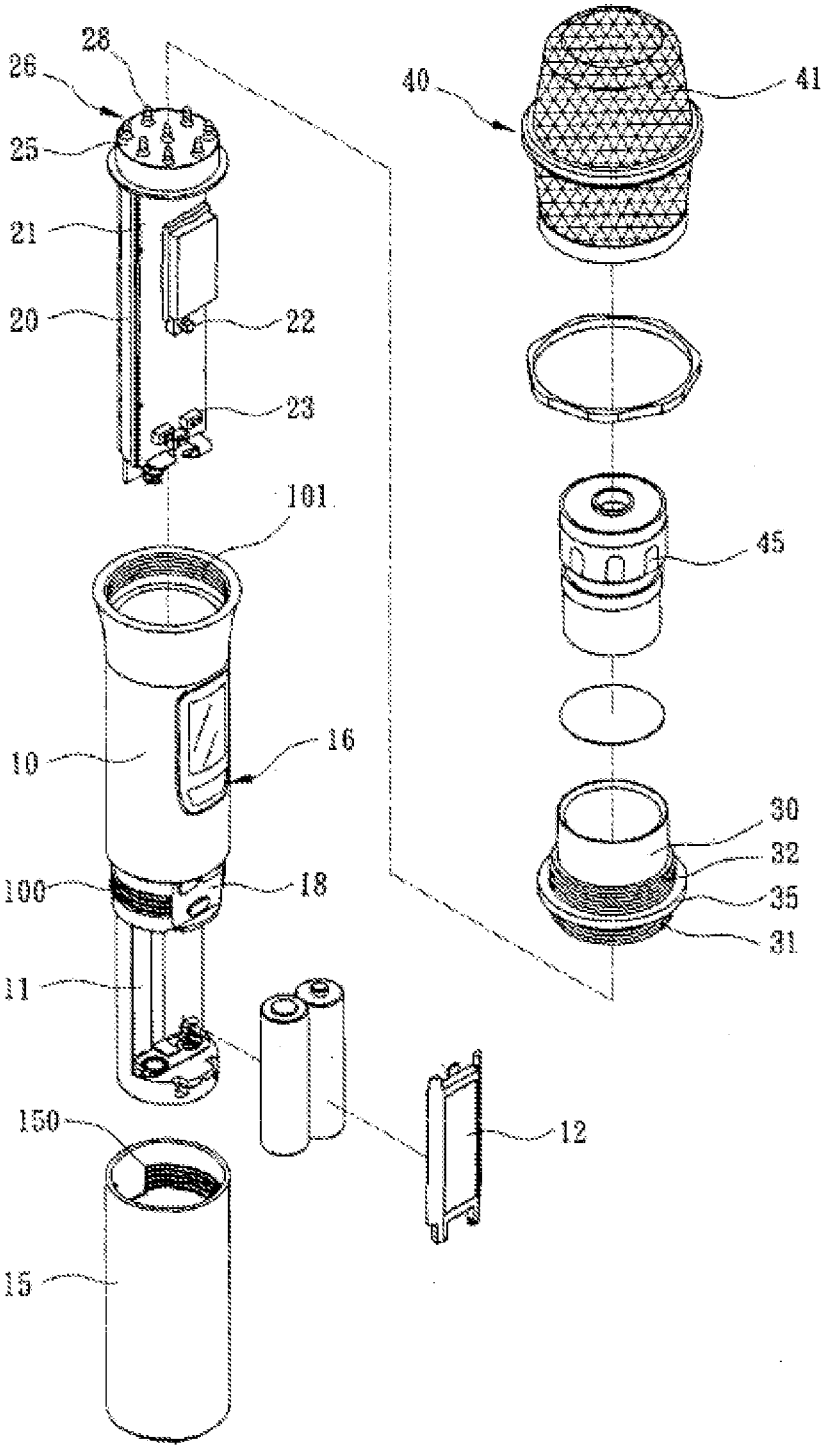
(28) second light-emitting element

(31) locking part

(35) light-transmitting display ring

(41) net head

Accompanying Drawing of the Abstract



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Accompanying Drawings of the Description

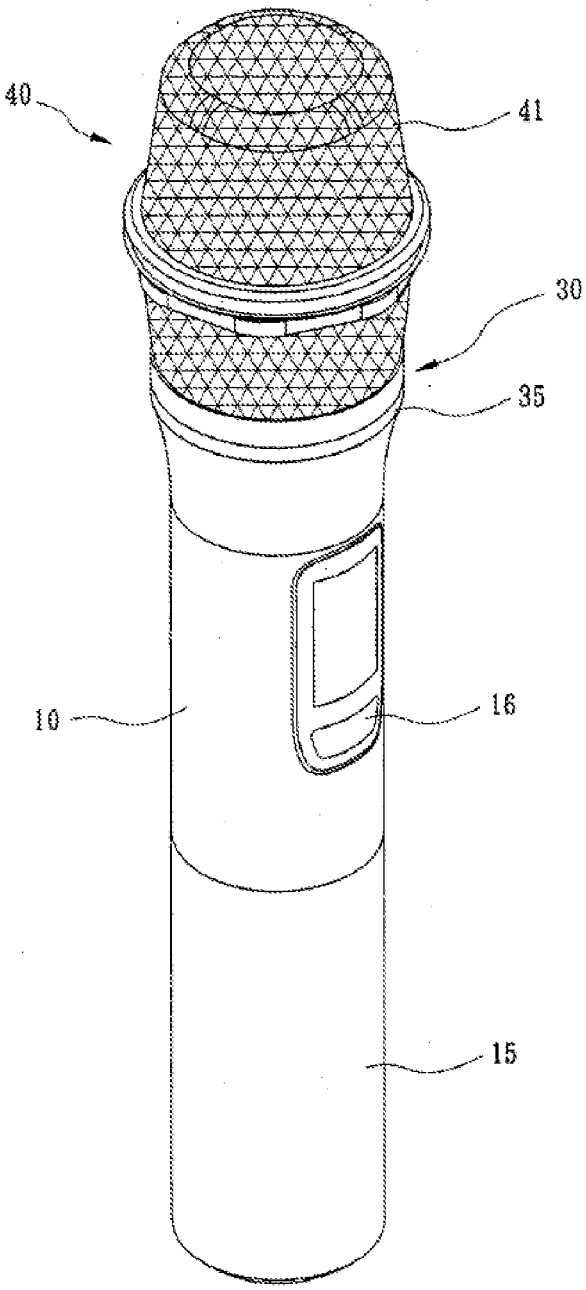


Fig. 1

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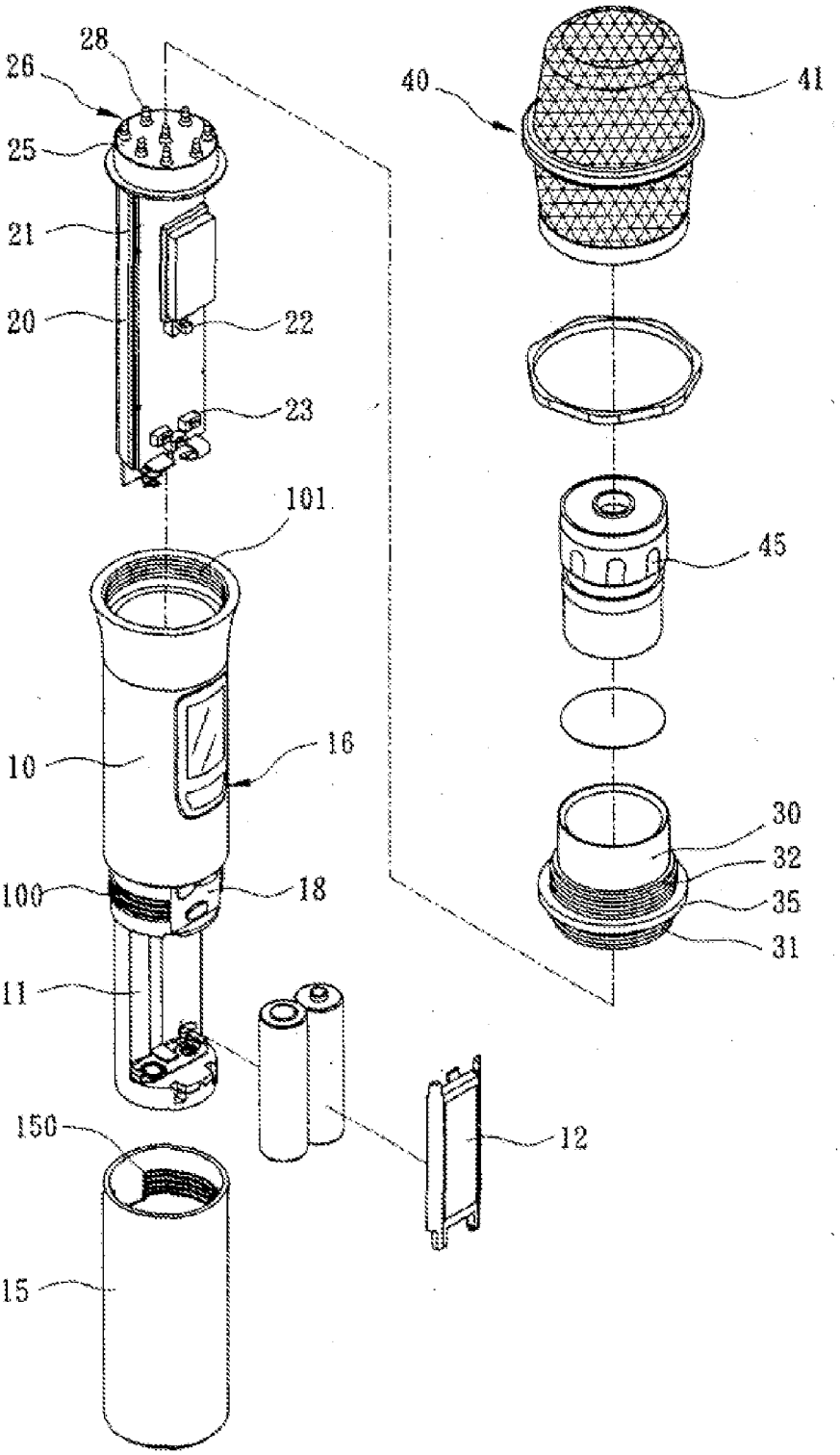


Fig. 2

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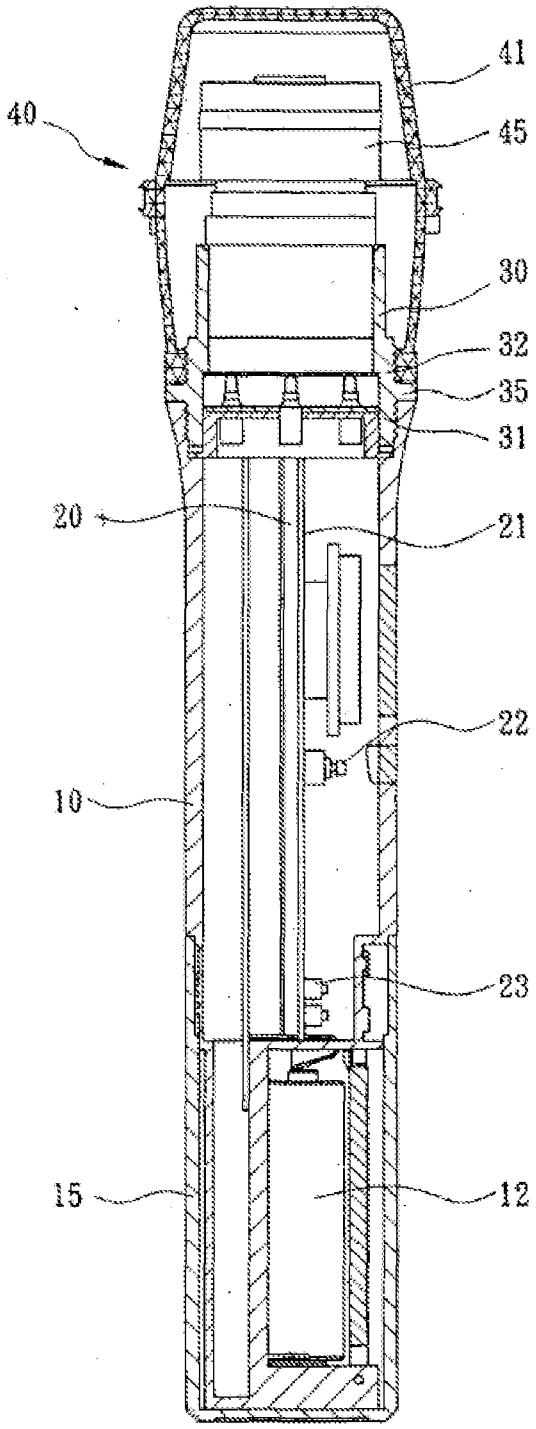


Fig. 3

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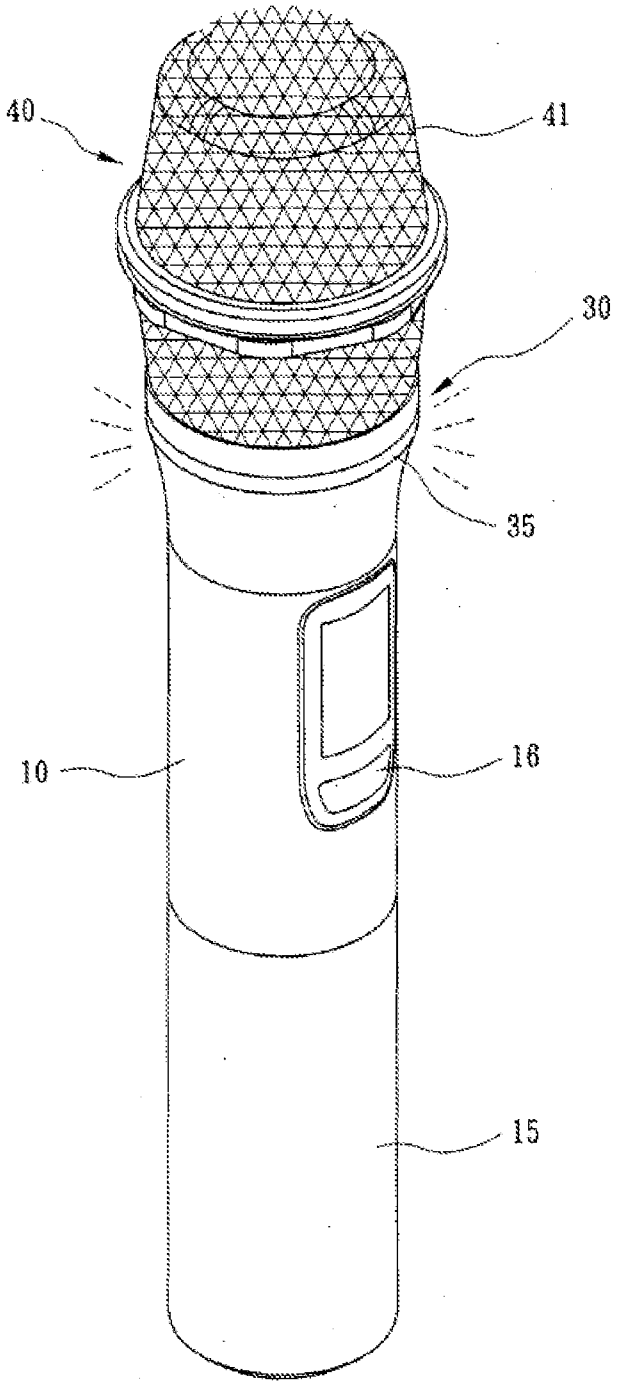


Fig. 4

Petitioner Therabody Ex-1004, 0737

Comment from Translator **TWM402573U**

1. The contents of Chinese PDF files are not provided in an ordinary form, which means the chapters or sections are arranged in a confused way. However, our English translation is in strict correspondence to the Chinese files. If you have any comments about rearranging the structure of the text, please let us know.

REF.: **MERC.L0112**

UNITED STATES PATENT AND TRADEMARK OFFICE
VERIFICATION OF A TRANSLATION

I, the below named translator, hereby declare that:

My name and post office address are as stated below:

That I am knowledgeable in the English language and in the Taiwanese language, and that I believe the English translation of the attached Taiwanese document **TWM402573U** is true and complete.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and, that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date

Full name of the translator: WANG, Hao

Signature of the translator:

Wang Hao

Post Office Address: Yard 50, Meteorological Road, Haidian District, Beijing

M402573

(19)中華民國智慧財產局

(12)新型說明書公告本 **(11)證書號數：TW M402573U1**

(45)公告日： 中華民國 100 (2011) 年 04 月 21 日

(21)申請案號：099220396 (22)申請日： 中華民國 99 (2010) 年 10 月 21 日

(51)Int. Cl.： ***H04R1/00 (2006.01)***

(71)申請人：台灣電音股份有限公司(中華民國) TAIWAN ELECTRIC VOICE CO., LTD (TW)
臺中市北屯區三光一街 68 號

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申請專利範圍項數：7 項 圖式數：4 共 23 頁

(54)名稱

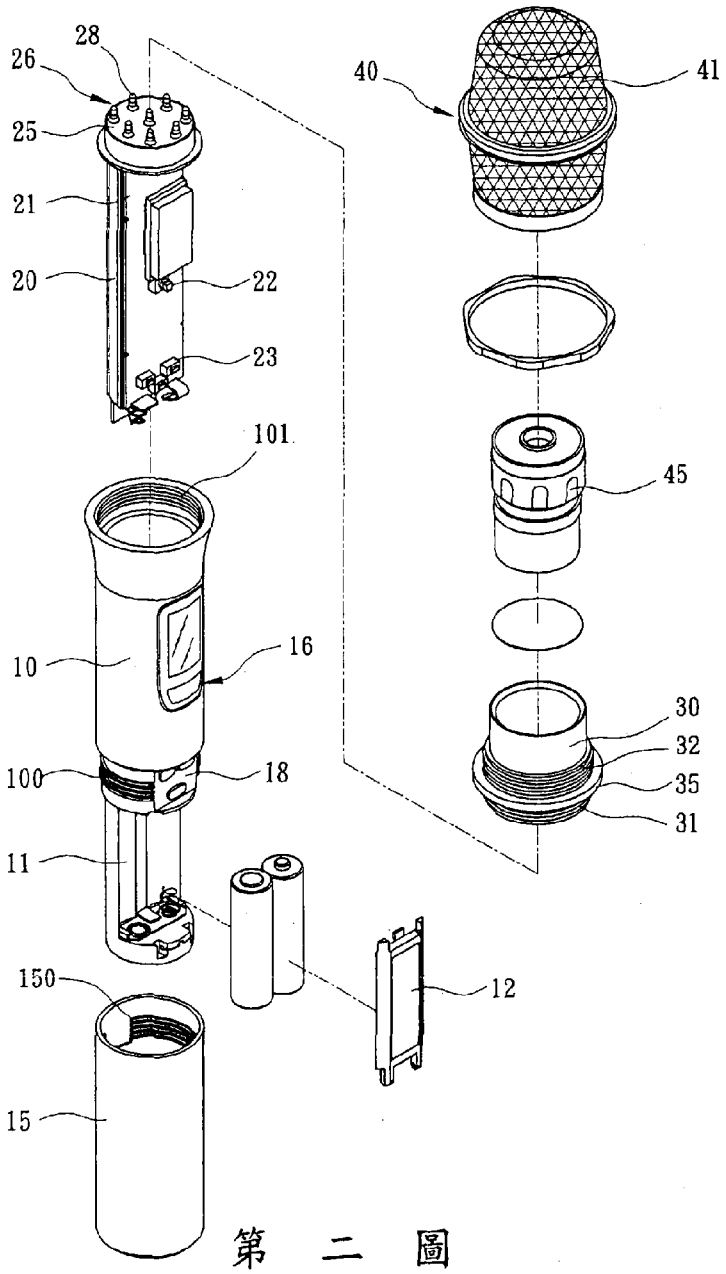
無線麥克風之電力顯示結構

(57)摘要

本創作涉及一種無線麥克風之電力顯示結構，特別係指一種易於辨識電量狀況、且高質感的無線麥克風之電力顯示結構，其至少包含有一供握持之握體、一供組設電氣元件之電路框架、一鎖設於握體頂端之接頭及一透過接頭裝設於握體頂端之網頭。該握體內具有用於提供電源之電池座，而電路框架係設於握體內部，且電路框架於對應接頭處具有一發光電路板，又且發光電路板於對應接頭內緣分設有一或多數不同色系之第一、二發光元件，再者接頭具有外露之透光顯示環，藉此，當電力充足時，電路板可啟動第一發光元件發光，反之當電力不足時，電路板則熄滅第一發光元件而啟動第二發光元件，如此可利用色差讓使用者判斷麥克風的用電狀況，同時由於接頭之透光顯示環係呈完整的環狀設計，故可大幅提升辨識的便利性，避免因電力不足而造成其他困擾。

MERCHSOURCE, LLC - EX 1009

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第 二 圖

(10)・・・握體

(100)・・・鎖接部

(101)・・・鎖接部

(11)・・・電池座

(12)・・・電池蓋

(15)・・・尾套

(150)・・・鎖接部

(16)・・・電源鍵

(18)・・・功能鍵

(20)・・・電路框架

(21)・・・電路板

(22)・・・電源電路

(23)・・・功能電路

(25)・・・發光電路板

(26)・・・第一發光元件

(28)・・・第二發光元件

(30)・・・透光接頭

(31)・・・鎖接部

(32)・・・鎖接部

(35)・・・透光顯示環

(40)・・・收音單元

(41)・・・網頭

(45)・・・音頭

M402573

公告本

新型專利說明書

（本說明書格式、順序，請勿任意更動，※記號部分請勿填寫）

※申請案號：99220396.

※申請日：99.10.21.　　※IPC分類：H04R 1/00

一、新型名稱：（中文/英文）

無線麥克風之電力顯示結構

二、中文新型摘要：

本創作涉及一種無線麥克風之電力顯示結構，特別係指一種易於辨識電量狀況、且高質感的無線麥克風之電力顯示結構，其至少包含有一供握持之握體、一供組設電氣元件之電路框架、一鎖設於握體頂端之接頭及一透過接頭裝設於握體頂端之網頭。該握體內具有用於提供電源之電池座，而電路框架係設於握體內部，且電路框架於對應接頭處具有一發光電路板，又且發光電路板於對應接頭內緣分設有一或多數不同色系之第一、二發光元件，再者接頭具有外露之透光顯示環，藉此，當電力充足時，電路板可啟動第一發光元件發光，反之當電力不足時，電路板則熄滅第一發光元件而啟動第二發光元件，如此可利用色差讓使用者判斷麥克風的用電狀況，同時由於接頭之透光顯示環係呈完整的環狀設計，故可大幅提升辨識的便利性，避免因電力不足而造成其他困擾。

三、英文新型摘要：

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四、指定代表圖：

(一)本案指定代表圖為：第（ 二 ）圖。

(二)本代表圖之元件符號簡單說明：

（10）	握體	（100）	鎖接部
（101）	鎖接部	（11）	電池座
（12）	電池蓋	（15）	尾套
（150）	鎖接部	（16）	電源鍵
（18）	功能鍵	（20）	電路框架
（21）	電路板	（22）	電源電路
（23）	功能電路	（25）	發光電路板
（26）	第一發光元件	（28）	第二發光元件
（30）	透光接頭	（31）	鎖接部
（32）	鎖接部	（35）	透光顯示環
（40）	收音單元	（41）	網頭
（45）	音頭		

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五、新型說明：

【新型所屬之技術領域】

本創作隸屬一種無線麥克風的技術領域，具體來說係一種無線麥克風之電力顯示結構，藉以讓使用者能輕易辨別該無線麥克風之電力狀況。

【先前技術】

按，麥克風係一種供以接收說話或歌唱的聲音，並傳送至接收機與放大器放大輸出，或者錄音儲存的電子產品，傳統麥克風主要係於一握柄頂端設有一由網頭罩覆之音頭，且握柄底端連接設有一連接放大器之訊號線，該訊號線除能傳遞聲音訊號外，並能提供麥克風電源，但受到訊號線的限制，影響到使用者的移動之便利性與範圍，因此有無線麥克風的發展。

一般無線麥克風適用於供使用者於一定範圍之內握持使用，也就是使用過程中，無線麥克風完全依靠內部之電池供給電源，因此無線麥克風上都會設置電池，以提供所需的電源。換言之，無線麥克風使用的有效性完全取決於電池的電力，也就是說，當電池電力不足時，會直接影響到收音的品質與效果，而造成音頻斷續或無法發聲的問題，影響到使用的便利性；

現有無線麥克風為了提醒使用者在電力不足時能及時更換電池，通常會於無線克風上設一個電力指示燈，透過電路設計，當該指示燈逐漸熄滅、又或亮起時，供使用者辨視，但由於其僅為一個亮點，再加上使用者的握姿、方位、甚至使用過程中不斷地移動或舞動等，都

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會直接影響到使用者的辨視，失去其警示電力不足之目的，造成之後無線麥克風因電池供應之電力不足而斷斷續續或收音上的瑕疵。

換言之，現有無線麥克風的電力警示無法滿足實際使用上的需求，造成其存在有辨視不易及使用不便的問題，故有必要進一步改良。

有鑑於此，本創作人乃針對前述現有無線麥克風在使用上所面臨的問題深入探討，藉由多年從事相關產業的製造與研發經驗，積極尋求解決之道，經不斷努力的研究與試作，終於創作出一種無線麥克風之電力顯示結構，藉以克服現有無線麥克風因電力顯示效果不彰所造成的困擾與不便。

【新型內容】

因此，本創作之主要目的係提供一種無線麥克風之電力顯示結構，藉以能讓使用者無論任何握姿、方位或晃動等，均能清楚識別電力狀況，以確保收音的品質，並提高使用的便利性。

據此，本創作主要係透過下列的技術手段，來具體實現前述的目的與效能：其包含有一握體、一電路框架、一透光接頭及一收音單元所組成；

所述握體係呈中空之長柄體，握體下段形成有一供容置電池之電池座，再者握體上分別形成有一電源鍵與一功能鍵；

前述電路框架係置設於握體內，且電路框架上設有

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一或多數由電池提供電力之電路板，電路板上至少具有對應前述電源鍵與功能鍵之電源電路及功能電路等，又電路框架頂端設有一與電路板連接之發光電路板，再者發光電路板上設有一或多數被定義為電力不足指示燈之第二發光元件；

至於透光接頭係鎖設於握體頂端，該透光接頭中段具有一全圓周之透光顯示環，且透光顯示環對應前述之第二發光元件，該透光顯示環並可露出於握體外部；

又收音單元則具有一可選擇性鎖掣於透光接頭上之網頭，且網頭內設有一與前述電路板連接之音頭。

藉此，透過前述技術手段的展現，讓本創作無線麥克風之電力顯示結構可在電力充足時，啟動第一發光元件發光，反之當電力不足時，則熄滅第一發光元件、且同步啟動第二發光元件，如此可利用第一、二發光元件的色差讓使用者判斷麥克風的用電狀況，同時由於接頭之透光顯示環係呈全圓周設計，不論使用者的握姿、方位、甚至使用過程中不斷地移動或舞動等，都不會影響到使用者的辨視，以維持其電力警示的有效性，確保收音的品質，並增進使用的便利性，從而增加產品附加價值，且能提高其經濟效益。

接下來配合圖式及圖號，同時舉一較佳實施例做進一步之說明，期能使　貴審查委員對本創作有更詳細的瞭解。

【實施方式】

本創作係一種無線麥克風之電力顯示結構，隨附圖

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例示之本創作無線麥克風之電力顯示結構的具體實施例及其構件中，所有關於前與後、左與右、頂部與底部、上部與下部、以及水平與垂直的參考，僅用於方便進行描述，並非限制本創作，亦非將其構件限制於任何位置或空間方向。圖式與說明書中所指定的尺寸，當可在不離開本創作之申請專利範圍內，根據本創作之具體實施例的設計與需求而進行變化。

本創作係一種無線麥克風之電力顯示結構，如第一、二圖所示，該無線麥克風之電力顯示結構係由一握體（10）、一電路框架（20）、一透光接頭（30）及一收音單元（40）所組成；

而關於本創作無線麥克風之電力顯示結構的較佳實施例，則係如第一、二及三圖所揭示者，其中所述握體（10）係呈中空之長柄體，且握體（10）中段外緣形成有一鎖接部（100），供一具對應鎖接部（150）之尾套（15）選擇性鎖掣，又握體（10）頂端內緣形成有一鎖接部（101），該鎖接部（101）可供前述透光接頭（30）選擇性鎖掣，再者握體（10）下段形成有一供容置電池之電池座（11），且握體（10）於電池座（11）上設有一可選擇性蓋合之電池蓋（12），供限制前述之電池，再者握體（10）上分別形成有一電源鍵（16）與一功能鍵（18），供無線麥克風啟閉或調整功能；

前述電路框架（20）係置設於握體（10）內，且電路框架（20）上設有一或多數由電池提供電力之電路板（21），電路板（21）上至少具有對應前述電源鍵（16）與功能鍵（18）之電源電路（22）及功能電路（23）

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等電路，又電路框架（20）頂端設有一對應透光接頭（30）之發光電路板（25），該發光電路板（25）並與電路板（21）連接、且受其操控，再者發光電路板（25）上至少設有一或多數被定義為電力充足指示燈之第一發光元件（26），以及一或多數被定義為電力不足指示燈之第二發光元件（28），且第一、二發光元件（26、28）係選自不同色系的發光元件，如第一發光元件（26）為藍色發光二極體【B-LED】、而第二發光元件（28）為紅色發光二極體【R-LED】；

至於透光接頭（30）則具兩端分別具有一鎖接部（31、32），供握體（10）與收音單元（40）選擇性鎖掣或分離，再者透光接頭（30）中段具有一全圓周之透光顯示環（35），且透光顯示環（35）不僅對應前述電路框架（20）之第一、二發光元件（26、28），且透光顯示環（35）並可露出於整個握體（10）外部，令使用者可直接目視；

又收音單元（40）則具有一可選擇性鎖掣於透光接頭（30）鎖接部（32）之網頭（41），且網頭（41）內設有一與前述電路板（21）連接之音頭（45），該音頭（45）具麥克風之收音功能；

藉此，組構成一可顯示電力狀況、且易於識別的無線麥克風之電力顯示結構者。

透過上述的設計，本創作於實際使用時，則係如第一至四圖所示，當所述無線麥克風的電池是處電力充足狀態時，當使用者按壓電源鍵（16）啟動使用，則電路

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102. 12.
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板（21）上的電路在檢知電池電力充足後，可啟動發光電路板（25）上代表電力充足的第一發光元件（26），進而讓該光線由透光接頭（30）之透光顯示環（35）透出，讓使用者及設備人員能清楚的辨別；

反之，當所述無線麥克風的電池是處電力不足狀態時，則使用者按壓電源鍵（16）啟動使用後，電路板（21）上的電路會即時檢知電池電力不足，此時其會啟動發光電路板（25）上代表電力不足的第二發光元件（28），同時關閉代表電力充足的第一發光元件（26），進而讓第二發光元件（28）的光線由透光接頭（30）之透光顯示環（35）射出，讓使用者及設備人員能清楚的辨別到該無線麥克風的電力不足，而能及時更換新的電池，以確保該無線麥克風使用的有效性與便利性；

透過上述的結構設計與動作說明，讓本創作無線麥克風之電力顯示結構可在電力不足時，啟動代表之發光元件，以提醒使用者或設備人員注意、且及時更換電池，如此可易於使用者判斷麥克風的用電狀況，同時由於接頭之透光顯示環係呈全圓周設計，不論使用者的握姿、方位、甚至使用過程中不斷地移動或舞動等，都不會影響到使用者的辨視，以維持其電力警示的有效性，確保收音的品質，大幅增進其使用的便利性，而能增加產品附加價值，且能提高其經濟效益。

藉此，可以理解到本創作為一創意極佳之新型創作，具有眾多的功效增進，且在相同的技術領域中未見相同或近似的產品創作或公開使用，故本創作已符合新型專利有關「新穎性」與「進步性」的要件，乃依法提出

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申請新型專利。

100. 2. 22
年 月 日 修正補充

【圖式簡單說明】

第一圖：係本創作無線麥克風之電力顯示結構的立體外觀示意圖。

第二圖：係本創作無線麥克風之電力顯示結構的分解示意圖，其揭示主要構成及其相對關係。

第三圖：係本創作無線麥克風之電力顯示結構的組成內部剖面示意圖。

第四圖：係本創作無線麥克風之電力顯示結構於實際使用的外觀示意圖。

【主要元件符號說明】

(10)	握體	(100)	鎖接部
(101)	鎖接部	(11)	電池座
(12)	電池蓋	(15)	尾套
(150)	鎖接部	(16)	電源鍵
(18)	功能鍵	(20)	電路框架
(21)	電路板	(22)	電源電路
(23)	功能電路	(25)	發光電路板
(26)	第一發光元件	(28)	第二發光元件
(30)	接頭	(31)	鎖接部
(32)	鎖接部	(35)	透光顯示環
(40)	收音單元	(41)	網頭
(45)	音頭		

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六、申請專利範圍：

1、一種無線麥克風之電力顯示結構，其包含有一握體、一電路框架、一透光接頭及一收音單元所組成；

所述握體係呈中空之長柄體，握體下段形成有一供容置電池之電池座，再者握體上分別形成有一電源鍵與一功能鍵；

前述電路框架係置設於握體內，且電路框架上設有一或多數由電池提供電力之電路板，電路板上至少具有對應前述電源鍵與功能鍵之電源電路及功能電路等，又電路框架頂端設有一與電路板連接之發光電路板，再者發光電路板上設有一或多數被定義為電力不足指示燈之第二發光元件；

至於透光接頭係鎖設於握體頂端，該透光接頭中段具有一全圓周之透光顯示環，且透光顯示環對應前述之第二發光元件，該透光顯示環並可露出於整個握體外部；

又收音單元則具有一可選擇性鎖掣於透光接頭上之網頭，且網頭內設有一與前述電路板連接之音頭；

藉此，組構成一可顯示電力狀況、且易於識別的無線麥克風之電力顯示結構者。

2、依據申請專利範圍第1項所述之無線麥克風之電力顯示結構，其中該握體中段外緣形成有一鎖接部，供一具對應鎖接部之尾套選擇性鎖掣，以封套電池座。

Petitioner Therabody Ex-1004, 0751

3、依據申請專利範圍第1項所述之無線麥克風之電力顯示結構，其中該握體頂端內緣形成有一鎖接部，鎖接部可供前述具對應鎖接部之透光接頭選擇性鎖掣。

4、依據申請專利範圍第1項所述之無線麥克風之電力顯示結構，其中該握體於電池座上設有一可選擇性蓋合之電池蓋，供限制電池。

5、依據申請專利範圍第1項所述之無線麥克風之電力顯示結構，其中該發光電路板於第二發光元件之同周緣上設有一或多數被定義為電力充足指示燈之第一發光元件，且第一、二發光元件分別選自不同色系之發光元件。

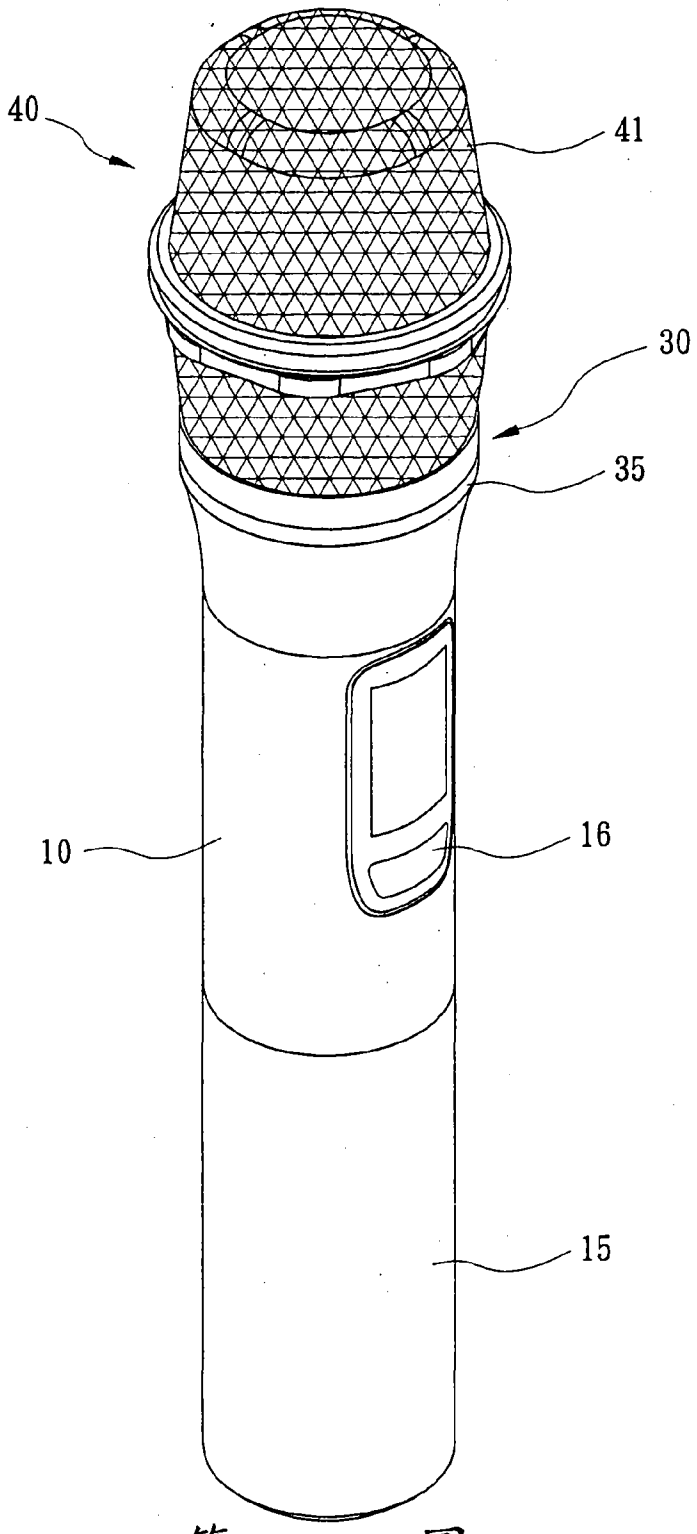
6、依據申請專利範圍第1或5項所述之無線麥克風之電力顯示結構，其中該第二發光元件為紅色發光二極體【R-LED】。

7、依據申請專利範圍第5項所述之無線麥克風之電力顯示結構，其中該第一發光元件為藍色發光二極體【B-LED】。

Petitioner Therabody Ex-1004, 0752

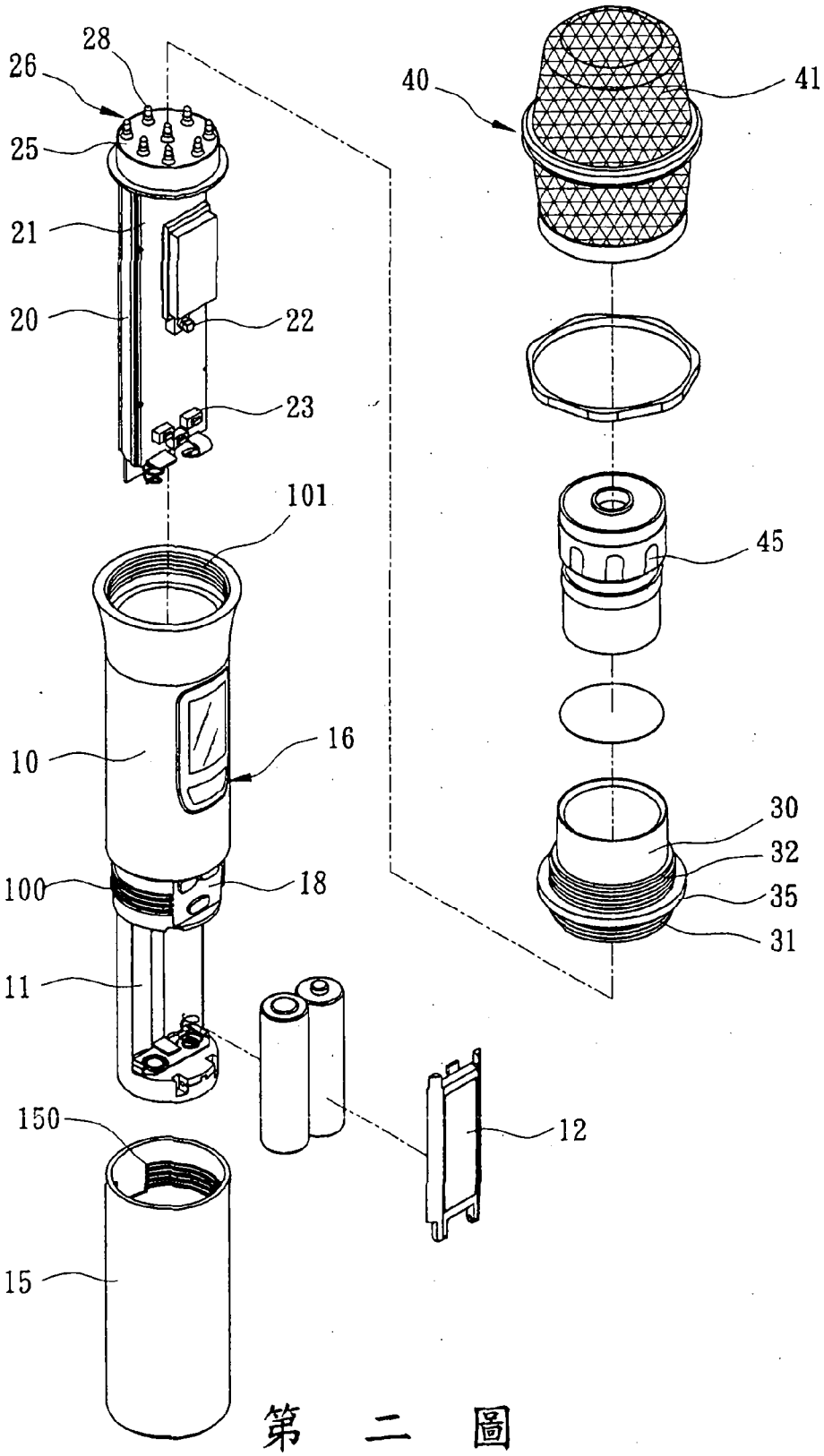
年 月 日 修

七、圖式：

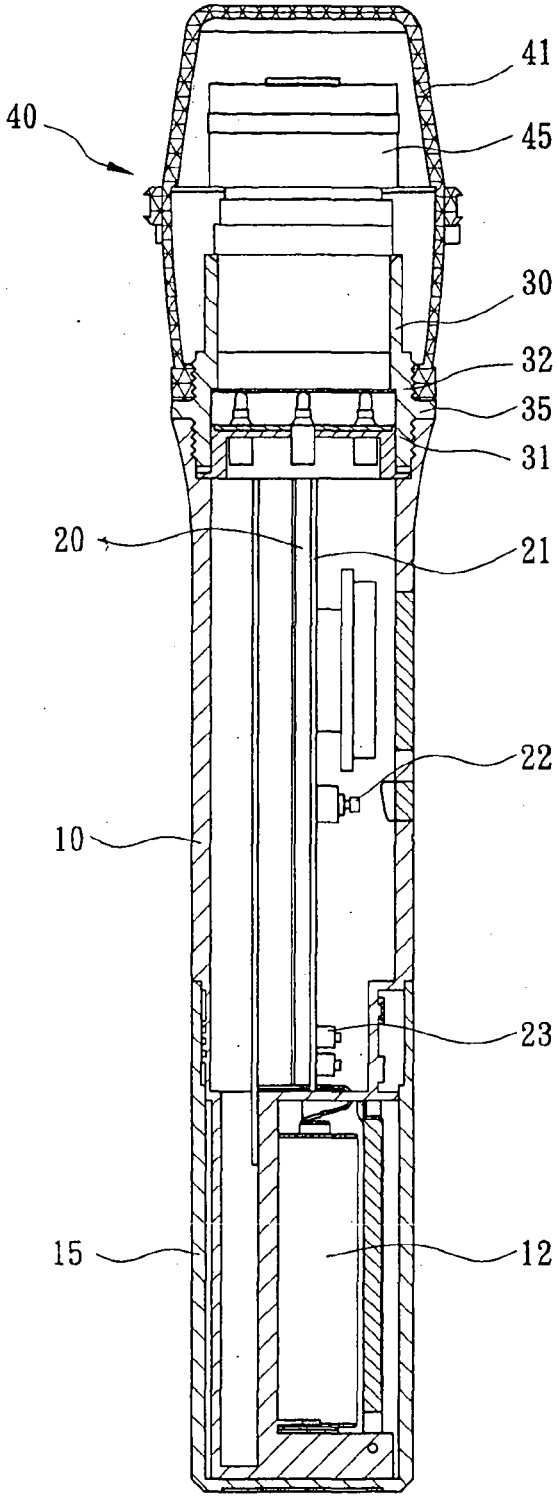


第 一 圖

100. 2. 2
修正
年 月 日
補充

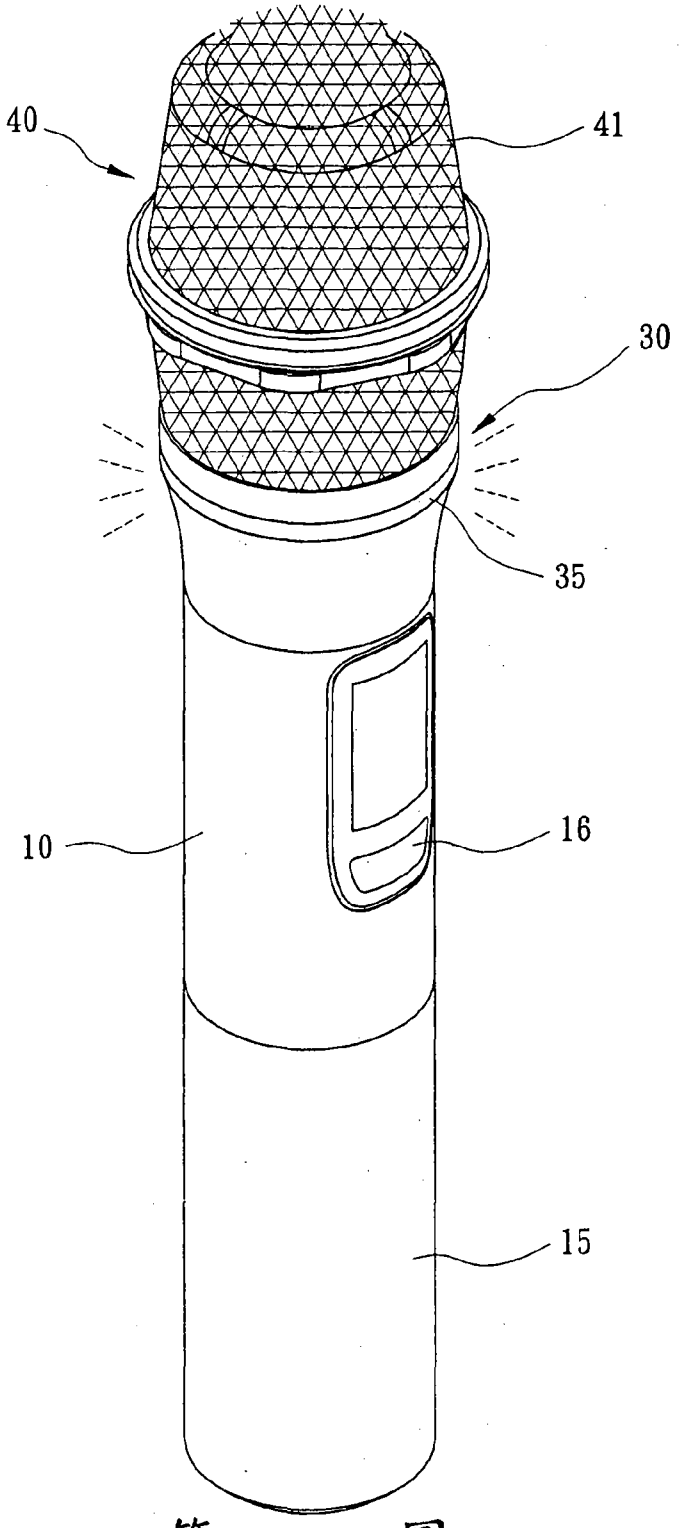


第 二 圖



第 三 圖

年 月 日 補充



第 四 圖

Electronic Acknowledgement Receipt

EFS ID:	45904689
Application Number:	17681367
International Application Number:	
Confirmation Number:	8567
Title of Invention:	MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH
First Named Inventor/Applicant Name:	Philip C. Danby
Customer Number:	162143
Filer:	Hunter Christian Malboeuf/Anna Beaulieu
Filer Authorized By:	Hunter Christian Malboeuf
Attorney Docket Number:	HYP-034C3
Receipt Date:	09-JUN-2022
Filing Date:	25-FEB-2022
Time Stamp:	09:21:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	TW_M272528_U_with_Translation.PDF	850891 107c2ae3f07fe0f9675242711daa1a33aff56d6d	no	26

Warnings:

Information:					
2	Foreign Reference	TW_M379178_U1_with_Translation.PDF	1360318 0a6b5fdc1f94ad1ba571b596b721196dfd4f89d7	no	27
Warnings:					
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3	Foreign Reference	TW_M402573_U1_with_Translation.PDF	1120317 12c76ad745e10c0862c712234c90db842ac5a115	no	36
Warnings:					
Information:					
4	Foreign Reference	TW_M433702_U1.PDF	908259 075ac3d0398e7b29c5a403c5778a12acce2da5e8	no	17
Warnings:					
Information:					
5	Foreign Reference	TM_M433702_-_Eng_Abstract.PDF	181543 934a654871126d63cf6c525d6bbf7e04db008350	no	1
Warnings:					
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6	Foreign Reference	TW_M493379_Y_with_Translation.PDF	2591227 261f39b7db53c4a986a452dee3ea603f1bb3e94a	no	38
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7	Foreign Reference	TW_M543692U_with_Translation.PDF	993486 636c7b8eca60e3b039f36be15c7503250d9af1e3	no	21
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8	Foreign Reference	WO_2008113139_A1.PDF	2776718 656844a5f4dc3c5e439161f7033e35e06a5d5a96	no	62
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9	Foreign Reference	WO_2009014727_A1.PDF	1816438 fe8f50133822479bd89d441106eb84c973b0c5a1	no	30
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10	Foreign Reference	WO_2012134469_A1.PDF	1524200 083495d72f30c52790664db071c4bde35ee0e446	no	31
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11	Foreign Reference	WO_2013141359_A1_with_Translation.PDF	2365151 f52119274952d8f2a3d038e482358b051afe5b05	no	53
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12	Foreign Reference	WO_2017123841_A2.PDF	13559865 c9ea9a5515d5b5b05becde7879b1bb525cc8c797	no	217
Warnings:					
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13	Foreign Reference	WO_2017184505_A2.PDF	12785021 4b553c7041586454d46471fefc601be1740c0631	no	210
Warnings:					
Information:					
14	Non Patent Literature	NPL_12_Jolt_Therapy_Tool.PDF	1995075 60e5b3fea9717ed1ecf3c5f32cf9ba4528d9801f	no	3
Warnings:					
Information:					
15	Non Patent Literature	NPL_08_CEN-TECH_4-in-1_Portable_Power_Pack.PDF	1655571 1c9c104e9bbbbf019efbe12992362b8446e57dff	no	12
Warnings:					
Information:					

16	Non Patent Literature	NPL_11_Porter-Cable_Compact_Lithium_Two_Tool_Kit.PDF	291002 750eb99e8f0c21e059f89e4e3bb0bc0ae5607dfa	no	5
Warnings:					
Information:					
17	Non Patent Literature	NPL_05_DuPuy_Synthes_Battery_Power_Line_II.PDF	19748810 93841b4eb7ad9caa7139660f85bcba2a6c2fd1d0	no	83
Warnings:					
Information:					
18	Non Patent Literature	NPL_01_DIY_Jigsaw_Drill_Massager-Percussion_Massager.PDF	2422059 6ded408e8b9875dcc94d6ce5a017bcd7f3d775fa	no	19
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Information:					
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20	Non Patent Literature	NPL_03_NutriKlick_Deep_Tissue_Massage_Gun.PDF	1523790 bb99a208961d311d0f61d0af7451a886c0b9e546	no	6
Warnings:					
Information:					
21	Non Patent Literature	NPL_10_PERFORMAX_Cordless_Driver_Owners_Manual.PDF	1396441 e81fa27042b2516dde9b93d9a76ab9293d0b4707	no	19
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Information:					

23	Non Patent Literature	NPL_02_Theragun_Owners_Manual_G2_Pro.PDF	953306 3d09deeb64dcc3982f84236c00a9c8c08fe1cd96	no	16
Warnings:					
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24	Non Patent Literature	NPL_06_TIMTAM_Power_Massager_1.PDF	1140892 ce2f068c82d981dc00bdfe34584295de95b46721	no	4
Warnings:					
Information:					
25	Non Patent Literature	NPL_04_TOPiando_Multifunctional_Massage_Gun.PDF	3023137 dba991468c079d4611c1f26d7b1831611668e604	no	19
Warnings:					
Information:					
26	Non Patent Literature	NPL_09_Yu-Chung_Chang_Electrolux_Power_Drill.PDF	239473 d67242c7e415f84bbf0824958062b1f45657abc5	no	4
Warnings:					
Information:					
27	Foreign Reference	WIPO_Global_Design_0043776 38-0002.PDF	119272 878a3266d1be9ce9fdfe03dbfe0dbbf76db9d1a1	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	80375891		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

M433702

(19)中華民國智慧財產局

(12)新型說明書公告本 **(11)證書號數：TW M433702U1**

(45)公告日： 中華民國 101 (2012) 年 07 月 11 日

(21)申請案號：101203476 (22)申請日： 中華民國 101 (2012) 年 02 月 24 日

(51)Int. Cl.： ***H05K7/00 (2006.01)***

(71)申請人：鑫銓電腦股份有限公司(中華民國) SHIN CHUAN COMPUTER CO., LTD (TW)
新北市中和區連城路 268 號 6 樓之 2

(72)創作人：涂仲源 TU, CHUNG YUAN (TW)

(74)代理人：林火泉

申請專利範圍項數：5 項 圖式數：6 共 15 頁

(54)名稱

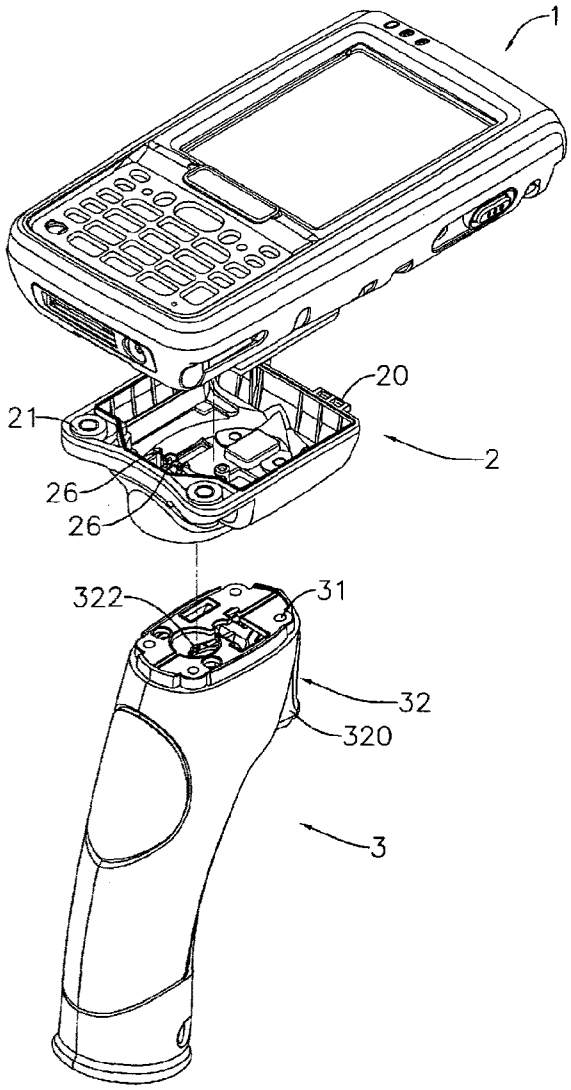
手持式電子裝置

(57)摘要

一種手持式電子裝置，透過改良手持式電子裝置之握持連接的結構，讓多種手持式電子裝置皆能使用相同(通用)的握把。手持式電子裝置包括裝置本體、電池蓋與握把，該裝置本體具有電池容置處，該電池容置處係凹部向內體成形於該裝置本體之背部，以供設置電池，該電池蓋蓋合該電池容置處。該握把鎖固於該電池蓋。因此，手持式電子裝置的電池蓋可以根據各種不同機型統一所連接之握把規格。

MassagerPriorArt0001775

Petitioner Therabody Ex-1004, 0763



第 2 圖

1・・・裝置本體

2・・・電池蓋

20・・・凸塊

21・・・鎖固組件

26・・・電極

3・・・握把

31・・・鎖孔

32・・・使用者介面

320・・・按鈕

322・・・觸發桿

五、新型說明：

【新型所屬之技術領域】

本創作關於一種握持結構的改良技術，特別在於提供一種手持式電子裝置。

【先前技術】

隨著電子科技的發達，生活中的電子化產品越趨普及，除了基本的個人式行動裝置(例如 PDA、手機、平板電腦等)，各種工商業活動對於電子產品的應用也越來越依賴，其中，最為普遍常見的便是條碼辨識之應用。

條碼是一種印製在產品外側以供進行電子辨識的編碼，每一個不同的產品皆會有其專屬的條碼編號，藉由條碼的設置，商店以及物流服務供應商皆可輕易的了解商品進貨、銷貨和存貨的狀態。

為求使用上的方便，現在的條碼辨識大多是利用手持式電子裝置(Portable Data Terminal，PDT)來進行，且此手持式電子裝置大多會搭配有一握把，以求使用者握持穩固並便於進行操作。然而，現有的握把大多會隨著手持式電子裝置的不同而有所搭配，因應不同型號的電子裝置而需開發不同握把之模具設計，進而無法有效降低手持式電子裝置的製作成本。

【新型內容】

根據本創作之一實施例，手持式電子裝置包括一裝置本體、一電池蓋與一握把，該裝置本體具有一電池容置處，該電池容置處係一凹部向內一體成形於該裝置本體之一背部，以供設置一電池，該電池蓋蓋合該電池容置處並包括一觸發部、一觸發晶片與一對電極。該觸發部穿設於該電池蓋之一側面。該觸發晶片設置於該電池蓋之內部，並電性連接該觸發部。該對電極設置於該電池蓋之內部，並電性連接該觸發晶片與該裝置本體。該握把之一頂面對應於該電池蓋之一凸緣大小，以供該握把鎖固於該電池蓋。

MassagerPriorArt0001777

Petitioner Therabody Ex-1004, 0765

其中，該握把包括一觸發桿與一按鈕。該按鈕與該觸發桿樞設於該握把內，其中，當該按鈕自一第一位置位移至一第二位置時，該按鈕帶動該觸發桿向上樞轉至該觸發部，以導通該觸發晶片與該裝置本體。

【實施方式】

以下僅以實施例來詳細說明本創作。

請參考第 1 至 3 圖所示，第 1 圖是本創作手持式電子裝置，電池蓋蓋合於裝置本體背部之一實施例的示意圖。第 2 圖是本創作手持式電子裝置之一實施例的分解示意圖。第 3 圖是第 2 圖之裝置本體與握把結合之示意圖。手持式電子裝置包括一裝置本體 1、一電池蓋 2 與一握把 3，該裝置本體 1 具有一電池容置處 10，該電池容置處 10 係一凹部向內一體成形於該裝置本體 1 之一背部，以供設置一電池 40，該電池蓋 2 蓋合該電池容置處 10。該握把 3 鎖固於該電池蓋 2。

如第 1 與 2 圖所示，於一實施例，該裝置本體 1 之背部具有一對卡槽 12 與一對鎖合孔 13，於此實施例，該對卡槽 12 係設置於該電池容置處 10 外圍之一側，該對鎖合孔 13 則設置於該電池容置處 10 外圍對應該對卡槽 12 之另一側。該電池蓋 2 包括一對凸塊 20 與一對鎖固組件 21。該對凸塊 20 係設置於該電池蓋 2 對應於該對卡槽 12 之一側，以供該電池蓋 2 卡合於該裝置本體 1，該對鎖固組件 21 係設置於該電池蓋 2 對應於該對鎖合孔 13 之另一側，以供該電池蓋 2 鎖固於該裝置本體 1，防止電池蓋 2 自裝置本體 1 上脫落。

然而，值得注意的是，為了讓圖面具有簡單與容易示意之效果，該對鎖固組件 21 之繪製僅以通孔表示，本案技術領域具有通常技藝之人士可知悉，該對鎖固組件 21 與該對鎖合孔 13 之鎖固方式可透過旋鈕卡合、推紐卡合或是透過螺絲鎖固的方式，於此不再加以累述，

請繼續參考第 2 與 3 圖所示，該電池蓋 2 另包括一凸緣(flange)22 與至少一鎖孔 23，該凸緣 22 設置於該電池蓋 2 蓋合於該裝置本體 1

MassagerPriorArt0001778

Petitioner Therabody Ex-1004, 0766

之另一側面，該鎖孔 23 係設置於該凸緣 22 之內，該握把 3 之一頂面對應於該凸緣 22 之大小，以供該握把 3 對應連接該電池蓋 2，另外，該握把 3 另包括至少一鎖孔 31 對應於該電池蓋 2 之鎖孔 23，讓一螺絲令該二鎖孔 23, 31 可將該握把 3 穩固鎖附於該電池蓋 2。

請參考第 4 至 6 圖所示，第 4 圖是本創作手持式電子裝置，電池蓋蓋合於裝置本體背部之另一實施例的示意圖。第 5 圖是本創作手持式電子裝置之另一實施例的分解示意圖。第 6 圖是第 5 圖之裝置本體與握把結合之示意圖。

第 4 至 6 圖所示之實施例與上述第 1 至 3 圖所示之實施例類似，最大差別在於裝置本體之類型不同(例如：型號與大小不同)。該些圖式是為了幫助審查委員了解本創作之手持式電子裝置僅需要置換適當的電池蓋，便可以讓多種手持式電子裝置皆能使用相同(通用)的握把，藉此降低為適應於不同手持式電子裝置所需的設計複雜度，以及可以透過大量生產通用握把而降低手持式電子裝置的成本，進而提高價格競爭力。

請同時參考第 1、2、4 及 5 圖，該電池蓋 2 包括一觸發部 24、一觸發晶片 25 與一組電極 26，該觸發部 24 穿設於連接有該握把 3 之一側面，該觸發晶片 25 設置於該電池蓋 2 之內部，並電性連接於該觸發部 24，該對電極 26 設置於該電池蓋 2 之內部，並電性連接於該觸發晶片 25 與該裝置本體 1 內之一電路(圖中未示)。該握把 3 設置有一使用者介面 32，該使用者介面 32 根據一使用者之操作，透過該觸發部 24 導通該觸發晶片 25 與該裝置本體 1。

該握把 3 之使用者介面 32 可為一按鍵或一觸控式面板，使用者可透過該使用者介面 32 操作該裝置本體 1。如第 2 與 5 圖所示，於本實施例中，該使用者介面 32 為一按鍵，其包括一按鈕 320 與一觸發桿 322，該按鈕 320 與該觸發桿 322 樞設於該握把 3 內，其中，當該按鈕 320 自一第一位置位移至一第二位置時，該按鈕 320 帶動該觸發桿 322 向上樞轉至該觸發部 24，以導通該觸發晶片 25 與該裝置本體 1。

MassagerPriorArt0001779

Petitioner Therabody Ex-1004, 0767

舉例來說，當一商店店員欲使用本創作之手持式電子裝置來對一商品之條碼進行掃描時，該店員按下該按鈕 320，該按鈕 320 帶動該觸發桿 322 向上樞轉觸碰該觸發部 24，該觸發部 24 觸發該觸發晶片 25，該觸發晶片 25 發送一觸發訊號，並透過該對電極 26 傳遞至該裝置本體 1 內，驅動該裝置本體 1 內之掃描電路，以用來對商品的條碼進行掃描。值得注意的是，本創作之手持式電子裝置適用於不同的應用，掃描條碼僅為其中一方便了解的應用例子，其餘應用可透過置換該觸發晶片 25，令該觸發晶片 25 發送對應欲達成之功能的觸發訊號。

綜上所述，本創作之手持式電子裝置的電池蓋可以根據各種不同機型之手持式行動裝置加以修改其實際尺寸，藉此統一握把之規格；假設同一單位內具有多種不同機型的手持式行動裝置，只需準備單一握把，並可通用裝設於各種機型之手持式行動裝置上。

惟以上所述者，僅為本創作之較佳實施例，當不能用以限定本創作可實施之範圍，凡知悉本案領域具有通常技藝人士所明顯可作的變化與修飾，皆應視為不悖離本創作之實質內容。

【圖式簡單說明】

第 1 圖為是本創作手持式電子裝置，電池蓋蓋合於裝置本體背部之一實施例的示意圖。

第 2 圖是本創作手持式電子裝置之一實施例的分解示意圖。

第 3 圖是第 2 圖之裝置本體與握把結合之示意圖。

第 4 圖是本創作手持式電子裝置，電池蓋蓋合於裝置本體背部之另一實施例的示意圖。

第 5 圖是本創作手持式電子裝置之另一實施例的分解示意圖。

第 6 圖是第 5 圖之裝置本體與握把結合之示意圖。

【主要元件符號說明】

1	裝置本體
10	電池容置處

MassagerPriorArt0001780

Petitioner Therabody Ex-1004, 0768

12	卡槽
13	鎖合孔
2	電池蓋
20	凸塊
21	鎖固組件
22	凸緣
23	鎖孔
24	觸發部
25	觸發晶片
26	電極
3	握把
31	鎖孔
32	使用者介面
320	按鈕
322	觸發桿
40	電池

MassagerPriorArt0001781

Petitioner Therabody Ex-1004, 0769

M433702

公告本

新型專利說明書

（本說明書格式、順序，請勿任意更動，※記號部分請勿填寫）

※申請案號：101203496

※申請日：101.2.24　　※IPC分類：H05K 7/00 (2006.01)

一、新型名稱：（中文/英文）

手持式電子裝置

二、中文新型摘要：

一種手持式電子裝置，透過改良手持式電子裝置之握持連接的結構，讓多種手持式電子裝置皆能使用相同(通用)的握把。手持式電子裝置包括裝置本體、電池蓋與握把，該裝置本體具有電池容置處，該電池容置處係凹部向內體成形於該裝置本體之背部，以供設置電池，該電池蓋蓋合該電池容置處。該握把鎖固於該電池蓋。因此，手持式電子裝置的電池蓋可以根據各種不同機型統一所連接之握把規格。

三、英文新型摘要：

MassagerPriorArt0001782

Petitioner Therabody Ex-1004, 0770

六、申請專利範圍：

1、 一種手持式電子裝置，係包括：

一裝置本體，係具有一電池容置處，該電池容置處係一凹部向內一體成形於該裝置本體之一背部，以供設置一電池；

一電池蓋，係蓋合該電池容置處並包括：

一觸發部，係穿設該電池蓋之一側面；

一觸發晶片，係設置於該電池蓋之一內部，並電性連接該觸發部；及

一對電極，係設置於該電池蓋之該內部，並電性連接該觸發晶片與該裝置本體；及

一握把，該握把之一頂面對應於該電池蓋之一凸緣之大小，以供該握把鎖固於該電池蓋，該握把包括：

一觸發桿；及

一按鈕，該按鈕與該觸發桿樞設於該握把內，其中，當該按鈕自一第一位置位移至一第二位置時，該按鈕帶動該觸發桿向上樞轉至該觸發部，以導通該觸發晶片與該裝置本體。

2、 如申請專利範圍第1項所述之手持式電子裝置，其中，該裝置本體之該背部具有一對卡槽與一對鎖合孔，該電池蓋包括一對凸塊與一對鎖固組件，該對凸塊係設置於該電池蓋對應於該對卡槽之一側，以供該電池蓋卡合於該裝置本體，該對鎖固組件係設置於該電池蓋對應於該對鎖合孔之另一側，以供該電池蓋鎖固於該裝置本體。

3、 如申請專利範圍第2項所述之手持式電子裝置，其中，該對卡槽係設置於該電池容置處外圍之一側，該對鎖合孔係設置於該電池容置處外圍對應該對卡槽之另一側。

MassagerPriorArt0001783

Petitioner Therabody Ex-1004, 0771

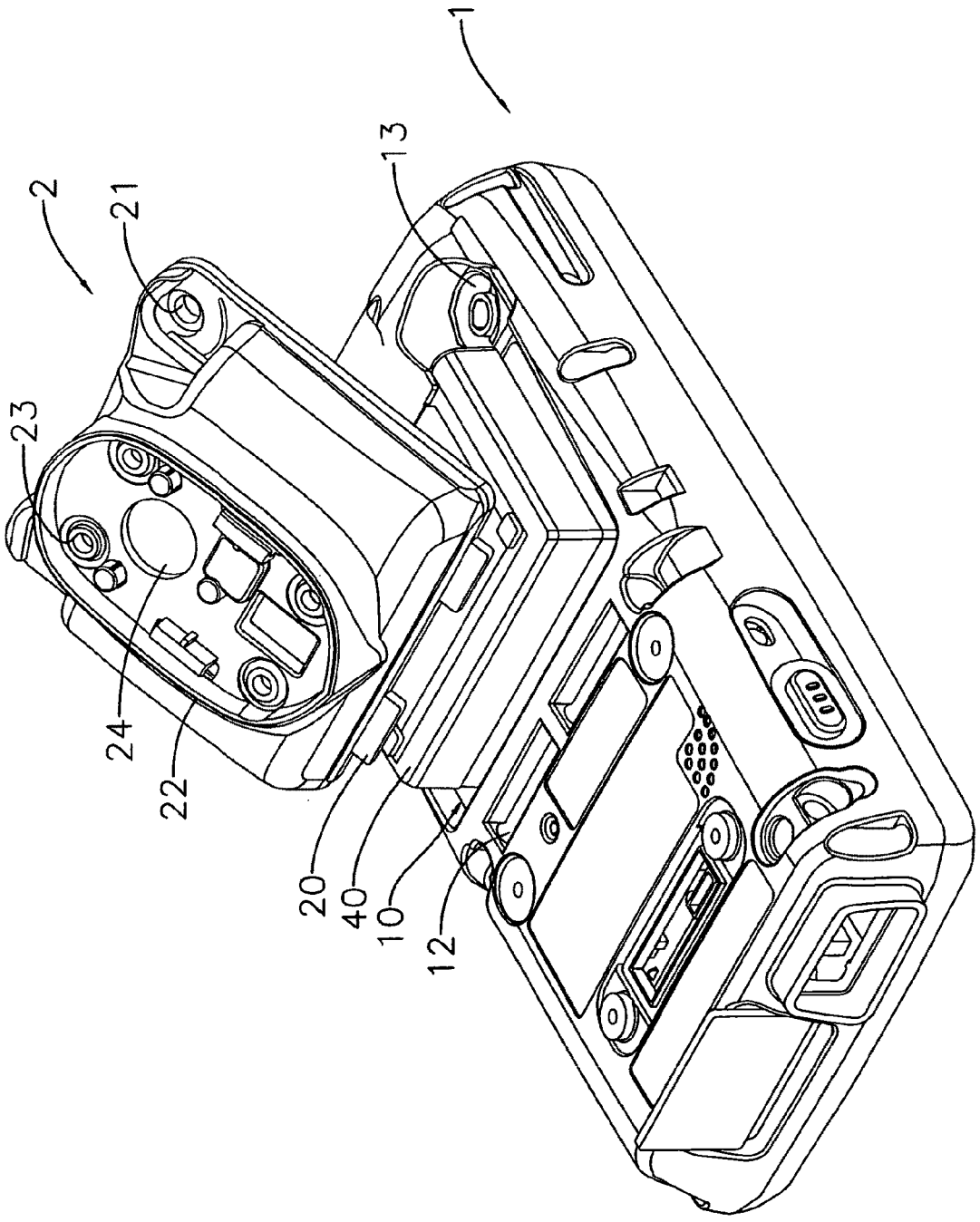
4、 如申請專利範圍第 1 項所述之手持式電子裝置，其中，該電池蓋與該握把另分別包括至少一鎖孔，該電池蓋之鎖孔設置於該凸緣之內，該握把之鎖孔對應於該電池蓋之鎖孔，以供一螺絲通過該二鎖孔將該握把穩固鎖附於該電池蓋。

5、如申請專利範圍第 1 項所述之手持式電子裝置，其中，該觸發部觸發該觸發晶片，該觸發晶片發送一觸發訊號，並透過該對電極傳遞至該裝置本體內，以驅動該裝置本體內之一掃描電路。

MassagerPriorArt0001784

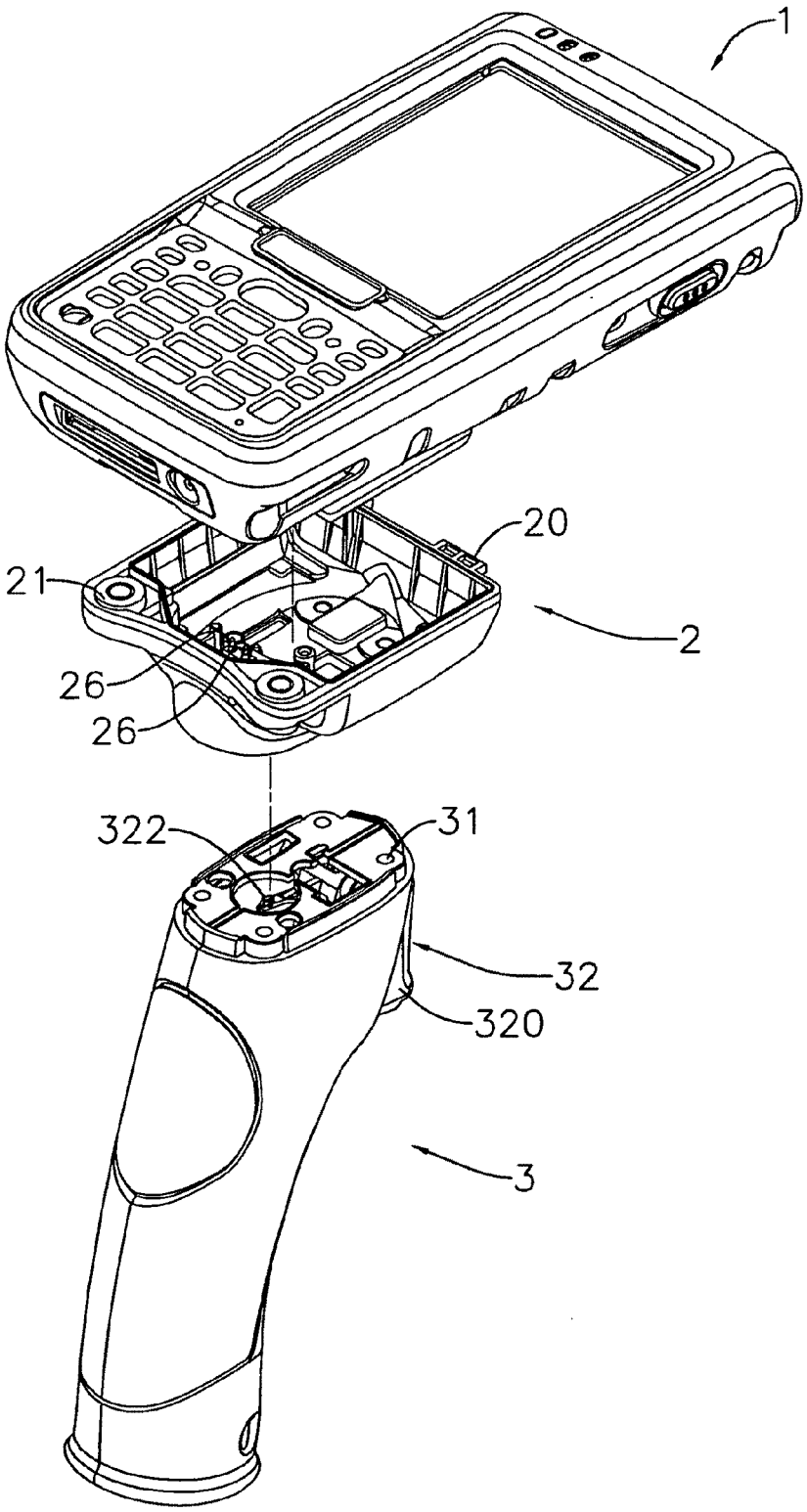
Petitioner Therabody Ex-1004, 0772

七、圖式：



第1圖

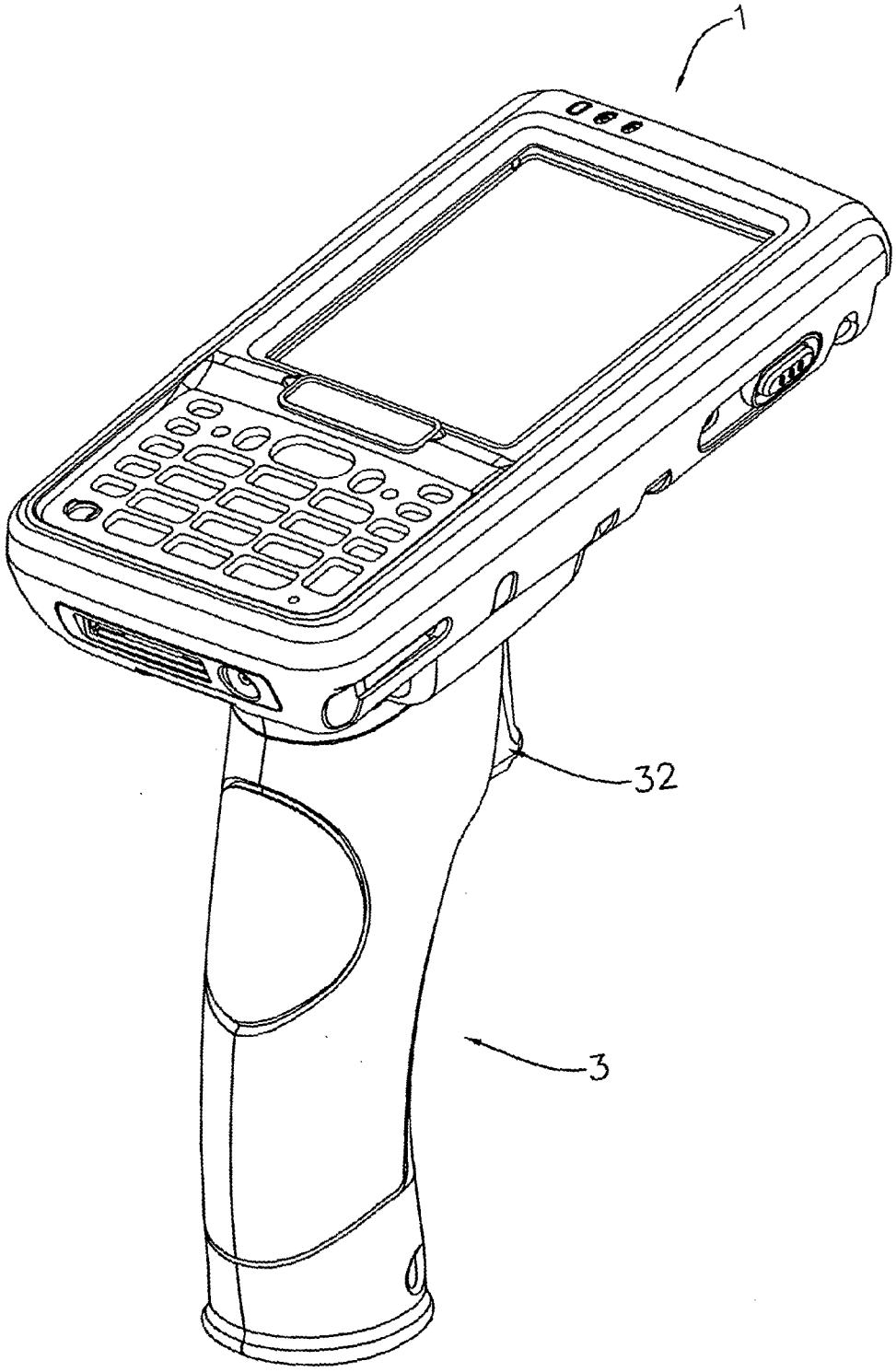
Petitioner Therabody Ex-1004, 0773



第 2 圖

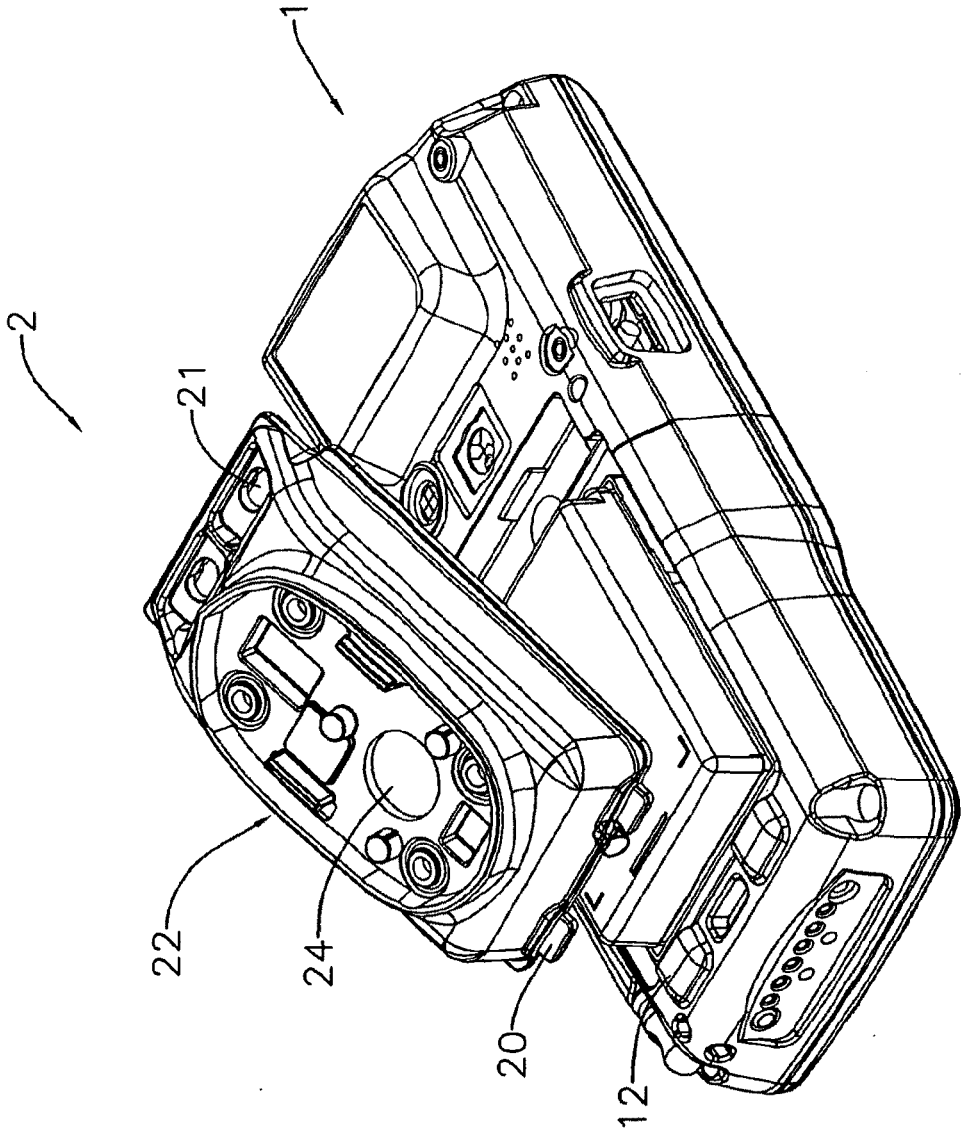
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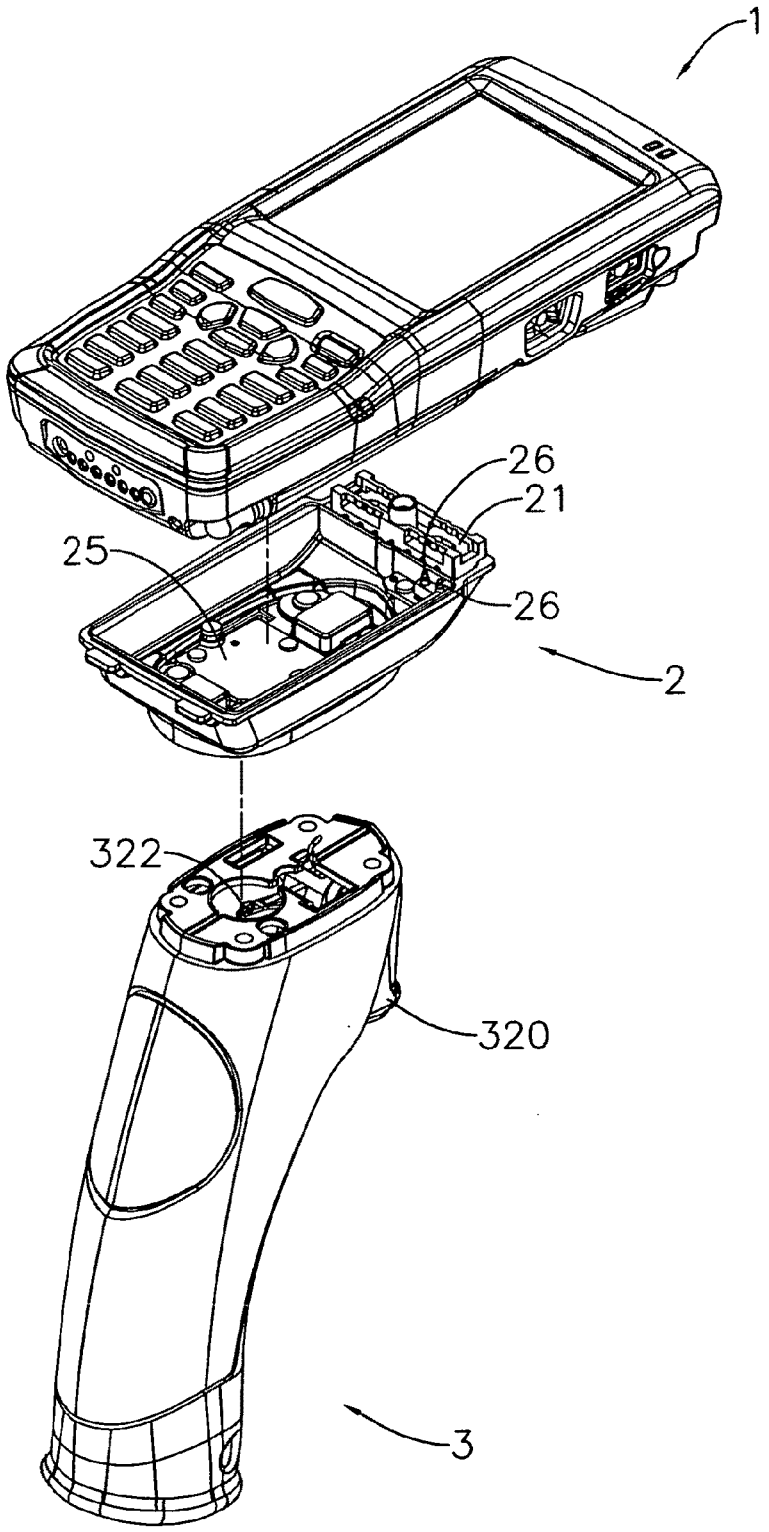
第3圖

MassagerPriorArt00



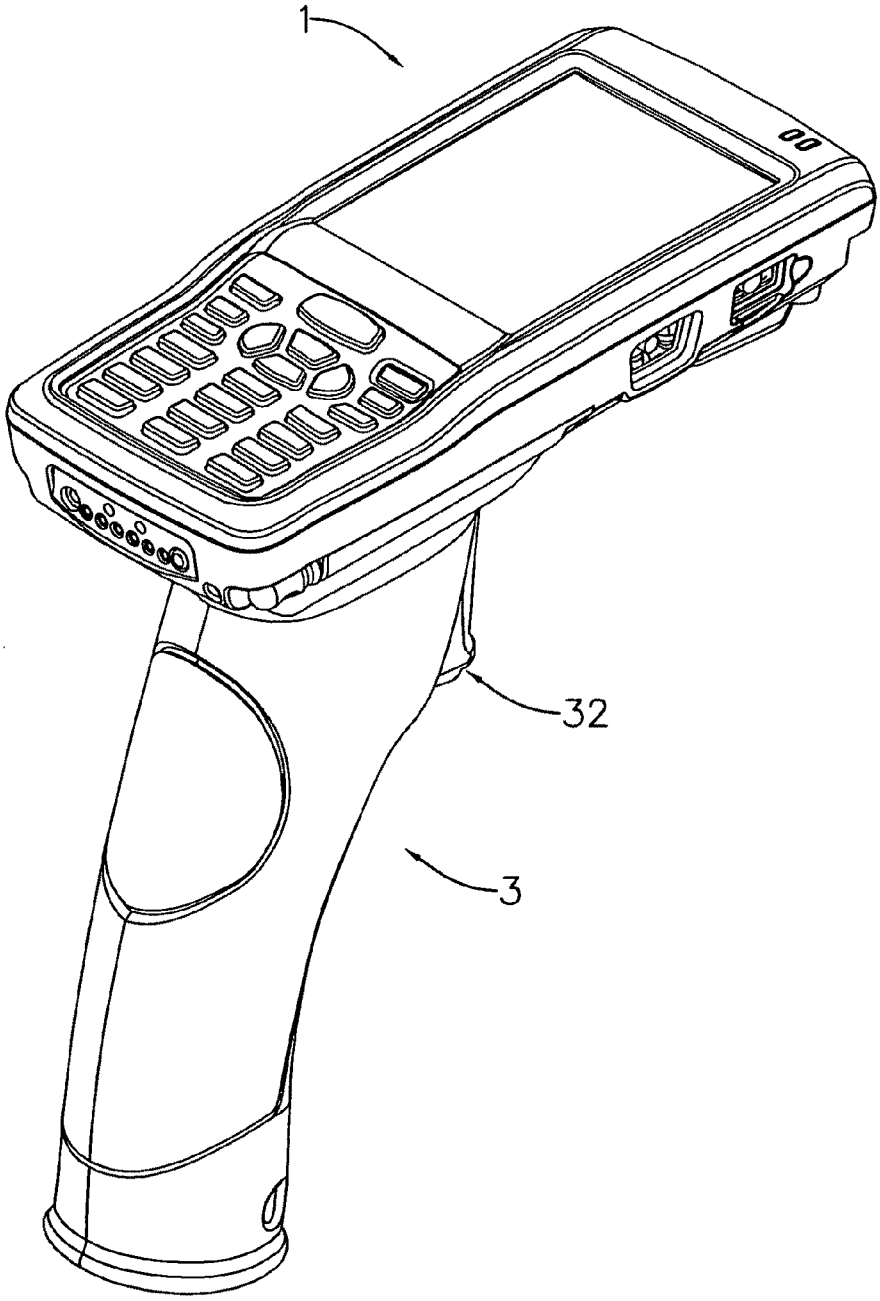
第4圖

Petitioner Therabody Ex-1004, 0776



第 5 圖

Petitioner Therabody Ex-1004, 0777



第 6 圖

Petitioner Therabody Ex-1004, 0778

四、指定代表圖：

(一)本案指定代表圖為：第 2 圖。

(二)本代表圖之元件符號簡單說明：

1	裝置本體
2	電池蓋
20	凸塊
21	鎖固組件
26	電極
3	握把
31	鎖孔
32	使用者介面
320	按鈕
322	觸發桿

MassagerPriorArt0001791

Petitioner Therabody Ex-1004, 0779

Portable massager

Description

M272528 8. Description of the new type: [Technical field to which the new type belongs] The present invention relates to a massager, particularly a portable massager that can be carried around. ^ [Prior art]

In general, in order to reach all parts of the body, the massager often has a suitable length = length, of course, it also has a certain weight, so it is not suitable for carry-on. In the case of economic benefits, the research and development of easy-to-carry massagers has become the goal of all relevant industries to develop and overcome improvements. [New content] Therefore, the purpose of the new model of the belt massager is to provide a mouthpiece that can reduce the size of the mouthpiece— "····· The shell has a convex portion formed at one end and formed In another

The holding portion has a recess formed on an end surface. The estimate is that it is housed in the casing and can vibrate with respect to the convex portion, so that the violation of the convex portion has a massage effect on the human body. The utility model has the advantages of reducing the volume and being easy to carry. [Embodiment] The following reference patterns for the present invention are clearly presented. The features and functions of a preferred embodiment of the foregoing and other technical contents will be described in detail in FIG. 2. A preferred embodiment of the novel portable massager M272528 Zhen Qin soap element 2 and a massage The unit 3 (see FIG. 3) includes: a battery cover 124 housing the container 123. A recessed groove 132 of the convex portion 131. The casing 1 has an upper cover Π and a base 12 which are aligned with each other, and a convex portion 13 formed at a front end (1) of the upper cover u. The upper cover has an upper grip portion 113 formed at the -rear portion. The base 12 has a reverse-front end portion m and a lower grip portion 122 formed at a rear end portion, a receiving chamber 123 formed in the lower grip portion 122 and receiving the battery 4, and a cover U. Has an end face

The vibration unit 2 is housed in the upper cover n and the front end portion 111 121 of the base 12, and has a motor 21 and an eccentric wheel 22 that generates vibration with respect to the convex portion 13. 3 and 4, the massage unit 3 has a number of massage heads 31 and a massage group 32 formed on the massage head 31. Each massage head 31 is sleeved on the convex portion 13 of the casing 1 in a fitting manner, and has a ring wall 3 11 surrounding the casing 13 and a top wall combined with the ring wall 3 11. 312, a ring 313 formed on the bottom wall 312-the bottom surface and inserted into the convex portion 13 and the groove 132. In this embodiment, the massage group 32 has a plurality of arc-shaped convex particles 321 scattered on the top wall 312-the top surface. Referring to FIG. $, The massage group 32 has a plurality of protruding posts 322 scattered on the top surface of the top wall 312. Referring to the figure, the massage group 32 has a convex post 323 formed on the top wall 312 and the center of the top surface. Referring to FIG. 7 ', the far massage group 32 has a plurality of ring ribs 324 formed on the top surface of the top wall 312 and scattered from the inside to the outside. Referring to FIG. 8, the massage group 32 has a rib 325 across the top surface of the top wall 312. Referring to Fig.

Petitioner Therabody Ex-1004, 0780

9, the massage group 32 has a soft capsule 326. M272528 Referring to FIG. 1 and FIG. 2, when the user holds the upper and lower grip portions 113 and 12 'and activates the vibration unit 2, the motor 21 will drive the eccentric wheel M during the rotation process relative to the convex portion. 13 generates vibration, so that the convex portion 13 can be used only to abut the eye of the human body, and the recessed groove 132 forms a space for the eye to accommodate the eye, and the convex portion 13 can be used to produce a massage effect on the eyes. And the space formed by the recessed grooves 132 avoids eyes repeatedly and enhances the comfort of the novel massage. 3, 4, and 5 to 9, the user can also view the massage part as follows: the massage head 31 and the massage group 32 can be set on the convex part 13 according to the difference of the massage part. Cooperate with each massage head 3m and massage group 32 with different shapes to massage various parts of the body, so that the present invention can be carried at any time and in any situation when it can be carried around. According to the above, the new portable massager has the following advantages and effects: "The new model is quite light in size, can be carried around, and can save huge mold opening costs. 'Importantly' because this new model can Carrying 'so' at any time and on any occasion, it can relax the body parts of Yizi, and improve the convenience and practicability of use. However, the above is only a better implementation of the new model. This is just an example: This defines the scope of the implementation of the new model, that is, the application of the new model :: Scope and description of the new model ▲ Early equivalent changes and modifications that fall within the scope of the new model patent. Still 7 M272528 [Brief description of the drawings] FIG. 1 is an exploded view illustrating a preferred embodiment of a portable massager of the present invention; FIG. 2 is a combined diagram illustrating the appearance of the combined preferred embodiment, 3 is an exploded view illustrating a massage head in the preferred embodiment; FIG. 4 is a combined view illustrating the preferred embodiment in combination with a massage head FIG. 5 is a combined view illustrating the preferred embodiment The second embodiment of the massage head; FIG. 6 is a combination diagram illustrating three implementation modes of the massage head in the preferred embodiment; FIG. 7 is a combination diagram illustrating the massage in the preferred embodiment The first four implementation modes; FIG. 8 is a combination diagram illustrating the five implementation modes of the massage head in the preferred embodiment; and FIG. 9 is a combination diagram illustrating the massage head in the preferred embodiment. A kind of implementation mode. M2725Z8 [Description of main component symbols] 1 …… •… shell 22 · *. ·· •… eccentric wheel ..., L generation ○ ..... 11 * * * L joTL In the early days 111… •… Other end 31 ··· * · •… Massage head 113… •… Upper grip 311…… Ring wall 12 ····· Base 3 12… •… Top wall m … •… front end 313…… rim 122… •… lower grip 32…… massage group 123…… container 321… bulge 124… battery cover 322… • … Protruding post 13…. •… protruding part 323…… protruding post 131… façade 324…… ring rib 132… pit 325…… rib 2 ..... Unit 326 ... • ... Capsule 21 ... ---- Motor

Petitioner Therabody Ex-1004, 0781

Drawings

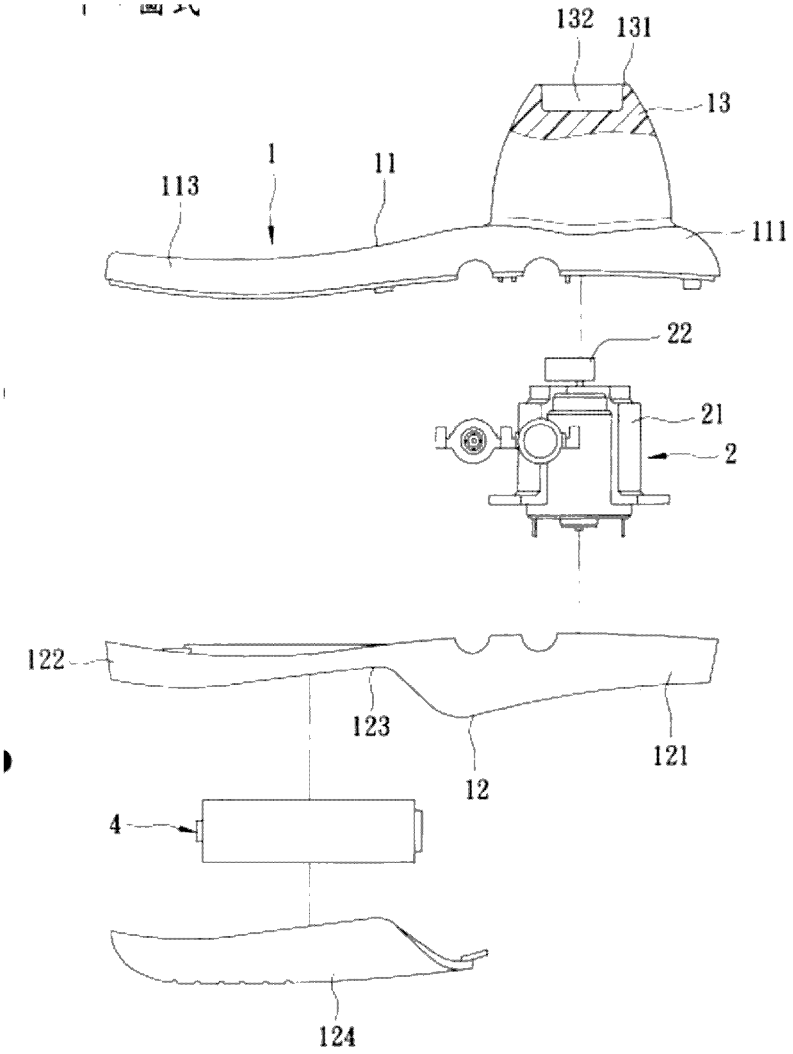


圖1

Petitioner Therabody Ex-1004, 0782

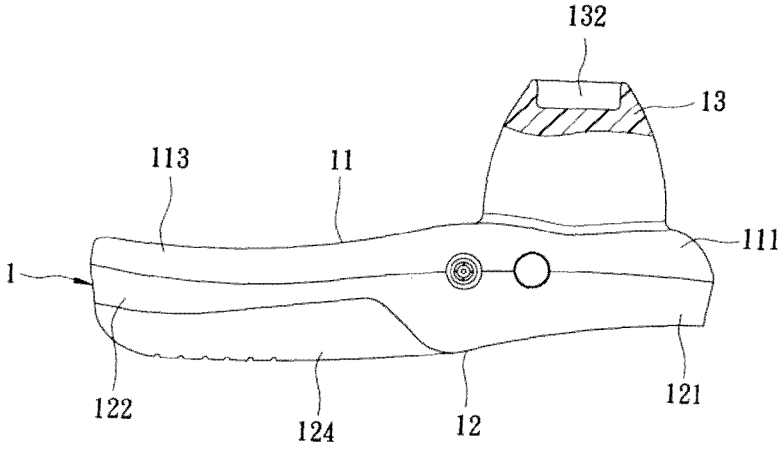


圖2

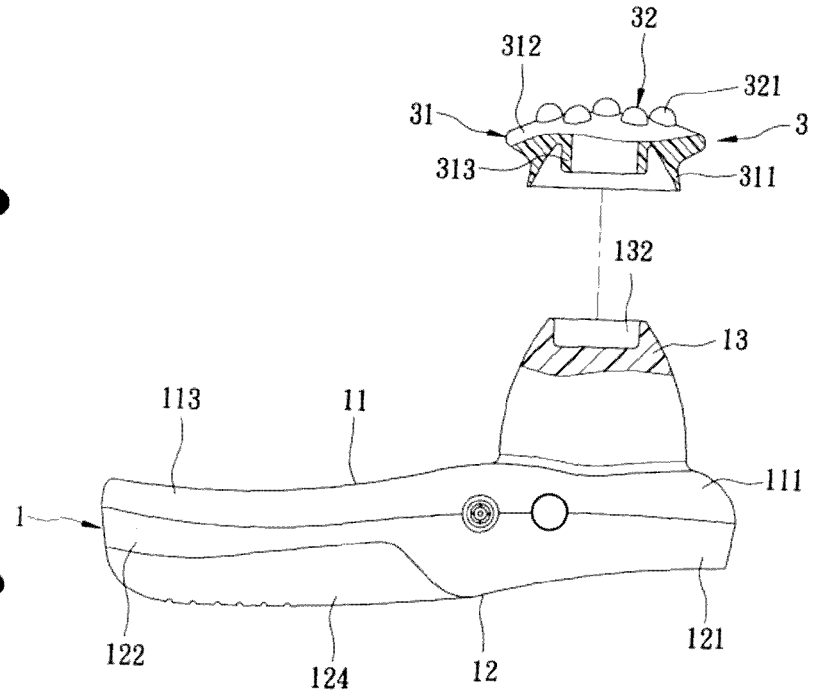


圖3

MassagerPriorArt0000961

Petitioner Therabody Ex-1004, 0783

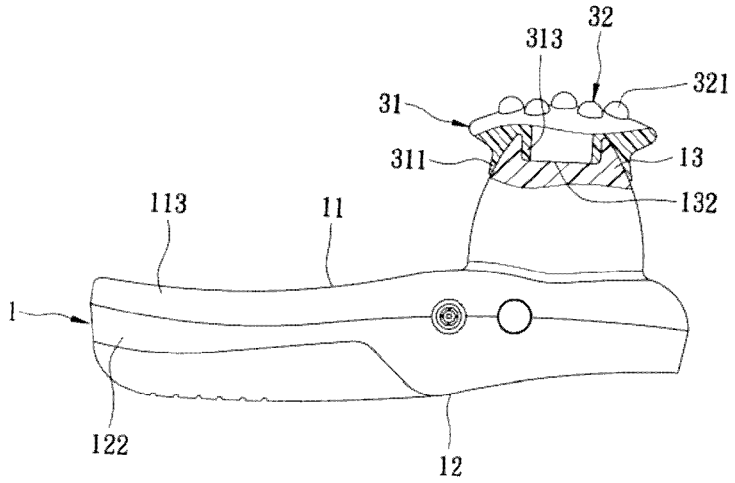


圖4

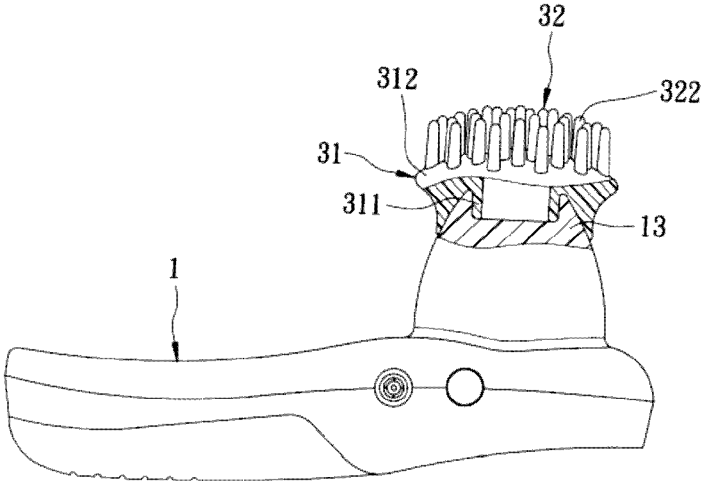


圖5

Petitioner Therabody Ex-1004, 0784

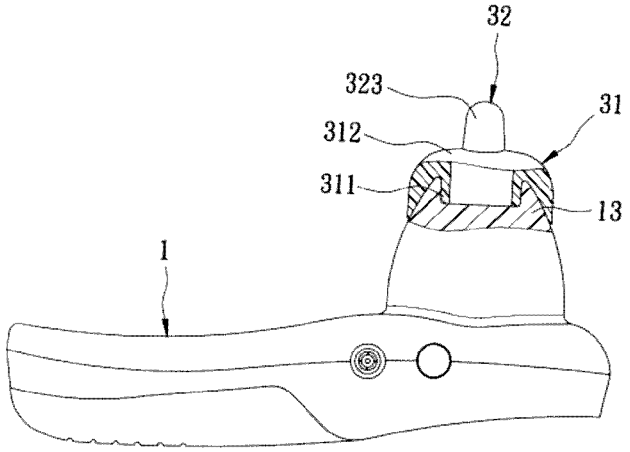


圖6

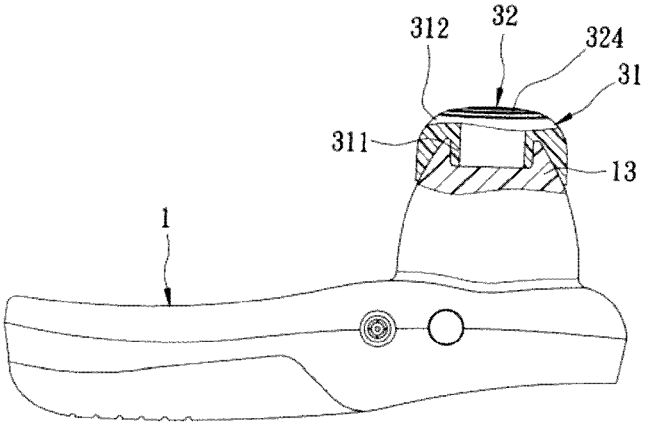


圖7

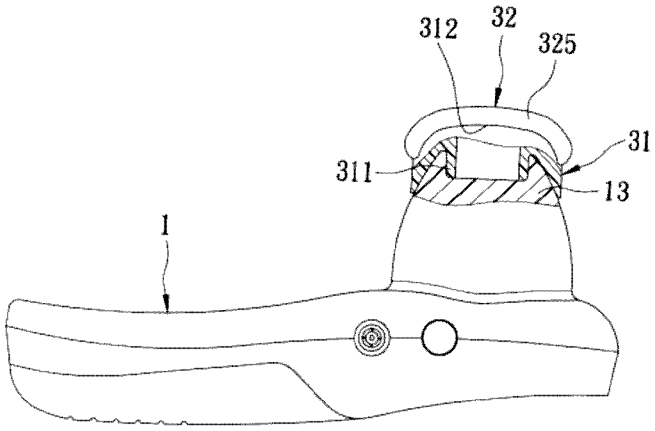


圖8

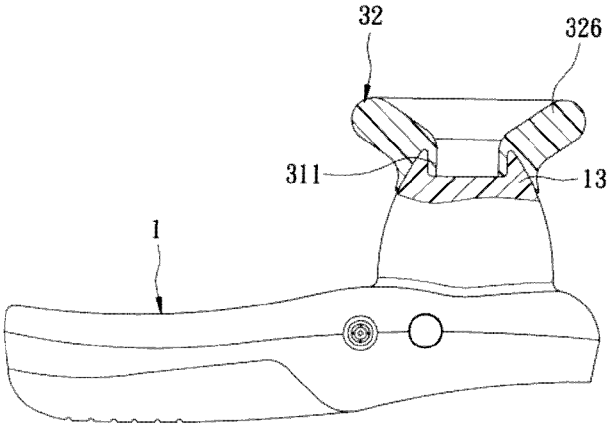


圖9

Petitioner Therabody Ex-1004, 0786

M272528

公告本

新型專利說明書

（本說明書格式、順序及粗體字，請勿任意更動，※記號部分請勿填寫）

※ 申請案號：94204580

※ 申請日期：94.3.24　　※IPC 分類：A61H 7/00 13/00

一、新型名稱：（中文/英文）

攜帶式按摩器

二、申 請 人：（共 1 人）

姓名或名稱：（中文/英文）

群中股份有限公司

代表人：（中文/英文）

王 鳳 嬌

住居所或營業所地址：（中文/英文）

(434)台中縣龍井鄉新興路 237 號

國　籍：（中文/英文）

中華民國

三、創作人：（共 1 人）

姓　名：（中文/英文）

陳 榮 忠

國　籍：（中文/英文）

中華民國

MassagerPriorArt0001139

Petitioner Therabody Ex-1004, 0787

四、聲明事項：

☐ 主張專利法第九十四條第二項☐第一款或☐第二款規定之事實，其事實發生日期為：　年　月　日。

☐ 申請前已向下列國家（地區）申請專利：

【格式請依：受理國家（地區）、申請日、申請案號　順序註記】

☐ 有主張專利法第一百零八條準用第二十七條第一項國際優先權：

☐ 無主張專利法第一百零八條準用第二十七條第一項國際優先權：

☐ 主張專利法第一百零八條準用第二十九條第一項國內優先權：

【格式請依：申請日、申請案號　順序註記】

MassagerPriorArt0001140

Petitioner Therabody Ex-1004, 0788

八、新型說明：

【新型所屬之技術領域】

本新型是有關於一種按摩器，特別是指一種可隨身攜帶的攜帶式按摩器。

【先前技術】

一般按摩器為了能觸及身體各部位，往往延伸有適當的長度，當然也具有一定的重量，因此，並不適合隨身攜帶，而產品要提升，就是要符合市場的需求，所以，如何在符合經濟效益的情形下，研發易於攜帶的按摩器，也就成為各相關業者極思開發與克服改良的目標。

【新型內容】

因此，本新型之目的，即在提供一種能縮小體積的攜帶式按摩器。

於是，本新型的攜帶式按摩器包含：一殼體及一振動單元。該殼體具有形成在一端部的一凸部，及形成在另一端部的一握持部，該凸部具有形成在一端面的一窩槽。該振動單元是容置在該殼體內，且能相對該凸部產生振動，使該凸部對人體產生按摩效果。

本新型的功效是能縮小體積、易於攜帶。

【實施方式】

有關本新型之前述及其他技術內容、特點與功效，在以下配合參考圖式之一個較佳實施例的詳細說明中，將可清楚的呈現。

參閱圖 1、圖 2，本新型的攜帶式按摩器的較佳實施例

MassagerPriorArt0001141

Petitioner Therabody Ex-1004, 0789

包含：一殼體 1、一振動單元 2 及一按摩單元 3(參圖 3)。

該殼體 1 具有上、下對合的一上蓋 11 與一底座 12，及形成在該上蓋 11 一前端部 111 的一凸部 13。該上蓋 11 具有形成在一後端部的一上握持部 113。該底座 12 具有反向的一前端部 121 與形成在一後端部的一下握持部 122、形成在該下握持部 122 且供數電池 4 容置的一容室 123，及封蓋該容室 123 的一電池蓋 124。該凸部 13 具有形成在一端面 131 的一窩槽 132。

該振動單元 2 是容置在該上蓋 11 與該底座 12 前端部 111、121 內，並具有一馬達 21，及相對該凸部 13 產生振動的一偏心輪 22。

參圖 3、圖 4，該按摩單元 3 具有數按摩頭 31，及形成在該按摩頭 31 上的按摩組 32。每一按摩頭 31 是以套合的方式套置在該殼體 1 的凸部 13 上，並具有環繞該殼體 1 凸部 13 的一環壁 311、結合該環壁 311 一端的一頂壁 312、形成在該頂壁 312 一底面且插置在該凸部 13 窩槽 132 內的一環緣 313。在本實施例中，該按摩組 32 具有散佈在該頂壁 312 一頂面的多數個圓弧形凸粒 321。參圖 5，該按摩組 32 具有散佈在該頂壁 312 頂面的多數個凸柱 322。參圖 6，該按摩組 32 具有形成在該頂壁 312 頂面中央的一凸柱 323。參圖 7，該按摩組 32 具有形成在該頂壁 312 頂面且由內向外散佈的數環肋 324。參圖 8，該按摩組 32 具有橫跨該頂壁 312 頂面的一肋條 325。參圖 9，該按摩組 32 具有一柔軟的膠囊 326。

MassagerPriorArt0001142

Petitioner Therabody Ex-1004, 0790

參圖 1、圖 2，當使用者握持該上、下握持部 113、122，並啟動該振動單元 2 時，該馬達 21 會帶動該偏心輪 22 在轉動過程中，相對該凸部 13 產生振動，藉此，只須將該凸部 13 貼靠在人體的眼部，及以該窩槽 132 形成供眼睛容置的空間，就可以利用凸部 13 的對眼睛的週圍產生按摩效果，及以該窩槽 132 形成的空間，避免迫壓眼睛，提昇本新型的按摩舒適感。

參圖 3、圖 4，及圖 5 至圖 9，使用者也可以視按摩部位的不同，選擇需求的按摩頭 31 及按摩組 32 套置在該凸部 13 上，藉此，就可以配合各按摩頭 31 與形狀各異的按摩組 32 按摩身體各部位，使本新型在可以隨身攜帶的情形下，於任何時機、任何場合，獲得身體各部位的舒解。

據上所述可知，本新型之攜帶式按摩器具有下列優點及功效：

本新型在體積上相當輕巧，可以隨身攜帶，且可以省去一筆龐大的開模費用，重要的是，由於本新型可以隨身攜帶，因此，在任何時機、任何場合，都可以使持有者獲得身體各部位的舒解，提昇使用上的方便性與實用性。

惟以上所述者，僅為本新型之較佳實施例而已，當不能以此限定本新型實施之範圍，即大凡依本新型申請專利範圍及新型說明內容所作之簡單的等效變化與修飾，皆仍屬本新型專利涵蓋之範圍內。

MassagerPriorArt0001143

Petitioner Therabody Ex-1004, 0791

【圖式簡單說明】

圖 1 是一分解圖，說明本發明一攜帶式按摩器的一較佳實施例；

圖 2 是一組合圖，說明該較佳實施例組合後的外觀；

圖 3 是一分解圖，說明該較佳實施例中一按摩頭；

圖 4 是一組合圖，說明該較佳實施例與一按摩頭結合；

圖 5 是一組合圖，說明該較佳實施例中該按摩頭的第二種實施態樣；

圖 6 是一組合圖，說明該較佳實施例中該按摩頭的第三種實施態樣；

圖 7 是一組合圖，說明該較佳實施例中該按摩頭的第四種實施態樣；

圖 8 是一組合圖，說明該較佳實施例中該按摩頭的第五種實施態樣；及

圖 9 是一組合圖，說明該較佳實施例中該按摩頭的第六種實施態樣。

MassagerPriorArt0001144

Petitioner Therabody Ex-1004, 0792

【主要元件符號說明】

1 ……殼體
11……上蓋
111 ……前端部
113 ……上握持部
12……底座
121 ……前端部
122 ……下握持部
123 ……容室
124 ……電池蓋
13……凸部
131 ……端面
132 ……窩槽
2 ……振動單元
21……馬達
22……偏心輪
3 ……按摩單元
31……按摩頭
311 ……環壁
312 ……頂壁
313 ……環緣
32……按摩組
321 ……凸粒
322 ……凸柱
323 ……凸柱
324 ……環肋
325 ……肋條
326 ……膠囊

MassagerPriorArt0001145

Petitioner Therabody Ex-1004, 0793

五、中文新型摘要：

一種攜帶式按摩器，主要包含一殼體及一振動單元。該殼體具有形成在一端部的一凸部，及形成在另一端部的一握持部，該凸部具有形成在一端面的一窩槽。該振動單元是容置在該殼體內，且能相對該凸部產生振動，使該凸部對人體產生按摩效果。

六、英文新型摘要：

MassagerPriorArt0001146

Petitioner Therabody Ex-1004, 0794

七、指定代表圖：

(一)本案指定代表圖為：圖（ 2 ）。

(二)本代表圖之元件符號簡單說明：

1……殼體

11……上蓋

111……前端部

113……上握持部

12……底座

121……前端部

122……下握持部

124……電池蓋

13……凸部

131……端面

132 窩槽

MassagerPriorArt0001147

Petitioner Therabody Ex-1004, 0795

九、申請專利範圍：

1. 一種攜帶式按摩器，包含：

一殼體，具有形成在一端部的一凸部，及形成在另一端部的一握持部，該凸部具有形成在一端面的一窩槽；及

一振動單元，是容置在該殼體內，且能相對該凸部產生振動，使該凸部對人體產生按摩效果。

2. 依據申請專利範圍第 1 項所述之攜帶式按摩器，更包含有一按摩單元，該按摩單元具有數按摩頭及數按摩組，每一按摩頭是可卸離地套置在該殼體的凸部上，每一按摩組是形成在該按摩頭一頂面。

3. 依據申請專利範圍第 2 項所述之攜帶式按摩器，其中，該按摩組可以是散佈在該按摩頭頂面的數凸粒、形成在該按摩頭頂面且位於中央部位的一凸柱、散佈在該按摩頭頂面的數凸柱、形成在該按摩頭頂面且由內向外散佈的數環肋，及概呈長條形的至少一肋條其中一種。

4. 依據申請專利範圍第 2 項所述之攜帶式按摩器，其中，每一按摩頭具有環繞該殼體凸部的一環壁，及結合該環壁一端且形成有該按摩組的一頂壁。

5. 依據申請專利範圍第 2 項所述之攜帶式按摩器，其中，每一按摩頭更具有形成在該頂壁一底面且插置在該凸部窩槽內的一環緣。

MassagerPriorArt0001148

Petitioner Therabody Ex-1004, 0796

十、圖式

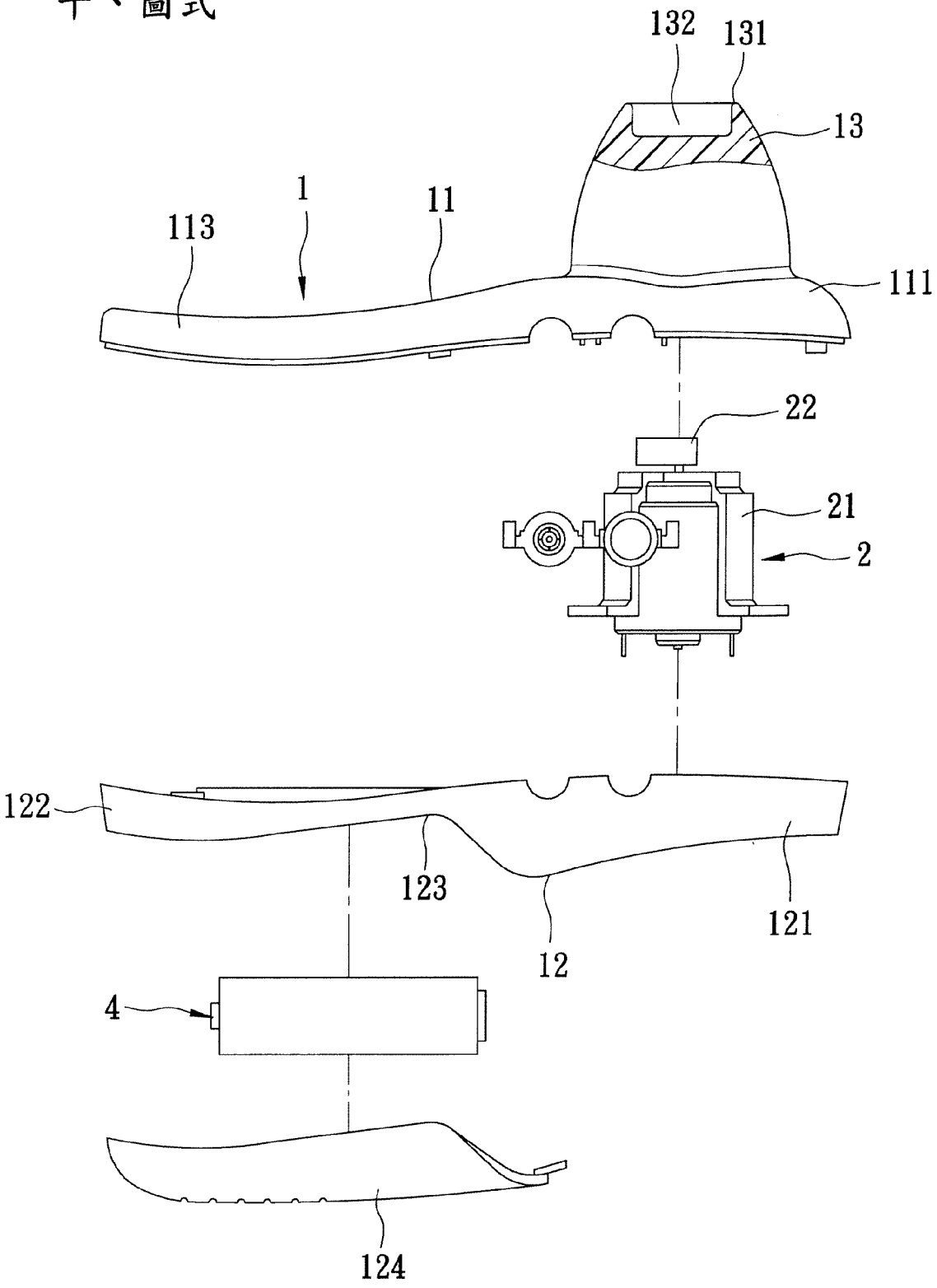


圖1

MassagerPriorArt0001149

Petitioner Therabody Ex-1004, 0797

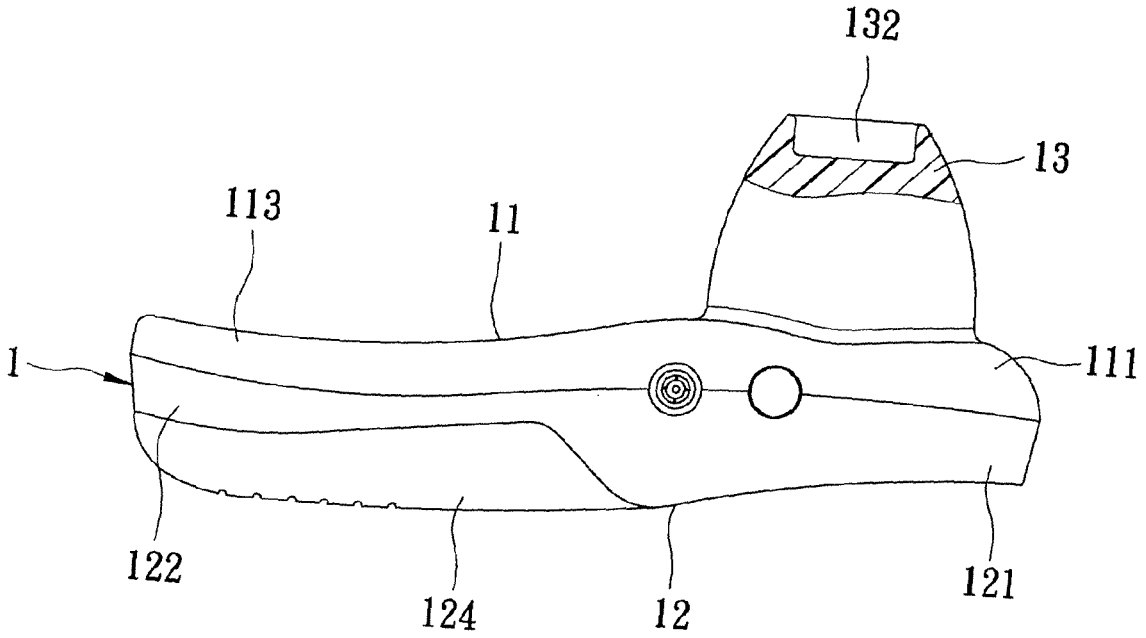


圖2

Petitioner Therabody Ex-1004, 0798

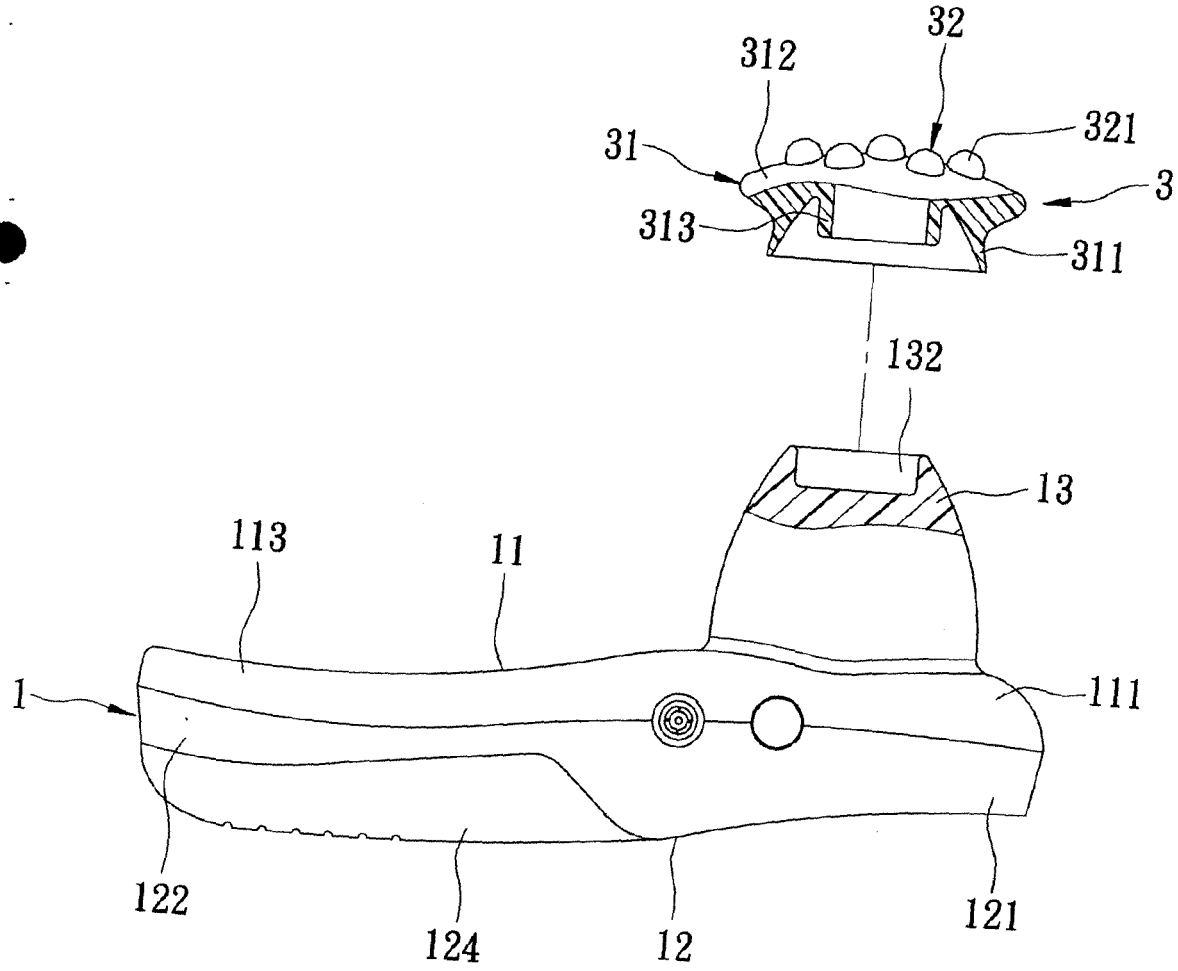


圖3

Petitioner Therabody Ex-1004, 0799

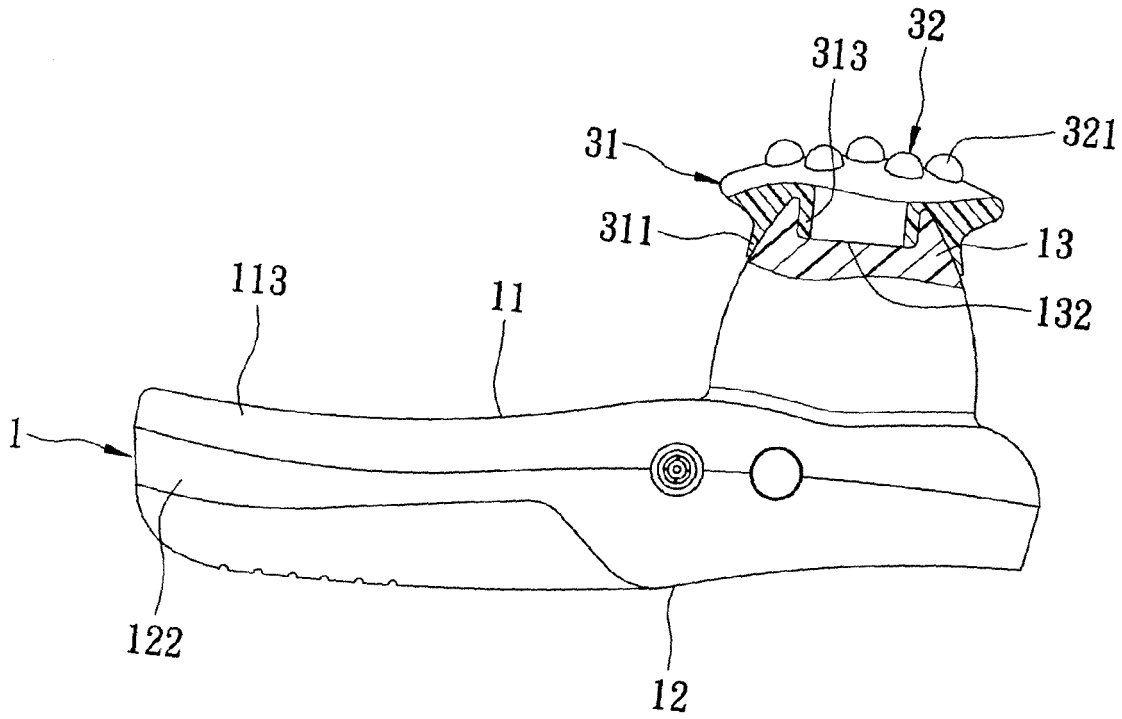


圖4

Petitioner Therabody Ex-1004, 0800

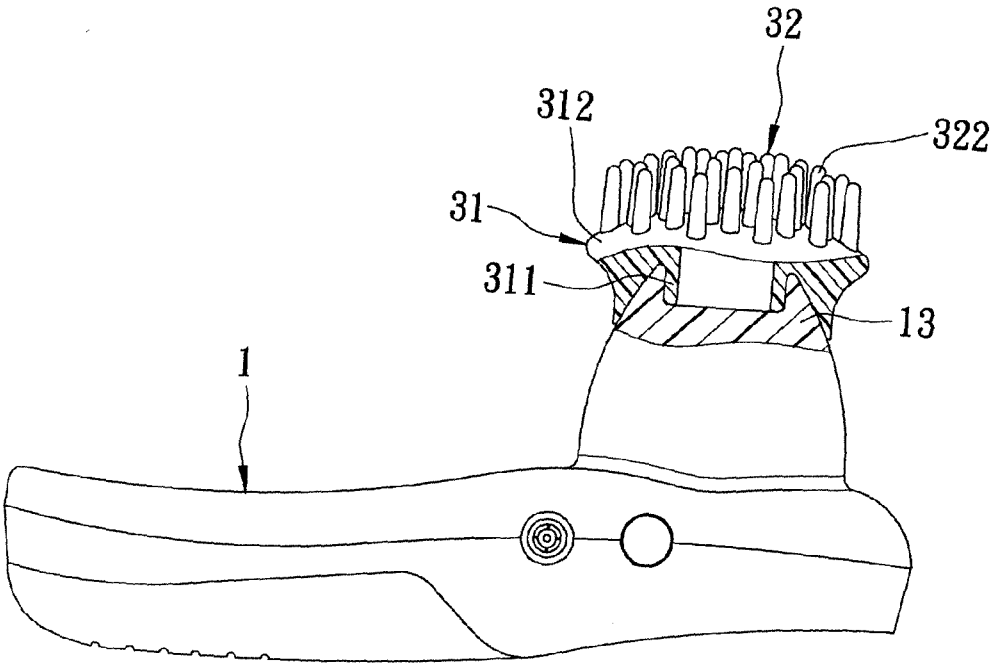


圖5

Petitioner Therabody Ex-1004, 0801

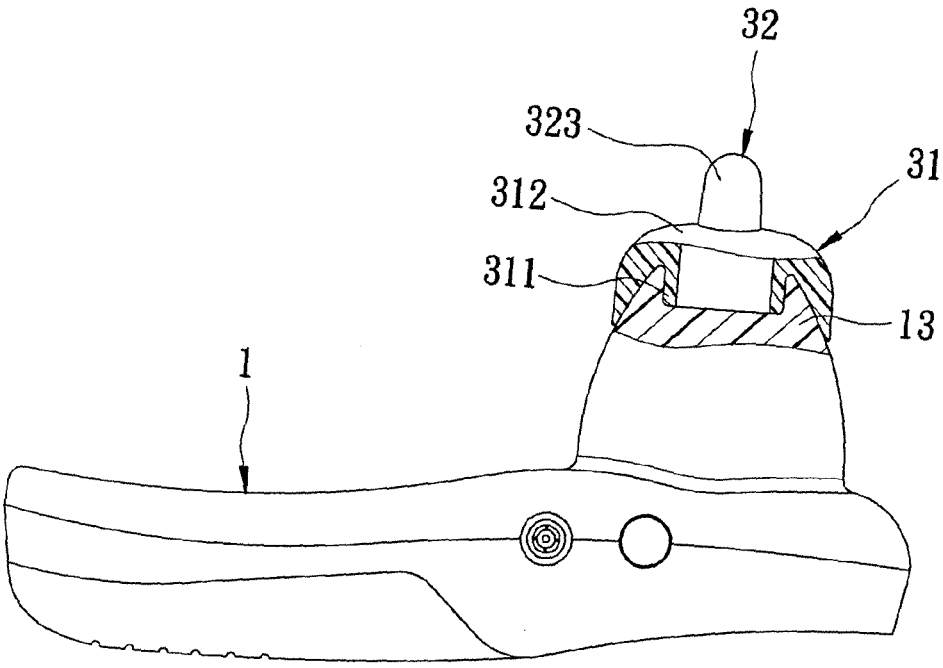


圖6

Petitioner Therabody Ex-1004, 0802

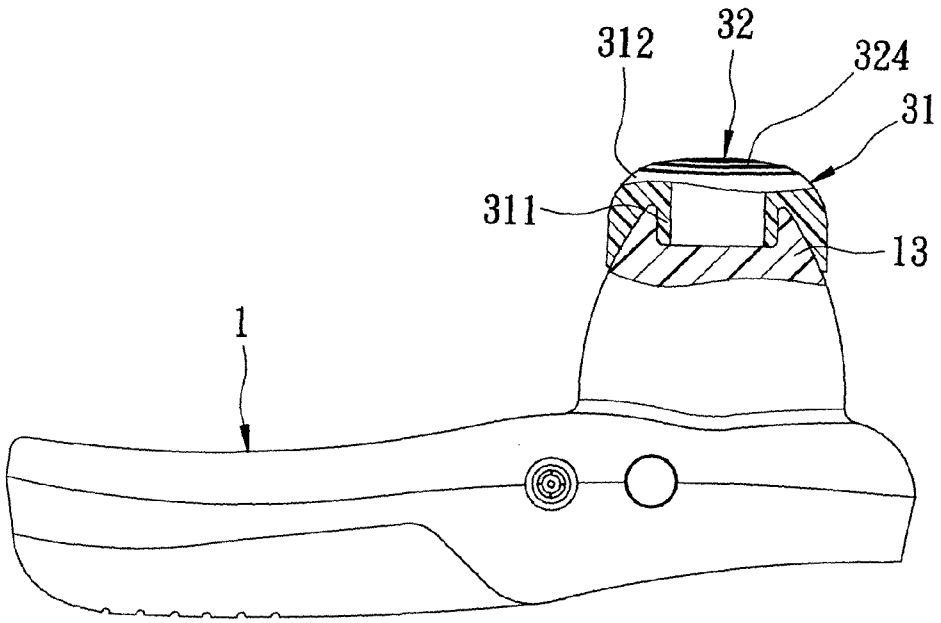


圖7

Petitioner Therabody Ex-1004, 0803

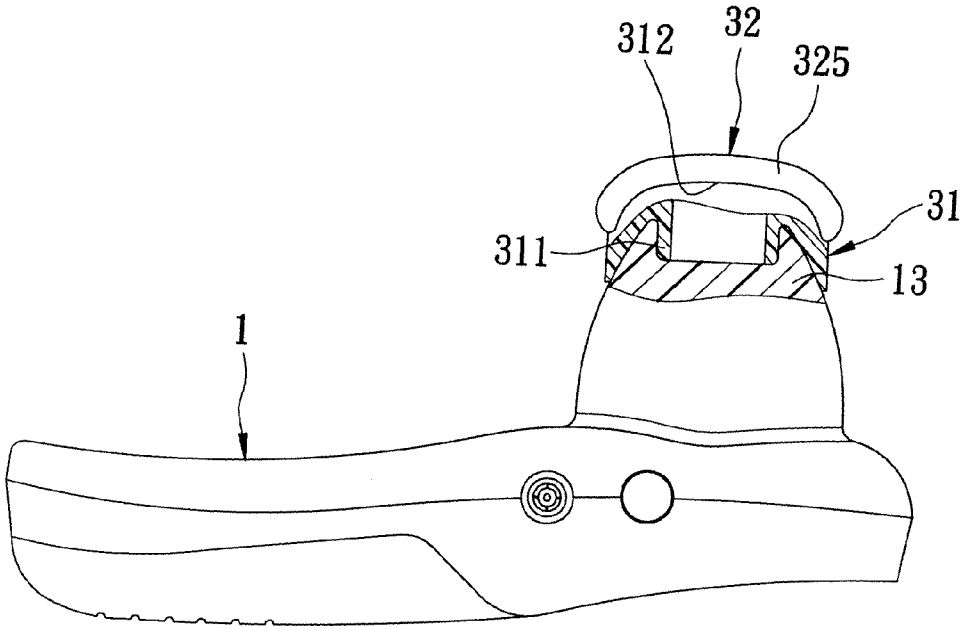


圖8

Petitioner Therabody Ex-1004, 0804

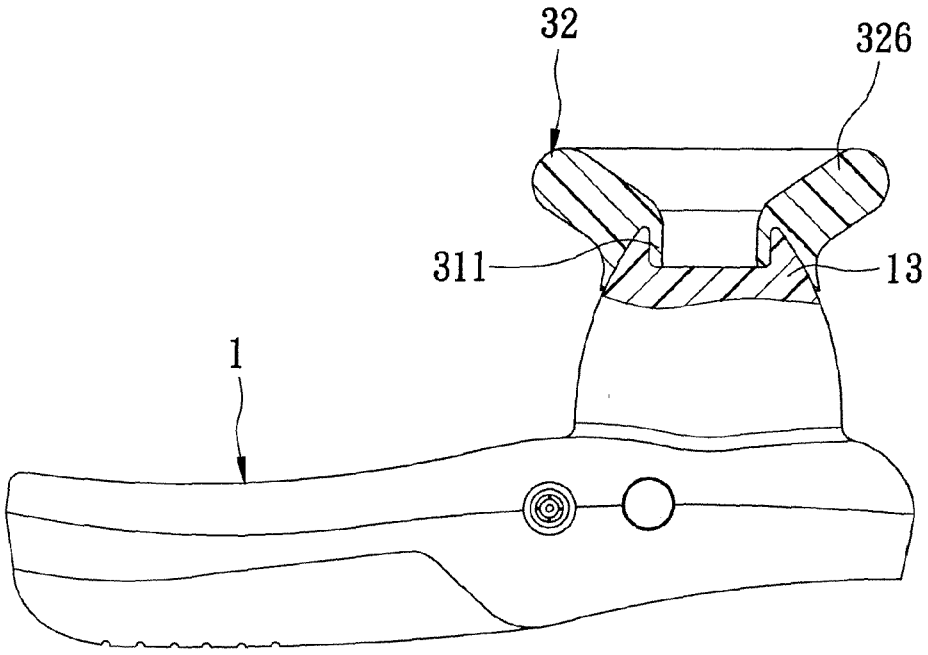


圖9

Petitioner Therabody Ex-1004, 0805

Secondary battery

Description

M379178 V. New description: [New technical field] This creation is about a lithium battery structure, especially a conductive battery and conductive terminal connection structure suitable for automated production of secondary batteries. [Prior Art] According to the conventional lithium battery structure, a cross-sectional view of the first drawing; as shown, the wound lithium battery is mainly composed of a battery cell 10, a conductive terminal 20, and a battery case 30. Among them, the battery core is composed of layers

An electrode roll u composed of a stacked positive electrode sheet, a separator and a negative electrode sheet is wound around a mandrel 12 to form a plurality of conductive handles 13 which are led out from the positive and negative electrode sheets at both ends of the 'electrode roll io The positive terminal and the negative terminal of 10, and for connecting the conductive handle 13 and the conductive terminal 3〇, each of the conductive handles 13 must be perforated (not shown) and inserted between the conductive terminal 2 () and the battery cell (7). - the inner rod 40, with the perforation of the conductive handle 13 passing through the inner rod milk, the conductive handle is fixed and electrically connected to the conductive terminal 2G, and finally the battery case 30 can be packaged to form a complete secondary battery. . However, the combination process of the battery-leading conductive handle 13 and the conductive terminal 2〇 is time-consuming and laborious, and the inner rod 4G must first be mosquitoes on the core material 12, and then the artificially-operated red person puts the conductive perforation into the inner rod 4〇. After that, the conductive terminals 2 can be combined on the inner rod 4〇 and electrically connected to the U. Mesh &, _ 1 (13 township red and operator proficiency will affect the secondary battery production time, and the manual operation mode is necessarily stored may be unstable, it is easy to cause the battery production reliability is reduced. Ben Chuang, Lai proposed - _ soft shirt to valid 3 MJ / 9178

Referring to the second to fourth circles, a combination diagram, an exploded view, and a cross-sectional view of the first embodiment of the secondary battery of the present invention are shown. As shown in the figure, a cylindrical secondary battery includes a battery core ㄇ which is formed by a positive (four) sandwiching separator and an electrode roll 51 wound around the mandrel 52, and each of the positive electrode and the negative electrode The plurality of conductive handles 53 are taken out by the metal falling pieces, so that the positive and negative two electrodes 53 are formed at the two ends of the battery core, and the conductive handles 53 on the end faces of the electrodes 531 are arranged in a ring shape. a battery case 6A, comprising a shell

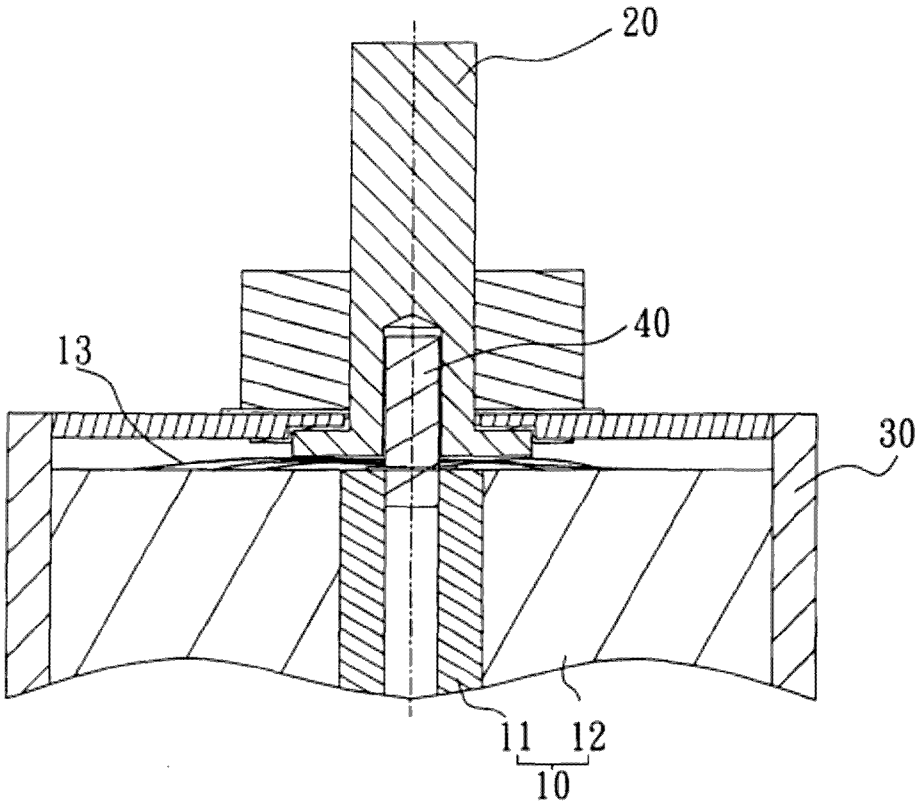
Petitioner Therabody Ex-1004, 0806

tube & for covering the body 5, and an end cap 62 for closing both ends of the shell tube 61, and a perforation 621 is provided in the middle of each of the end caps 6 This perforation 621 is directed against the mandrel 52. The second conductive terminal is disposed on the battery case 60, and each of the conductive terminals 7G is opposed to the mandrel 2 through the through hole 621. In this embodiment, the conductive terminal 7G-end is a screw external device. And the other drama set a thread as a connection with the battery; the towel, the conductive terminal miscellaneous, in addition to the externally threaded screw, the 'external space' different needs' can also (10) have a column of _ grain, Such a similarity. The structure is a structure that can be easily replaced by those who have relevant knowledge, and because of the change of these equal structures, it does not change the scope of the patent. Furthermore, the second connecting device 80 is disposed between the two end covers 62 of the casing 6 and the two electrodes 531 of the battery core 50. Each of the connecting devices 8 includes an inner rod 8 and a current collecting plate a and On the opposite side of the collector plate 83, the inner rod 81 is a screw in this embodiment, and its end is locked into the mandrel 52 so that the shaft is surrounded by the conductive handle 53, and the other end of the inner rod 81 is facing the end cover. (7) a through hole 621 for the conductive terminal 7G to lock i], and a lower portion of the lower collecting pan 82 is provided with a flange 82 The 1 region forms a recess 822, and the recess 822 is provided with a lower fixing hole 823, and the lower fixing hole 823 can be positioned through the inner rod 81 on the end surface of the electrode 531 of the electric anger 5 ,, at this time, the flange 821 will face The upper collector plate 83 has an upper fixing hole 831, and the shape of the body is kissed by the recess 822 of the collector disk 82, and the upper fixing hole 83i can pass through the inner rod 8i to make the body Covered by the flange 821 and buried in the recess 822. In addition, when the upper collector pan is phantomly engaged with the collector pan, it will be able to press and hold all the conductive handles 53 around the recess, and the figure will be made. Corresponding to the above, when the secondary battery of the present invention is finely integrated in the S flow, the combination steps are as follows: First, as shown in step S1, the battery core 50 is first packaged into a cylinder 1 in step 82, and the inner rod 81 is inserted. Inserting the current collector disk so that the lower collector disk 82 is disposed in the middle of the conductive handle 53 of the end face of the electrode 531; when the lower collector disk 82 is positioned, the process proceeds to step S3, which surrounds the lower collector disk. The conductive around (four) is folded into the concave 4 822 'continuation step S4, and the upper collecting tray 83 is used to join the lower collecting tray to cry. Quickly press all _ 53 positioning, and enter the step %, _ combined way to combine the conductive terminal 70 and the upper collector plate 83; after the conductive terminal 7 () and the upper collector (10) are combined - then can be 4 S6 The welding or laser is similar to the Q of the packaged battery button (8), so that the conductive terminal 7 is passed through the through hole 621, and (4) is connected to the hole. The green, the object 70 is designed to be externally locked by the end cover 62 to the collector plate 83. At the time, it is naturally the procedure of the green welding end cap Q, and then the step of locking the conductive terminal 7G, that is, the steps % and the step of the county can be exchanged. In addition, if the

conductive terminal has been used before production? If it is directly fixed on the upper collector disk, the step S5 can be simplified in the assembly process. That is, after the step of the step is completed, the process proceeds directly to step S6 to encapsulate the end cap 62 of the electrical domain body 6G. For example, as shown in the sixth figure, the bottom structure of the connection structure is a metal mesh body made of copper or Ming or recorded or unrecorded steel, thereby increasing conductivity and upper polarity. The disk 83 is in the form of a flat disk having a locking-type conductive terminal 7G thereon, whereby it can directly enter the step % after the end step %. In the case of the end cap 62, the conductive end w at this time does not necessarily protrude from the end cap ȯ2, nor does it affect the implementation of the present invention. Furthermore, the creation structure is simple and applicable, and it is self-contained. (4) The battery case of the σ is opened 60 ", _, _ shape of the second clock • Zha. , (4) Step (4) Juxuan, step S2, the lower collector pan 82, step S3 (four) folded conductive handle 53, the combination of the smoke 4, the collector disk 83, the stepping conductive terminal 7G, and the step (4) sealing end cap , completed in sequence. According to this type of heap, this creation naturally applies to a similar type of square secondary battery. Therefore, 'this creation uses the method of improving the connection structure of the secondary battery to simplify the combination of the conductive handles of the secondary battery _ sub-combination, thoroughly _ know _ and _ sub must rely on the lack of manual work, and can automate mass production, Reduce costs and increase product reliability. The above description is based on the embodiments to illustrate the features of the present invention, and the purpose of the present invention is to enable the skilled person to understand the content of the present invention and implement it according to the scope of the patent, so that the other is not divorced from the creation. Equivalent modifications or modifications made by the spirit of the invention should still be included in the scope of the claims described below. BRIEF DESCRIPTION OF THE DRAWINGS The first figure is a cross-sectional view of a conventional battery structure. The second figure is a perspective view of the first embodiment of the creation. The third figure is an exploded view of the first embodiment of the creation. The fourth figure is a cross-sectional view of the first embodiment of the creation. The fifth circle is the flow chart of the creative combination.

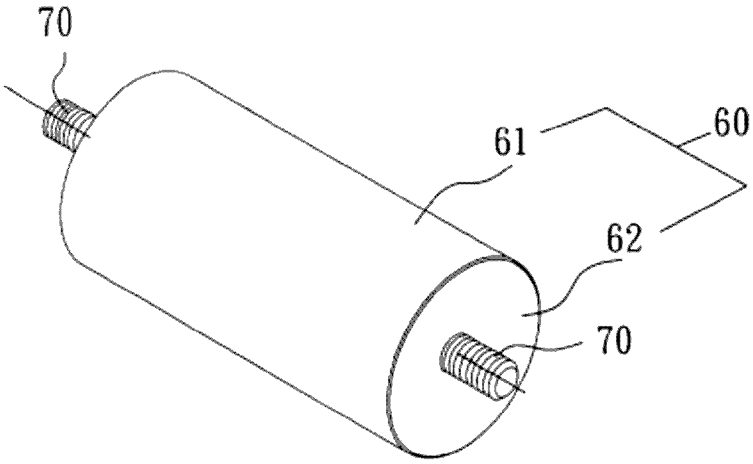
Petitioner Therabody Ex-1004, 0808

Drawings

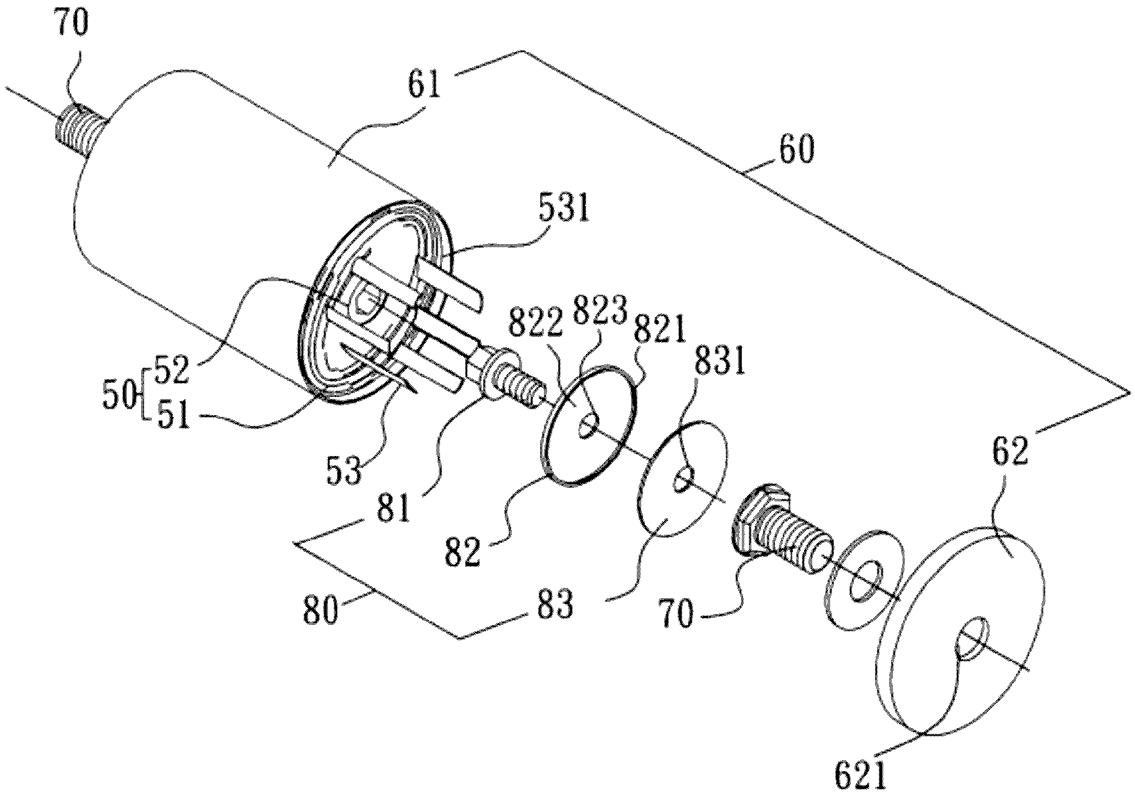


第一圖（先前技術）

Petitioner Therabody Ex-1004, 0809

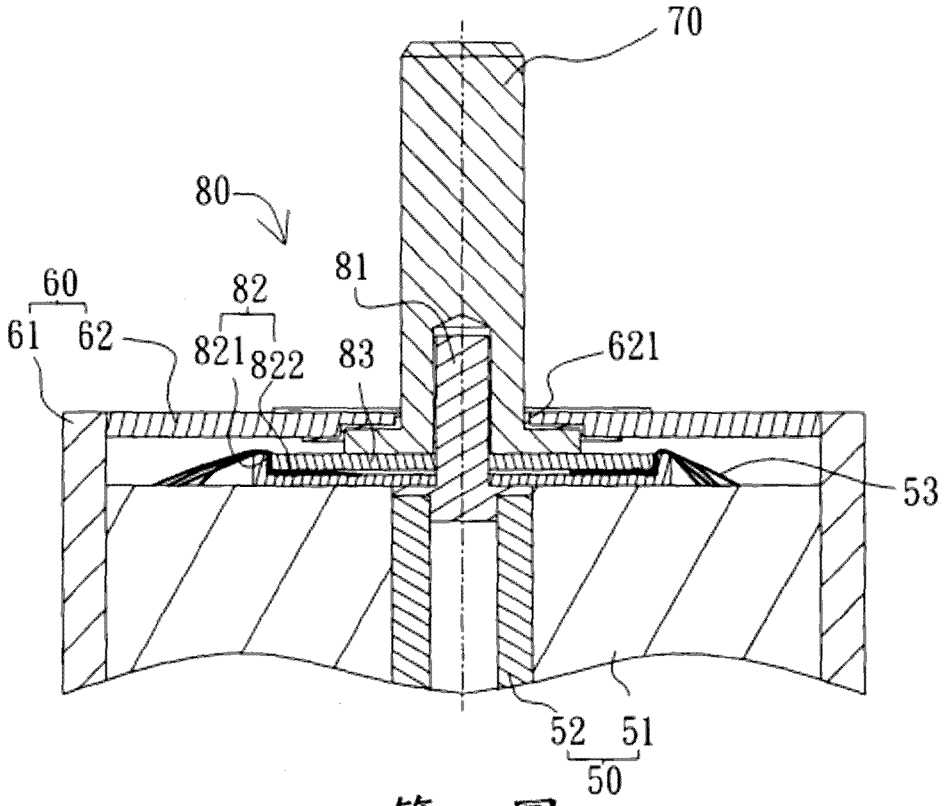


第二圖



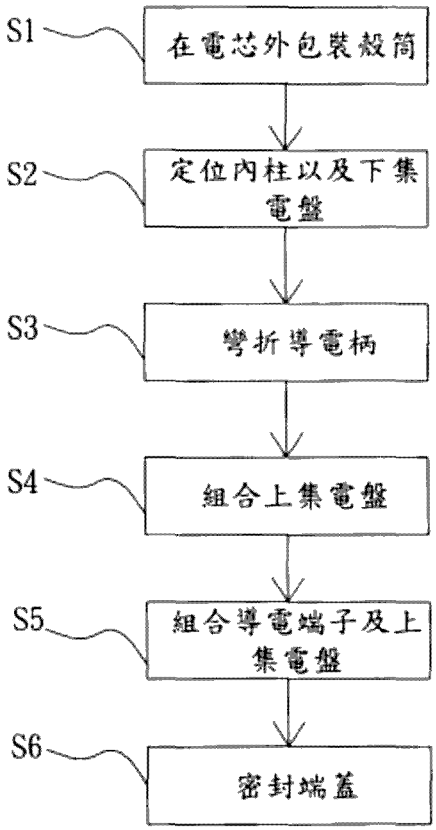
第三圖

Petitioner Therabody Ex-1004, 0810

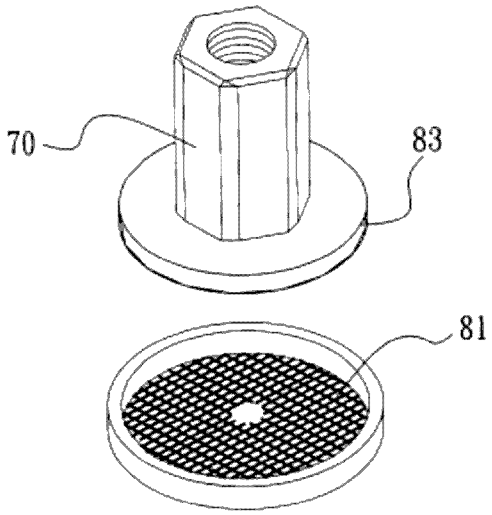


第四圖

Petitioner Therabody Ex-1004, 0811

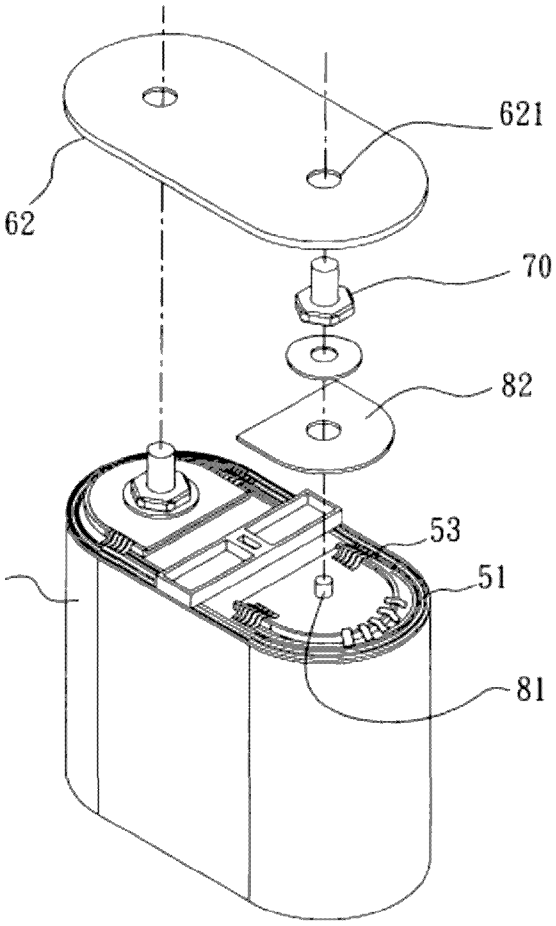

S1
在電芯外包裝殼筒
S2
定位內柱以及下集電盤
S3
彎折導電柄
S4
組合上集電盤
S5
組合導電端子及上集電盤
S6
密封端蓋

第五圖



第六圖

Petitioner Therabody Ex-1004, 0813



第七圖

Petitioner Therabody Ex-1004, 0814

(19)中華民國智慧財產局
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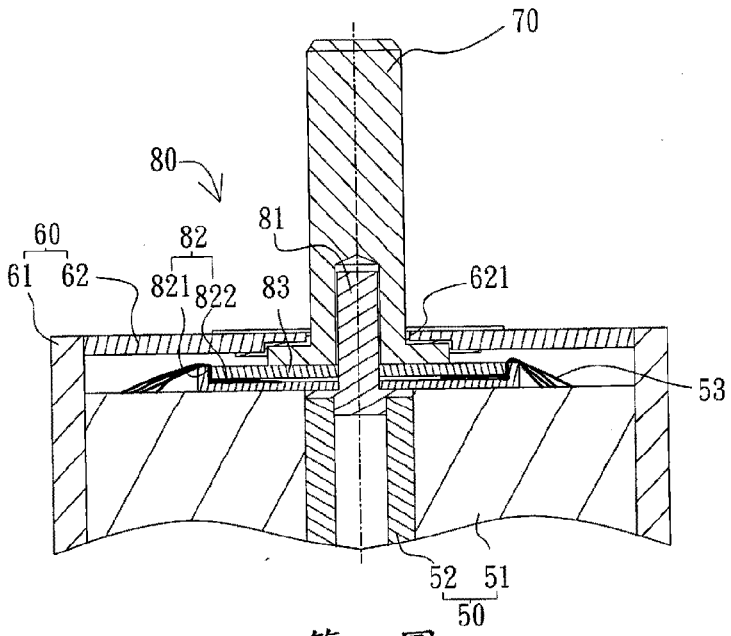
(21)申請案號：098220810 (22)申請日： 中華民國 98 (2009) 年 11 月 10 日
(51)Int. Cl.： *H01M10/00 (2006.01)*
(71)申請人：昇陽國際半導體股份有限公司(中華民國) (TW)
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申請專利範圍項數：10 項 圖式數：7 共 20 頁

(54)名稱

二次電池

(57)摘要

本創作提供一種二次電池，係為改善習知鋰電池其電芯之導電柄與其導電端子組合不易之問題，故，改良其連結結構，利用一下集電盤設置在導電柄環繞之電芯端面上，再於下集電盤之上方設置一上集電盤，由上集電盤連接導電端子，藉此，利用上、下集電盤夾固住所有導電柄後，再封裝電池殼體之端蓋，使二次電池之結構組合容易，而適用於自動化生產，並能夠節省人力與成本之支出。



第四圖

50・・・電芯
51・・・電極卷
52・・・芯軸
53・・・導電柄
60・・・電池殼體
61・・・殼筒
62・・・端蓋
621・・・穿孔
70・・・導電端子
80・・・連結裝置
81・・・內桿
82・・・下集電盤
821・・・凸緣
822・・・凹部
83・・・上集電盤

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五、新型說明：

【新型所屬之技術領域】

本創作係有關於一種鋰蓄電池結構，尤指一種導電柄與導電端子連接結構適用於自動化生產之二次電池。

【先前技術】

按，習知鋰電池結構係如第一圖之剖視圖；如圖示，捲繞式鋰電池主要是由電芯 10、導電端子 20 以及電池殼體 30 組成。其中，電芯 10 是由層疊的正極片、隔離膜以及負極片組成的一電極卷 11 捲繞於一芯軸 12 上形成，電極卷 10 的兩端具有複數由正、負極片引出的導電柄 13，方以形成電芯 10 之正極端以及負極端，且為將導電柄 13 與導電端子 30 連接，每一導電柄 13 必須設有一穿孔(圖中未示)，並在導電端子 20 與電芯 10 之間插入一內桿 40，以導電柄 13 之穿孔穿過內桿 40 之方式，將導電柄 13 固定位置並電性連接導電端子 20，最後才能進行電池殼體 30 之封裝，成型一完整之二次電池。

惟，二次電池之導電柄 13 與導電端子 20 之組合流程耗時費力，必須先將內桿 40 固定在芯軸 12 上，接著以人工作業方式，由工作人員將導電柄 13 之穿孔一一套入內桿 40 中，後續才能組合導電端子 20 於內桿 40 上並電性連接導電柄 13。因此，電芯 10 之導電柄 13 數量的多寡以及作業人員動作熟練度都將影響二次電池製作時間，且人工作業之模式必然存著些許不穩定因素，容易造成電池之生產可靠度降低。

也因此，本創作針對上述困擾提出一種創新設計的二次電池，以有效改善習知缺失。

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參閱第二圖～第四圖，為本創作二次電池之第一實施例的組合圖、分解圖以及剖視圖。如圖示，一圓筒型二次電池，係包含一電芯 50，其由夾設隔離膜之正極片以及負極片形成之電極卷 51 捲繞於一芯軸 52 形成，且正極片與負極片各以金屬箔片引出複數導電柄 53，藉以在電芯 50 二端形成正負二電極 531，因正負極片捲繞之關係，每一電極 531 端面上的導電柄 53 將成環狀排列。一電池殼體 60，包含一包覆電芯 50 身部之殼筒 61，以及二用以封閉殼筒 61 二端之端蓋 62，每一端蓋 62 中間並設置著一穿孔 621，此二穿孔 621 係正對著芯軸 52。再以二導電端子 70 設置在電池殼體 60 上，且每一導電端子 70 皆透過穿孔 621 而正對著芯軸 52，於本實施例中，導電端子 70 一端為螺桿，用以外接外部裝置，而其另一端則設置一螺孔作為與電芯 50 之連結；其中，導電端子型態，除了為具有外螺紋之螺桿以外，視外部裝置需求不同，還可以為具有內螺紋之柱體，舉凡該等相似結構，係為該領域具有相關知識者可輕易置換之結構，又因該些均等結構之改變並不影響本專利範圍，當不能以之限定本創作之專利範圍。

再者，以二連結裝置 80 設在殼體 60 之二端蓋 62 與電芯 50 之二電極 531 之間，每一連結裝置 80 都包含一內桿 81、一下集電盤 82 以及與之相對之一上集電盤 83，內桿 81 於本實施例中為螺桿，其一端鎖入芯軸 52 中心而使桿身被導電柄 53 圍繞，內桿 81 另一端正對端蓋 62 之穿孔 621，以供導電端子 70 鎖固；下集電盤 82 一端面之周圍設有一凸緣 821，因而使其中間區域形成一凹部 822，凹部 822 內並設有一下固定孔 823，而能以下固定孔 823 穿過內桿 81 定位在電芯 50 之電極 531 端面上，此時，凸緣 821 將朝向上集電盤 83；上集電盤 83 同樣具有一上固定孔 831，且身部形狀吻

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合下集電盤 82 之凹部 822，而可以上固定孔 831 穿過內桿 81，使身部受凸緣 821 包覆而埋入凹部 822 中，此外，當上集電盤 83 對合下集電盤 82 時，將可以壓固住周圍所有導電柄 53 位於凹部 822 中。

續請參閱第五圖，對應上述結構說明，本創作二次電池應用在自動化控制流程時，其組合步驟如下：首先如步驟 S1 所示，先在電芯 50 外包裝殼筒 61，接著，於步驟 S2 中，插入內桿 81 並套入一下集電盤 82，方使得下集電盤 82 設置在一電極 531 之端面的導電柄 53 中間；當該下集電盤 82 定位後，即進入步驟 S3 中，將環繞著下集電盤 82 周圍的導電柄 53 彎折入凹部 822 內，接續步驟 S4，利用上集電盤 83 卡合下集電盤 82 之方式，快速地壓迫所有導電柄 53 定位，並進入步驟 S5，利用鎖合之方式組合導電端子 70 與上集電盤 83；待導電端子 70 與上集電盤 83 合而為一後，即可以於步驟 S6 中，以焊接或者雷射方式封裝電池殼體 60 之端蓋 62，使導電端子 70 穿過穿孔 621，而可連接一外部裝置供電。當然，若導電端子 70 之設計是由端蓋 62 外部鎖接上集電盤 83 時，自然是先執行焊接端蓋 62 之程序，接著在執行鎖接導電端子 70 之步驟，也就是將前述的步驟 S5 以及步驟 S6 是可以調換的。

另外，若生產之前已經將導電端子 70 直接固定在上集電盤 83 上，則前述組裝流程中，更可以簡化步驟 S5，亦即，完成步驟 S4 之卡合動作後，直接進入步驟 S6 中，封裝電池殼體 60 之端蓋 62。舉例而言，如第六圖所示之連結結構另一態樣之示意圖，下極電盤 82 係由銅或鋁或鎳或不銹鋼構成之金屬網體，藉以增加導電性，而上極電盤 83 為平板圓盤狀，其上焊接著鎖入式的導電端子 70，藉此，而能在結束步驟 S4 後直接進入步驟 S6 中。

MassagerPriorArt0000821

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想當然爾，此時的導電端子 70 並不依定要凸出端蓋 62，倘若與端蓋 62 齊平，亦不影響本創作實施。

再者，本創作結構簡單、適用性廣，還適用在單端開口之電池殼體 60 上，其自動化組裝過程並不受影響，例如，第七圖所示，一橢圓形二次鋰電池實施例之結構示意圖，一樣是由步驟 S1 的包裝殼筒 61、步驟 S2 的定位下集電盤 82、步驟 S3 的彎折導電柄 53、步驟 S4 的組合上集電盤 83、步驟 S5 的導電端子 70 以及步驟 S6 的密封端蓋，依序進行所完成。依此類堆，本創作自然也適用類似型態之方形二次電池。

因此，本創作利用改良二次電池之連結結構的方式，簡化二次電池之導電柄與導電端子間之組合方式，徹底解決習知導電柄與導電端子必須依靠人工作業產生之缺失，而能夠自動化大量生產、降低成本、提高產品生產可靠度。

以上所述，係藉由實施例說明本創作之特點，其目的在使熟習該技術者能瞭解本創作之內容並據以實施，而非限定本創作之專利範圍，故凡其他未脫離本創作所揭示之精神而完成之等效修飾或修改，仍應包含在以下所述之申請專利範圍中。

【圖式簡單說明】

第一圖為習知一種鋰電池結構剖視圖。

第二圖為本創作第一實施例之立體圖。

第三圖為本創作第一實施例之分解圖。

第四圖為本創作第一實施例之剖視圖。

第五圖為本創作組合流程圖。

MassagerPriorArt0000822

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新型專利說明書

（本說明書格式、順序，請勿任意更動，※記號部分請勿填寫）

※申請案號：98220810

※申請日：98. 11. 10　　※IPC 分類：H01M 10/00

一、新型名稱：（中文/英文）

二次電池

二、中文新型摘要：

本創作提供一種二次電池，係為改善習知鋰電池其電芯之導電柄與其導電端子組合不易之問題，故，改良其連結結構，利用一下集電盤設置在導電柄環繞之電芯端面上，再於下集電盤之上方設置一上集電盤，由上集電盤連接導電端子，藉此，利用上、下集電盤夾固住所有導電柄後，再封裝電池殼體之端蓋，使二次電池之結構組合容易，而適用於自動化生產，並能夠節省人力與成本之支出。

三、英文新型摘要：

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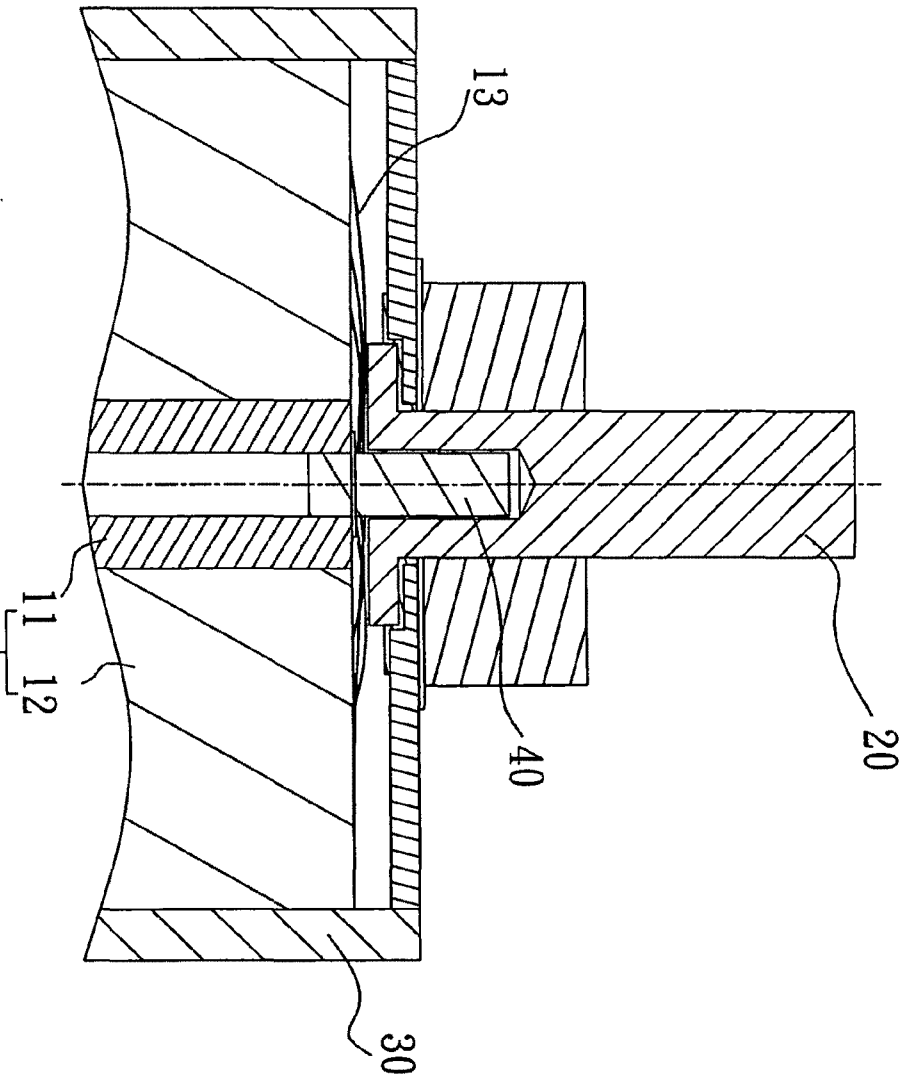
Petitioner Therabody Ex-1004, 0820

7. 如申請專利範圍第 1 項所述之二次電池，其中該連接裝置更包括一內桿固定於該電芯上，受該等導電柄環繞，該下集電盤具有一下固定孔，用以套入該內桿，以及該上集電盤具有一上固定孔，用以套入該內桿而設置在該下集電盤上，該內桿穿過該穿孔而連接一該導電端子。
8. 如申請專利範圍第 1 項所述之二次電池，其中每一該導電端子係直接連接一該上集電盤。
9. 如申請專利範圍第 1 項所述之二次電池，其中該二次電池為圓筒形鋰電池或橢圓型鋰電池。
10. 如申請專利範圍第 1 項所述之二次電池，其中該二次電池為方形二次鋰電池。

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Petitioner Therabody Ex-1004, 0821

七、圖式：

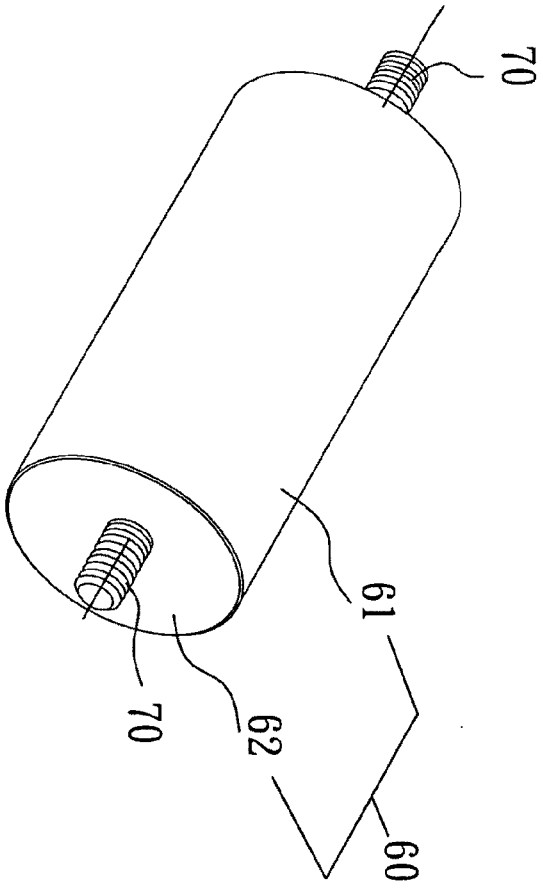


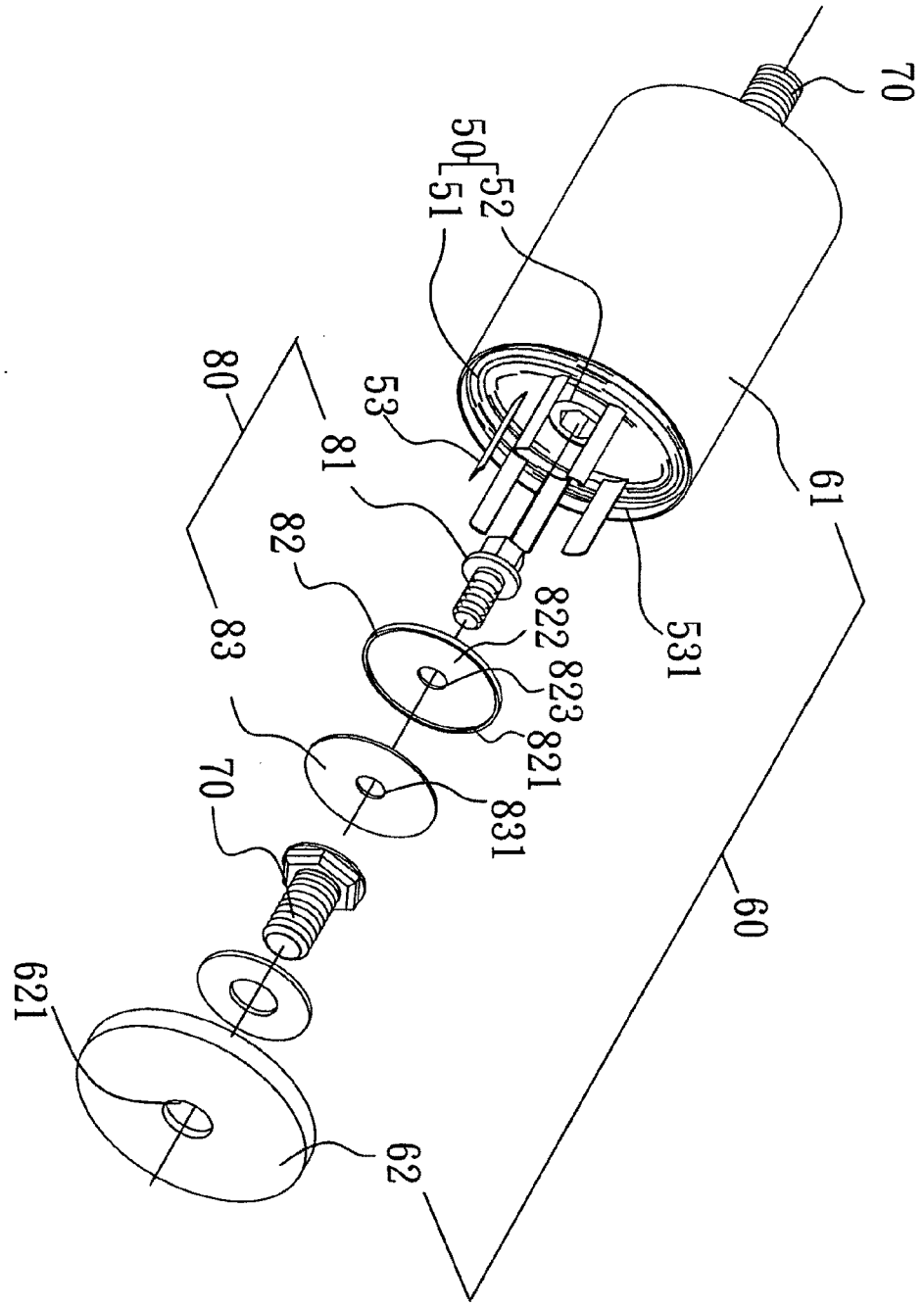
第一圖（先前技術）

MassagerPriorArt0000825

Petitioner Therabody Ex-1004, 0822

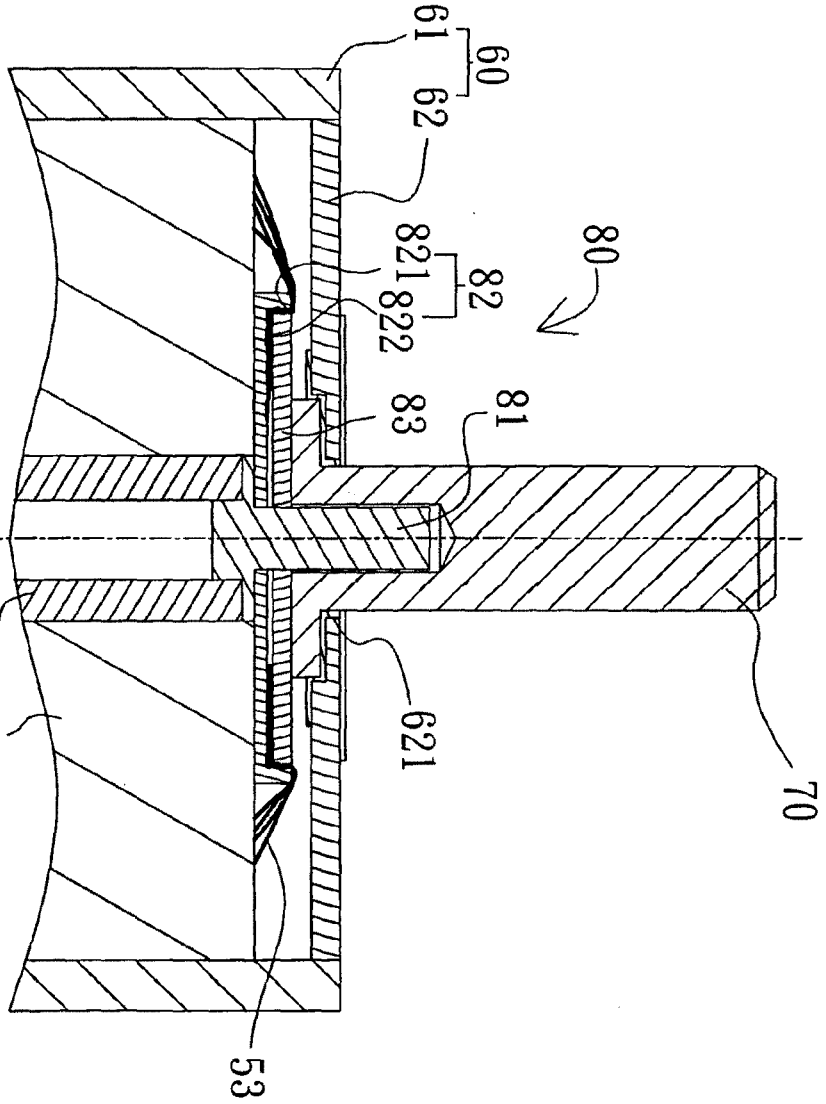
第二圖





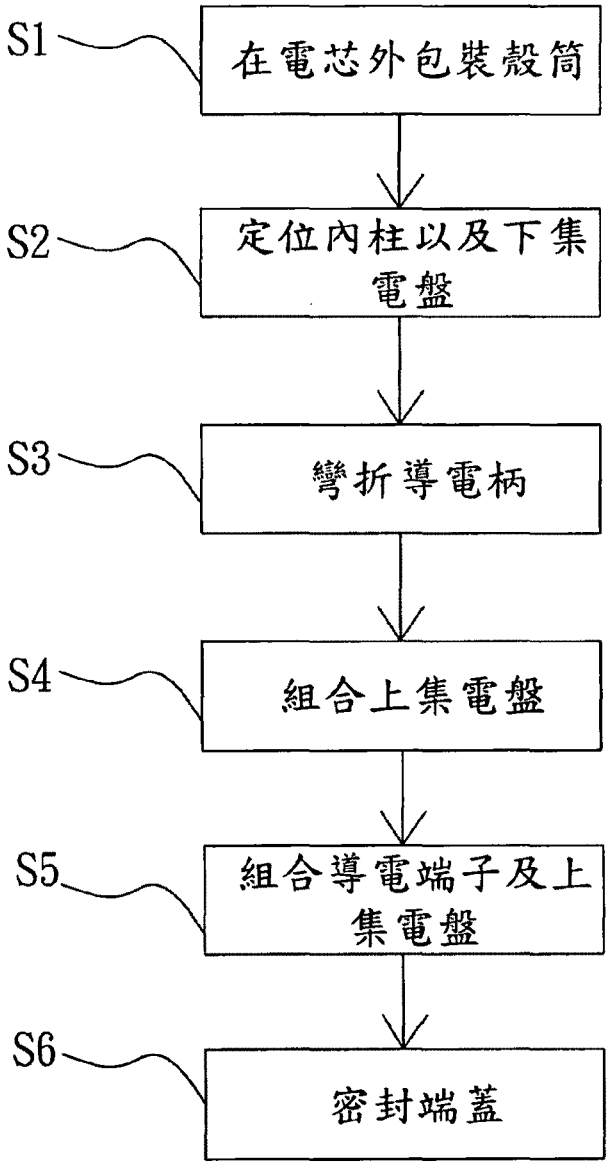
第三圖

Petitioner Therabody Ex-1004, 0824



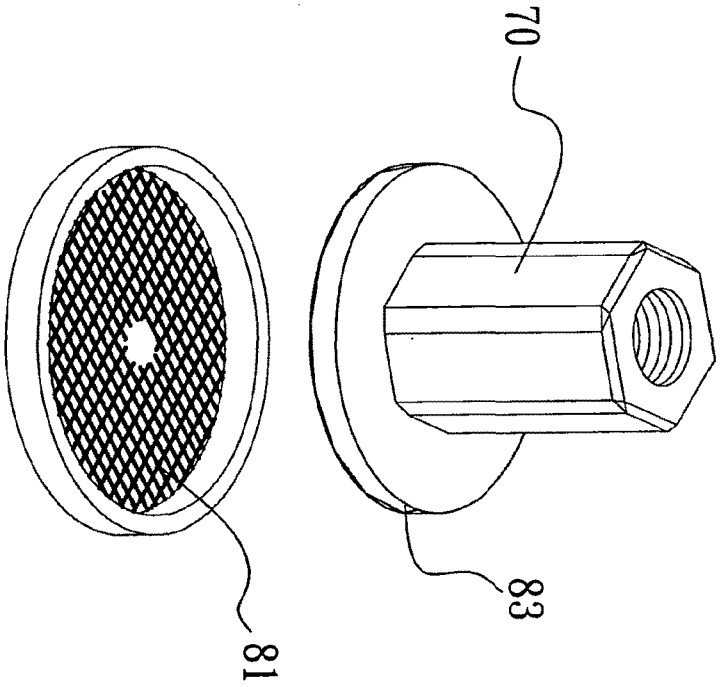
第四圖

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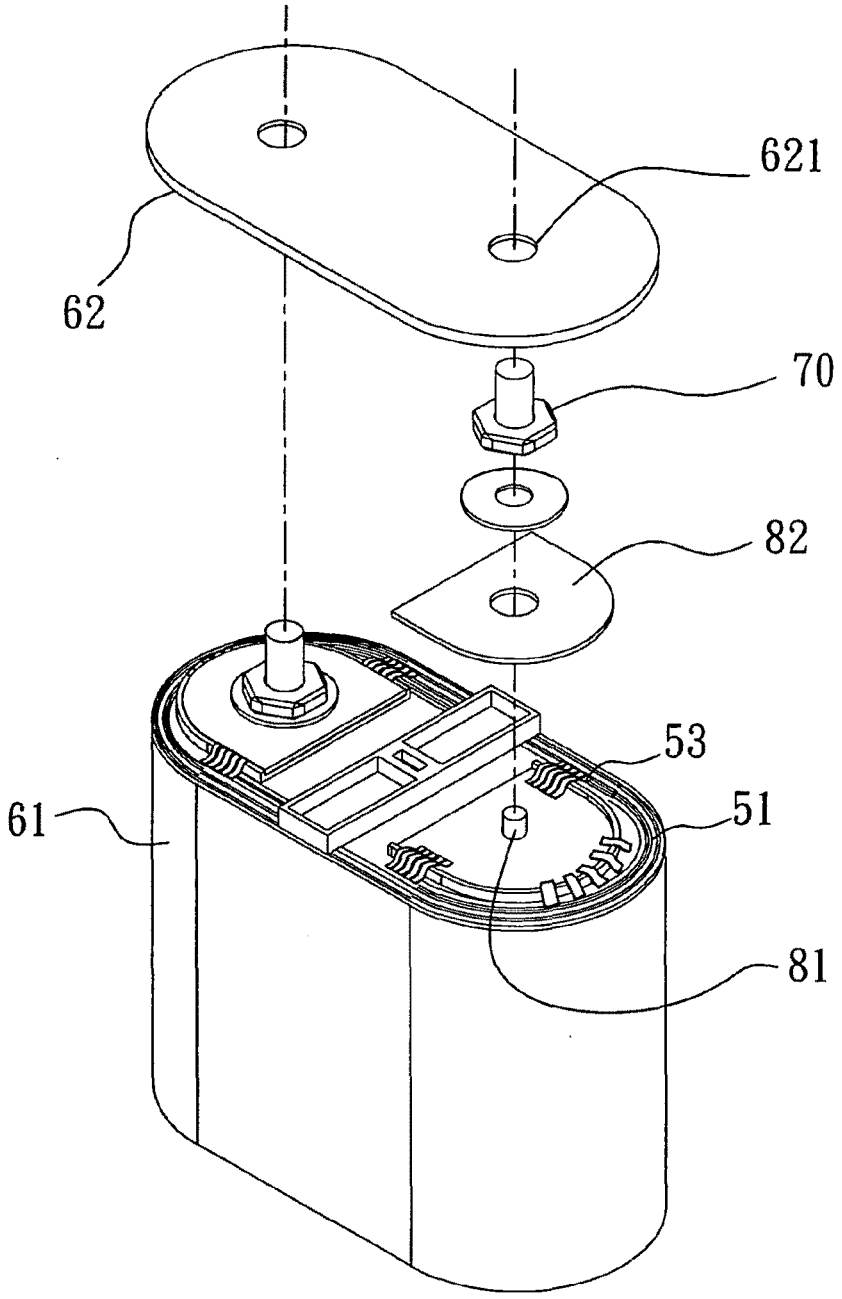
第五圖

Petitioner Therabody Ex-1004, 0826



第六圖

Petitioner Therabody Ex-1004, 0827



第七圖

Petitioner Therabody Ex-1004, 0828

四、指定代表圖：

(一)本案指定代表圖為：第（ 四 ）圖。

(二)本代表圖之元件符號簡單說明：

50 電芯	51 電極卷	52 芯軸
53 導電柄		
60 電池殼體	61 殼筒	62 端蓋
621 穿孔		
70 導電端子		
80 連結裝置	81 內桿	
82 下集電盤	821 凸緣	
822 凹部		
83 上集電盤		

MassagerPriorArt0000832

Petitioner Therabody Ex-1004, 0829

【新型內容】

本創作之主要目的係在提供一種二次電池，其適合自動化大量生產作業，藉以降低生產成本以及生產時間。

本創作之又一要目的係在提供一種二次電池，其導電柄以及導電端子間的連接結構係可由機台自動執行，因此提高二次電池之生產可靠度。

為達到上述之目的，本創作揭露一種二次電池，其包括一具有正負二電極之電芯，一包覆電芯之電池殼體、二設在電池殼體外並對應二電極位置之導電端子，以及二設在二電極以及二導電端子間之連結結構，其中，電芯係以正、負極片夾合隔離膜捲繞形成，正、負極片並利用金屬箔片引出複數導電柄形成電芯的正負二電極，且每一電極端面上的導電柄並呈環狀排列，電池殼體係在對應二電極位置設有二穿孔，換言之，每一導電端子也將會對應於一該穿孔之位置；此外，每一連結結構包含對合之一下集電盤與一上集電盤，且下集電盤設在其中一電極之端面的該等導電柄中間，下集電盤並與上集電盤夾壓固定住周圍環繞的所有導電柄，上集電盤透過電池殼體之穿孔連接導電端子，而完成本創作之二次電池。以藉由改良連結結構而使導電柄與導電端子間之組合更容易。

底下藉由具體實施例配合所附的圖式詳加說明，當更容易瞭解本創作之目的、技術內容、特點及其所達成之功效。

【實施方式】

本創作提出一種二次電池，以針對習知鋰電池之導電端子與電芯之導電柄連接作業費時費力之問題，提供另一種連結結構，進而適合自動化生產。

MassagerPriorArt0000833

Petitioner Therabody Ex-1004, 0830

第六圖為本創作連結結構另一實施態樣示意圖。

第七圖為本創作第二實施例之立體分解圖。

【主要元件符號說明】

10 電芯

11 電極卷　12 芯軸

13 導電柄

20 導電端子

30 電池殼體

31 殼筒

40 內桿

50 電芯　51 電極卷　52 芯軸

53 導電柄　531 電極

60 電池殼體　61 殼筒　62 端蓋

621 穿孔

70 導電端子

80 連結裝置　81 內桿

82 下集電盤　821 凸緣

822 凹部　823 下固定孔

83 上集電盤　831 上固定孔

MassagerPriorArt0000834

Petitioner Therabody Ex-1004, 0831

六、申請專利範圍：

1. 一種二次電池，包括：

一電芯，具有正負二電極，每一該電極之端面設有環形排列之複數導電柄；

一電池殼體，包覆該電芯，該電池殼體對應每一該電極位置設有一穿孔；

二導電端子，分別設在該電池殼體上並對應該二穿孔之位置；以及

二連結結構，分別設在該二導電端子與該二電極之間，每一該連結結構包括一下集電盤，其設在一該電極之端面的該等導電柄中間，以及一上集電盤，壓制該等導電柄設在該下集電盤上，該上集電盤並透過該穿孔連結一該導電端子。

2. 如申請專利範圍第 1 項所述之二次電池，其中該等連結結構之該下集電盤或該上集電盤為導電材料製成之金屬網狀結構。

3. 如申請專利範圍第 1 項所述之二次電池，其中該等下集電盤或該等上集電盤之材質為銅、鎳、鋁、或不銹鋼。

4. 如申請專利範圍第 1 項所述之二次電池，其中該電池殼體包括一殼筒以及二封蓋該殼筒二端之端蓋，每一該端蓋並以點焊或雷射結合於該殼筒上。

5. 如申請專利範圍第 1 項所述之二次電池，其中每一該下集電盤在其一端面邊緣設有至少一凸緣，形成中間區域凹入之一凹部，每一該上集電盤係可容設在該凹部內，且受該凸緣包覆。

6. 如申請專利範圍第 1 項所述之二次電池，其中該等導電端子為具有外螺紋之柱體或具有內螺紋之柱體或其結合。

MassagerPriorArt0000835

Petitioner Therabody Ex-1004, 0832

Intelligent scalp massager

Abstract

The invention discloses an intelligent scalp massager, which adopts a waterproofing design at the level of IPx7. The intelligent scalp massager comprises a base shell and a massager body, wherein a charging hole is formed in the base shell; the massager body is of a stamp-shaped structure, and comprises a housing, massaging comb heads, a motor, a singlechip microcomputer module, a charging module and a button battery; a handle is arranged on the housing; the housing is connected with the massaging comb heads in an embedding manner; a switch button, a mode indicating lamp, a charging indicating lamp and a speed indicating lamp are arranged on the handle; the massaging comb heads are of bulged claw structures; the massaging comb heads are of a four-wheel rotary type; the motor is connected with the massaging comb heads; the singlechip microcomputer module is connected with the motor, the button battery, the switch button, the mode indicating lamp, the charging indicating lamp and the speed indicating lamp; the button battery is connected with the charging module; the button battery is a lithium battery.

List of publications

Application number	Publication date
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Technology domain	Medical technology
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Claims

1. An intelligent scalp massager, IPx7 stage using water-proof design, which comprises a base housing 1, and a massager body (2) base shell is (1) provided with a charging hole (3), characterized in: seal-like generally (2) forms a massager structure, comprising a housing (4), a massage, combing

(5) their hair, a motor (6), single chip (7) module and button-type battery (9) charging module (8).

2. An intelligent scalp massager according to claim 1, characterized in: the housing (4) is provided with a handle (10), housing (4) and the massage attachment inlaid combing (5).

3. An intelligent scalp massager according to claim 2, characterized in: a handle (10) is provided with a switch button (11), mode indicator (12) lights, indicator (14) lights and speed charging indicator (13) light.

4. An intelligent scalp massager according to claim 1, characterized in: combing (5) heads are convex claw structure at the head of the massage, the massage combing (5) is a four-round counter-rotating.

5. An intelligent scalp massager according to claim 1, characterized in: motor (6) connected to the massager combing (5).

6. An intelligent scalp massager according to claim 3, characterized in: single-chip microcomputer module (7) to the (6) motor, battery (9), a button, a switch button (11), a mode indicating (12) lamp lights (14) and speed charging lamp (13) connected.

7. An intelligent scalp massager according to claim 1, characterized in: a button battery (9) and the charging module is connected (8), button-type battery (9) material is a lithium battery.

Description

Intelligent scalp massager

Technical Field

The present invention relates to the technical field of household products, and particularly relates to an intelligent scalp massager.

Background Art

In the modern life of people working life of the day are sitting most of the time, without the presence of motion, thus leading to a neck shoulders and lumbar pain strain occurs, at the same time because negligible maintenance of the scalp, there is also a poor blood gas color, dizziness and the occurrence of a migraine headache, and the massage may soothe pain of the body part, body massaging apparatus is basically common use today for the massage, the massaging apparatus is relatively small specific to the head, and are generally in the form of a vibration massage of the head.

Summary

The prior state of the art is an object of the present invention, there is provided a smart scalp massager, in order to achieve the function of the scalp massage service.

To that end, the present invention adopts the following technical scheme:

The present invention to an intelligent scalp massager, waterproof design using IPx7 stage, includes a base housing and the massaging unit body, a base shell is provided with a charging aperture, the base is used for placing

protective massager body and the massager body is charged, the massaging unit is configured in a seal-like structure, convenient for hand-held use, comprising a housing, a massage the combing heads, a motor, a single chip module, the charging module and button-type battery.

Further, the housing is provided with a handle, housing and the massage combing insert connection.

Further, the handle is provided with a switch button, mode indicator lights, charging indicator light and the speed indicator light.

Further, the massage a combing head at the head is a convex jaw structure, a counter-rotating massage combing is a four-round, this is to simulate a human massage technique design, the four round counter-rotating massage the combing heads having a four-finger massage of the function.

Further, the motor is connected with the massage combing.

Further, a single chip module to the motor, a button battery, a switch button, mode indicator lights, charging indicator light and the speed indicator light is connected.

Further, a button battery and the charging module is connected, a button battery material is a lithium battery.

The present invention has the advantages that: a counter-rotating massage the scalp massager an intelligent round combing head simulation of the four fingers while technique four people, scalp gently pressed through relaxation acts to soothe, cooperate with head to use, easier to clean the scalp soil, scalp massager is provided with a through intelligent while converting the swing speed to have a strong and a weak alternating beat pattern, having a forward slow kneading, forward fast kneading and an inverse fast kneading three modes, the mode indicating lamp can correspond to display yellow, green and blue, the speed with the speed of the speed indication lamp will flicker, the intelligent scalp massager in addition to clean the method provided by head cutaneous, imitation man massage the scalp massager may be of the intelligent design technique of the plurality of portions of the body massage, have a beneficial effect..

Description of Drawings

FIG. 1 is a front view the present invention;

FIG. 2 is a top plan view the present invention;

FIG. 3 is a system block diagram of the present invention.

Embodiment

In order for the examination commissioner is able to the purpose of the present invention, there is a further understanding of the features and functions, and to cooperate with the drawings hereby give the preferred embodiment are detailed below:

Referring to FIG. 1 to 3 shown, the preferred embodiment to the present invention is of a front view, top view and a system block diagram, an intelligent scalp massager, waterproof design using IPx7 stage, includes a

base shell 1 and the massaging unit body 2, the base shell 1 is provided with a charging aperture 3, the massaging unit body 2 is in a seal-like structure, includes a housing 4, the massage the combing heads 5, 6 of the motor, the single chip module 7, 8 and button-type battery charging module 9, housing 4 is provided with a handle 10, housing 4 is connected with the massage combing insert 5, the handle 10 is provided with a switch button 11, 12 mode indicating lamp, charging indicator light 13 and the speed indicator light 14, massaging the combing heads 5 at the head is a convex claw structure, massaging the combing heads 5 is a four-round counter-rotating, the motor 6 is connected with the massage the combing heads 5, 7 and the motor 6 single chip module, a button battery 9, a switch button 11, 12 mode indicator light, indicator light 14 is connected charging indicator light 13 and speed, a button battery 8 is connected to the charge module 9, button-type battery is a lithium battery 9 material.

As shown in FIG. 1 to 2 shown, when using the present invention, a switch button 11 open smart scalp massager short press, after power-on switch button 11 mode is switched in a short, the intelligent scalp massager mode switching orders of the first is a forward slow kneading mode, a re-switching is a forward fast kneading mode and finally the inverse fast kneading mode, the user may after switching modes according to its own case, holds the handle 10 uses an intelligent scalp massage a scalp massager, the massage before can select an appropriate hair cream was applied to a more excellent effect of the root, when the finger to reach the scalp during the massage allowing only, and not the entire palm, or otherwise make the hair entanglement or is pulled out, it is noted that such as the scalp with a wound, scalp massaging can not be performed.

Of course, the above illustration is only the preferred embodiment of the present invention, it is not in this limited range of use of the present invention, it is made on an equal change in the principles of the present invention all the should be included in the scope of the present invention.

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A61H 7/00(2006.01)

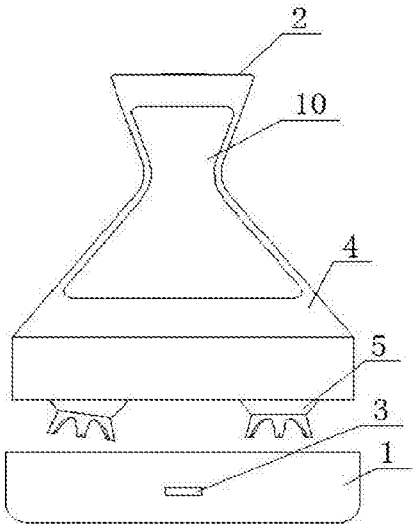
权利要求书1页 说明书2页 附图2页

(54)发明名称

一种智能头皮按摩器

(57)摘要

本发明公开一种智能头皮按摩器，采用IP×7级防水设计，包括底座壳和按摩器体，底座壳设有充电孔，所述的按摩器体呈印章状结构，包括壳体、按摩梳头、电机、单片机模块、充电模块和纽扣电池，所述的壳体上设有手柄，壳体与按摩梳头镶嵌连接，所述的手柄上设有开关按钮、模式指示灯、充电指示灯和速度指示灯，所述的按摩梳头梳头处是凸起爪结构，按摩梳头是四轮回转式，所述的电机与按摩梳头连接，所述的单片机模块与电机、纽扣电池、开关按钮、模式指示灯、充电指示灯和速度指示灯连接，所述的纽扣电池与充电模块连接，纽扣电池材料是锂电池。



CN 106806103 A

MassagerPriorArt0000429

Petitioner Therabody Ex-1004, 0837

1.一种智能头皮按摩器，采用IP×7级防水设计，包括底座壳1和按摩器体(2)，底座壳(1)设有充电孔(3)，其特征在于：所述的按摩器体(2)呈印章状结构，包括壳体(4)、按摩梳头(5)、电机(6)、单片机模块(7)、充电模块(8)和纽扣电池(9)。

2.根据权利要求1所述的一种智能头皮按摩器，其特征在于：所述的壳体(4)上设有手柄(10)，壳体(4)与按摩梳头(5)镶嵌连接。

3.根据权利要求2所述的一种智能头皮按摩器，其特征在于：所述的手柄(10)上设有开关按钮(11)、模式指示灯(12)、充电指示灯(13)和速度指示灯(14)。

4.根据权利要求1所述的一种智能头皮按摩器，其特征在于：所述的按摩梳头(5)梳头处是凸起爪结构，按摩梳头(5)是四轮回转式。

5.根据权利要求1所述的一种智能头皮按摩器，其特征在于：所述的电机(6)与按摩梳头(5)连接。

6.根据权利要求3所述的一种智能头皮按摩器，其特征在于：所述的单片机模块(7)与电机(6)、纽扣电池(9)、开关按钮(11)、模式指示灯(12)、充电指示灯(13)和速度指示灯(14)连接。

7.根据权利要求1所述的一种智能头皮按摩器，其特征在于：所述的纽扣电池(9)与充电模块(8)连接，纽扣电池(9)材料是锂电池。

MassagerPriorArt0000430

Petitioner Therabody Ex-1004, 0838

一种智能头皮按摩器

技术领域

[0001] 本发明涉及日常用品技术领域，尤其涉及一种智能头皮按摩器。

背景技术

[0002] 现代生活中的人们在一天的工作生活中大部分时间都是坐着，缺少了运动，因此导致颈肩和腰椎出现劳损疼痛，同时因为忽视对头皮的保养，还有气血不畅气色差、头昏和偏头痛的出现，而按摩可以舒缓身体部位的疼痛，目前普遍使用的按摩器基本上是针对身体进行的按摩，专门针对头部的按摩器比较少，且均是以振动的形式对头部进行按摩。

发明内容

[0003] 本发明的目的在于针对已有的技术现状，提供一种智能头皮按摩器，以实现按摩保养头皮的功能。

[0004] 为达到上述目的，本发明采用如下技术方案：

本发明为一种智能头皮按摩器，采用IP×7级防水设计，包括底座壳和按摩器体，底座壳设有充电孔，底座用于放置保护按摩器体和按摩器体充电，所述的按摩器体呈印章状结构，方便手持使用，包括壳体、按摩梳头、电机、单片机模块、充电模块和纽扣电池。

[0005] 进一步的，所述的壳体上设有手柄，壳体与按摩梳头镶嵌连接。

[0006] 进一步的，所述的手柄上设有开关按钮、模式指示灯、充电指示灯和速度指示灯。

[0007] 进一步的，所述的按摩梳头梳头处是凸起爪结构，按摩梳头是四轮回转式，这是模仿真人按摩手法设计，四轮回转式按摩梳头具有四指揉按功能。

[0008] 进一步的，所述的电机与按摩梳头连接。

[0009] 进一步的，所述的单片机模块与电机、纽扣电池、开关按钮、模式指示灯、充电指示灯和速度指示灯连接。

[0010] 进一步的，所述的纽扣电池与充电模块连接，纽扣电池材料是锂电池。

[0011] 本发明的有益效果是：一种智能头皮按摩器的四轮回转式按摩梳头模仿真人四指按摩手法，通过轻柔按压头皮起到舒缓放松作用，配合洗头使用，更易清洁头皮污垢，同时智能头皮按摩器设有通过变换回转速度而具有强弱交替变化的节拍模式，有正向慢速揉捏、正向快速揉捏和反向快速揉捏三种模式，模式指示灯会对应显示黄色、绿色和蓝色，速度指示灯会随着速度快慢而闪动，智能头皮按摩器除了能洁净呵护头皮外，仿针人按摩手法的设计使智能头皮按摩器可以对身体多个部位进行按摩，产生有益的效果。。

附图说明

[0012] 附图1为本发明正视图；

附图2为本发明俯视图；

附图3 为本发明系统框图。

MassagerPriorArt0000431

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具体实施方式

[0013] 为了使审查委员能对本发明之目的、特征及功能有更进一步了解，兹举较佳实施例并配合图式详细说明如下：

请参阅图1至3所示，系为本发明之较佳实施例正视图、俯视图和系统框图，一种智能头皮按摩器，采用IP×7级防水设计，包括底座壳1和按摩器体2，底座壳1设有充电孔3，所述的按摩器体2呈印章状结构，包括壳体4、按摩梳头5、电机6、单片机模块7、充电模块8和纽扣电池9，所述的壳体4上设有手柄10，壳体4与按摩梳头5镶嵌连接，所述的手柄10上设有开关按钮11、模式指示灯12、充电指示灯13和速度指示灯14，所述的按摩梳头5梳头处是凸起爪结构，按摩梳头5是四轮回转式，所述的电机6与按摩梳头5连接，所述的单片机模块7与电机6、纽扣电池9、开关按钮11、模式指示灯12、充电指示灯13和速度指示灯14连接，所述的纽扣电池9与充电模块8连接，纽扣电池9材料是锂电池。

[0014] 如图1至2所示，使用本发明时，短按开关按钮11打开智能头皮按摩器，开机后短按开关按钮11切换模式，智能头皮按摩器模式的切换顺序首先是正向慢速揉捏模式，再切换是正向快速揉捏模式最后是反向快速揉捏模式，用户可根据自身情况切换模式后，手持手柄10使用智能头皮按摩器按摩头皮，在按摩之前可以选择适当的发乳涂于发根处效果更佳，在按摩时只能让手指触及头皮，而不是整个手掌，否则会使头发缠结或被拔出，注意如头皮有伤口，不可进行头皮按摩。

[0015] 当然，以上图示仅为本发明较佳实施方式，并非以此限定本发明的使用范围，故凡是在本发明原理上做等效改变均应包含在本发明的保护范围内。

MassagerPriorArt0000432

Petitioner Therabody Ex-1004, 0840

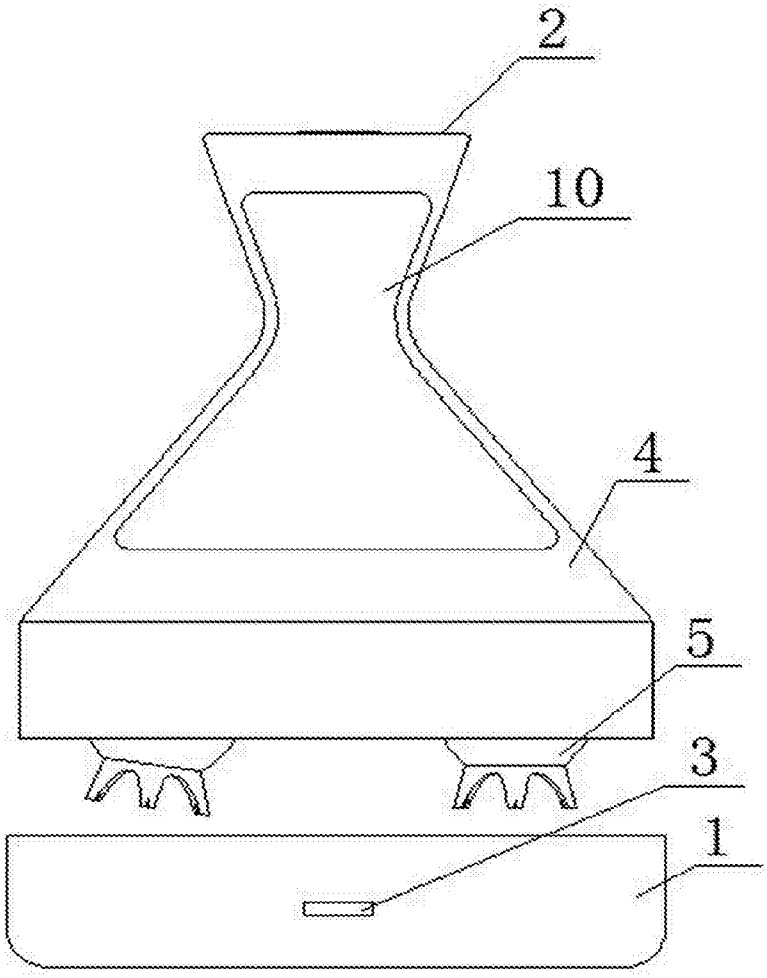


图1

MassagerPriorArt0000433

Petitioner Therabody Ex-1004, 0841

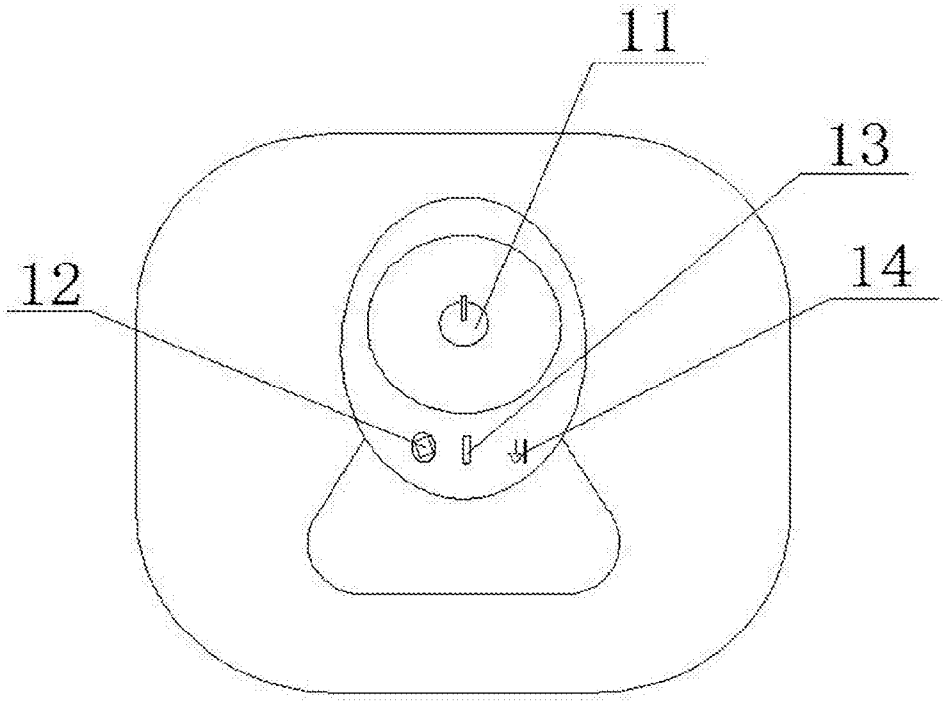


图2

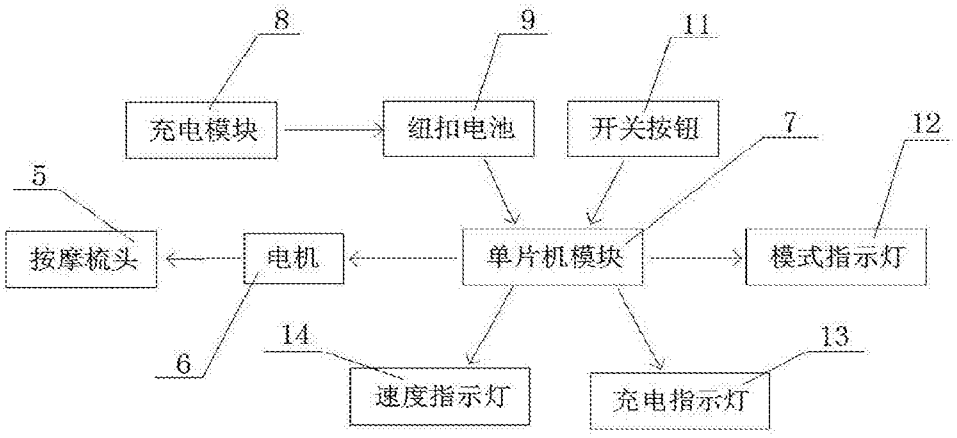


图3

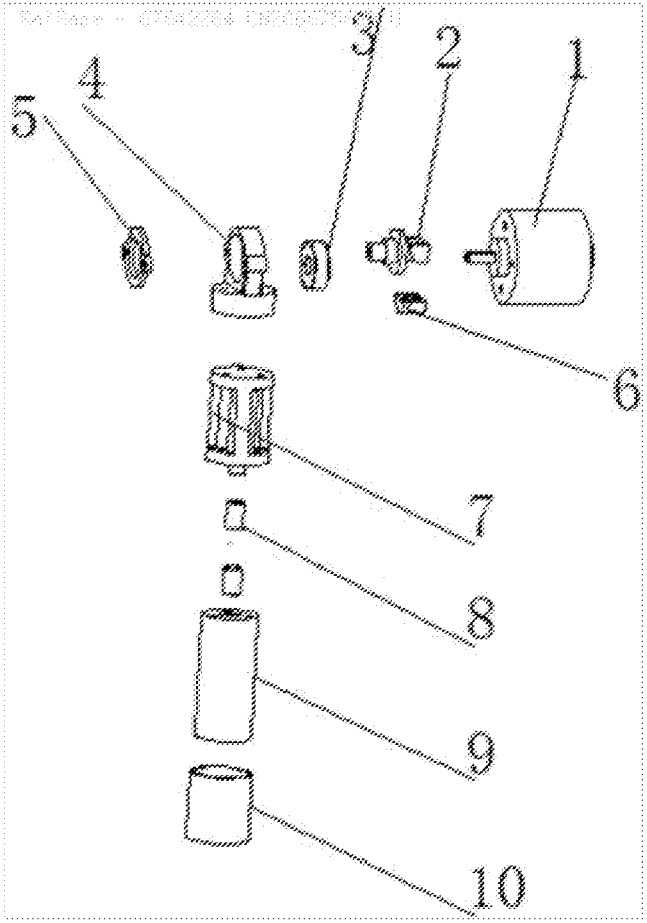
MassagerPriorArt0000434

Petitioner Therabody Ex-1004, 0842

CN206675699 U PatBase number: 67642284

Title: LINEAR MOTION STRIKES FORMULA MASSAGE STRUCTURE

Abstract:
Source: CN206675699 U The utility model discloses a linear motion strikes formula massage structure, including motor, piston, rubber connecting piece, eccentric wheel, motor output end connects the eccentric wheel, and the bottom of eccentric wheel has a solid fixed pressing plate, the eccentric wheel tip passes through the bearing and installs on the bearing frame, magnet is installed to the bottom installation rubber connecting piece of bearing frame and the bottom installation piston of rubber connecting piece between rubber connecting piece and the piston, piston bottom installation linear bearing. This linear motion strikes formula massage structure reasonable in design, convenient to use makes the connecting rod into flexible rubber connecting piece, makes being connected between traditional connecting rod and the slider rotate, can also produce linear motion simultaneously, and the cost is reduced in actually applying to the massager product has eliminated this and has located the noise, is fit for extensively popularization.



Owner(s) / Assignee(s): ESINO TECH CO LTD

Inventor(s): WU ZHIYONG

Published in: (family)

Country	Publication number	Publication date	Application number	Application date	
CHINA	CN206675699 U	Nov 28, 2017	CN201621456953U	Dec 28, 2016	PUBL. UTILITY MODEL APPLICATION

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Priority: CN201621456953U 20161228
International class: *A61H23/02* (Core/Invention)

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(12)实用新型专利

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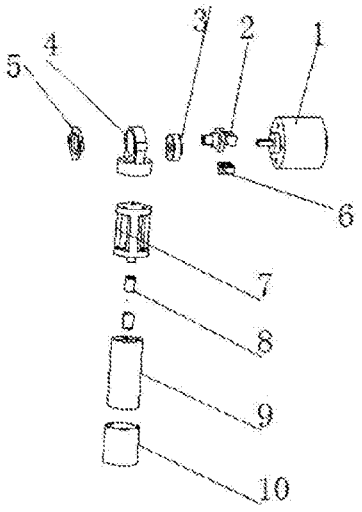
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(54)实用新型名称

一种直线运动打击式按摩结构

(57)摘要

本实用新型公开了一种直线运动打击式按摩结构，包括马达、活塞、橡胶连接件、偏心轮，所述马达输出端连接偏心轮，偏心轮的底部具有固定压板，所述偏心轮端部通过轴承安装在轴承座上，所述轴承座的底部安装橡胶连接件以及橡胶连接件的底部安装活塞，橡胶连接件与活塞之间安装有磁铁，所述活塞底部安装直线轴承。该一种直线运动打击式按摩结构设计合理，使用方便，把连杆改成柔性的橡胶连接件，使传统的连杆与滑块之间的连接不用转动，同时还可以产生直线运动，在实际运用于按摩器产品中降低了成本，消除了该处噪音，适合广泛推广。



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1.一种直线运动打击式按摩结构，包括马达(1)、活塞(9)、橡胶连接件(7)、偏心轮(2)，其特征在于：所述马达(1)输出端连接偏心轮(2)，偏心轮(2)的底部具有固定压板(6)，所述偏心轮(2)端部通过轴承(3)安装在轴承座(4)上，所述轴承座(4)的底部安装橡胶连接件(7)以及橡胶连接件(7)的底部安装活塞(9)，橡胶连接件(7)与活塞(9)之间安装有磁铁(8)，所述活塞(9)底部安装直线轴承(10)。

2.根据权利要求1所述的一种直线运动打击式按摩结构，其特征在于：所述轴承座(4)上安装有轴承盖(5)。

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一种直线运动打击式按摩结构

【技术领域】

[0001] 本实用新型涉及一种按摩机构，特别涉及一种直线运动打击式按摩结构。

【背景技术】

[0002] 目前，在传统的按摩机械中，马达的圆周运动转变为直线运动一般采用曲柄连杆滑块结构，该结构中连杆是刚性的，且连杆与滑块之间的连接要求是可以转动的，这就增加了实际应用中复杂性，提高了成本，而且噪音比较大，摩擦力度过大使得产品寿命不长，不能满足使用者舒适性要求，使用效益较低。

【实用新型内容】

[0003] 本实用新型的主要目的在于提供一种直线运动打击式按摩结构，可以有效解决背景技术中的问题。

[0004] 为实现上述目的，本实用新型采取的技术方案为：

[0005] 一种直线运动打击式按摩结构，包括马达、活塞、橡胶连接件、偏心轮，所述马达输出端连接偏心轮，偏心轮的底部具有固定压板，所述偏心轮端部通过轴承安装在轴承座上，所述轴承座的底部安装橡胶连接件以及橡胶连接件的底部安装活塞，橡胶连接件与活塞之间安装有磁铁，所述活塞底部安装直线轴承。

[0006] 进一步地，所述轴承座上安装有轴承盖。

[0007] 与现有技术相比，本实用新型具有如下有益效果：该一种直线运动打击式按摩结构设计合理，使用方便，通过设置马达、偏心轮、橡胶连接件、磁铁、活塞、直线轴承，即把传统的连杆改成柔性的橡胶连接件，使传统的连杆与滑块之间的连接不用转动了，同时还可以产生直线运动，在实际运用于按摩器使用寿命更长，产品生产降低了成本，消除了该处噪音，应用前景广泛，适合广泛推广。

【附图说明】

[0008] 图1为本实用新型一种直线运动打击式按摩结构的整体结构爆炸图。

[0009] 图2为本实用新型一种直线运动打击式按摩结构的侧视图。

[0010] 图3为本实用新型一种直线运动打击式按摩结构的后视图。

[0011] 图4为本实用新型一种直线运动打击式按摩结构的剖视图。

[0012] 图中：1、马达；2、偏心轮；3、轴承；4、轴承座；5、轴承盖；6、固定压板；7、橡胶连接件；8、磁铁；9、活塞；10、直线轴承。

【具体实施方式】

[0013] 为使本实用新型实现的技术手段、创作特征、达成目的与功效易于明白了解，下面结合具体实施方式，进一步阐述本实用新型。

[0014] 如图1-4所示，一种直线运动打击式按摩结构，包括马达1、活塞9、橡胶连接件7、偏

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心轮2，所述马达1输出端连接偏心轮2，偏心轮2的底部具有固定压板6，所述偏心轮2端部通过轴承3安装在轴承座4上，所述轴承座4的底部安装橡胶连接件7以及橡胶连接件7的底部安装活塞9，橡胶连接件7与活塞9之间安装有磁铁8，所述活塞9底部安装直线轴承10。

[0015] 其中，所述轴承座4上安装有轴承盖5。

[0016] 需要说明的是，本实用新型为一种直线运动打击式按摩结构，该一种直线运动打击式按摩结构主体结构采用马达、偏心轮、橡胶连接件、磁铁、活塞和直线轴承，即把传统的连杆改成柔性的橡胶连接件，使传统的连杆与滑块之间的连接不用转动了，同时还可以产生直线运动，在实际运用于按摩器产品中降低了成本，消除了该处噪音，工作时，马达驱动偏心轮工作，进一步的偏心轮通过橡胶连接件以及磁铁推动活塞以及直线轴承工作，实现工作流程，保证该一种直线运动打击式按摩结构的使用效益。

[0017] 以上显示和描述了本实用新型的基本原理和主要特征和本实用新型的优点。本行业的技术人员应该了解，本实用新型不受上述实施例的限制，上述实施例和说明书中描述的只是说明本实用新型的原理，在不脱离本实用新型精神和范围的前提下，本实用新型还会有各种变化和改进，这些变化和改进都落入要求保护的本实用新型范围内。本实用新型要求保护范围由所附的权利要求书及其等效物界定。

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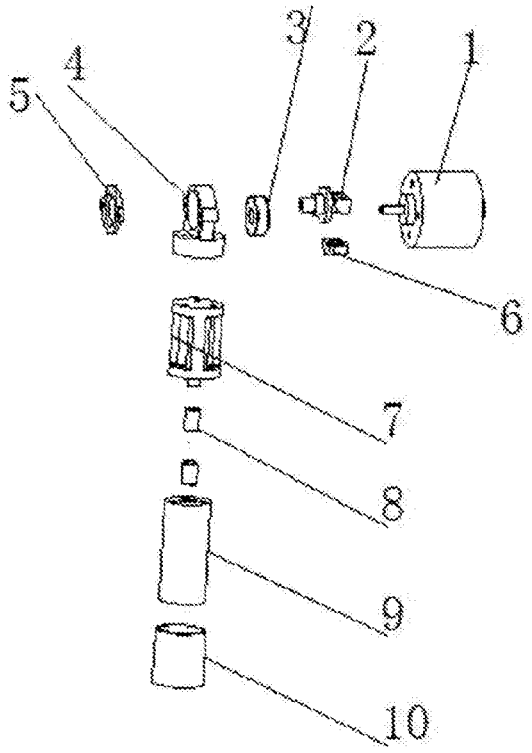


图1

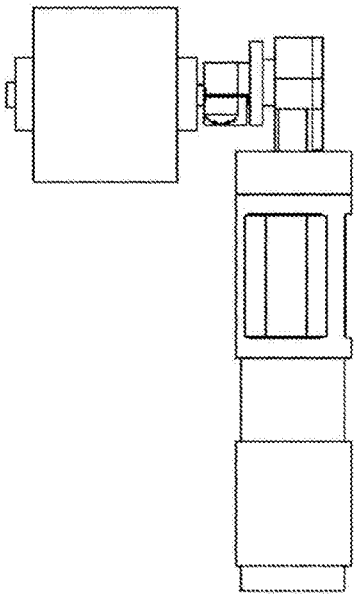


图2

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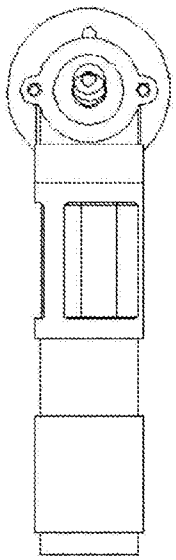


图3

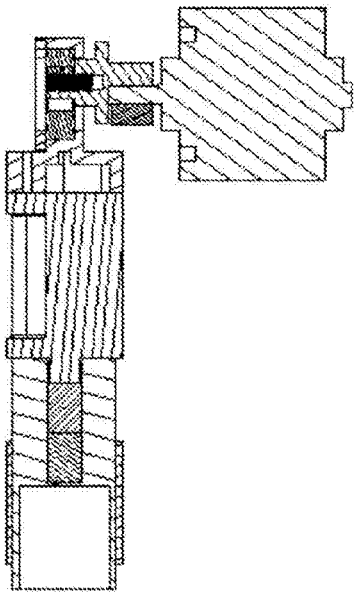


图4

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Applicant	shin dae chul

발명의 명칭

전동침

Title of Invention

electric acupuncture

요약

본 발명은 통상의 출혈침에 모터(22)를 이용해 연사사가 되는 기능을 추가함으로써 짧은 시간에 시침이 가능하여 환자의 긴장상태와 고통을 짧게 느낄 수 있게 하는 동시에 치료하는 사람의 반복되는 노동을 줄일 수 있고, 또 인체공학적인 디자인으로 설계되어 그립(grip)잡기가 편하고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11)을 교환하여 사용할 수 있도록 하였고, 압진기를 설치하여 시침에 편리함을 더하였으며, 무엇보다도 작동버튼만 누르면 자동으로 연사되어 편리함을 제공하는 것을 특징으로 하는 전동침(10)이 제공된다.

침, 사혈 침, 전동 침, 사혈, 전동, 출혈침

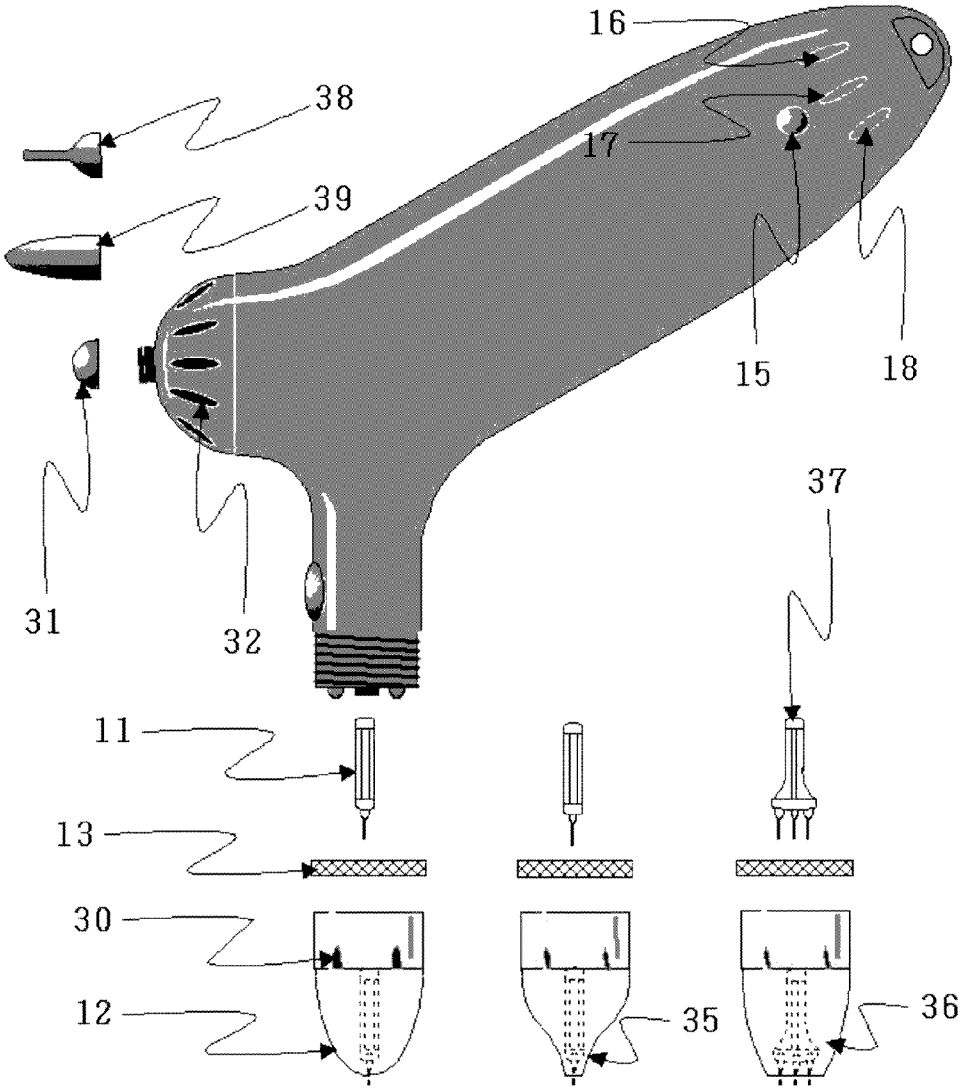
Abstract

The invention provides the electric needle (10) which could reduce the repeated labor of the human the hour hand was possible in the time to be short and feeling the state of tension and pain of the patient and since it added the function in which the strand corp. was by using the motor (22) for the normal bleeding needle treated at the same time and comfortable to be designed to the design which was and, the ergonomic and grasp the grip and beautiful and it exchanged the transparency lid (12) or the single-use needle (11) according to the use and the human used and it set up suppression and it added the convenience to the hour hand and it is twined with the automatically if the operating button above anything else presses and provides the convenience.

The needle, the depletion needle, the electric needle, depletion, electric, the bleeding needle
.

대표도면(Representative drawing)

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청구의 범위

청구 1항:

사혈을 할 때 사용되는 출혈용 침에 있어서; 상기 작동수단을 손가락이 아닌 모터(22)를 활용해 자동으로 작동시키고, 전체구조는 본체 몸통을 중심으로 세 부위로 갈라진 손잡이 부와 모터 부, 침부로 나누어지고; 상기 손잡이 단부에는 고리(33)가 설치되고, 그 아래에 3개의 램프(16, 17, 18)와 전원버튼(15)이 설치되며, 반대쪽에는 건전지(20)를 교환할 수 있는 건전지뚜껑(21)이 있는 것과; 상기 모터 부에는 전동 모터(22)가 내장되어있고 단부에는 환기구(32)가 설치되며; 상기 침부에는 투명 뚜껑(12)과 침 길이조절링(13)내부에 나사산이 있고 외부에 나사산이 있는 본체에 차례대로 조립되는 것과, 그 관통된 중앙부에는 일회용 침(11)이 침 꽂이에 결합되고, 수직연결대(26)와 행정연결대(25), 휠(24), 회전축(23), 모터(22) 순으로 연결된 구조를 가지고 있으며, 모터의 회전운동이 왕복운동으로 바뀌어 침이 재봉틀처럼 작동되는 것을 특징으로 하는 전동침(10).

Scope of Claims

Claim 1:

The electric needle in which the single-use needle (11) is combined in the needle prod in the penetrated central part ; it has with the structure of being connected to the vertical connecting belt (26) and administration connection stick (25), wheel (24), rotary shaft (23), motor (22) net ; and the rotary motion of the motor is changed to the reciprocatory movement and the needle is operated like the sewing machine. It is boiled in the needles inside the transparent lid (12) and needle length adjustment ring (13) in the main body in which the screw thread is in the outside it has the screw thread in order the ventilation opening (32) is installed in end the electric motor (22) is built in the motor unit it has the battery cover (21) exchanging the dry cell (20) in the opposite side lamps (16, 17, 18) and power button (15) of 3 are installed the ring (33) is installed in the grasping end the overall structure is divided into the handle part divided into the force site and motor unit, and the needles around the main body body the actuating means is automatically operated as to the needle for the bleeding which is used it depletes blood the motor (22) which is not finger is utilized (10).

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청구 2항:

1항에 있어서, 일회용 침 하나에 여러 개의 바늘을 갖고, 그 모양에 따라 투명뚜껑(12)의 개방된 구멍의 크기가 넓어진 것을 특징으로 하는 전동침(10).

청구 3항:

1항에 있어서, 투명뚜껑(12)의 주둥이가 이침에 사용할 수 있게 뾰족한 것을 특징으로 하는 전동침(10).

청구 4항:

1항에 있어서, 투명뚜껑(12)의 주둥이가 도장침을 사용할 수 있게 구멍이 넓게 뚫린 것을 특징으로 하는 전동침(10).

청구 5항:

1항에 있어서; 일회용 침(11)하나에 여러 개의 바늘이 달린 것을 특징으로 하는 일회용 도장침(11).

청구 6항:

1항에 있어서, 본체 몸통을 중심으로 세 부위로 갈라진 구조로, 손잡이 부와 모터 부, 침부로 나누어지고; 상기 본체를 시침할 부위에 따라 권총을 잡을 때의 그립(grip), 연필을 잡을 때의 그립(grip)두 가지 형태로 쥐고 작동시킬 수 있는 것을 특징으로 하는 전동침(10).

청구 7항:

1항에 있어서, 고정뚜껑(31)을 압진기로 사용할 수 있게 한 것을 특징으로 하는 전동침(10).

청구 8항:

1항에 있어서, 투명뚜껑(12)내부에 전구(29)를 장착하여 시침 시 환부의 조도를 높여줄 수 있게 한 것을 특징으로 하는 전동침(10).

청구 9항:

2항에 있어서, 일회용 침 하나에 여러 개의 바늘을 갖은 것을 특징으로 하는 일회용 도장침(37)

Claim 2:

The electric needle in which it has several needles on the single-use needle one as to claim 1 ; and the size of the opened hole of the transparency lid (12) widens according to the shape (10).

Claim 3:

The electric needle in which the spout of the transparency lid (12) is pointed as to claim 1 to use in this needle (10).

Claim 4:

The electric needle in which the hole is widely opened so that the spout of the transparency lid (12) can,cans use the coating needle as to claim 1 (10).

Claim 5:

The single-use coating needle in which several needles run to the single-use needle (11) one as to claim 1 (11).

Claim 6:

The electric needle which can be divided into the handle part and motor unit, and the needles and which hold the main body to the grip when catching gun according to the *** site, and the grip two form when catching the pencil and can operate to the structure of being divided into the force site as to claim 1 around the main body body (10).

Claim 7:

The electric needle using the fixing lid (31) as suppression as to claim 1 (10).

Claim 8:

The electric needle mounting the bulb (29) as to claim 1 inside the transparency lid (12) and enhances the illumination of the affected part in the hour hand (10).

Claim 9:

The single-use coating needle having several needles on the single-use needle one as to claim 2 (37)

배경기술

본 발명은 통상의 출혈침에 모터(22)를 이용해 연사가 되는 기능을 추가함으로써 짧은 시간에 시침이 가능하여 환자의 긴장상태와 고통을 짧게 느낄 수 있게 하는 동시에 치료하는 사람의 반복되는 노동을 줄일 수 있다, 또 인체공학적인 디자인으로 설계되어 환자의 부위에 따라 도 13이나 도 14와 같이 잡기가 편리한 방식을 선택하여 시침 할 수 있고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11)을 교환하여 사용할 수 있도록 하였고, 무엇보다도 작동버튼만 누르면 자동으로 연사되어 편리함을 제공하는 전동침에 관한 것이다.

Background Art

The present invention relates to the electric needle which when could reduce the repeated labor of the human the hour hand was possible in the time to be short and feeling the state of tension and pain of the patient and by adding the function of being twined by using the motor (22) for the normal bleeding needle treated at the same time it selected the method in which was convenient that it was designed to the design which was and, the ergonomic and caught according to the site of the patient like the figures 13 or 14 and the hour hand could be named and beautiful and it exchanged the transparency lid (12) or the single-use needle (11) according to the use and the human used and it is twined with the automatically if the operatin

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g button above anything else presses and provides th e convenience.

일반적으로 출혈침은 혈자리나 환부에 출혈을 목적으로 사용되며, 급체시나 구급 시에 혈자리를 자극하여 응급처치를 하고, 근래에는 대체의학으로 널리 사용되어 많은 사람들이 활용하고 있는데, 의사나 시침을 하는 사람들은 여러 환자를 상대하는 경우와, 한 부위에 수차례 연속적으로 시침을 하는 경우 때문에, 그 반복되는 노동으로 스트레스를 받는다.

Generally, the bleeding needle is bleeding used for th e blood aperture or the affected part as the purpose and the blood aperture is stimulated in the sudden st omach disorder time or relief and it gives first aid and many people which is recently widely used to the alte rnative medicine and utilizes. The hour hand the stre ss is consecutively therefore received in the case, wh ere the people deciding on the doctor or the hour han d deals with the some patient and one site in case as the repeated labor with several times.

침을 맞기를 좋아 하는 사람은 없을 것이다, 더군다나 여러 차례 침을 같은 부위에 놓는 다면 대부분 사람들은 맞으려고 하지 않아 시침을 하는 데 어려움이 있다. 또 경험해본 사람들은, 침을 맞는 긴 시간동안 아픔을 동반한 긴장상태 때문에 다시는 맞으려고 하지 않는 문제점이 있다.

It is good to have the needle and there will be no hu man doing. Many sides that furthermore places the s everal times needle on the same site the people most ly tries to fit and the hour hand is decided on but hu man has the difficulty. And there is a problem that th e people experienced therefore again tries to fit the s tate of tension accompanying the pain for the long ti me to have the needle.

상기 압진기는 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서 일반적으로 별도의 압진기를 구매하여 사용하여야 하는 불편함이 있었다.

It had the inconvenience with it reduced the pain ma ssaging the place and had the needle generally of pur chasing the separate suppression and to using *** b efore suppression acupunctured.

발명의 내용

Summary of Invention

발명의 효과

Effects of the Invention

상술한 바와 같이 본 발명은 종래의 제반 문제점을 해소하기 위하여 안출한 것으로, 인체공학적인 디자인으로 설계되어 환자의 부위에 따라 도 13이나 도 14와 같이 시침하기 편리한 그립(grip)방식을 선택할 수 있고, 세련되고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11), 고정뚜껑(31)을 교환하여 사용할 수 있도록 하였고, 상기 고정뚜껑(31)은 압진기 대체용으로 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서, 일반적으로 별도의 압진기를 구매하여 사용하여야 했으나 전동침(10)에는 자체에 압진기가 장착되어 전동침(10)만 있으면 시침은 물론 압진기의 역할까지 할 수 있는 효과가 있다. 무엇보다도 작동버튼만 누르면 자동으로 연사되어 시간을 절약하고, 시침하는 사람이 전동의 힘을 빌려 반복되는 같은 동작에서 해방이 되며, 일회용 침이 피부를 통과하는 순간이 눈 깜짝 할 사이에 이루어짐으로써 통증도 줄고, 스피드하게 시술할 수 있는 효과를 갖는다.

As described above, the present invention has the effect that it devised the conventional overall problem was raveled. It was designed to the design which was the ergonomic and the grip mode which was convenient to *** could be selected according to the site of the patient like the figures 13 or 14 and it was polished and it was beautiful and the transparency lid (12) or the single-use needle (11), and the fixing lid (31) were exchanged according to the use and the patient used and the pain which massages the place *** before the fixing lid (31) acupunctures for the suppression substitution and has the needle is reduced. Generally the separate suppression was purchased and it had to use but suppression is mounted on itself in the electric needle (10) and itself can do to the role of suppression as well as the hour hand if it has the electric needle (10). Above anything else, if the operating button presses, it is twined with the automatically and time is economized in and it is free from the operation of being the same of the *** human renting the power of electric and being repeated and since the moment when the single-use needle passes through skin is comprised of the interval which it eye is with surprise called the pain decreases and it has the effect that speed it can perform an operation.

기술적 과제

Technical Task

이에 본 발명은 상기한 바와 같은 종래의 제반 문제점을 해소하기 위하여 안출한 것으로, 그 목적은 침을 맞지 않는 것이 아니라 스피드하게 맞고, 시침하는 사람도 전동의 힘을 빌려 반복되는 같은 동작에서 해방이 되며, 바늘이 피부에

Thus, the invention is to provide the electric needle (10) which it devises it cancels the conventional over all problem as described above and the purpose fit th e needle but it speeds it fits and it is free from the op eration of being the same of the *** human borrowin

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시침될 때 짧은 순간에 이루어짐으로써 고통도 덜 수 있는 전동침(10)을 제공함에 있다.

g the power of electric and being repeated and the pa in can remove by being made at the moment when it is short when the needle acupunctures to skin.

발명의 구성 및 작용

Structure & Operation of the Invention

상기와 같은 목적을 달성하기 위해서 , 본 발명은 본체 케이스하부에 투명뚜껑(12)을 열면 일회용 침(11)을 끼우는 침꽂이(28)와 수직 작동하는 연결부를 갖고 스프링(27)과 모터(22)를 활용해 자동으로 작동시키고; 상기 본체 몸통을 중심으로 세 부위로 갈라진 구조로, 손잡이 부와 모터 부, 침부로 나누어지고; 상기 손잡이 단부에는 고리(33)가 설치되고, 그 아래에 3개의 램프(16, 17, 18)와 전원버튼(15)이 설치되며, 반대쪽에는 건전지(20)를 교환할 수 있는 건전지뚜껑(21)이 있는 것과; 상기 모터 부에는 전동 모터(22)가 내장되어있고 단부에는 환기구(32)가 설치되며; 상기 침부에는 투명뚜껑(12)과 침 길이조절 링(13)내부에 나사산이 있고 외부에 나사산이 있는 본체에 차례대로 조림되는 것과, 그 관통된 중앙부에는 일회용 침(11)이 침 꽂이(28)에 결합되고, 수직연결대(26)와 행정연결대(25), 휠(24), 회전축(23), 모터(22) 순으로 연결된 구조를 가지고 있으며, 모터의 회전운동이 왕복운동으로 바뀌어 침이 재봉틀처럼 작동되는 것을 특징으로 하는 것이다.

To achieve the object, it has the connection part operating with the needle prod (28) and the perpendicularity inserts the single-use needle (11) if the , the invention opens the transparency lid (12) at the lower part of the main case and the spring (27) and motor (22) are utilized and it automatically operates and it is divided into the handle part and motor unit, and the needles and the ring (33) is installed around the main body body in the structure of being divided into the force site in the grasping end and lamps (16, 17, 18) and power button (15) of 3 are installed and the single-use needle (11) is combined in the penetrated central part in the needle prod (28) and it has the battery cover (21) exchanging the dry cell (20) in the opposite side the ventilation opening (32) is installed in end it is boiled in the needles inside the transparency lid (12) and needle length adjustment ring (13) in the main body which has the screw thread and in which the screw thread is in the outside in order the structure has with the structure of being connected to the vertical connecting belt (26) and administration connection stick (25), wheel (24), rotary shaft (23), motor (22) net and the rotary motion of the motor is changed to the reciprocatory movement and the needle is operated like the sewing machine.

이하, 첨부된 도면을 참조로 하여 본 발명의 바람직한 일실시예를 상세히 설명한다.

The embodiment doing with the desirable of the invention it does with reference to the drawing attached below is particularly illustrated.

도 1에 도시한 바와 같이 본 발명에 따른 전동침(10) 조립도로 본 발명의 조립되는 구성을 살펴보면, 상기 본체 케이스하부에 투명뚜껑(12)은 전구(29)를 장착하여 시침 시 환부의 조도를 높여줄 수 있게 투명한 소재를 선택하였으며, 일회용 침(11)과 더불어 환부에 따라 교환 하여 사용할 수 있도록 하였고, 기본적인 일반 형 투명뚜껑(12)과 주둥이가 뾰족한 깔때기형 투명뚜껑(35), 구멍이 크게 뚫린 도장형 투명뚜껑(36)이 있다, 일반 형은 기본적인 타입으로 일회용 침(11)을 사용할 때 장착하고, 깔때기형 투명뚜껑(35)은 이침(耳針)이나 움푹한 곳에 침을 놓을 때 장착하며, 도장형 투명뚜껑(36)은 일회용 침에 바늘이 여러 개 나와 있는 도장침(37)을 사용할 때 장착하는 것으로 한 부위에 여러 대의 침을 놓을 때 사용한다. 또 고정 뚜껑(31)은 기본적인 일반 형과 빗살무늬토기형 뚜껑(39) 그리고 긴 깔때기형 뚜껑(38)이 있다, 일반 형은 기본적인 타입으로 공이 반 절단된 모양을 하고 있고, 빗살무늬토기형 뚜껑(39)은 럭비공을 반 절단한 모양을 하고 있으며, 긴 깔때기형 뚜껑(38)은 깔때기 모양 끝에 구슬 같은 볼 형태의 돌기가 만들어져, 압진기 역할을 한다. 상기 압진기는 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서 일반적으로 별도의 압진기를 구매하여 사용하여야 했으나 전동침(10)에는 자체에 압진기가 장착되어 전동침만 있으면 시침은 물론 압진기의 역할까지 할 수 있게 하였다.

As shown in Figure 1, as to the electric needle (10) assembly drawing according to the present invention the configuration of being assembled of the invention, the transparent material was selected to the transparency lid (12) mount the bulb (29) at the lower part of the main case and could enhance the illumination of the affected part in the hour hand and it exchanged with the single-use needle (11) according to the affected part and it used and the material has the funnel form transparency lid (35) in which the primary general type transparency lid (12) and spout are pointed, and the stamp type transparency lid (36) in which the hole is opened. It mounts when the general type uses the single-use needle (11) as the primary type and when the funnel form transparency lid (35) acupunctures on this needle or the sunken place, it mounts and when with it mounts when the stamp type transparency lid (36) uses the coating needle (37) in which the needle comes out in the single-use needle with the some placing the needle of the some part on one site, it uses. And the primary general type, *** type lid (39) and the long funnel form lid (38) have the fixing lid (31). The protrusion of the form looked such as the funnel form lid (38) it has the shape cut down with the pestle half and it has the shape that *** type lid (39) cuts the rugby ball with half and long. Is the bead after the funnel shape as to the general type, is made of the primary type and it serves as suppression. Before suppression acupunctured with the pain massaging the place and had the needle was reduced generally t

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he separate suppression was purchased and *** had to be used but suppression was mounted on itself in t he electric needle (10) and if it had the electric needl e, itself did to the role of suppression as well as the h our hand.

도 2에 도시한 바와 같이 본 발명에 따른 전동침(10)의 A-A종단면도로 전반적인 전동침(10)의 내부를 표현하고 있다. 상기 일회용 침(11)을 끼우는 침 꽂이(28)는 침을 끼웠을 때 유동이 없도록 침 모양과 닮은꼴로 되어있고, 원통형으로 된 상부가 막혀있는 삽입공 모양을 하고 있으며, 하부에서부터 수직으로 서있는 원통의 한 면이 갈라져 있어 일회용 침(11)을 끼우고 뺄 때 헐렁하지 않으면서 자연스럽게 삽입되고 빼낼 수 있도록 되어있는 것과; 상기 침 꽂이(28)의 원기둥 바깥쪽으로 스프링(27)이 끼워져 전동침(10)이 작동 하지 않을 때는 노출되지 않고 항상 투명뚜껑(12)안쪽에 머물러 있도록 하는 역할을 한다, 상기 침 꽂이(28)위에서 잡아주는 수직연결대(26)는 행정연결대(25)와 침 꽂이(28)를 연결하고; 상기 행정연결대(25)는 수직연결대(26)와 휠(24)을 연결하며 상하 한쪽으로 ㄷ자를 이루며 연결촉이 튀어 나와 있고; 상기 휠(24)은 모터의 회전축과 연결되어 모터에서 나오는 동력을 수직 상하왕복운동으로 바꾸어 주는 역할을 한다. 또 상기 모터에는 건전지(20)에서 나오는 전력으로 동력을 일으키며, 여기서는 1.5v AA size 건전지 두개를 사용 하였으나 AC로도 활용할 수 있고, DC를 사용하여 휴대하기 편리 하게 축전지를 활용할 수도 있다.

As shown in Figure 2, the inside of the overall electric needle (10) is expressed in the A-A cross-sectional vi ew of the electric needle (10) according to the presen t invention. When inclining, the needle prod (28) inse rting the single-use needle (11) becomes the needle t o the needle shape and similar shape so that there is no flow and it has the insertion hole shape that of the upper portion composed of *** is choked and when t he spring (27) is inserted to the cylinder outside of th e needle prod (28) and when one page which perpen dicularly stands in the lower part of the cylinder bein g divided and the single-use needle (11) being insert ed and taking out, it is not baggy and the cylinder ca n be inserted and it can lure the electric needle (10) does not operate, it is not exposed and it always stay s in the transparency lid (12) inside. While the vertic al connecting belt (26) caught in the needle prod (2 8) connects the administration connection stick (25) and needle prod (28) and the administration connecti on stick (25) connects the vertical connecting belt (2 6) and wheel (24) the power the connection splashes and it comes out and in which above wheel (24) is co nnected to the rotary shaft of the motor and while be ing comprised ㄷ shape with the high-low limit side c oming out from the motor is changed into perpendicu lar up down back and forth motion. And in the motor, the power is generated to the electricity of coming fr om the dry cell (20) and here 1.5v AA size dry cell tw o was used but it can utilize as AC and the storage ba ttery can be utilized to be convenient to carry using DC.

도 3에 도시한 바와 같이 본 발명에 따른 전동침(10)의 B-B횡단면도로, 상기 도 2의 발명의 구성에서 상세히 설명이 되었으며, 모터(22)의 동력이 휠(24)로 연결되어 회전운동에너지가 상하 왕복운동에너지로 변환되는 과정을 보여준다(참조로 도 6에 도시한바와 같이 화살표를 따라 행정이 이루어진다.). 추가로 보충 설명할 것은 스프링(27)의 역할과 침 길이조절 링(13)의 역할로서 상기 에서는 스프링(27)을 단순히 전동침(10)이 작동 하지 않을 때는 노출되지 않고 항상 투명뚜껑(12)안쪽에 머물러 있도록 하는 역할을 하는 것으로만 설명되었으나 항상 스프링(27)이 긴장상태를 유지하고 있어, 침이 피부에 삽입되었다가 빠질 때 스프링(27)도움을 받아 가장 빠른 속도로 빠져나와 통증을 최소화 할 수 있도록 하여 주고, 침 길이조절 링(13)은 시침 시 환자의 고통을 호소하면 침 길이조절 링(13)을 돌려 침의 길이를 통증과 반비례하게 조절하여 사용한다, 다시 말하자면 많이 아파하는 사람은 조금만 침이 삽입되게 침 길이조절 링(13)을 풀어 사용하고, 피부에 혈이 돌지 않아 통증을 느끼지 못하는 환자는 빠른 효과를 위하여 침 길이조절 링(13)을 조여 침이 피부에 깊이 삽입되게 하여 사용한다.

As shown in Figure 3, in the B-B cross-sectional view, of the electric needle (10) according to the present in vention the above is the construction of the Invention of 2, it was particularly explained and the power of th e motor (22) is connected to the wheel (24) and the process where the rotational kinetic energy is transfo rmed to up down back and forth motion energy is sho wn (as shown in the reference furnace is 6, the admi nistration is made according to the arrow). In the abo ve case, only by that when the electric needle (10) ju st did not operate the spring (27) as the role of the s pring (27) and role of the needle length adjustment ri ng (13), role were not exposed and it always stayed i n the transparency lid (12) inside it was explained bu t to the additionally add an explanation the spring (2 7) always maintains the state of tension and when th e needle being inserted into skin and coming off, the spring (27) help is accepted and it frees from to the s peed which is most fast and the pain is minimized an d if the pain of the patient is complained of, the needl e length adjustment ring (13) turns the needle length adjustment ring (13) in the hour hand and the length of the needle is controlled to be in inverse proportion to the pain and the patient uses. The needle length a djustment ring (13) is loosened so that as to the hum an, who namely very much feels a pain the needle be a little inserted and the human, uses and the needle l ength adjustment ring (13) is tightened for the fast e ffect and the needle is deeply inserted into skin and t he patient in which the hole does not go round in skin and who is unable to feel the pain uses.

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도 4에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력 전달 구조 A#39#종단면도로, 도 2를 확대 하여 디테일하게 표현한 도면이다.

As shown in Figure 4, it is drawing which it expresses to enlarge fig. 2 into the electric needle (10) power transmitting structure A' cross-sectional view according to the present invention and detail.

도 5에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력 전달 구조 B#39#종단면도로, 도 3을 확대 하여 디테일하게 표현한 도면이다.

As shown in Figure 5, it is drawing which it expresses to enlarge fig. 3 into the electric needle (10) power transmitting structure B' cross-sectional view according to the present invention and detail.

도 6에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력 전달 구조 회전축(23)의 진행상태를 나타낸 도면으로, 도 3의 발명의 구성에서 자세히 설명되어 있다.

As shown in Figure 6, in the construction of the Invention of the drawing, showing the progress of the electric needle (10) power transmitting structure rotary shaft (23) according to the present invention fig. 3, it is explained in detail.

도 7, 도 8, 도 9, 도 10, 도 11, 도 12에 도시한 바와 같이 본 발명에 따른 전동침(10)의 앞뒤상하좌우입면도로, 육면체의 유리관에 넣고 여섯 면에서 바라본 그림이다, 전체가 현대감각에 맞게 유선형디자인으로 설계되었으며, 의료기인 만큼 청결하고 시술이 용이하며 시침 시 편리한 인체공학적인 모양으로 설계되었다. 도 7의 정면도에서 고리(33) 아래쪽에는 3개의 램프(16, 17, 18)와 전원버튼(15)이 있는데 손잡이 내부에 있는 제어판(19)과 연결되어 제어가 되며, 전원버튼(15)을 길게 누르면 전원램프(16)에 점등이 되고 작동준비 상태를 알리며, 나머지 수동램프(17)와 자동램프(18)는 전원버튼을 짧게 누를 때 마다 번갈아 점등되고, 다시 길게 누르면 소등이 됨과 동시에 OFF상태가 된다.

As shown in Figure 12, the fig. 7, fig. 8, fig. 9, fig. 10, fig. 11 was drawing which put in the glass tube of the cube and looked in 6 to front and back up and down/left and right elevation of the electric needle (10) according to the present invention. Whole was projected according to *** to the streamlined shape design and whole was designed to the shape that was the ergonomic clean and in which the procedure was facilitated and which was convenient as the medical instruments phosphorus in the hour hand. In the front view of fig. 7, it has lamps (16, 17, 18) and power button (15) of 3 but it is connected in the ring (33) downside to the control panel (19) having inside the handle and it is controlled and if the power button (15) is lengthways pressed, it is turned on and the functioning ready state is informed the power lamp (16) of and it is turned on by the alternately whenever the rest manual lamp (17) and automatic lamp (18) briefly press the power button and with being put out if it again lengthways presses it becomes the OFF state.

도 13에 도시한 바와 같이 본 발명에 따른 전동침(10)의 손잡이 부를 잡은 상태를 나타낸 입면도로, 권총을 잡을 때의 그립(grip)이다. 침부를 잡을 때의 그립(grip)보다 손목에 무리를 주지 않으며 장시간 시침을 하거나 많은 사람을 시술할 때 편리하며, 검지로 작동버튼(14)을 누를 수 있다.

As shown in Figure 13, it is the grip when catching gun to the elevation showing the state catching the handle part of the electric needle (10) according to the present invention. When while nots giving the unreasonableness to the wrist than the grip when catching the needles the long time hour hand being decided on or performing an operation on many human, it is convenient and the operating button (14) can be pressed to the scanning.

도 14에 도시한 바와 같이 본 발명에 따른 전동침(10)의 침부를 잡은 상태를 나타낸 입면도로, 연필을 잡을 때의 그립(grip)이다. 손잡이 부를 잡을 때의 그립(grip)보다 섬세한 시침을 할 때 유리하며, 검지로 작동버튼(14)을 누를 수 있다.

As shown in Figure 14, it is the grip when catching the pencil to the elevation showing the state catching the needles of the electric needle (10) according to the present invention. When deciding on the hour hand which is delicate than the grip when catching the handle part, it is advantageous and the operating button (14) can be pressed to the scanning.

도면에 대한 간단한 설명

도 1은 본 발명에 따른 전동침(10) 조립도,

도 2는 본 발명에 따른 전동침(10) A-A종단면도,

도 3은 본 발명에 따른 전동침(10) B-B횡단면도,

도 4는 본 발명에 따른 전동침(10)동력전달 구조 A#39#종단면도,

도 5는 본 발명에 따른 전동침(10)동력전달 구조 B#39#종단면도,

Brief explanation of the drawing

Figure 1 is a state elevation in which the electric needle (10) assembly drawing , and

2 the electric needle (10) A-A cross-sectional view according to the present invention , and

3 the electric needle (10) B-B cross-sectional view according to the present invention , and

4 the electric needle (10) power transmitting structure A' cross-sectional view according to the present invention , and

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도 6은 본 발명에 따른 전동침(10)의 휠(24) 동력전달 구조 진행상태 도면,

도 7은 본 발명에 따른 전동침(10) 정면도,

도 8은 본 발명에 따른 전동침(10) 배면도,

도 9는 본 발명에 따른 전동침(10) 우측면도,

도 10은 본 발명에 따른 전동침(10) 좌측면도,

도 11은 본 발명에 따른 전동침(10) 저면도,

도 12는 본 발명에 따른 전동침(10) 상면도,

도 13은 본 발명에 따른 전동침(10)의 손잡이 부를 잡은 상태 입면도,

도 14는 본 발명에 따른 전동침(10)의 침부를 잡은 상태 입면도.

* 도면의 주요부분에 대한 부호 설명

10 : 전동침

11 : 일회용 침

12 : 투명뚜껑

13 : 침 길이조절 링

14 : 작동버튼

15 : 전원버튼

16 : 전원램프

17 : 수동램프

18 : 자동램프

19 : 제어판

20 : 건전지

21 : 건전지뚜껑

22 : 모터

23 : 회전축

24 : 휠

25 : 행정연결대

26 : 수직연결대

27 : 스프링

28 : 침 꽂이

29 : 전구

5 the electric needle (10) power transmitting structure B' cross-sectional view according to the present invention , and

6 the wheel (24) power transmitting structure progress drawing of the electric needle (10) according to the present invention , and

7 the electric needle (10) front view according to the present invention , and

8 the electric needle (10) rear elevation according to the present invention , and

9 the electric needle (10) right side view according to the present invention , and

10 the electric needle (10) left side view according to the present invention , and

11 the electric needle (10) bottom view according to the present invention , and

12 the electric needle (10) top view according to the present invention , and

13 catches the handle part of the electric needle (10) according to the present invention, and the state elevation in which

14 catches the needles of the electric needle (10) according to the present invention according to the invention.

* the code description

toward the main part of drawing 10: the electric needle

11: the single-use needle

12: the transparency lid

13: the needle length adjustment ring

14: the operating button

15: the power button

16: the power lamp

17: the manual lamp

18: the automatic lamp

19: the control panel

20: the dry cell

21: the battery cover

22: the motor

23: the rotary shaft

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30 : 통기구

31 : 고정뚜껑

33 : 환기구

34 : 힌지

35 : 깔때기형 투명뚜껑

36 : 도장형 투명뚜껑

37 : 도장침

38 : 긴 깔때기형 뚜껑

39 : 빗살무늬형 뚜껑

40 : 나사못

24: the wheel

25: the administration connection stick

26: the vertical connecting belt

27: the spring

28: the needle prod

29: the bulb

30: the ventilation hole

31: the fixing lid

33: the ventilation opening

34: the hinge

35: the funnel form transparency lid

36: the stamp type transparency lid

37: the coating needle

38: the long funnel form lid

39: the teeth of a comb type lid

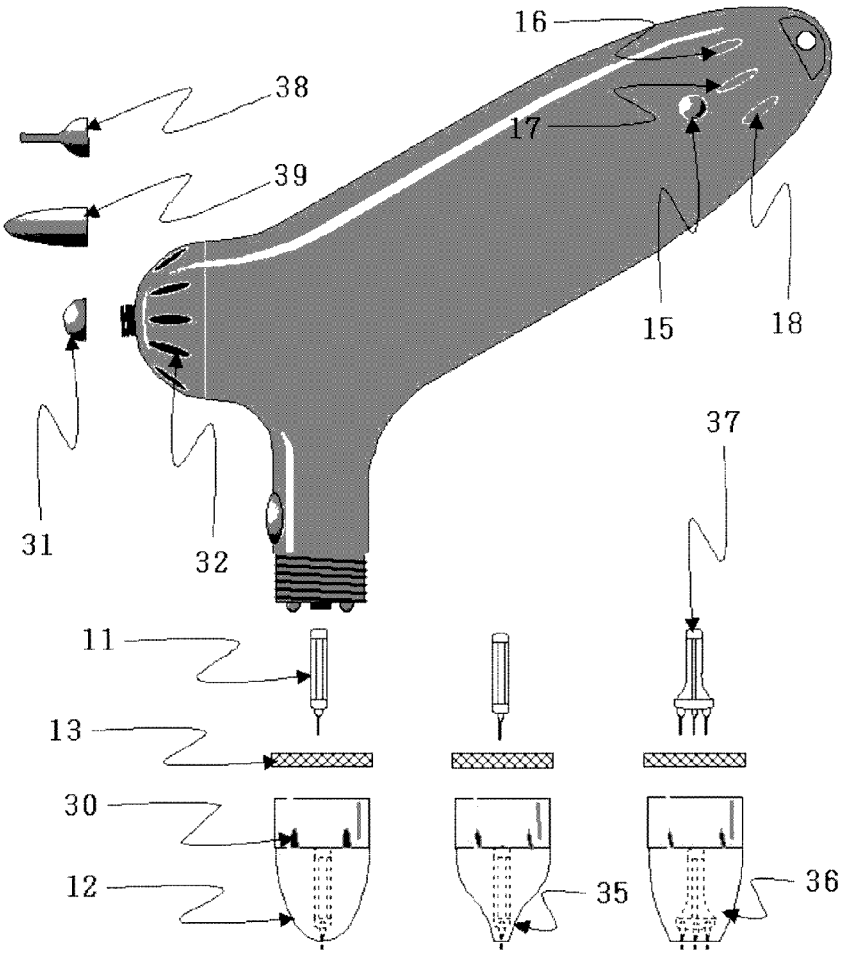
40: the screw spike

.

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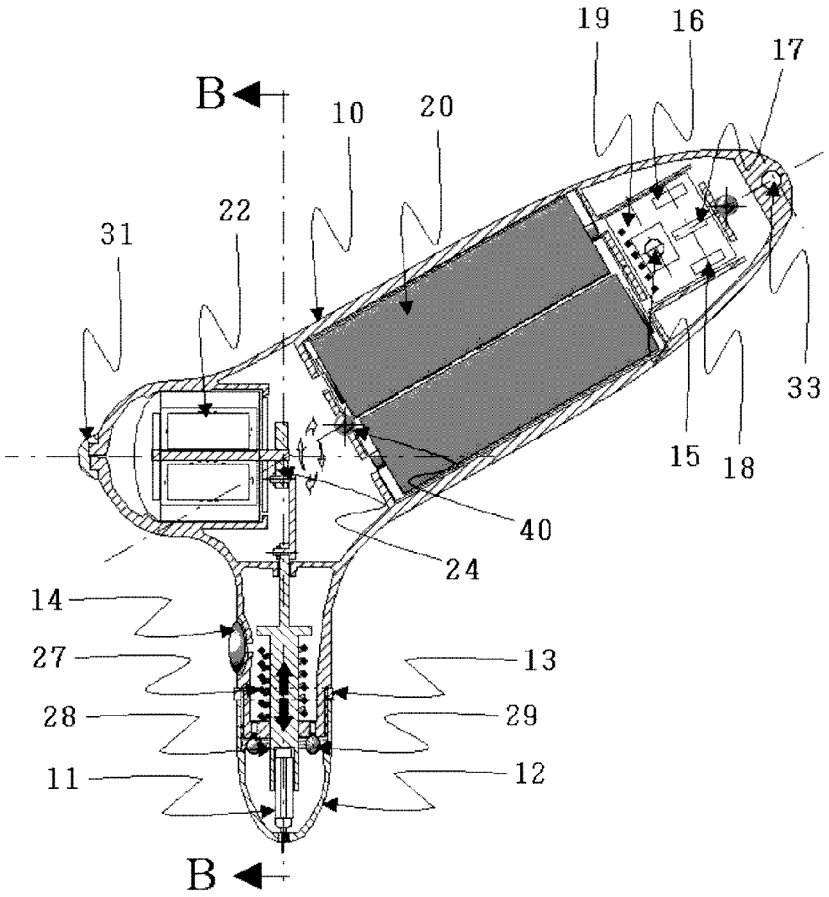
도면1



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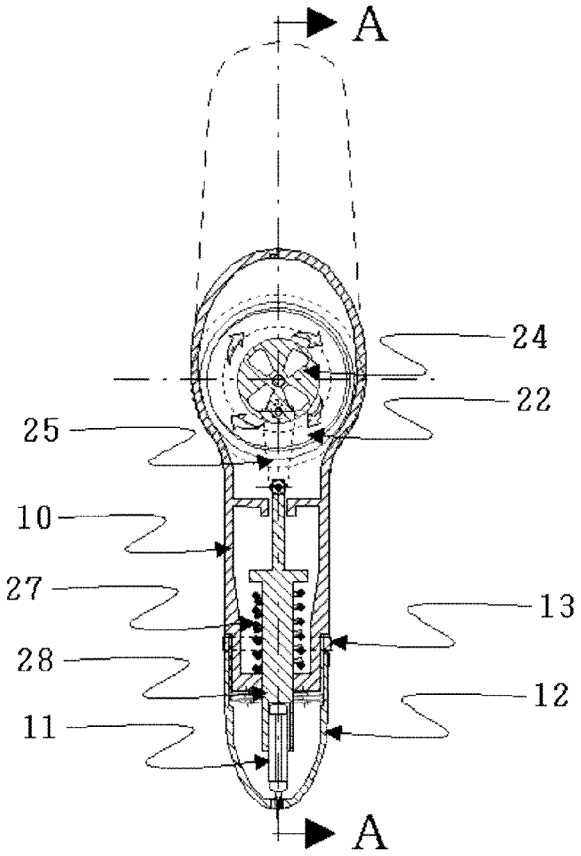
도면2



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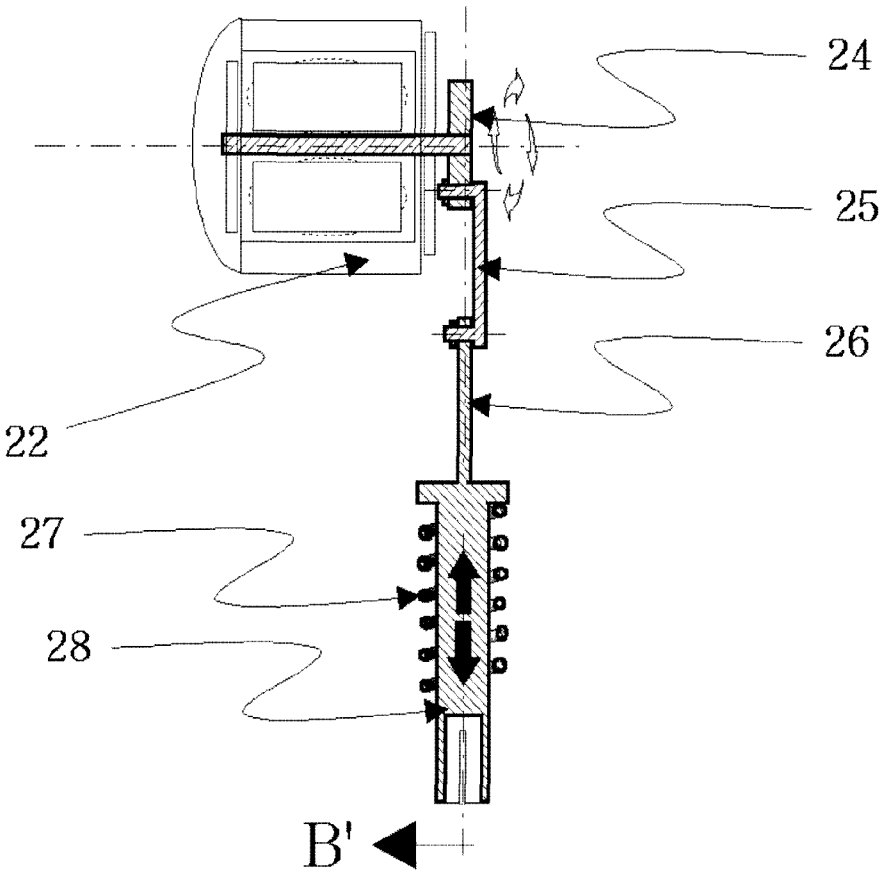
도면3



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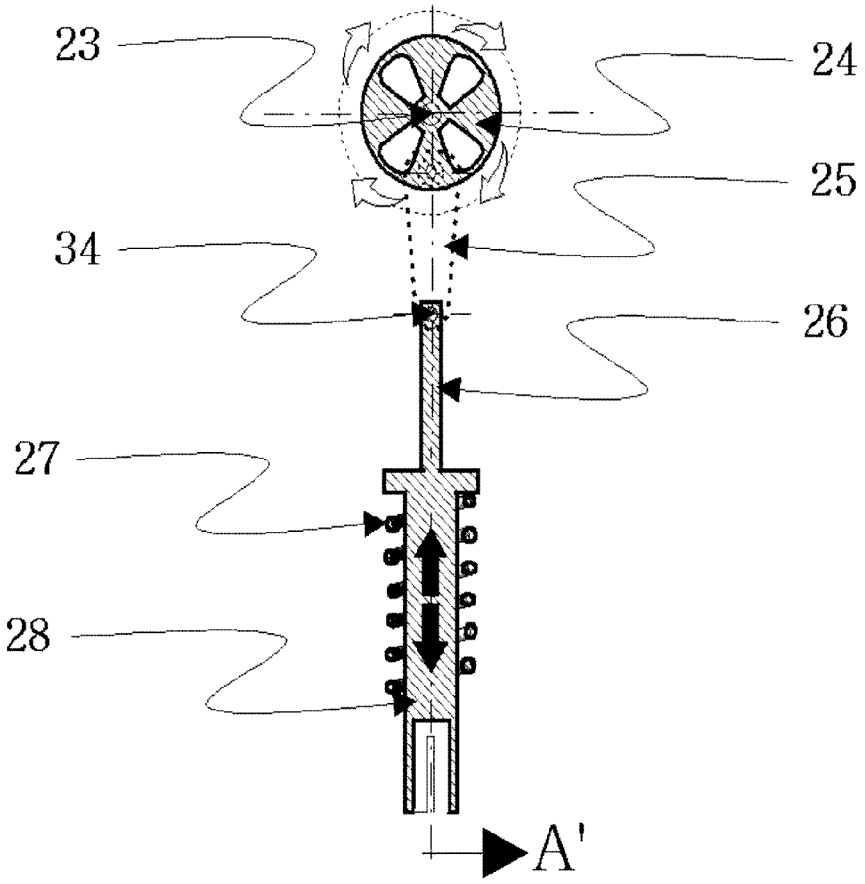
도면4



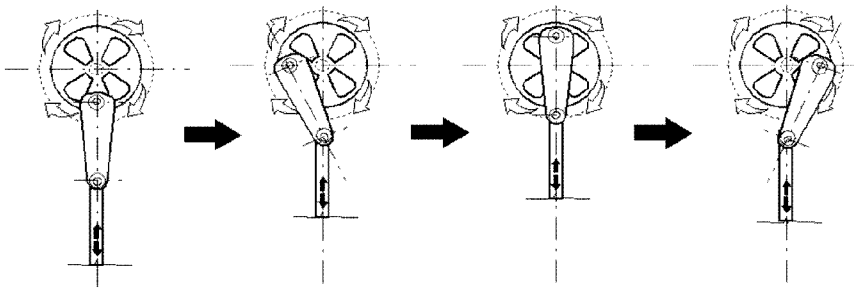
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도면5



도면6



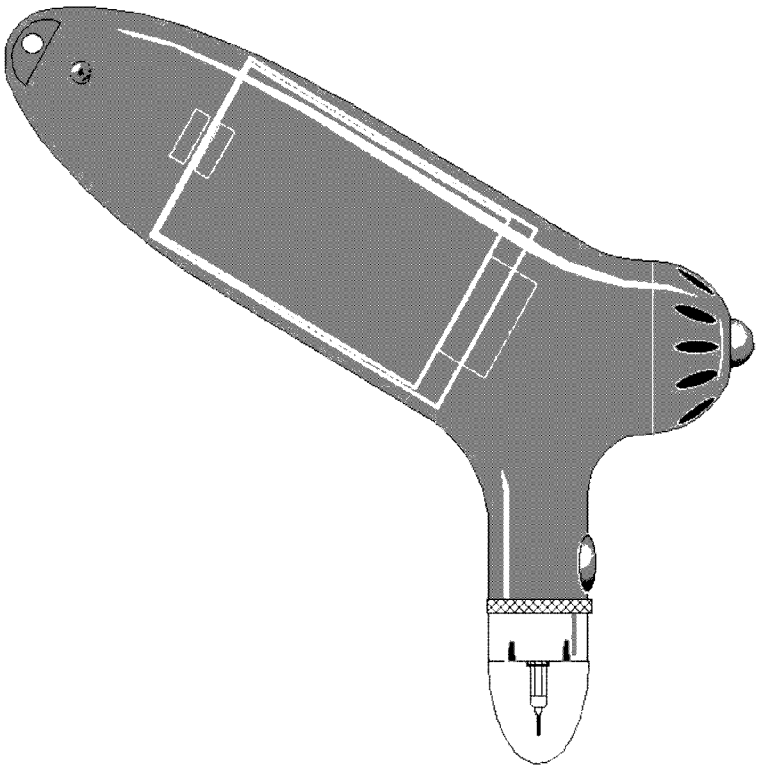
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도면7



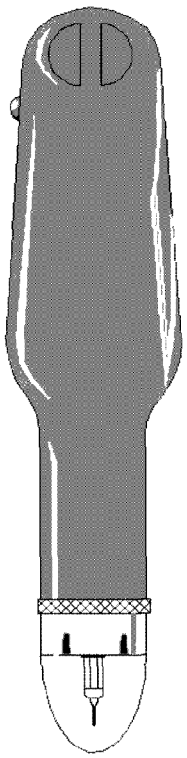
도면8



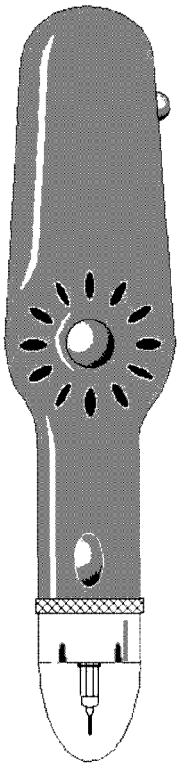
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도면9



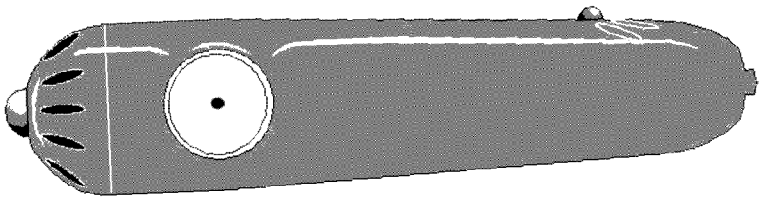
도면10



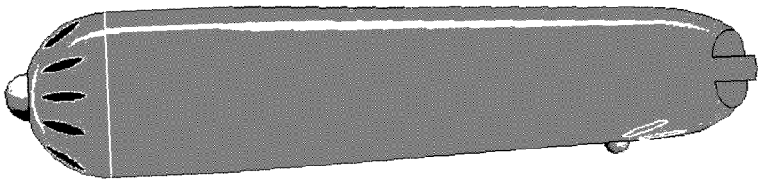
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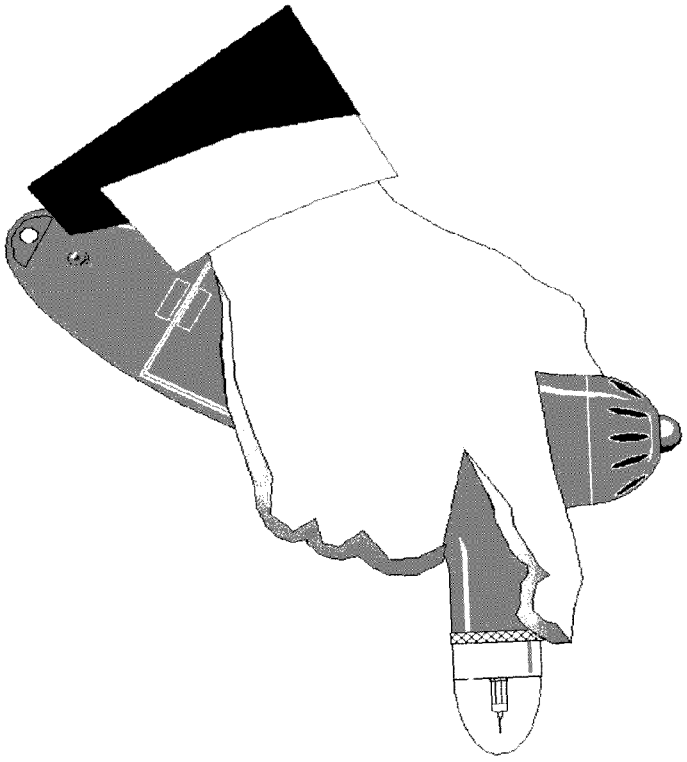
도면11



도면12



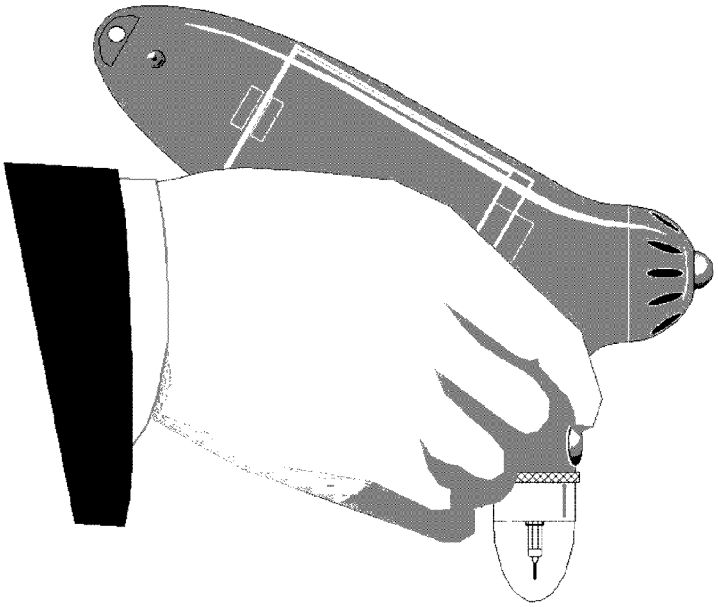
도면13



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도면14



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심사청구 : 없음

(54) 전동침

요약

본 발명은 통상의 출혈침에 모터(22)를 이용해 연사사가 되는 기능을 추가함으로써 짧은 시간에 시침이 가능하여 환자의 긴장상태와 고통을 짧게 느낄 수 있게 하는 동시에 치료하는 사람의 반복되는 노동을 줄일 수 있고, 또 인체공학적인 디자인으로 설계되어 그립(grip)잡기가 편하고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11)을 교환하여 사용할 수 있도록 하였고, 압진기를 설치하여 시침에 편리함을 더하였으며, 무엇보다도 작동버튼만 누르면 자동으로 연사되어 편리함을 제공하는 것을 특징으로 하는 전동침(10)이 제공된다.

대표도

도 1

색인어

침, 사혈 침, 전동 침, 사혈, 전동, 출혈침

명세서

도면의 간단한 설명

도 1은 본 발명에 따른 전동침(10) 조립도,

도 2는 본 발명에 따른 전동침(10) A-A종단면도,

도 3은 본 발명에 따른 전동침(10) B-B횡단면도,

도 4는 본 발명에 따른 전동침(10)동력전달 구조 A'종단면도,

도 5는 본 발명에 따른 진동침(10)동력진달 구조 B'종단면도,

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도 6은 본 발명에 따른 전동칫(10)의 휠(24) 동력전달 구조 진행상태 도면,

도 7은 본 발명에 따른 전동칫(10) 정면도,

도 8은 본 발명에 따른 전동칫(10) 배면도,

도 9는 본 발명에 따른 전동칫(10) 우측면도,

도 10은 본 발명에 따른 전동칫(10) 좌측면도,

도 11은 본 발명에 따른 전동칫(10) 저면도,

도 12는 본 발명에 따른 전동칫(10) 상면도,

도 13은 본 발명에 따른 전동칫(10)의 손잡이 부를 잡은 상태 입면도,

도 14는 본 발명에 따른 전동칫(10)의 칫부를 잡은 상태 입면도.

* 도면의 주요부분에 대한 부호 설명

10 : 전동칫

11 : 일회용 칫

12 : 투명뚜껑

13 : 칫 길이조절 링

14 : 작동버튼

15 : 전원버튼

16 : 전원램프

17 : 수동램프

18 : 자동램프

19 : 제어판

20 : 건전지

21 : 건전지뚜껑

22 : 모터

23 : 회전축

24 : 휠

25 : 행정연결대

26 : 수직연결대

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27 : 스프링

28 : 침 꽂이

29 : 전구

30 : 통기구

31 : 고정뚜껑

33 : 환기구

34 : 힌지

35 : 깔때기형 투명뚜껑

36 : 도장형 투명뚜껑

37 : 도장침

38 : 긴 깔때기형 뚜껑

39 : 빗살무늬형 뚜껑

40 : 나사못

발명의 상세한 설명

발명의 목적

발명이 속하는 기술 및 그 분야의 종래기술

본 발명은 통상의 출혈침에 모터(22)를 이용해 연사가 되는 기능을 추가함으로써 짧은 시간에 시침이 가능하여 환자의 긴장상태와 고통을 짧게 느낄 수 있게 하는 동시에 치료하는 사람의 반복되는 노동을 줄일 수 있다, 또 인체공학적인 디자인으로 설계되어 환자의 부위에 따라 도 13이나 도 14와 같이 잡기가 편리한 방식을 선택하여 시침 할 수 있고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11)을 교환하여 사용할 수 있도록 하였고, 무엇보다도 작동버튼만 누르면 자동으로 연사되어 편리함을 제공하는 전동침에 관한 것이다.

일반적으로 출혈침은 혈자리나 환부에 출혈을 목적으로 사용되며, 급체시나 구급 시에 혈자리를 자극하여 응급처치를 하고, 근래에는 대체의학으로 널리 사용되어 많은 사람들이 활용하고 있는데, 의사나 시침을 하는 사람들은 여러 환자를 상대하는 경우와, 한 부위에 수차례 연속적으로 시침을 하는 경우 때문에, 그 반복되는 노동으로 스트레스를 받는다.

침을 맞기를 좋아 하는 사람은 없을 것이다, 더군다나 여러 차례 침을 같은 부위에 놓는 다면 대부분 사람들은 맞으려고 하지 않아 시침을 하는 데 어려움이 있다. 또 경험해본 사람들은, 침을 맞는 긴 시간동안 아픔을 동반한 긴장상태 때문에 다시는 맞으려고 하지 않는 문제점이 있다.

상기 압진기는 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서 일반적으로 별도의 압진기를 구매하여 사용하여야 하는 불편함이 있었다.

발명이 이루고자 하는 기술적 과제

MassagerPriorArt0000918

Petitioner Therabody Ex-1004, 0871

이에 본 발명은 상기한 바와 같은 종래의 제반 문제점을 해소하기 위하여 안출한 것으로, 그 목적은 침을 맞지 않는 것이 아니라 스피드하게 맞고, 시침하는 사람도 전동의 힘을 빌려 반복되는 같은 동작에서 해방이 되며, 바늘이 피부에 시침될 때 짧은 순간에 이루어짐으로써 고통도 덜 수 있는 전동침(10)을 제공함에 있다.

발명의 구성 및 작용

상기와 같은 목적을 달성하기 위해서 , 본 발명은 본체 케이스하부에 투명뚜껑(12)을 열면 일회용 침(11)을 끼우는 침 꽂이(28)와 수직 작동하는 연결부를 갖고 스프링(27)과 모터(22)를 활용해 자동으로 작동시키고; 상기 본체 몸통을 중심으로 세 부위로 갈라진 구조로, 손잡이 부와 모터 부, 침부로 나누어지고; 상기 손잡이 단부에는 고리(33)가 설치되고, 그 아래에 3개의 램프(16, 17, 18)와 전원버튼(15)이 설치되며, 반대쪽에는 건전지(20)를 교환할 수 있는 건전지뚜껑(21)이 있는 것과; 상기 모터 부에는 전동 모터(22)가 내장되어있고 단부에는 환기구(32)가 설치되며; 상기 침부에는 투명뚜껑(12)과 침 길이조절 링(13)내부에 나사산이 있고 외부에 나사산이 있는 본체에 차례대로 조립되는 것과, 그 관통된 중앙부에는 일회용 침(11)이 침 꽂이(28)에 결합되고, 수직연결대(26)와 행정연결대(25), 휠(24), 회전축(23), 모터(22) 순으로 연결된 구조를 가지고 있으며, 모터의 회전운동이 왕복운동으로 바뀌어 침이 재봉틀처럼 작동되는 것을 특징으로 하는 것이다.

이하, 첨부된 도면을 참조로 하여 본 발명의 바람직한 일실시예를 상세히 설명한다.

도 1에 도시한 바와 같이 본 발명에 따른 전동침(10) 조립도로 본 발명의 조립되는 구성을 살펴보면, 상기 본체 케이스하부에 투명뚜껑(12)은 전구(29)를 장착하여 시침 시 환부의 조도를 높여줄 수 있게 투명한 소재를 선택하였으며, 일회용 침(11)과 더불어 환부에 따라 교환 하여 사용할 수 있도록 하였고, 기본적인 일반 형 투명뚜껑(12)과 주둥이가 뾰족한 깔때기형 투명뚜껑(35), 구멍이 크게 뚫린 도장형 투명뚜껑(36)이 있다, 일반 형은 기본적인 타입으로 일회용 침(11)을 사용할 때 장착하고, 깔때기형 투명뚜껑(35)은 이침(耳針)이나 움푹한 곳에 침을 놓을 때 장착하며, 도장형 투명뚜껑(36)은 일회용 침에 바늘이 여러 개 나와 있는 도장침(37)을 사용할 때 장착하는 것으로 한 부위에 여러 대의 침을 놓을 때 사용한다. 또 고정 뚜껑(31)은 기본적인 일반 형과 빗살무늬토기형 뚜껑(39) 그리고 긴 깔때기형 뚜껑(38)이 있다, 일반 형은 기본적인 타입으로 공이 반 절단된 모양을 하고 있고, 빗살무늬토기형 뚜껑(39)은 럭비공을 반 절단한 모양을 하고 있으며, 긴 깔때기형 뚜껑(38)은 깔때기 모양 끝에 구슬 같은 볼 형태의 돌기가 만들어져, 압진기 역할을 한다. 상기 압진기는 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서 일반적으로 별도의 압진기를 구매하여 사용하여야 했으나 전동침(10)에는 자체에 압진기가 장착되어 전동침만 있으면 시침은 물론 압진기의 역할까지 할 수 있게 하였다.

도 2에 도시한 바와 같이 본 발명에 따른 전동침(10)의 A-A종단면도로 전반적인 전동침(10)의 내부를 표현하고 있다. 상기 일회용 침(11)을 끼우는 침 꽂이(28)는 침을 기웠을 때 유동이 없도록 침 모양과 닮은꼴로 되어있고, 원통형으로 된 상부가 막혀있는 삽입공 모양을 하고 있으며, 하부에서부터 수직으로 서있는 원통의 한 면이 갈라져 있어 일회용 침(11)을 끼우고 뺄 때 헐렁하지 않으면서 자연스럽게 삽입되고 빼낼 수 있도록 되어있는 것과; 상기 침 꽂이(28)의 원기둥 바깥쪽으로 스프링(27)이 끼워져 전동침(10)이 작동 하지 않을 때는 노출되지 않고 항상 투명뚜껑(12)안쪽에 머물러 있도록 하는 역할을 한다, 상기 침 꽂이(28)위에서 잡아주는 수직연결대(26)는 행정연결대(25)와 침 꽂이(28)를 연결하고; 상기 행정연결대(25)는 수직연결대(26)와 휠(24)을 연결하며 상하 한쪽으로 ㄷ자를 이루며 연결 촉이 뒤어 나와 있고; 상기 휠(24)은 모터의 회전축과 연결되어 모터에서 나오는 동력을 수직 상하왕복운동으로 바꾸어 주는 역할을 한다. 또 상기 모터에는 건전지(20)에서 나오는 전력으로 동력을 일으키며, 여기서는 1.5v AA size 건전지 두개를 사용 하였으나 AC로도 활용할 수 있고, DC를 사용하여 휴대하기 편리 하게 축전지를 활용할 수도 있다.

도 3에 도시한 바와 같이 본 발명에 따른 전동침(10)의 B-B횡단면도로, 상기 도 2의 발명의 구성에서 상세히 설명이 되었으며, 모터(22)의 동력이 휠(24)로 연결되어 회전운동에너지가 상하 왕복운동에너지로 변환되는 과정을 보여준다(참조로 도 6에 도시한바와 같이 화살표를 따라 행정이 이루어진다.). 추가로 보충 설명할 것은 스프링(27)의 역할과 침 길이조절 링(13)의 역할로서 상기 에서는 스프링(27)을 단순히 전동침(10)이 작동 하지 않을 때는 노출되지 않고 항상 투명뚜껑(12) 안쪽에 머물러 있도록 하는 역할을 하는 것으로만 설명되었으나 항상 스프링(27)이 긴장상태를 유지하고 있어, 침이 피부에 삽입되었다가 빠질 때 스프링(27)도움을 받아 가장 빠른 속도로 빠져나와 통증을 최소화 할 수 있도록 하여 주고, 침 길이조절 링(13)은 시침 시 환자의 고통을 호소하면 침 길이조절 링(13)을 돌려 침의 길이를 통증과 반비례하게 조절하여 사용한다, 다시 말하자면 많이 아파하는 사람은 조금만 침이 삽입되게 침 길이조절 링(13)을 풀어 사용하고, 피부에 혈이 돌지 않아 통증을 느끼지 못하는 환자는 빠른 효과를 위하여 침 길이조절 링(13)을 조여 침이 피부에 깊이 삽입되게 하여 사용한다.

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Petitioner Therabody Ex-1004, 0872

Petitioner Therabody Ex-1004, 0873

도 4에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력전달 구조 A'종단면도로, 도 2를 확대 하여 디테일하게 표현한 도면이다.

도 5에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력전달 구조 B'종단면도로, 도 3을 확대 하여 디테일하게 표현한 도면이다.

도 6에 도시한 바와 같이 본 발명에 따른 전동침(10) 동력전달 구조 회전축(23)의 진행상태를 나타낸 도면으로, 도 3의 발명의 구성에서 자세히 설명되어 있다.

도 7, 도 8, 도 9, 도 10, 도 11, 도 12에 도시한 바와 같이 본 발명에 따른 전동침(10)의 앞뒤상하좌우입면도로, 육면체의 유리관에 넣고 여섯 면에서 바라본 그림이나, 전체가 현대감각에 맞게 유선형디자인으로 설계되었으며, 의료기인 만큼 청결하고 시술이 용이하며 시침 시 편리한 인체공학적인 모양으로 설계되었다. 도 7의 정면도에서 고리(33)아래쪽에는 3개의 램프(16, 17, 18)와 전원버튼(15)이 있는데 손잡이 내부에 있는 제어판(19)과 연결되어 제어가 되며, 전원버튼(15)을 길게 누르면 전원램프(16)에 점등이 되고 작동준비 상태를 알리며, 나머지 수동램프(17)와 자동램프(18)는 전원버튼을 짧게 누를 때 마다 번갈아 점등되고, 다시 길게 누르면 소등이 됨과 동시에 OFF상태가 된다.

도 13에 도시한 바와 같이 본 발명에 따른 전동침(10)의 손잡이 부를 잡은 상태를 나타낸 입면도로, 권총을 잡을 때의 그립(grip)이다. 침부를 잡을 때의 그립(grip)보다 손목에 무리를 주지 않으며 장시간 시침을 하거나 많은 사람을 시술할 때 편리하며, 검지로 작동버튼(14)을 누를 수 있다.

도 14에 도시한 바와 같이 본 발명에 따른 전동침(10)의 침부를 잡은 상태를 나타낸 입면도로, 연필을 잡을 때의 그립(grip)이다. 손잡이 부를 잡을 때의 그립(grip)보다 섬세한 시침을 할 때 유리하며, 검지로 작동버튼(14)을 누를 수 있다.

발명의 효과

상술한 바와 같이 본 발명은 종래의 제반 문제점을 해소하기 위하여 안출한 것으로, 인체공학적인 디자인으로 설계되어 환자의 부위에 따라 도 13이나 도 14와 같이 시침하기 편리한 그립(grip)방식을 선택할 수 있고, 세련되고 미려하며, 용도에 맞게 투명뚜껑(12)이나 일회용 침(11), 고정뚜껑(31)을 교환하여 사용할 수 있도록 하였고, 상기 고정뚜껑(31)은 압진기 대체용으로 침을 놓기 전에 침놓을 자리를 마사지하여 침을 맞는 고통을 줄일 수 있도록 한 것으로서, 일반적으로 별도의 압진기를 구매하여 사용하여야 했으나 전동침(10)에는 자체에 압진기가 장착되어 전동침(10)만 있으면 시침은 물론 압진기의 역할까지 할 수 있는 효과가 있다. 무엇보다도 작동버튼만 누르면 자동으로 연사되어 시간을 절약하고, 시침하는 사람이 전동의 힘을 빌려 반복되는 같은 동작에서 해방이 되며, 일회용 침이 피부를 통과하는 순간이 눈 깜짝 할 사이에 이루어짐으로써 통증도 줄고, 스피드하게 시술할 수 있는 효과를 갖는다.

(57) 청구의 범위

청구항 1.

사혈을 할 때 사용되는 출혈용 침에 있어서; 상기 작동수단을 손가락이 아닌 모터(22)를 활용해 자동으로 작동시키고, 전체구조는 본체 몸통을 중심으로 세 부위로 갈라진 손잡이 부와 모터 부, 침부로 나누어지고; 상기 손잡이 단부에는 고리(33)가 설치되고, 그 아래에 3개의 램프(16, 17, 18)와 전원버튼(15)이 설치되며, 반대쪽에는 건전지(20)를 교환할 수 있는 건전지뚜껑(21)이 있는 것과; 상기 모터 부에는 전동 모터(22)가 내장되어있고 단부에는 환기구(32)가 설치되며; 상기 침부에는 투명 뚜껑(12)과 침 길이조절 링(13)내부에 나사산이 있고 외부에 나사산이 있는 본체에 차례대로 조립되는 것과, 그 관통된 중앙부에는 일회용 침(11)이 침 꽂이에 결합되고, 수직연결대(26)와 행정연결대(25), 휠(24), 회전축(23), 모터(22) 순으로 연결된 구조를 가지고 있으며, 모터의 회전운동이 왕복운동으로 바뀌어 침이 재봉틀처럼 작동되는 것을 특징으로 하는 전동침(10).

청구항 2.

MassagerPriorArt0000920

1항에 있어서, 일회용 침 하나에 여러 개의 바늘을 갖고, 그 모양에 따라 두명뚜껑(12)의 개방된 구멍의 크기가 넓어진 것을 특징으로 하는 전동침(10).

청구항 3.

1항에 있어서, 투명뚜껑(12)의 주둥이가 이침에 사용할 수 있게 뾰족한 것을 특징으로 하는 전동침(10).

청구항 4.

1항에 있어서, 투명뚜껑(12)의 주둥이가 도장침을 사용할 수 있게 구멍이 넓게 뚫린 것을 특징으로 하는 전동침(10).

청구항 5.

1항에 있어서; 일회용 침(11)하나에 여러 개의 바늘이 달린 것을 특징으로 하는 일회용 도장침(11).

청구항 6.

1항에 있어서, 본체 몸통을 중심으로 세 부위로 갈라진 구조로, 손잡이 부와 모터 부, 침부로 나누어지고; 상기 본체를 시침할 부위에 따라 권총을 잡을 때의 그립(grip), 연필을 잡을 때의 그립(grip)두 가지 형태로 쥐고 작동시킬 수 있는 것을 특징으로 하는 전동침(10).

청구항 7.

1항에 있어서, 고정뚜껑(31)을 압진기로 사용할 수 있게 한 것을 특징으로 하는 전동침(10).

청구항 8.

1항에 있어서, 투명뚜껑(12)내부에 전구(29)를 장착하여 시침 시 환부의 조도를 높여줄 수 있게 한 것을 특징으로 하는 전동침(10).

청구항 9.

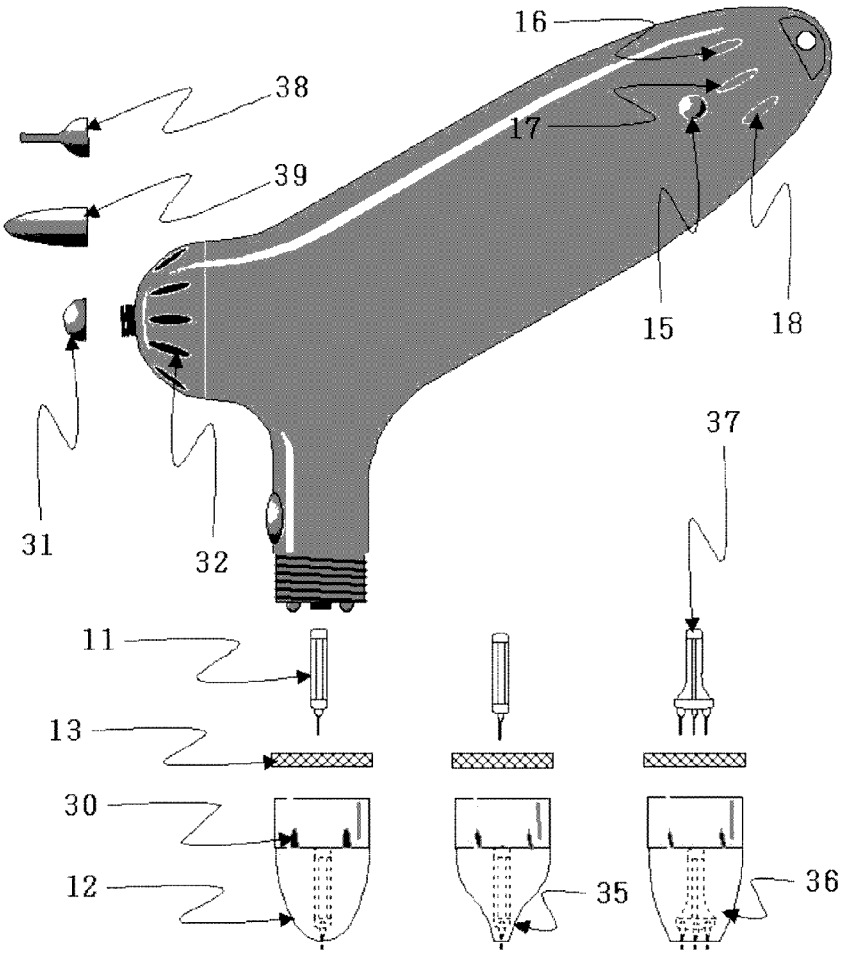
2항에 있어서, 일회용 침 하나에 여러 개의 바늘을 갖은 것을 특징으로 하는 일회용 도장침(37)

도면

MassagerPriorArt0000921

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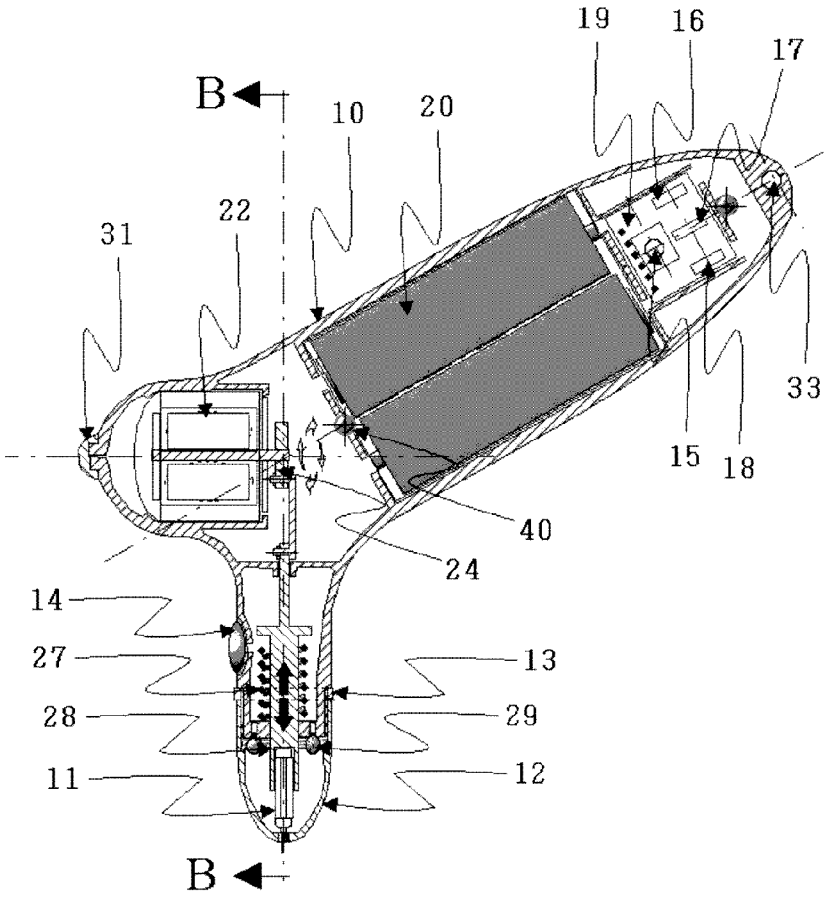
도면1



MassagerPriorArt0000922

Petitioner Therabody Ex-1004, 0875

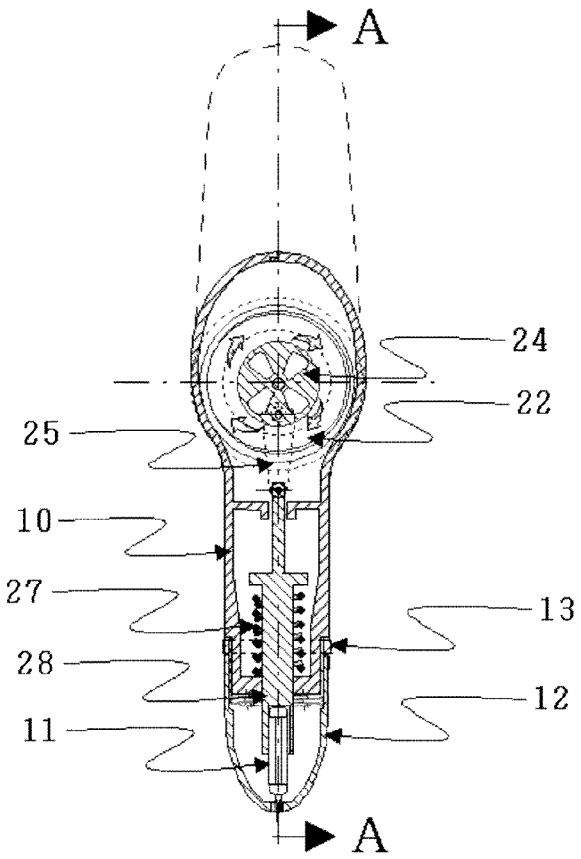
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MassagerPriorArt0000923

Petitioner Therabody Ex-1004, 0876

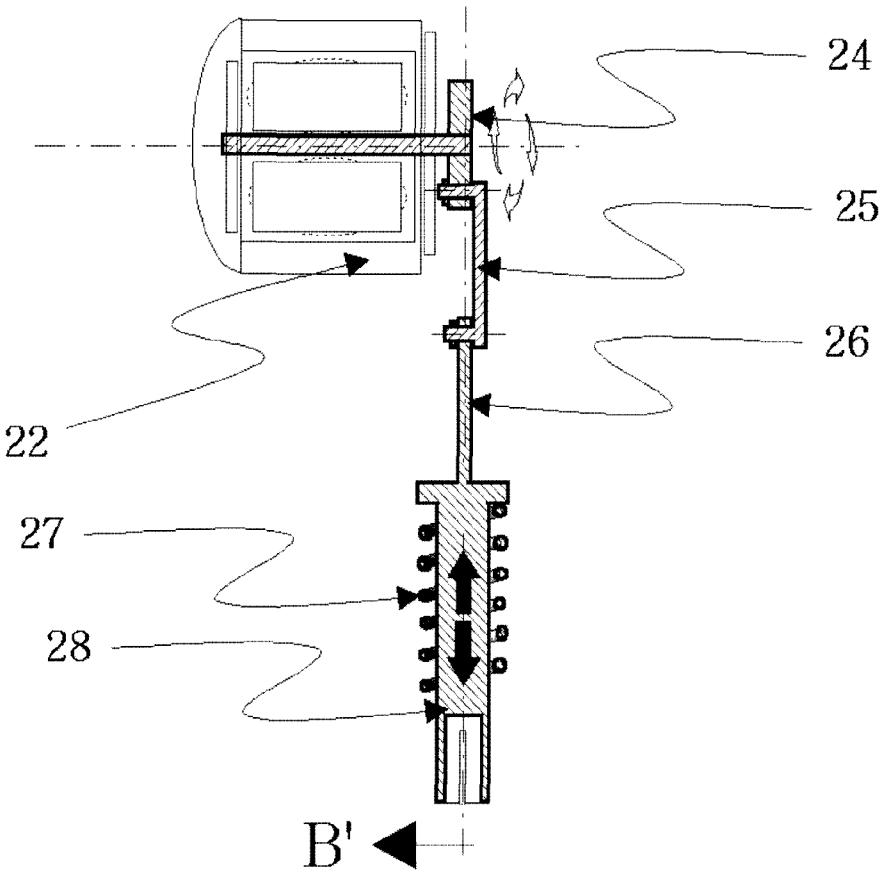
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MassagerPriorArt0000924

Petitioner Therabody Ex-1004, 0877

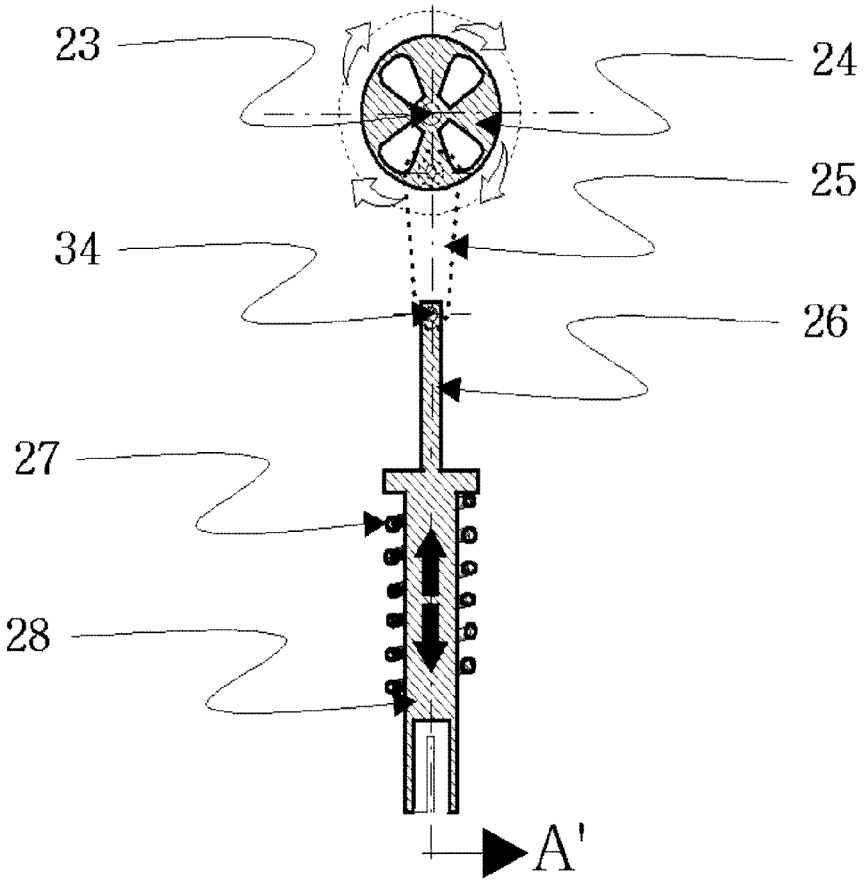
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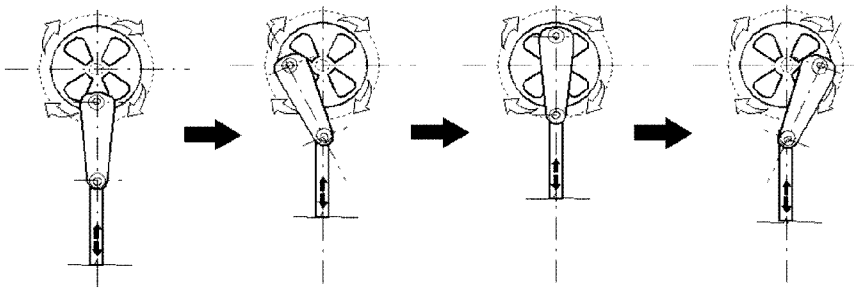
MassagerPriorArt0000925

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도면5



도면6



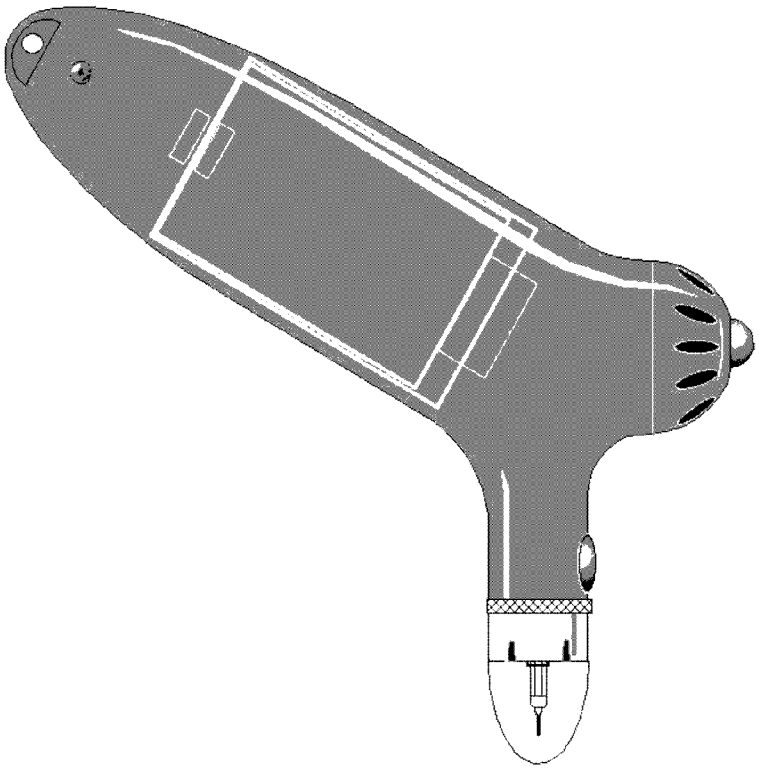
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도면7



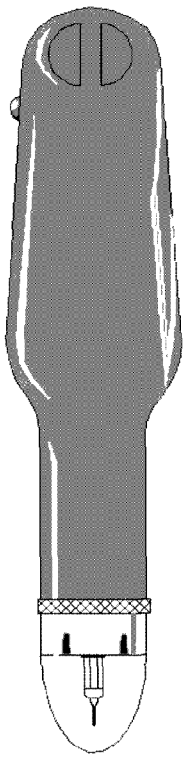
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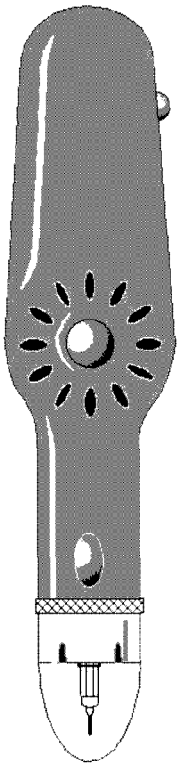
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도면9



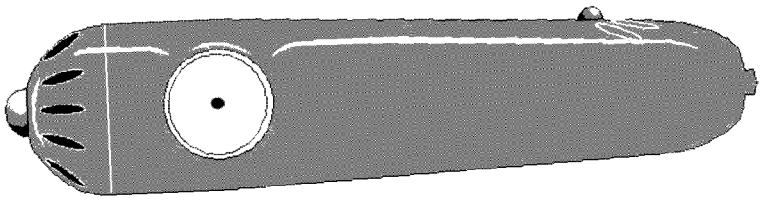
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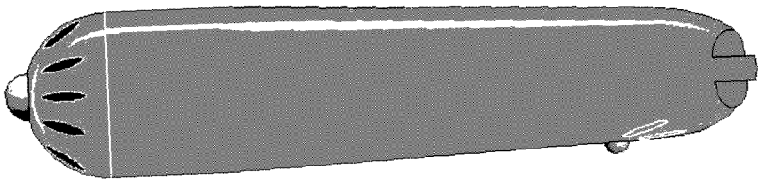
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Petitioner Therabody Ex-1004, 0881

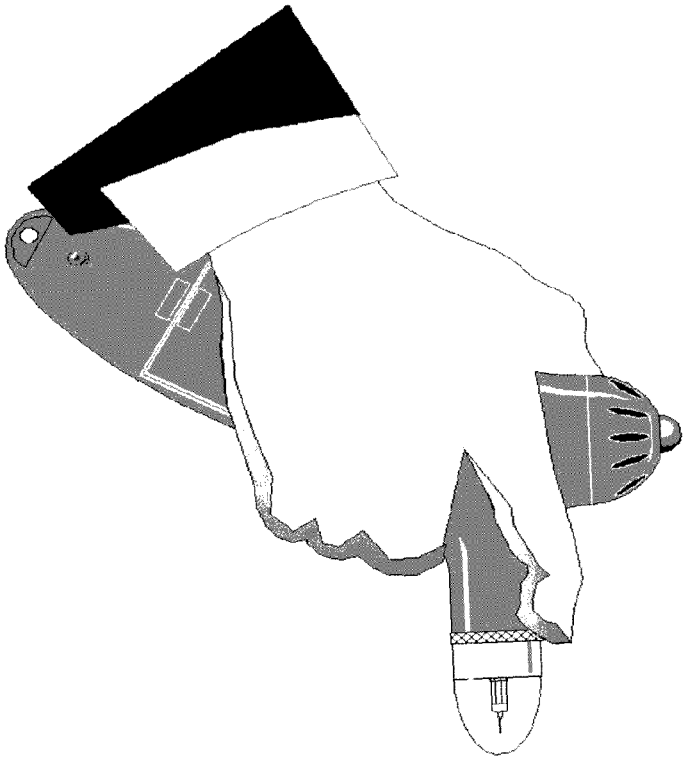
도면11



도면12



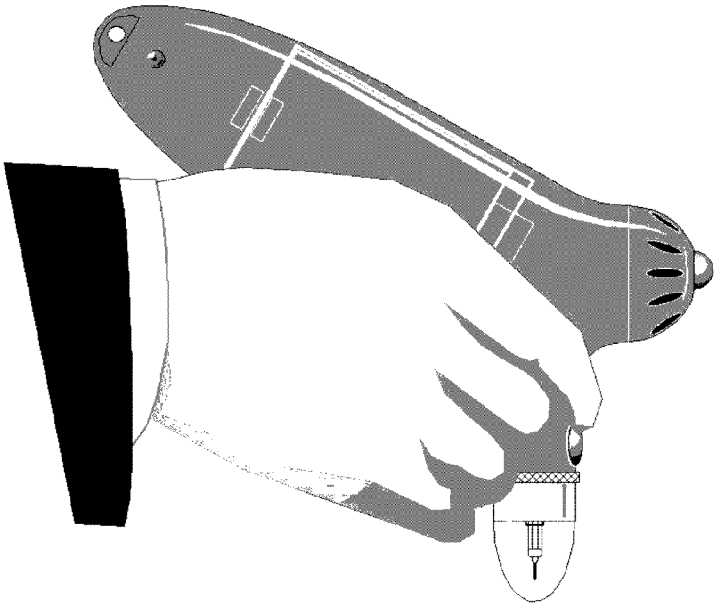
도면13



MassagerPriorArt0000929

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도면14



MassagerPriorArt0000930

Petitioner Therabody Ex-1004, 0883

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HOT STONE THERAPY WAND MASSAGER

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Abstract of CA2440783 (A1)

A hand-held wand massager providing a heated stone therapy is provided. The wand massager has a handle and a detachable applicator connected to the handle for providing a localized massage. The applicator has a therapeutic stone capable of delivering heated stone therapy to a user. The user can substitute the applicator for a wide variety of massage sensations including infrared therapy, copper therapy and a heated, vibrating massage.

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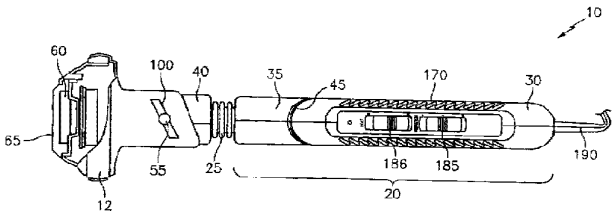
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(54) APPAREIL PORTATIF DE MASSAGE A LA PIERRE CHAUDE
(54) HOT STONE THERAPY WAND MASSAGER

(57)

A hand-held wand massager providing a heated stone therapy is provided. The wand massager has a handle and a detachable applicator connected to the handle for providing a localized massage. The applicator has a therapeutic stone capable of delivering heated stone therapy to a user. The user can substitute the applicator for a wide variety of massage sensations including infrared therapy, copper therapy and a heated, vibrating massage.



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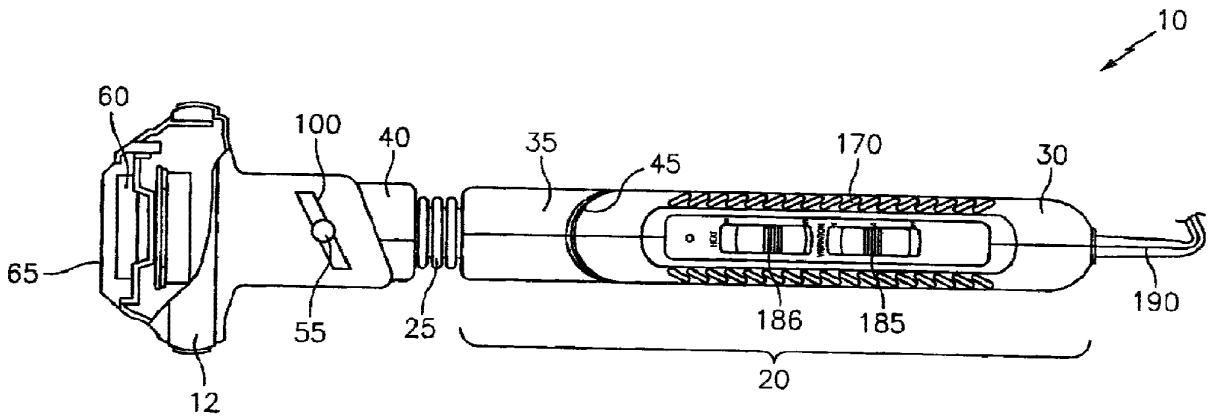
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(54) Titre : APPAREIL PORTATIF DE MASSAGE A LA PIERRE CHAUDE
(54) Title: HOT STONE THERAPY WAND MASSAGER



(57) Abrégé/Abstract:
A hand-held wand massager providing a heated stone therapy is provided. The wand massager has a handle and a detachable applicator connected to the handle for providing a localized massage. The applicator has a therapeutic stone capable of delivering heated stone therapy to a user. The user can substitute the applicator for a wide variety of massage sensations including infrared therapy, copper therapy and a heated, vibrating massage.

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ABSTRACT OF THE DISCLOSURE

A hand-held wand massager providing a heated stone therapy is provided. The wand massager has a handle and a detachable applicator connected to the handle for providing a localized massage. The applicator has a therapeutic stone capable of delivering heated stone therapy to a user. The user can substitute the applicator for a wide variety of massage sensations including infrared therapy, copper therapy and a heated, vibrating massage.

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HOT STONE THERAPY WAND MASSAGER

BACKGROUND OF THE INVENTION

1. Field Of the Invention

The present invention relates to hand-held wand massagers. More particularly, the present invention relates to a hand-held vibratory wand massager that has a detachable applicator. Even more particularly, the present invention relates to an applicator having a therapeutic stone to provide a heated vibratory therapeutic hot stone massage to a user's body.

2. Description of the Prior Art

Various types of hand-held vibratory massagers are known in the art. Presently available wand massagers typically have an elongated handle secured to a contoured massaging applicator. A source of vibration is located in the prior art massagers in either the applicator or the handle. One source of vibration may include a motor driving an unbalanced weight. The unbalanced weight is typically attached to a spring or a shaft connected to the motor. The motor drives the unbalanced weight that vibrates a contoured massaging applicator. Typically, the prior art wand massagers rely upon different massaging contours to achieve desired massaging sensations. When the vibrating contoured applicator is applied to the user's skin, desired massaging sensations are achieved.

While the above-mentioned types of massagers may be suitable for providing a vibratory, massage sensation when

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applied to the body and muscles of the user, they are limited to delivering only vibratory sensations to the user. Users desire a hand-held wand massager that delivers a wide range of massaging sensations, including a therapeutic hot stone massage comparable to a holistic, spa-like massage that can only be found at expensive resorts or exclusive spas.

Prior art stone therapy uses heated and cooled therapeutic stones to penetrate deeply heating and cooling sensations to a user's skin and conjure up increased blood circulation and a healing or massaging effect. Stone massage therapy rejuvenates the user's body by using heat transferred through a therapeutic stone to increase and facilitate blood circulation through the user's skin, muscles and tissues. This procedure includes placing heated stones on the body, back, muscle tissues and skin of the user at specific predetermined locations to facilitate circulation, massage and relieve arthritic pain and certain dermatological conditions at these locations. The stones may be of any suitable size or shape depending upon the location of application or the location that the user's desires the therapeutic stone massage therapy such as the user's toes, back or hands. A drawback is that the therapeutic hot stone massage is typically reserved for luxury spas, resorts, masseuses, and holistic therapy purposes and is not cost effective for the consumers of the mass market.

Thus, it is desired to provide a hand-held portable vibrating wand massager that produces a therapeutic hot stone massage that is comparable to an expensive, luxurious masseur and that is capable of producing therapeutic hot stone massage sensations, in a portable manner at the point of contact of the massaging applicator and

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the user's body and skin tissues.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a massager having a detachable vibrating applicator.

It is another object of the present invention to provide a massager that provides a therapeutic hot stone massage.

These and other objects and advantages are achieved by the present invention that includes a hand-held, massager having a detachable vibrating applicator. The vibrating applicator has a heater and a therapeutic stone that, in combination, delivers a therapeutic hot stone massage. The massager may include an infrared device, a copper vibrating applicator, a moisture absorbent pad or any combination thereof. The massager includes a handle having a post, a grip, an offset section and a pivot. The detachable applicator is connected to the post. The post has a vibrator located in its interior. In the applicator, there is an exemplary conductor to electrically connect the applicator to a socket disposed on an outermost portion of the post member to provide the applicator with power. The conductor provides the heater with power for heating the therapeutic stone. The present invention allows the user to apply the vibrating applicator to body tissues for delivering a therapeutic hot stone massage, infrared therapy or heated copper therapy to the user's body tissues for an improved, luxurious, deluxe massage.

The above and other objects, advantages and benefits of the present invention will be understood by reference to the

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detailed description provided below and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be better understood with reference to the following detailed description of the present teachings when viewed in conjunction with the accompanying drawings.

Fig. 1 is a side view of a hand-held massager according to the present invention;

Fig. 2 is a cross sectional view of an applicator of the hand-held massager of Fig. 1;

Fig. 3 is a perspective view of the hand-held massager of Fig. 1;

Fig. 4 is a perspective exploded view of another preferred embodiment of the hand-held massager of Fig. 1 with a copper applicator, a pad and a therapeutic hot stone massage applicator; and

Fig. 5 is a cross sectional view of the hand held massager of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings and particularly to Fig. 1, there is provided a hand-held massager generally represented by

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reference numeral 10. Massager 10 has an applicator 12 and a handle 20. The applicator 12 is preferably detachable, and has the ability to vibrate. The user may adjust the configuration of the handle 20. The handle 20 may deform in a pre-selected manner to apply applicator 12 to various portions of the user's body and skin tissues for a relaxing and therapeutic massage.

Handle 20 may be a substantially cylindrical member made from a suitable thermoplastic having a hollow interior. Handle 20 may be formed having at least three members predominantly a tubular grip or section 30, an offset section 35 and a post 40.

In a preferred embodiment of the present invention, offset section 35 and grip 30 may have a pivot pin 45 disposed therebetween. Pivot pin 45 may be a fixed pin on the end of which offset section 35 and grip 30 may rotate with respect to one another. In greater detail, both the offset section 35 and the grip 30 may pivot with respect to one another from an orientation of straight alignment of handle 20 to an orientation in which offset section 35 and grip 30 are disposed at about ninety degrees with respect to one another.

In another exemplary embodiment of the present invention, the offset section 35 and the grip 30 may be joined by complementary slanted surfaces, which may slant with respect to one another in the range about forty-five degrees to about ninety degrees. In still another illustrative embodiment of the present invention, offset section 35 and grip 30 may also be connected by a flexible elbow (not shown) for selectively pivoting the offset section with respect to the grip for

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application of applicator 12 to the user's skin and body tissues.

Offset section 35 is also connected to a flexible pipe 25 that is also connected to a cylindrical post 40 of handle 20. Post 40 preferably has a diameter that is less than the diameter of handle 20. Referring to Figs. 1 and 2, post 40 is a cylindrical member having a substantially flat outermost end 50. Post 40 preferably has a diameter that is less than a diameter of handle 20 such that the exemplary detachable applicator 12 may mate with post 40 and rest or or overlay the post. In this manner, post 40 and applicator 12 may deflect about flexible pipe 25.

Referring again to Fig. 1, post 40 has a biasing device 55 that is positioned about a portion of the post. Biasing device 55 may be a cylindrical coil disposed on post 40. In another exemplary embodiment of the present invention, a detent (not shown) or other suitable member may be disposed on the post 40 or an outermost end 50 for selectively engaging the post with applicator 12. Post 40 may have a length sufficient to allow any number of exemplary applicators 12 to mate with the post 40 and to allow a user to use any number of pre-selected massaging applicators or members having different massaging attributes for the massaging action desired by the user.

As can be understood from the drawings and in particular Fig. 2, heated stone therapy and massaging action is provided by applicator 12. Applicator 12 may be any number of suitable shapes and sizes having any number of discrete bumps, striations, contours, dimples or any combination thereof

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disposed on the applicator 12. The applicator 12 may be disk shaped and have a suitable number of internal ribs disposed therein to provide increased structural integrity to the applicator. In a preferred embodiment of the present invention, applicator 12 has an aperture 60 disposed in its topside. At least one therapeutic stone 65 is intended to be positioned in aperture 60 in the applicator 12, however any number of therapeutic stones 60 may be disposed in the applicator 12 for imparting a therapeutic hot stone massage to the user.

Therapeutic stone 65 may be marble, granite, travertine, limestone, polished stones, quartz, feldspar, basalt, mica or any other material that will preferably absorb and retain heat energy from a heater 70 disposed in applicator 12 and transfer heat energy from the therapeutic stones 65 to the user's skin, muscles and body tissues. Therapeutic stone 65 may also have a flat round shape and a flat back and front surface such that the therapeutic stone 65 may rest in a suitable sized aperture 60 in the top of applicator 12 for application to the user's skin, muscles, back or any combination thereof.

Therapeutic stone 65 is illustrated as circular and oblong in shape. However, therapeutic stone 65 may be any size and shape suitable for imparting a therapeutic hot stone massage to the user. Therapeutic stone 65 may be any suitable shape to place the therapeutic stone 65 on the user's body tissues, feet, hands or torso.

Therapeutic stone 65, when heated and vibrating, is intended to promote circulation of the blood at or near the site

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of application of the therapeutic stone to the user's skin, muscles and body tissues.

In an alternative embodiment of the present invention, therapeutic stone 65 also may be coated with medicinal additives, such as aloe vera, cortizone, aspirin, a lubricating cream, vitamins, including vitamin C, vitamin E, herb, mineral or any other beneficial material that may be topically applied to the skin. Therapeutic stone 65 may also be a number of different sized or shaped stones that may rest in applicator 12.

Therapeutic stone 65 is free from sharp edges and has lateral sides that are conducive to either heat transfer or conducive to a imparting a cooling sensation upon the user.

Referring to Figs. 2, 3 and 4, in another exemplary embodiment of the present invention, applicator 12 may have a copper material disposed in aperture 60. Copper material is disposed on the top of applicator 12 and is conducive to heat transfer. The copper material also vibrates and is heated by heater 70. Copper material also facilitates and/or stimulates blood circulation, reduces swelling and relieves aching joints of the user. Copper material disposed in applicator 12 relieves fatigue, improves blood circulation and reduces joint aches.

In another exemplary embodiment of the present invention, applicator 12 may also have an infrared device 75 disposed in aperture 60 on applicator 12. Infrared device 75 may be electrically connected to an exemplary power supply 80 in handle 20. Infrared device 75 is in aperture 60 of applicator 12 and emits infrared radiation to the user's skin and body tissues.

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When supplied with electrical power, the infrared device 75 produces infrared radiant heat. Infrared radiant heat is communicated to the user through an infrared light emitting plate 85 on applicator 12. The infrared radiant heat is transmitted through the infrared light emitting plate 85 to stimulate the muscles and joints of the user. Infrared light emitting plate 85 may be a smooth, substantially circular shaped member that is non-abrasive to be readily applied to the user's skin tissues, muscles and joints without producing any cuts, scratches or abrasions. Infrared light emitting plate 85 may be vibrated by vibrating mechanism 105 in post 40, to rub and knead the muscles and joints. Infrared device 75 may be any device known in the art that emits photons in the infrared spectrum through infrared light emitting plate 85 to the user's muscles and body tissues.

Referring again to Figs. 3 and 4, in yet another exemplary embodiment of the present invention, applicator 12 may also be a water absorbent pad 90. Pad 90 may be an ethylene-vinyl acetate, a gel pad, or any thin porous material (e.g. 3mm in thick) capable of absorbing and spreading heated liquid or moisture across the area of pad 90. In another embodiment, pad 90 may be a fabric or spongy material. Preferably, pad 90 overlaps at least a portion of applicator 12. Pad 90 may be removable from applicator 12 for cleaning purposes. Pad 90 may be any suitable water absorbent material for the wicking away of perspiration, water, cream, vitamin, nutrient, medicinal additive or any combinations thereof. Pad 90 may also be used for the application of water moisture, cream, vitamin, nutrient, medicinal additive or any combination thereof to the user's

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skin, muscles and or body tissues to contribute to the hot stone therapy.

Referring to Figs. 2 and 5, applicator 12 may be any suitable member that may be fastened to post 40. In a preferred embodiment of the present invention, applicator 12 is intended to be a T shaped member having a hollow interior for housing heater 70. Applicator 12 also has a hollow cylindrical lip 95 on its bottom side. Lip 95 extends outward opposite aperture 60 and is positioned on a bottom side of applicator 12. Lip 95 can be a cylindrical sleeve that has a suitable diameter to complement and overlay post 40. Lip 95 has surrounding lateral sides that have a suitable length to allow post 40 to mate therein. Lip 95 also has a corresponding notches 100, 105 disposed in a suitable location on the lateral exterior of lip 95, to allow biasing device 55 to fit therein. Biasing device 55 contracts when engaging the lateral sides of lip 95 and then expands once disposed in notch 100, 105 to allow applicator 12 to be selectively fastened to post 40. One skilled in the art should appreciate that biasing device 55 is suitable to hold applicator 12 on post 40 when the user is manipulating massager 10 on the user's skin and body.

Applicator 12 may be made of a thermoplastic, a polymer, a metallic material or any material having a suitable hardness surrounding applicator 12 for providing massaging action to the user. Applicator 12 may also have a number of dimples, striations, bumps, protrusions or any combinations thereof, and can be distributed in rows and columns over the exterior surface of applicator 12. In yet another exemplary embodiment of the present invention, applicator 12 may have a combination of

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therapeutic stones 65, an infrared therapy device 75 and a copper material (not shown). In this manner, applicator 12, when vibrating, may provide any number of different massaging effects similar to the effects that a professional masseur may produce by changing the orientation of the masseur's hands.

Referring again to Fig. 5, handle 20 also has an interior that may house vibrating mechanism 105. Vibrating mechanism 105 may be housed in the interior of post 40, the interior of handle 20, grip section 30, offset section 35, applicator 12 or any combinations thereof. In a non-limiting embodiment of the present invention, post 40 has an interior for housing a motor 110, an output shaft 115 connected to the motor, and an eccentric weight 120 connected to the shaft. The interior of post 40 preferably has two or more moldings 125 and 130 for receipt of motor 110 and to impede the movement of the motor when the eccentric weight is rotated in post 40.

The motor 110 and eccentric weight 120 generate a vibration in post 40 and applicator 12, when the applicator is disposed over the post 40. Motor 110 has a motor output shaft that is connected to one end of output shaft 115, which in turn is connected to eccentric weight 120. Motor 110 also has an input coil and an output coil. The input coil of motor 110 is electrically connected to power supply 80 by a wire. When motor 110 is energized with power, the motor rotates output shaft 115 and, in turn, eccentric weight 120 is rotated. The eccentric weight 120 rotates in an unbalanced manner that results in a vibration of post 40 and applicator 12.

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In another embodiment of the present invention, at least two motors may be used. Other sources of vibration may be used with the present invention including, but not limited to, a motor 110 mounted to an eccentric cam or a spring or any other device for creating a vibration in the interior of post 40 or the interior of handle 20.

Preferably, heater 70 is in applicator 12. Also, heater 70 is preferably a heater wire. Preferably, applicator 12 has heater 70 disposed winding along its interior and around therapeutic stone 65. In another embodiment, a thermal conductive plate (not shown) is disposed along the interior of applicator 12 in communication with at least one therapeutic stone 65 in aperture 60 for heating the therapeutic stones. The thermal conductive plate may also be electrically connected to power supply 80. In yet another exemplary embodiment of the present invention, a positive thermal coefficient heater or in-line heater may also be in applicator 12.

Heater 70, when energized by power supply 80, transfers heat energy through applicator 12 to therapeutic stones 65. In this manner, heater 70 heats therapeutic stones 65 preferably to a maximum temperature of sixty-five degrees Celsius. Heater 70 transfers heat energy to therapeutic stone 65 and to at least maintain the temperature of the therapeutic stones and prevent the therapeutic stone from cooling. As shown in Fig. 2, heater 70 may surround a bottom side of therapeutic stones 65 to maximize the amount of heat energy that may be communicated through the therapeutic stones to the user's skin, muscles or body tissues.

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A known problem in the art with using a massager with a detachable applicator 12 is the difficulty in maintaining the connection of power from power supply 80 to the electrical components in the applicator while simultaneously interchanging multiple applicators. Typically, the prior art has difficulties in implementing applicators that produce heating sensations and vibratory sensations, and are detachable. Typically, prior art applicators and handles are a unitary member to maintain and ensure the electrical connection between the applicator and the handle. The present invention has obviated this concern.

Referring again to Fig. 5, outermost end 50 of post 40 has a first and second sockets 135, 140 respectively disposed on outermost end 50. First and second sockets 135, 140 are electrically connected to power supply 80 by a wire 150. Applicator 12 also has a first and second male conductors 155, 160, respectively. First and second male conductors 155, 160 are generally cylindrical in shape and are made from any suitable electrically conductive material known in the art. First and second male conductors 155, 160 are disposed in the interior of applicator 12 under lip 95. One skilled in the art should appreciate that first and second male conductors 155, 160 may be placed in any suitable location for mating with first and second sockets 140, 145 disposed on outermost end 50 of post 40. In this manner, when applicator 12 is fastened on post 40, heater 70 is energized with power.

The heater 70 that is disposed in applicator 12 is also electrically connected to first and second male conductors 155, 160 by a wire. In this manner, heater 70 may receive electrical

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power from power supply 80 when first and second conductors 155, 160 are mated with first and second sockets 135, 140.

Handle 20 may also have a battery compartment 165 in the interior space of handle 20. Battery compartment 165 may hold a number of batteries, a rechargeable nickel cadmium battery, a solar powered battery or any other suitable portable power supply known in the art or known in the future. In another exemplary embodiment, handle 20 may also include a power cord for electrically connecting the electrical components to an AC power supply.

A user may manipulate applicator 12 by grasping handle 20. Referring to Fig. 1, grip 30 preferably has a number of gripping notches 170 disposed on an exterior surface, thereof to facilitate grasping of handle 20 by the user and to provide a positive tactile feedback to the user. Massager 10 can provide a massaging action by interaction of applicator 12, therapeutic stones 65 and/or contours of applicator 12 with body tissues and skin of the user by grasping handle 20 at the gripping notches 170.

In one embodiment, heater 70 and motor 110 are electrically connected to power supply 80. In a preferred embodiment, a first and a second capacitors 175 and 180 may be electrically connected amongst power supply 80, motor 110, the heater 70 to decrease the amount of voltage to the motor and the heater from power supply 80.

Additionally, electrically connected between power supply 80, capacitors 175 and 180, infrared therapy device 75, motor

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110, and heater 70 is a first switch 185 and a second switch 186. Switches 185 and 186 may have two positions, namely a first and a second position. When first switch 185 is in the first position, vibratory sensations will be imparted to the user. When second switch 186 is in the first position, heating sensations will be imparted to the user through therapeutic stone 65, infrared therapy device 75 or copper material (not shown). When first and second switch 185, 186 are placed in the second position, the massager 10 is off.

In operation, when the user desires vibratory sensations to be imparted to the user, user moves first switch 185 to the first position. In the first position, power flows from power supply 80 across switch 185 to motor 110. Motor 110 rotates output shaft 115 and, in turn, eccentric weight 120. Eccentric weight 120 rotates in an unbalanced manner thereby imparting an unbalancing force to vibrate post 40 and applicator 12 in a number of directions relative to handle 20. When the user desires heated stone therapy delivered from therapeutic stone 65 to the user, the user moves second switch 186 to the first position. When the switch 186 is in the first position, power is transferred from power supply 80 across the second switch 186 through first and second socket 135, 140 to first and second conductors 155, 160 to heater 70 disposed in applicator 12. Heater 70 is energized and power from power supply 80 is converted into heat energy transmitted through therapeutic stones 65.

In yet another embodiment, when second switch 186 is in the first position, power is transferred from power supply 80 across second switch 186 through first and second sockets 135, 140 to

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first and second conductors 155, 160 to infrared therapy device 75, that is disposed in the applicator 12, for energizing the infrared device. Other removable geometric couplings or connectors to post 40 are possible and in the scope of the present invention.

A power cord 190 for charging of the battery may be provided at the end of handle 20 opposite applicator 12. Alternatively, a plug (not shown) may be connected to power cord 190 for providing direct power to motor 110 and heater 70. First and second switches 185, 186 may also be electrically connected to an electric circuit to regulate the amount of power delivered from the electrical components mounted upon a printed circuit board 200. Preferably, board 200 is mounted in or along the interior of handle 20. In an alternative embodiment, board 200 may be mounted on a motor casing 205 that encapsulates the motor 110.

In yet another embodiment, a light emitting diode indicator light 210 may be located on the exterior surface of handle 20 wired between power supply 80 and switch 185 to indicate that a battery is charging. In an alternative embodiment, LED 210 may be wired between heater 70 and power supply 80 to indicate that the heater 70 is activated.

Referring to Fig. 1 and 2, through positioning of applicator 12, massager 10 produces a portable, vibrating, therapeutic hot stone massage to the user's body comparable to a masseur's spa or finger like massage. One skilled in the art should appreciate that the weight of the therapeutic stone 65 acts to dampen the vibration produced by vibrating mechanism

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105. The dampening of the vibration produces a more relaxing vibrating sensation to the user than the chaotic shaking of the prior art wand massagers. The sensations imparted by massager 10 are comparable to the stimulus of a therapeutic, deluxe masseur that can be found in an expensive spa. The user can adjust the massager to provide a wide variety of massage sensations included infrared therapy, copper therapy and heated stone therapy.

It should be understood that the foregoing description is only illustrative of the present invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances.

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WHAT IS CLAIMED IS:

1) A heated object therapy system comprising

a basin;

a liquid contained in said basin;

at least one object positioned in said basin; and

a heat source for generating heat and transferring heat to said liquid and to said object, wherein said object is removable from said basin and positionable against or upon a surface to transfer heat from said object to said surface.

2) A system according to claim 1, wherein

said object comprises a stone.

3) A system according to claim 1, wherein

said heat source is an electrical heat source.

4) A system according to claim 1, wherein

said surface to which heat is transferred is the outer surface of a human body.

5) A system according to claim 1, further comprising

an impact-resistant plate positioned inside said basin and adapted to support said objects thereon and to protect said basin from impact generated by movement of said objects.

6) A system according to claim 5, wherein

said plate comprises at least one vent forming a passage therethrough to enable said liquid to circulate therethrough.

7) A system according to claim 1, wherein

said basin comprises a basin floor having a top surface facing upward and forming the floor of an internal chamber within said basin, and a bottom surface opposite said top surface; and

said heat source comprises a heat surface contact element that contacts said bottom surface of said basin for to transmit heat thereto which is then transmitted through said basin floor via said top surface to said water.

8) A system according to claim 7, further comprising

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an increased surface area section of said basin floor having non-planar contours which cause said basin floor to have a greater surface area than if said basin floor were a smooth plane.

9) A system according to claim 8, wherein

said increased surface area section comprises a series of ridges formed on at least said top surface of said basin floor.

10) A system according to claim 8, wherein

said increased surface area section comprises a series of ridges formed on said top surface and said bottom surface of said basin floor.

11) A system according to claim 10, wherein

said heat surface contact element comprises an electrical heating wire positioned against said bottom surface of said basin floor and resting in between at least two of said ridges formed on said bottom surface of said basin floor.

12) A system according to claim 1, further comprising

a controller for receiving an input signal to selectively activate or de-activate heat generation by said heat source.

13) A system according to claim 12, further comprising

a heat-adjustment controller for selecting a certain heating temperature for which said heat source generates.

14) A system according to claim 1, wherein

said controller is programmable to receive input instructions determining one or more of time of heat generation, duration of heat generation, and temperature of heat.

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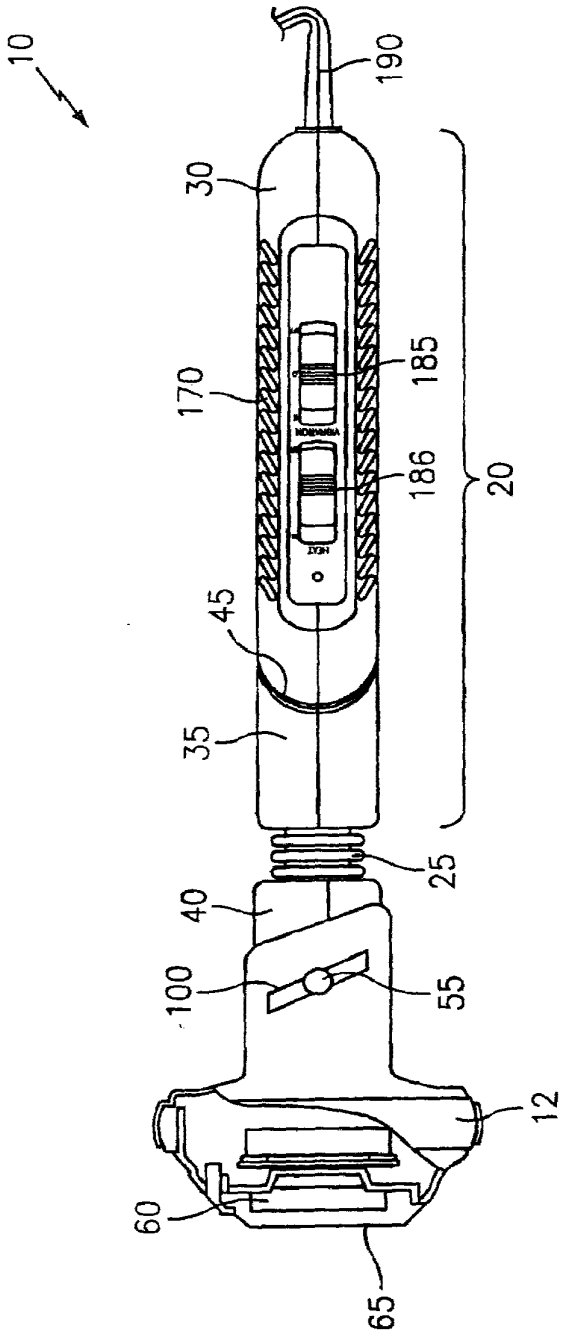


FIG. 1

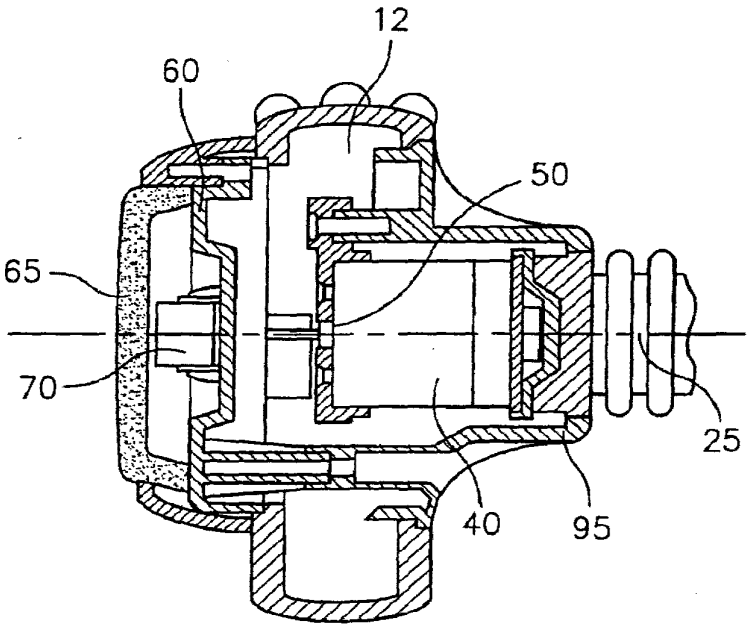


FIG. 2

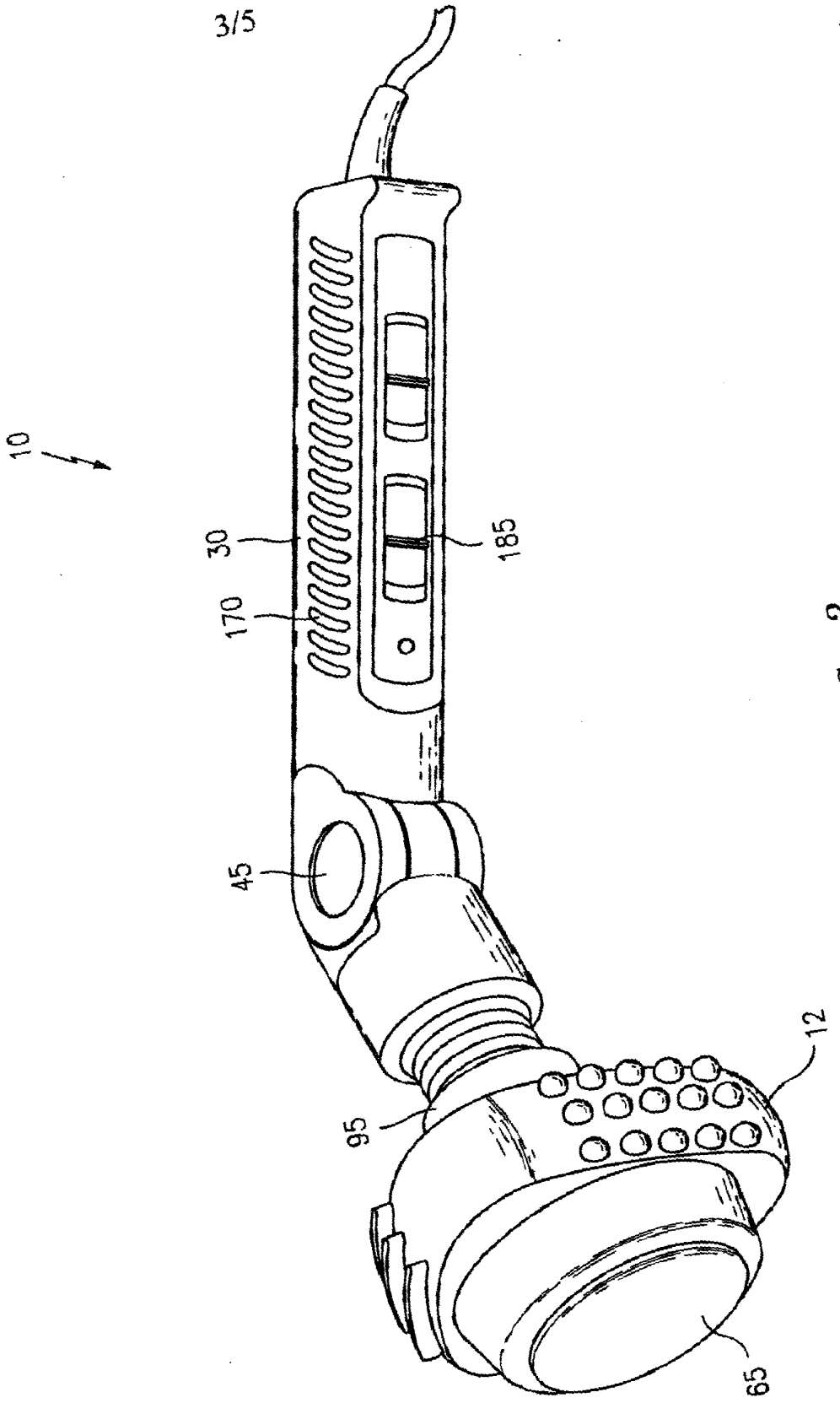


FIG. 3

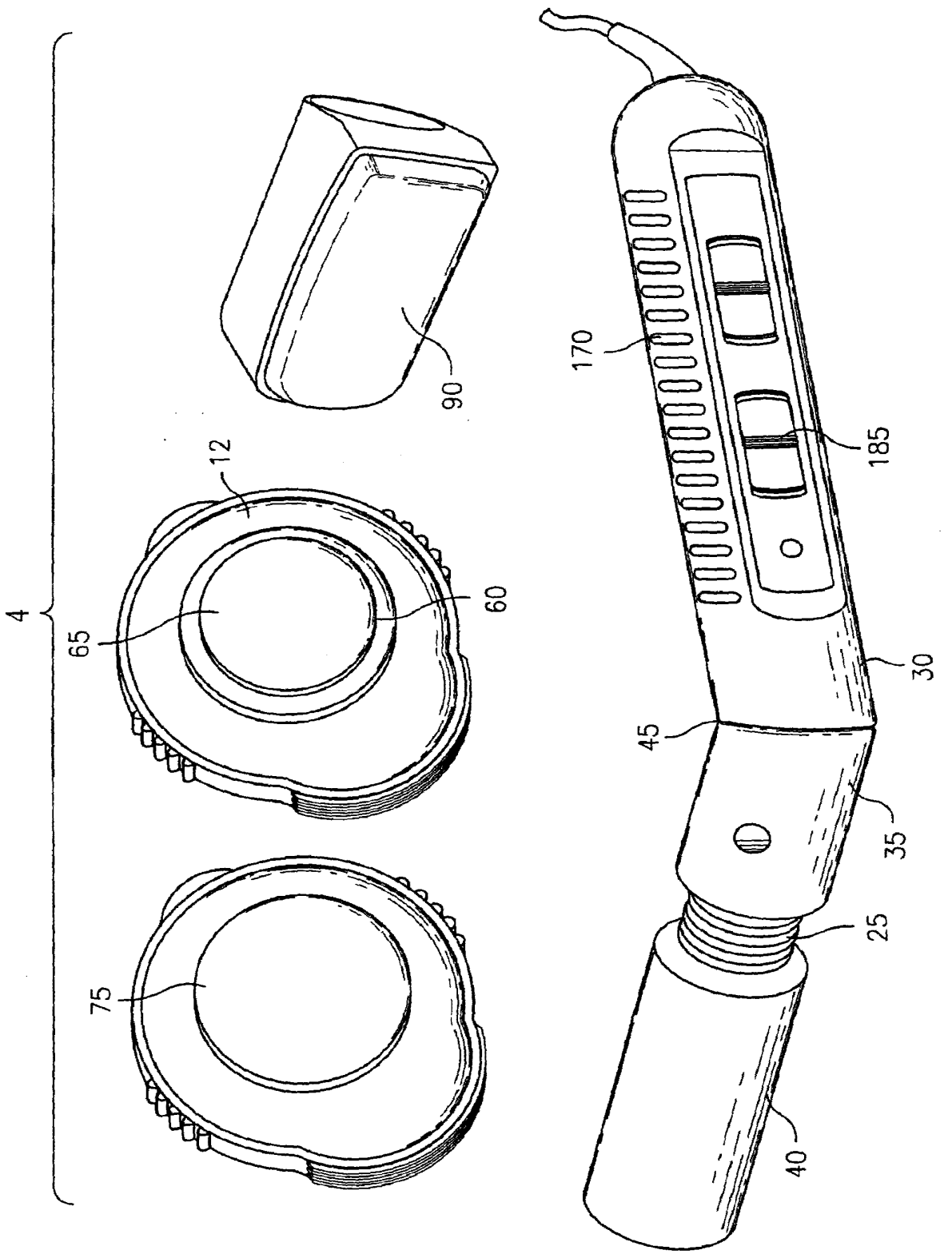


FIG. 4

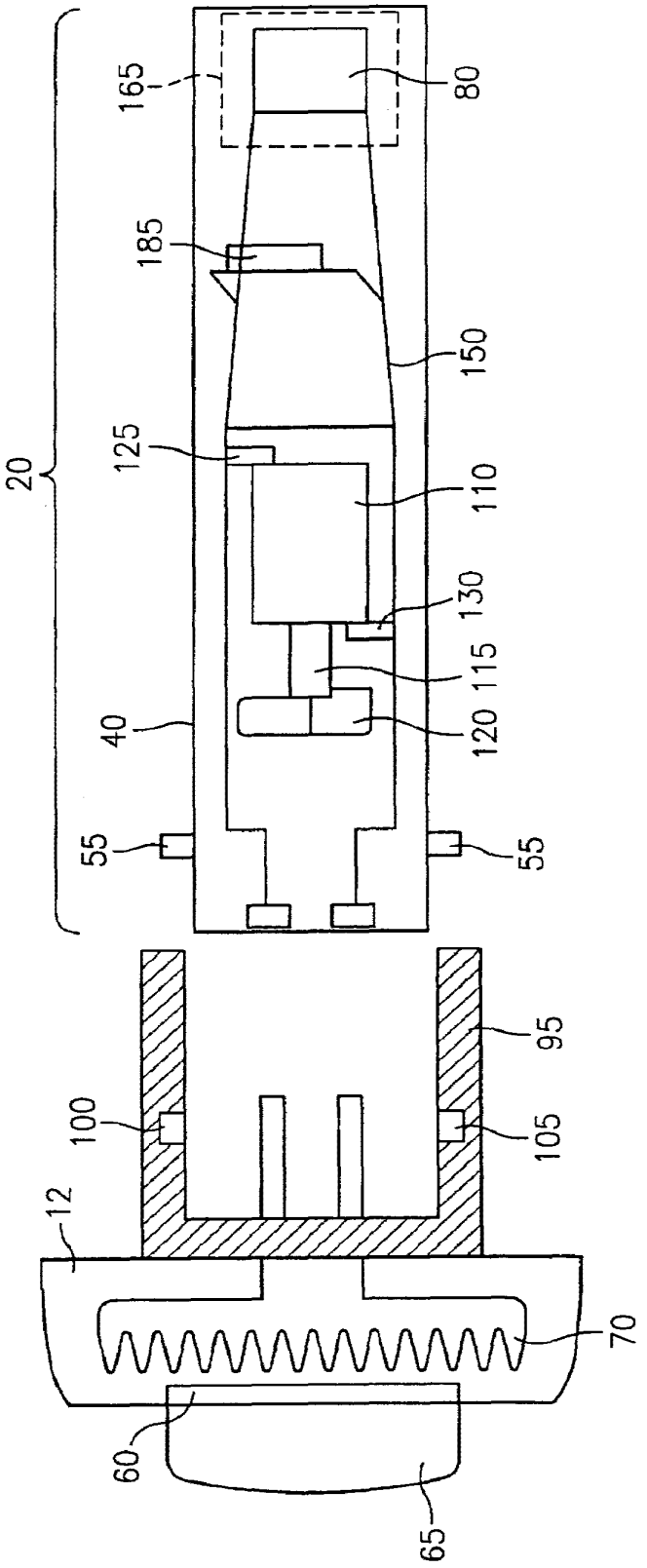


FIG. 5

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Eye massage device capable of securing visibility

List of publications

Application number 2012K..	Publication date
KR101315314 B1 Pat...	2013-10-14

Abstract

PURPOSE: An eye massage device is provided to reduce the accumulation of fatigue due to the use of arms.

CONSTITUTION: An eye massage device comprises a case (120) in which a switch (124) is installed, a probe which is installed on the front of the case and delivers vibration generated from a vibrator, and a massage unit (140) which connects to the probe, contacts the skin of the pupils, and vibrates the skin. The massage unit includes a contact block (142) which forms a cyclic rim (141) and is formed with a through-hole (143) in the center thereof, a cap (144) which is integrated with the contact block and is detachable form a probe, and an acupressure protrusion (146) which is formed along the circumference of the contact block.

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English Abstract (Native or MT)

PURPOSE: An eye massage device is provided to reduce the accumulation of fatigue due to the use of arms.

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Other Abstracts

본 발명은 눈 마사지기에 관한 것으로, 진동을 발생시키는 바이브레이터와, 상기 바이브레이터와 함께 바이브레이터의 작동을 제어하는 스위치가 설치되는 케이스와, 상기 바이브레이터에서 발생하는 진동이 전달되는 케이스의 선단에 구비되는 프로브 및 상기 프로브와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부로 이루어진 마사지기에 있어서, 상기 마사지부는 환형의 테를 이루며 그 중심에 통공이 형성된 접촉 블록과, 상기 접촉 블록과 일체로 형성되며 프로브와 탈착되는 캡 및 상기 접촉 블록의 둘레를 따라 형성되는 지압 돌기를 포함하는 것을 특징으로 하는 눈 마사지기가 개시된다. 이에 따라서, 휴대가 간편하여 사무실에서 업무 중 또는 차량의 운전 중과 같은 틈새 시간에 눈 주위의 피부를 마사지할 수 있을 뿐만 아니라 마사지 중에도 접촉 블록에 형성된 통공을 통해 사용자 전방의 시야를 확보할 수 있어 안전사고의 발생을 미연에 발생할 수 있다.

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Application Numbers & Dates KR20120063276 2012-06-13 [2012KR-0063276]

Priority Numbers & Dates KR20120063276 2012-06-13 [2012KR-0063276]

Technology domain Medical technology

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CPC codes A61F-009/00 A61H-005/00 A61H-023/02/54*A61H-039/04 A61H-2201/0153 A61H-2201/1215A61H-2205/024

Notes Number of Claims: 7
Number of Pages: 13

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Examiner citations
-KR200127999 (Y1) [KR200127999U]; -KR200427986 (Y1) [KR200427986U]; -JP07194666 (A) [JP7194666]; -JP06044538 (U) [JP6044538]; Unspecified source
-KR200127999 (Y1)

-KR200427986 (Y1)
-JP07194666 (A)
-JP06044538 (U)

Claims

1. Generating a vibration with a vibrator (110), the vibrator (110) together with a switch to control (124) the operation of the vibrator (110) is installed in the casing (120), the vibration occurring at the vibrator (110) is delivered at the end of a casing (120) of the probe (130) and the probe (130) is connected to the contact with the skin and the skin around the pupil vibrating section (140) consisting of the massage machine massage, the massage unit (140) is, for making annular rim of (141) the center of the aperture (143) is formed; contact block (142) is integrally formed with the contact block (142) and detachment of the probe (130) and cap (144); and the contact block (142) is formed along a circumference of the acupressure protrusions (146); characterized in that it comprises an eye massager.

2. Method according to claim 1, wherein the contact block shows its cross section of a circular shape such (141) as to massage the eye.

3. Method according to claim 1, wherein the aperture (143) is formed on both sides of the contact block (142) length is greater than the length of an elliptical shape vertically and massage eye.

4. Method according to claim 1, wherein the contact block (142) is from the axis of the (120) case is formed obliquely to the eye massager.

5. Claim 1 apparatus according to any one of the method according to claim 4, wherein the contact block (142) is made of soft and consisting of an eye massager.

6. Method according to claim 1, wherein the (144) cap is in the shape of the HORN to massage the eye.

7. Method according to claim 1, wherein the acupressure protrusions (146) is, of the perforations (143) located in upper elliptical protrudes in the form of such (141) as to massage the eye.

Original Claims

1. 진동을 발생시키는 바이브레이터(110)와, 상기 바이브레이터(110)와 함께 바이브레이터(110)의 작동을 제어하는 스위치(124)가 설치되는 케이스(120)와, 상기 바이브레이터(110)에서 발생하는 진동이 전달되는 케이스(120)의 선단에 구비되는 프로브(130) 및 상기 프로브(130)와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부(140)로 이루어진 마사지기에 있어서,
상기 마사지부(140)는,
환형의 테(141)를 이루며 그 중심에 통공(143)이 형성된 접촉 블록(142);
상기 접촉 블록(142)과 일체로 형성되며 프로브(130)와 탈착되는 캡(144); 및
상기 접촉 블록(142)의 둘레를 따라 형성되는 지압 돌기(146);를 포함하는 것을 특징으로 하는 눈 마사지기.

2. 청구항 1 에 있어서,
상기 접촉 블록의 테(141)는 그 단면이 원형인 것을 특징으로 하는 눈 마사지기.

3. 청구항 1에 있어서,
상기 접촉 블록(142)에 형성된 통공(143)은 양측의 길이가 상하의 길이보다 긴 타원형인 것을 특징으로 하는 눈 마사지기.

4. 청구항 1에 있어서,
상기 접촉 블록(142)은 상기 케이스(120)의 축선으로부터 경사지게 형성되는 것을 특징으로 하는 눈 마사지기.

5. 청구항 1 내지 청구항 4 중 어느 한 항에 있어서,
상기 접촉 블록(142)은 연질의 재질로 이루어진 것을 특징으로 하는 눈 마사지기.

6. 청구항 1에 있어서,
상기 캡(144)은 혼(HORN)의 형상을 갖는 것을 특징으로 하는 눈 마사지기.

7. 청구항 1에 있어서,
상기 지압 돌기(146)는,
상기 통공(143)의 상하에 위치하는 테(141)에 타원형의 형태로 돌출 형성되는 것을 특징으로 하는 눈 마사지기.

Description

TECHNICAL FIELD

[0001] The present invention relates generally relates to an eye massager, and more particularly to a vibration is not transmitted to the pupil directly to the skin around the eyes to a fine tremor stimulation by massage, the skin around the eyes with respect to the skin around the eyes to improve blood

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circulation to help improve the health and visual acuity of the eye to the massage machine disclosed embodiment of the invention.

BACKGROUND ART

[0002] Generally the face in the skin around the eye has a small number of sebum secretion to lines and is liable to occur, without being exposed to elasticity to the movement of sagging is easily generated due to the reasons described below.

[0003] The reason why such a phenomenon occurs where the skin while excessive exposure of the keratinocytes to ultraviolet light from the thickening of the skin loses the feeling of transparency while at the same time as the metabolism of the skin is lowered moisture and nutrient supply because it does not smoothly made the present invention.

[0004] Thus, in order to solve this conventional various methods are used for the skin around the eye by the portable device and the management is performed. For example, the nutrition supply functional cosmetic were applied at the same time so that the user can maintain moisture on the skin of the cross balafilcon moisturizing agents and the like cycle.

[0005] In addition, a more efficient for skin care visit to a specialist beauty shop regular peeling that died removed horny skin function and metabolism is lowered due to activate the growth of a healthy skin and others.

[0006] The professional as above beauty shop by managing the skin using the depending on the healthy skin can be maintained while the, in skin care should be invested a large amount of time required for the skin because of an epoxy group to be managed young women due to include any combination of social life temporal margin to disregarding in skin care as well as to the number of outlets, the skin beauty shop according to the utilization of take up much management cost economically there is no available wtppm and beauty shop professional people using within the prohibitive skin management is that it was impossible.

[0007] Thus, professional eye directly without the aid of the second massage can be massaged has been developed. This prior art from the eye of the utility model registration"No. 20-0127999"acupressure massage machine the spigot for a possible embodiment of the invention. This will be described on the basis of 1 and Fig. 2 will be described below.

[0008] Fig. 1 is an exploded perspective view showing a massage machine of the prior art, Fig. 2 shows a conventional use of a massage machine shown in a state diagram for use. Will now be described with reference to the drawings, an oscillating weight (40) on top of the massage machine of the conventional case which (10) is installed in an eccentric motor mounted to (30) the lower surface of the cover (20) and is being attached and detached by accommodating the (11) dry battery by forming in an acupressure massage machine, the outer periphery of a circular acupressure rod (51) having a large number of the indentation (52) is formed at the center thereof and the (50) cap is rotated the naeseol further (40) connected to an upper part of the case (10) has a structure.

[0009] Such a conventional motor (30) of the massage machine supplying power to the eccentric to the rotation of the oscillating weight (40) by which the case (10) and to vibrate, wherein the such a vibration is communicated to the cap (50). In this way massage to the vibration of the cap (50) can be lightly on the eye when fitted over the outer surface of the cap (50) of the button allows the virus to contact the eye and the spigot acupressure rod (51) is located at a site, the center of the cap (50) of the indentation (52) is a pupil of the eye is wound is located massaging the spigot for the eye without the pain of the pupil of the apparatus according to the invention.

[0010] However, the massage machine of the prior art mentioned above as shown in Fig. 2 the user has a case (10) with one hand wrapped around the front side of the rat eye in a state where the cap (50) is oriented toward the massager is to be placed in the horizontal direction which causes inconvenience to be used because it to be used therein.

[0011] In other words, massage and to the front face of the eye to be cap (50) is positioned, wherein the (50) cap at the rear of the case (10) is located in the eye since a user's hand and the horizontal to be located on the much larger amount of the by the arm to be raised, arm muscle force caused by the use of a problem of fatigue is developed in the.

[0012] In addition, the conventional cap (50) of the massage machine of the indentation (52) formed in the periphery of the pattern formed by acupressure rod (51), at the time of the entire circumference of the pupils massage since

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the acupressure rod (51) tightly around the pupil relative to the total of only a portion which cannot be any massage the problems which are discussed below.

[0013] Then, by using a conventional eye of the massage machine massage in the event that the indentation (52) of the cap (50) and is closed, case (10), and the like arm of a user since the user's vision obscuring an eye on the front of a user when the user massages the risk for the condition cannot be visually sensed safety problems which are discussed below.

SUMMARY OF INVENTION

TECH PROBLEM

[0014] The present invention relates to such as the days in order to solve the problems, the secretion of sebum is less effective to cause sagging of the skin around the eyes is the appearance or to a fine vibration stimulation for promoting blood circulation can be maintained in a resiliently into the skin of the clearance time is used to as well as by the user who can be massaged around the pupil of the eye to provide a massage machine object of the present invention.

[0015] In addition, pupil periphery upon lifting the arm massage operation is reduced to decrease the muscle force of the arm according to usage to minimize the fatigue accumulation eye that can be massager for its purpose to provide thereto can be used.

[0016] And, a massage around the pupil when so as not to obstruct the view or the occurrence of an accident does not know to be visually sensed eye that can be used to provide a massage machine thereto can be used for its purpose.

TECH SOLUTION

[0017] In order to achieve the above object of the present invention include an technical idea, generating a vibration with a vibrator, together with the vibrator or a vibrator and controls the operation of a switch is installed to a case and, wherein the vibrator to the transmission of the vibration occurring at the tip end of a casing provided in the probe and the probe that is connected with the skin around the pupil are in contact with the skin to vibrate in to the massage machine consisting of a massaging part, wherein the massage unit being made up to the annular rim of a contact block and formed with an aperture in the center thereof, wherein the contact block is integrally formed with the probe and the detachment of the cap and the contact block is formed along a circumference of the acupressure protrusions characterized in that it comprises a attained by the eye to the massage machine.

[0018] Here, the contact block such as a circular shape of its cross section is to be preferred.

[0019] Also, the contact block length that is vertically formed on both sides of the aperture is longer than the length of an elliptical shape are preferred over the others.

[0020] In addition, the contact block further comprises a probe and a binding from the axis of the cap that are made by rotation of the acrylic acid is preferably used.

[0021] Then, the contact block is made of soft materials are preferably selected from the consisting of.

[0022] In addition, the cap may be present (HORN) having the shape of the horn are preferably as follows.

ADVANTAGEOUS EFFECTS

[0023] In the present invention massage machine eye by a portable device which is simple and is in the office or at work such as during a driver of a vehicle at the time of the crevices of the skin around the eyes a massage massage can be even during as well as the contact block formed of the user through the bores of the field of view of the front can be ensured in an occurrence of safety accidents can be generated.

[0024] Also, the eye massager of the present invention of a casing included in the massage unit is formed on the tip end of the massaging part contact block out of the casing is formed in an inclined manner so that the user is arm does not lift height and massaged muscle force can be caused by the use of the arm to minimize the fatigue accumulation can be convenient for use.

DESCRIPTION OF DRAWINGS

[0025] Fig. 1 is a exploded perspective view showing the conventional massage machine of the present invention. Fig. 2 shows a conventional use

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of a massage machine state diagram for the indicated user. Fig. 3 is a perspective view showing the eye massager according to the invention the present invention. Fig. 4 illustrates a massage machine according to the present invention exploded perspective view showing the eye of the present invention. Fig. 5 illustrates a sectional view showing the eye massager according to the invention of the present invention. Fig. 6 is a massage machine according to the present invention showing use of the eye is a state diagram for use. Fig. 7 is a massage machine according to the present invention in the eye of the acupressure protrusions showing still another example of a perspective view.

DESCRIPTION OF EMBODIMENTS

[0026] As used in the present specification and claims the term or word which are customary or dictionary sense with respect to and should not be construed as limited to, the inventor believes that the own most aspect of the present invention in the best way in order to explain the concept of the terms defined appropriately can be made in accordance with a principle of the present invention means a technical matching the concept of the concepts must be interpreted.

[0027] The following appended with reference to the drawings showing a preferred embodiment of the present invention will be described in detail for the sake of conciseness.

[0028] Fig. 3 is a schematic eye according to the invention perspective view illustrating a massage machine, Fig. 4 illustrates a eye massager according to the present invention shown in an exploded perspective view, Fig. 5 illustrates a sectional view showing the eye massager according to the invention of the present invention.

[0029] Referring to the drawings to be explained in detail, the eye massager (100) according to the present invention is greatly generating a vibration with a vibrator (110), the vibrator (110) of a vibrator (110) together with controlling the operation of the switch (124) is installed in the casing (120), wherein the vibrator (110) for the transfer of vibration occurring at the tip end of a casing (120) provided in the probe (130) and said probe (130) can be connected with the pupil and around in contact with the skin of the skin to be vibrated is composed of the massage unit (140).

[0030] Wherein the vibrator (110) is a vibration energy to electric energy is converted through the probe (130) in contact with the skin around the eye of a user of a massaging part (140) in the heat transfer to stimulate the skin, wherein the vibrator (110) is an eccentric weight (116) to a rotational axis (114) of the drive motor (112) is provided on a depending on the operation of the drive motor (112) to the center of gravity of the rotation shaft rotates (114) an eccentric weight (116) according to the movement consist in a structure where vibration occurs.

[0031] Depending on the case, wherein the vibrator (110) is supplied with electrical energy of the rod and the linear reciprocating motion to the linear motor may also be allowed to and generating vibrations by the of this disclosure.

[0032] Such a vibrator (110) is a dry battery (150) to store electric energy are accommodated in the support being mounted on the inside of the casing (120), wherein the dry (150) battery and a vibrator (110) is electrically connected by means of a switch (124) for on/off of the switch by the electric energy from the dry (150) battery and for receiving the vibrator (110) to generate vibration by operating the apparatus according to the invention.

[0033] Wherein the (120) case illustrates that the user can be wrapped rat with one hand so that the columns having a predetermined length and a diameter in the inside thereof and has the same shape of the drive motor (112) and dry (150) battery are accommodated in the accommodation space (121) is formed therein.

[0034] As such case (120) in the accommodation space (121) is formed on the inside of the front end of the case (120) also gradually formed so as to narrow and, at the proximal end of the case (120) is open such that the proximal end of the dry (150) battery through apparatus according to the invention is to be replaced.

[0035] In this way is at the proximal end of the open case (120) is a finishing comprises at the proximal end of the cover (122). The dry battery (150) wherein said (122) cover and a vibrator is (110) adapted to be connected electrically to the lead (123) is led out from the proximal end of the case (120) to the cover (122) when assembled into a vibrator (110) to the lead (123) is

electrically connected thereto. In addition, the cover includes a (122) lead pin (123) dry (150) battery by and electrically connected to a vibrator is (110) a switch for switching (124) is installed.

[0036] In other words, Fig. 4 and Fig. 5 as shown in the receiving space is (121) of a case of the (120) first eccentric weight (116) to a rotational axis (114) of the drive motor (112) is installed on the installation comprises a vibrator (110) is provided and dry (150) battery, after the cover (122) is combined in sequential order of the one constituting the electric circuit can be calculated as follows.

[0037] At this time, the receiving space (121) of the case (120) having been previously set in the first drive motor (110) 1 of the ground terminal (112a) of the anode (+) is a dry battery (150) being in contact, the lead (123) mounted to the cover (122) by the negative electrode of the dry (150) battery (-) of the drive motor (112) 2 (112b) the first contact with the ground terminal can be calculated as follows.

[0038] In such a state may be mounted to the cover (122) to the lead (123) switch (124) is the vibrator (110) ground or the negative pole of the dry battery to control the actuation of the short circuit can be calculated as follows.

[0039] On the other hand, said case (120) is provided with a tip of the probe (130) of the vibrator (110) and the vibration generated by the operation of delivered to the probe (130). In this way probe (130) vibration is delivered to the massage unit (140) massaging parts (140) may be transferred into the skin which is in contact with the bottom plate by vibration stimulus to improve blood circulation to help improve skin health and visual acuity can be calculated as follows.

[0040] Comes into direct contact with the skin a massaging part (140) is an annular rim of a (141) large aperture (143) is formed in the center thereof and is in contact block (142) and, wherein the contact block (142) and integrally formed with the probe (130) and detachment of the cap (144) and the contact block (142) formed along a circumference of which is composed of the acupressure protrusions (146).

[0041] Incidentally, to have a contact block preferably includes (142) an annular rim of a (141) circular sectional shape to equilibrate with the ambient pressure of the eye according to the facial skeleton in conformity to the bending through close contact, vibration that is transmitted to the massage unit (140) in the delivery to the skin. Particularly, wherein the contact block (142) is angled in such (141) as the annular rim of a (141) since the curved surface formed on is formed can be effortlessly with the skin in contact with the apparatus according to the invention.

[0042] At this time, the contact block (142) is made of soft materials is preferred to be made. In other words, the contact block (142) is formed of a silicon, synthetic resin, rubber such as an elastic restoring force is exerted if a soft material selected from steel, if the user around the eye contact block (142) is brought into close contact strongly to when with bending of the contact block (142) to the user's face surrounding the eyes is deformed to be in contact with the skin around the eyes more effectively block (142) will come into contact apparatus according to the invention.

[0043] In addition, the contact block (142) attached closely around the pupil when the eye position is allowed to be added to the pattern formed by the aperture (143), the iris and the perimeter of the skin is in contact with and adhered closely to the block (142), in such a state vibrator (110) to generate vibration in vibration is operating even if not delivered directly to the pupil can be calculated as follows.

[0044] In other words, the contact block (142) in contact with the eye pupil is located within the aperture to (143) at the time when the user is consciously aware because the eye does not sensing the user can be assured in the field of view for the front of the apparatus according to the invention.

[0045] In this way, the contact block (142) formed on both sides of the through hole (143) is the length of that is vertically long elliptical shape than the length of the consisting preferably is formed so as to, as such through (143) hole is a long elliptical shape on both sides of the contact block (142) is formed of an annular rim (141) around the lens on the eye when contacting the annular rim (141) around the eye and further increase of the adhesion to the skin with the result that the annular rim (141) and increase the contact area with the skin around the eyes to effectively be a massage apparatus according to the invention.

[0046] For example, contact block (142) which does not form the holes (143) in the shape of a plate when brought in contact block (142) can be allowed to contact block (142) in contact with the eye pupil is most first comes into contact with the iris are vibrations directly transmitted to the pupil thereby according to the tremors of dizziness, transient vision decline or the like is generated can be calculated as follows.

[0047] However, as in the present invention if it is made of the holes (143) in contact block (142) as shown in Fig. 6 as formed in the contact block (142) within the aperture to (143) the skin around the eyes and the pupil is located in a border of the (141) contact block (142) is in contact with the vibrator (110) thereby enabling the large upon actuation of the skin around the eyes the vibration delivered to the skin around the eyes and thereby efficiently can be a massage apparatus according to the invention.

[0048] On the other hand, the contact block (142) is inclined at an angle from the case (120) formed in such a manner are preferred over the others. Incidentally, the contact block further comprises a (142) probe (130) and bound to the surface of the cap (144) for being formed obliquely from the axis of the, in this way contact block (142) out of the casing (120) is formed to be inclined at an angle if the user is wrapped and which includes a case (120) with one hand to the eye of a contact block (142) murine upon contacting with a specific distance between the hands and face can be secured and freely moving the hand may be the skin around the eyes for a massage apparatus according to the invention.

[0049] As such case (120) formed at the leading end of the probe (130) and the massage unit (140) is connected by a cap (144), the cap (144) may be integral with the contact block (142) of the massaging part (140) formed therein. At this time, the cap may be present (144) (HORN) essentially consisting of a shape of the horn.

[0050] In other words, the cap may be present (144) in the probe (130) contact block (142) toward the narrower the diameter approximately cone comes to have the shape of the pillar. As such a cap is (144) with the shape of the of the horn vibrations which are transferred from the probe (130) when the cap is (144) centered at the contact block (142) state by being conveyed, eventually contacting the vibration of the block (142) can be obtained and the effect of improving, this improved by vibrations on the skin around the eyes in contact with the contact block (142) to slightly shakes the skin around the eyes so as to health and vision to help improve to a massage apparatus according to the invention.

[0051] On the other hand, the contact block (142) are formed which include the acupressure protrusions (146), wherein the acupressure protrusions (146) which includes an annular rim of a (141) protruded along the skin around the eyes for pressurizing apparatus according to the invention. In this way, contact block (142) projecting in the rim of a (141) acupressure protrusions (146) is a contact block (142) along the rim of a (141) distributed into different shapes can be formed.

[0052] For example, the contact block formed of (142) acupressure protrusions (146) is a as shown in the figures contact block (142) of a predetermined height from the surface of the protruded hemisphere can also be configured in the form of, such the acupressure protrusions (146) is in contact with the obverse and reverse faces of a block (142) are formed thereof.

[0053] In this way, the contact block (142) formed on the rim of a (141) acupressure protrusions (146) eye indicates that the contact block (142) is attached closely around the of the annulus (141) when the surface and the skin is in part in contact with the acupressure protrusions (146) is compared to the more strongly a portion formed with the skin to push the massage effect can be obtained in the apparatus according to the invention.

[0054] The present invention having the same configuration as with the eye of the massage (100) machine for use of their based on Fig. 6 will be described below.

[0055] Fig. 6 is a schematic eye according to the present invention showing the use of a massage machine state diagram for use. Will now be described with reference to the drawings, if the user in order to massage the skin around the eyes for the first case (120) in a state where the rats encompassed by a hand of the massaging part (140) contact block (142) can be calculated as follows placement in the eye.

[0056] At this time, the contact block formed of (142) pupil within the through hole (143) in a pulled back position mounted to the cover (122) of the case (120) manipulates a switch (124) to actuate the vibrator (110) apparatus according to the invention. As such a vibrator is (110) actuated vibration is probe (130) and through the cap (144) delivered to the contact block (142) and the skin becomes finely dithered, such as the fine acoustical diaphragms located in the skin by the stimulus to the circulation of blood is improved in the example according to the skin around the eyes health and blood circulation to help improve vision can be calculated as follows.

[0057] In particular, such as the eye massager (100) according to the present invention is cellular is simple in offices or at work such as during a driver of a vehicle at the time of the crevices of the skin around the eyes a massage as well as can be formed in the contact block (142) even during massage to the user through the aperture to (143) ensure a field of view in front of the light can be in an occurrence of safety accident can be generated.

[0058] In addition, eye massager (100) of the present invention designates a case (120) in which the tip of the massage unit (140) is formed on the contact block (142) is inclined from the casing (120) of the massaging part (140) is formed so as to height where the user does not lift the arm and can be used to massage the muscle force of the arm according to minimize the fatigue accumulation can be convenient for use.

[0059] On the other hand, the present invention is not limited to the example described above but without departing from the gist of the present invention in the range in which modifications and variations can be carried out by, such variation and modification is applied to the technical scope of the present invention that belongs to the of the appended claims.

[0060] For example, the contact block formed of the acupressure protrusions shown in the foregoing description and drawings without being limited to those shown variously modified can be carried out in the same. This will be described on the basis of the 7 embodiment of the invention.

[0061] Fig. 7 is a schematic eye massager according to the present invention in a perspective view showing another embodiment of the acupressure protrusions of the present invention. Will now be described with reference to the drawings, wherein the contact block formed of (142) acupressure protrusions (146) is wrapped circumferentially around an of the aperture to (143) form a rim (141) formed in the, wherein the acupressure protrusions (141) is located up and down of the aperture to (143) form a rim (141) in the form of an oval formed to protrude from a preferably as short as possible.

[0062] In this way, the perforations (143) of the upper and lower parts of the acupressure protrusions (146) is formed, at the time of a pupil of the eye massaging acupressure protrusions (146) between the eyebrows respectively beneath the crow's feet with the skin of the resulting from the generation of a dark circle massage the skin so as to be, according to the improvement of blood circulation to help improve the skin health and visual acuity can be calculated as follows.

REFERENCE SIGNS LIST

[0063] 100: Eye massager 110: vibrator 112: drive motor 114:116 and the axis of rotation: an eccentric weight 120: case 121: accommodation space 122: cover 123: lead wire 124: switch 130: probe 140: massaging part 141:142 such as: contact block 143: seating hole 144: cap 146:150 the acupressure protrusions: dry battery

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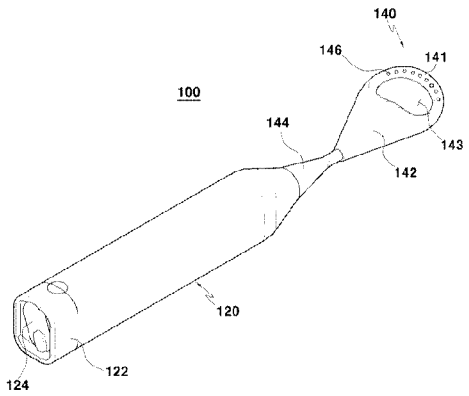
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(54) 발명의 명칭 **눈 마사지기**

(57) 요 약

본 발명은 눈 마사지기에 관한 것으로, 진동을 발생시키는 바이브레이터와, 상기 바이브레이터와 함께 바이브레이터의 작동을 제어하는 스위치가 실치되는 케이스와, 상기 바이브레이터에서 발생하는 진동이 전달되는 케이스의 선단에 구비되는 프로브 및 상기 프로브와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부로 이루어진 마사지기에 있어서, 상기 마사지부는 환형의 테를 이루며 그 중심에 통공이 형성된 접촉 블록과, 상기 접촉 블록과 일체로 형성되며 프로브와 탈착되는 캡 및 상기 접촉 블록의 둘레를 따라 형성되는 지압 돌기를 포함하는 것을 특징으로 하는 눈 마사지기가 개시된다. 이에 따라서, 휴대가 간편하여 사무실에서 업무 중 또는 차량의 운진 중과 같은 틈새 시간에 눈 주위의 피부를 마사지할 수 있을 뿐만 아니라 마사지 중에도 접촉 블록에 형성된 통공을 통해 사용자 전방의 시야를 확보할 수 있어 안전사고의 발생을 미연에 발생할 수 있다.

대 표 도 - 도3



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특허청구의 범위

청구항 1

진동을 발생시키는 바이브레이터(110)와, 상기 바이브레이터(110)와 함께 바이브레이터(110)의 작동을 제어하는 스위치(124)가 설치되는 케이스(120)와, 상기 바이브레이터(110)에서 발생하는 진동이 전달되는 케이스(120)의 선단에 구비되는 프로브(130) 및 상기 프로브(130)와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부(140)로 이루어진 마사지기에 있어서,

상기 마사지부(140)는,

환형의 테(141)를 이루며 그 중심에 통공(143)이 형성된 접촉 블록(142);

상기 접촉 블록(142)과 일체로 형성되며 프로브(130)와 탈착되는 캡(144); 및

상기 접촉 블록(142)의 둘레를 따라 형성되는 지압 돌기(146);를 포함하는 것을 특징으로 하는 눈 마사지기.

청구항 2

청구항 1 에 있어서,

상기 접촉 블록의 테(141)는 그 단면이 원형인 것을 특징으로 하는 눈 마사지기.

청구항 3

청구항 1에 있어서,

상기 접촉 블록(142)에 형성된 통공(143)은 양측의 길이가 상하의 길이보다 긴 타원형인 것을 특징으로 하는 눈 마사지기.

청구항 4

청구항 1에 있어서,

상기 접촉 블록(142)은 상기 케이스(120)의 축선으로부터 경사지게 형성되는 것을 특징으로 하는 눈 마사지기.

청구항 5

청구항 1 내지 청구항 4 중 어느 한 항에 있어서,

상기 접촉 블록(142)은 연질의 재질로 이루어진 것을 특징으로 하는 눈 마사지기.

청구항 6

청구항 1에 있어서,

상기 캡(144)은 혼(HORN)의 형상을 갖는 것을 특징으로 하는 눈 마사지기.

청구항 7

청구항 1에 있어서,

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상기 지압 돌기(146)는,

상기 통공(143)의 상하에 위치하는 테(141)에 타원형의 형태로 돌출 형성되는 것을 특징으로 하는 눈 마사지기.

명 세 서

기 술 분 야

[0001] 본 발명은 눈 마사지기에 관한 것으로, 더욱 상세하게는 눈동자에 직접 진동이 전달되지 않고 눈 주위의 피부를 미세한 떨림으로 자극해 마사지함으로써, 눈 주위의 피부에 대한 혈액 순환을 개선해 눈 주위의 피부 건강 및 시력 개선에 도움을 주는 눈 마사지기에 관한 것이다.

배 경 기 술

[0002] 일반적으로 얼굴 피부 중 피지 분비가 적은 눈 주위는 잔주름이 생기기 쉽고, 탄력 없이 푸석푸석해 지면서 늘어짐이 쉽게 발생하게 된다.

[0003] 상기와 같은 현상이 발생하는 이유는 피부가 자외선에 과다하게 노출되면서 각질이 두꺼워져 피부가 투명감을 잃어 버리면서 피부의 신진대사가 저하됨과 동시에 수분 및 영양분 공급이 원활하게 이루어지지 않기 때문이다.

[0004] 따라서, 이를 해결하기 위해 종래에는 다양한 방법에 의한 눈 주위의 피부관리가 이루어지고 있다. 예를 들어, 기능성 화장품을 발라 영양을 공급함과 동시에 촉촉함을 유지할 수 있도록 피부에 보습제 등을 발라주기도 한다.

[0005] 또한, 좀더 효과적인 피부 관리를 위하여 전문 뷰티샵을 방문해 정기적인 필링으로 죽은 각질을 제거해 저하된 피부기능과 신진대사를 활성화시켜 건강한 피부를 가꾸고 있다.

[0006] 상기와 같이 전문 뷰티샵을 이용하여 피부를 관리함에 따라 건강한 피부를 유지할 수 있는 반면, 피부 관리에 필요한 시간을 많이 투자해야 하기 때문에 피부를 관리해야 할 시기의 젊은 여성들로서는 사회생활로 인한 시간적 여유가 없어 피부 관리에 소홀할 수 밖에 없을 뿐만 아니라, 뷰티샵 이용에 따른 피부 관리 비용이 많이 소요되어 경제적으로 여유가 없는 사람들로써는 전문 뷰티샵을 이용한 피부 관리는 엄두를 낼 수가 없었다.

[0007] 따라서, 전문가의 도움 없이 직접 눈을 마사지할 수 있는 마사지기가 등장하였다. 이러한 선행기술로 등록실용신안 제20-0127999호의 "눈 언저리용 지압 마사지기"가 있다. 이를 도 1 및 도 2에 의거하여 설명한다.

[0008] 도 1은 종래의 마사지기를 나타낸 분해 사시도이며, 도 2는 종래 마사지기의 사용을 나타낸 사용 상태도이다. 도면을 참조하여 설명하면, 종래의 마사지기는 케이스(10)의 상부에 회전추(40)가 편심 설치된 모터(30)를 내설하고 하부에는 덮개(20)가 착탈되는 건전지 수납함(11)을 형성하여 된 지압 마사지기에 있어서, 외주연에 원형의 지압봉(51)이 다수 형성되고 그 중앙에 요입부(52)가 형성된 캡(50)이 회전추(40)가 내설된 케이스(10)의 상단에 결합된 구조를 갖는다.

[0009] 이와 같은 종래의 마사지기는 모터(30)에 전원을 공급하여 편심된 회전추(40)의 회전에 의해 케이스(10)가 진동하게 되고, 상기와 같은 진동은 캡(50)에 전달된다. 이렇게 진동하는 캡(50)을 마사지할 눈 위에 가볍게 접촉시키게 되면 캡(50)의 외주연에 돌설된 지압봉(51)은 눈 언저리 부위에 위치하며, 캡(50)의 중앙 요입부(52)는 감은 눈의 눈동자가 위치하여 눈동자의 통증 없이 눈 언저리를 마사지할 수 있게 된다.

[0010] 그러나, 상기와 같은 종래의 마사지기는 도 2에 도시된 바와 같이 사용자가 한 손으로 케이스(10)를 감싸 쥔 상태에서 눈의 정면으로 캡(50)이 향하도록 마사지기를 수평으로 위치시켜야 하기 때문에 사용에 불편함이 있다.

[0011] 즉, 마사지할 눈의 정면으로 캡(50)이 위치하고, 상기 캡(50)의 후방으로 케이스(10)가 위치하기 때문에 사용자의 손과 눈이 수평 상에 위치하게 되어 그만큼 팔을 많이 들어올려야 함으로써, 팔의 근력 사용에 따른 피로가 발생하는 문제가 있다.

[0012] 또한, 종래의 마사지기는 캡(50)에 형성된 요입부(52)의 둘레로 지압봉(51)이 형성됨으로써, 마사지 시 눈동자 전체 둘레에 지압봉(51)이 밀착되기 때문에 눈동자 주위의 전체에 대한 어느 한 부분만을 마사지할 수 없는 문제가 있다.

[0013] 그리고, 종래의 마사지기를 이용하여 눈을 마사지하게 되는 경우 캡(50)의 요입부(52)가 막혀 있고, 케이스

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(10), 사용자의 팔 등이 사용자의 시야를 가리기 때문에 눈을 마사지할 때 사용자의 진방에 대한 위험을 시각적으로 감지할 수 없어 안전상의 문제가 있다.

발명의 내용

해결하려는 과제

[0014] 본 발명은 상기와 같은 문제점을 해결하기 위한 것으로, 피지 분비가 적어 잔주름 또는 늘어지기 쉬운 눈 주위의 피부를 미세한 진동으로 자극해 혈액 순환을 촉진시켜 탄력 있는 피부로 유지시킬 수 있을 뿐만 아니라 틈새 시간을 이용하여 사용자 스스로 눈동자 주위를 마사지할 수 있는 눈 마사지기를 제공하는데 그 목적이 있다.

[0015] 또한, 눈동자 주위에 대한 마사지 시 팔을 들어올리는 동작을 감소시켜 팔의 근력 사용에 따른 피로 누적을 최소화시킬 수 있는 눈 마사지기를 제공하는데 그 목적이 있다.

[0016] 그리고, 눈동자 주위를 마사지할 때 시야를 가리지 않도록 하여 발생할지 모를 사고를 시각적으로 감지할 수 있는 눈 마사지기를 제공하는데 그 목적이 있다.

과제의 해결 수단

[0017] 상기와 같은 목적을 달성하기 위한 본 발명의 기술적 사상으로는, 진동을 발생시키는 바이브레이터와, 상기 바이브레이터와 함께 바이브레이터의 작동을 제어하는 스위치가 설치되는 케이스와, 상기 바이브레이터에서 발생하는 진동이 전달되는 케이스의 선단에 구비되는 프로브 및 상기 프로브와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부로 이루어진 마사지기에 있어서, 상기 마사지부는 환형의 테를 이루며 그 중심에 통공이 형성된 접촉 블록과, 상기 접촉 블록과 일체로 형성되며 프로브와 탈착되는 캡 및 상기 접촉 블록의 둘레를 따라 형성되는 지압 돌기를 포함하는 것을 특징으로 하는 눈 마사지기에 의해 달성된다.

[0018] 여기서, 상기 접촉 블록의 테는 그 단면이 원형인 것이 바람직하다.

[0019] 또한, 상기 접촉 블록에 형성된 통공은 양측의 길이가 상하의 길이보다 긴 타원형인 것이 바람직하다.

[0020] 또한, 상기 접촉 블록은 상기 프로브와 결속된 캡의 축선으로부터 경사지게 형성되는 것이 바람직하다.

[0021] 그리고, 상기 접촉 블록은 연질의 재질로 이루어진 것이 바람직하다.

[0022] 또한, 상기 캡은 혼(HORN)의 형상을 갖는 것이 바람직하다.

발명의 효과

[0023] 본 발명에 의한 눈 마사지기는 휴대가 간편하여 사무실에서 업무 중 또는 차량의 운전 중과 같은 틈새 시간에 눈 주위의 피부를 마사지할 수 있을 뿐만 아니라 마사지 중에도 접촉 블록에 형성된 통공을 통해 사용자 전방의 시야를 확보할 수 있어 안전사고의 발생을 미연에 발생할 수 있다.

[0024] 또한, 본 발명의 눈 마사지기는 케이스의 선단에 마사지부가 형성되되 상기 마사지부의 접촉 블록이 케이스로부터 경사지게 형성되어 사용자가 팔을 높이 들어올리지 않고 마사지할 수 있어 팔의 근력 사용에 따른 피로 누적을 최소화시킬 수 있어 사용이 편리하다.

도면의 간단한 설명

[0025] 도 1은 종래의 마사지기를 나타낸 분해 사시도이다.

도 2는 종래 마사지기의 사용을 나타낸 사용 상태도이다.

도 3은 본 발명에 따른 눈 마사지기를 나타낸 사시도이다.

도 4는 본 발명에 따른 눈 마사지기를 나타낸 분해 사시도이다.

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도 5는 본 발명에 따른 눈 마사지기를 나타낸 단면도이다.

도 6은 본 발명에 따른 눈 마사지기의 사용을 나타낸 사용 상태도이다.

도 7은 본 발명에 따른 눈 마사지기 중 지압 돌기의 다른 실시예를 나타낸 사시도이다.

발명을 실시하기 위한 구체적인 내용

[0026] 본 명세서 및 청구범위에 사용된 용어나 단어는 통상적이거나 사전적인 의미로 한정해서 해석되어서는 아니 되며, 발명자는 자신의 발명을 가장 최선의 방법으로 설명하기 위해 용어의 개념을 적절하게 정의할 수 있다는 원칙에 입각하여 본 발명의 기술적 사상에 부합하는 의미와 개념으로 해석되어야만 한다.

[0027] 이하 첨부된 도면을 참조하여 본 발명의 바람직한 실시예를 상세히 설명하기로 한다.

[0028] 도 3은 본 발명에 따른 눈 마사지기를 나타낸 사시도이고, 도 4는 본 발명에 따른 눈 마사지기를 나타낸 분해 사시도이며, 도 5는 본 발명에 따른 눈 마사지기를 나타낸 단면도이다.

[0029] 도면을 참조하여 설명하면, 본 발명에 따른 눈 마사지기(100)는 크게 진동을 발생시키는 바이브레이터(110)와, 상기 바이브레이터(110)와 함께 바이브레이터(110)의 작동을 제어하는 스위치(124)가 실치되는 케이스(120)와, 상기 바이브레이터(110)에서 발생하는 진동이 전달되는 케이스(120)의 선단에 구비되는 프로브(130) 및 상기 프로브(130)와 연결되며 눈동자 주위의 피부와 접촉하여 피부를 진동시키는 마사지부(140)로 구성된다.

[0030] 상기 바이브레이터(110)는 전기 에너지를 진동 에너지로 변환하여 프로브(130)를 통해 사용자의 눈 주위의 피부와 접촉하는 마사지부(140)에 전달하여 피부를 자극하는 것으로, 상기 바이브레이터(110)는 구동 모터(112)의 회전축(114)에 편심추(116)가 설치되어 구동 모터(112)의 작동에 따라 회전축(114)이 회전하여 편심추(116)의 무게 중심이동에 따른 진동이 발생하는 구조로 이루어진다.

[0031] 경우에 따라서는, 상기 바이브레이터(110)가 전기 에너지를 공급받아 로드가 직선왕복 운동하는 리니어 모터에 의해 진동을 발생시킬 수도 있을 것이다.

[0032] 이와 같은 바이브레이터(110)는 전기 에너지를 저장한 건전지(150)가 수납되는 케이스(120)의 내부에 설치되며, 상기 건전지(150)와 바이브레이터(110)는 스위치(124)에 의해 전기적으로 연결되어 스위치의 on/off에 의해 건전지(150)로부터 전기 에너지를 공급받아 바이브레이터(110)가 작동하여 진동을 발생시키게 된다.

[0033] 상기 케이스(120)는 사용자가 한 손으로 감싸쥘 수 있도록 소정의 길이와 직경을 갖는 기둥의 형상을 갖으며 그 내부에 구동 모터(112) 및 건전지(150)가 수납되는 수납 공간(121)이 형성된다.

[0034] 이와 같이 케이스(120)의 내부에 형성된 수납 공간(121)은 케이스(120)의 선단으로 갈수록 점진적으로 좁아지도록 형성되며, 기단은 개방되어 케이스(120)의 기단을 통해 건전지(150)를 교체할 수 있게 된다.

[0035] 이렇게 기단이 개방된 케이스(120)는 기단을 마감하는 커버(122)를 포함한다. 상기 커버(122)는 건전지(150)와 바이브레이터(110)가 전기적으로 연결되도록 리드 선(123)이 인출되어 케이스(120)의 기단에 커버(122)가 조립되었을 때 리드 선(123)이 바이브레이터(110)와 전기적으로 연결된다. 또한, 상기 커버(122)에는 리드 선(123)에 의해 건전지(150)와 바이브레이터(110)가 전기적으로 연결되는 것을 단속하는 스위치(124)가 설치된다.

[0036] 즉, 도 4 및 도 5에 도시된 바와 같이 케이스(120)의 수납 공간(121)에는 먼저 구동 모터(112)의 회전축(114)에 편심추(116)가 설치된 바이브레이터(110)가 마련되고 이후 건전지(150), 커버(122)가 순차적으로 결합되어 하나의 전기 회로를 구성하게 된다.

[0037] 이때, 케이스(120)의 수납 공간(121)에 먼저 설치된 구동 모터(110)의 제 1 접지단자(112a)에 건전지(150)의 양극(+)이 접촉하게 되며, 커버(122)에 설치된 리드 선(123)에 의해 건전지(150)의 음극(-)이 구동 모터(112)의 제 2 접지단자(112b)와 접촉하게 된다.

[0038] 이와 같은 상태에서 커버(122)에 실치된 스위치(124)는 리드 선(123)을 건전지의 음극에 접지 또는 단락시켜 바이브레이터(110)의 작동을 제어하게 된다.

[0039] 한편, 상기 케이스(120)의 선단에는 프로브(130)가 구비되어 바이브레이터(110)의 작동에 의해 발생하는 진동이 프로브(130)로 전달된다. 이렇게 프로브(130)로 전달된 진동은 마사지부(140)로 전달되어 마사지부(140)와 접

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촉하는 피부가 진동에 의해 자극을 받아 혈액 순환을 개선해 피부 긴강 및 시력 개선에 도움을 주게 된다.

[0040] 피부와 직접 접촉하게 되는 마사지부(140)는 크게 환형의 테(141)를 이루며 그 중심에 통공(143)이 형성된 접촉 블록(142)과, 상기 접촉 블록(142)과 일체로 형성되며 프로브(130)와 탈착되는 캡(144) 및 상기 접촉 블록(142)의 둘레를 따라 형성되는 지압 돌기(146)로 구성된다.

[0041] 부연하자면, 환형의 테(141)를 이루는 접촉 블록(142)은 그 단면 형상이 원형을 이루게 되어 눈 주위의 안면 굴곡에 따른 굴곡에 맞추어 밀착됨으로써, 마사지부(140)에 전달되는 진동을 피부에 전달하게 된다. 특히, 상기 접촉 블록(142)이 환형의 테(141)를 이루이기 때문에 테(141)에 곡면이 형성되어 피부와 무리 없이 접촉할 수 있게 된다.

[0042] 이때, 상기 접촉 블록(142)은 연질의 재질로 이루어지는 것이 바람직하다. 즉, 상기 접촉 블록(142)이 실리콘, 합성수지, 고무와 같은 탄성 복원력이 발휘되는 연질의 재질로 이루어지게 되면, 사용자가 접촉 블록(142)을 눈 주위에 강하게 밀착시켰을 때 눈 주위의 안면 굴곡에 따라 접촉 블록(142)이 변형되어 더욱 효과적으로 눈 주위의 피부에 접촉 블록(142)이 접촉할 수 있게 된다.

[0043] 또한, 상기 접촉 블록(142)이 눈 주위에 밀착될 때 눈동자가 위치할 수 있게 통공(143)이 형성됨으로써, 눈동자 주위의 피부가 접촉 블록(142)에 밀착되고, 이러한 상태에서 바이브레이터(110)가 작동하여 진동을 발생시키더라도 진동이 눈동자에 직접 전달되지 않게 된다.

[0044] 즉, 상기 접촉 블록(142)을 눈에 접촉시켰을 때 통공(143) 내에 눈동자가 위치하기 때문에 사용자가 의식적으로 눈을 감지 않는 한 사용자 전방에 대한 시야를 확보할 수 있게 된다.

[0045] 이렇게, 상기 접촉 블록(142)에 형성된 통공(143)은 양측의 길이가 상하의 길이보다 긴 타원형으로 이루어지도록 형성하는 것이 바람직한데, 이와 같이 통공(143)이 양측으로 긴 타원형으로 형성되면 접촉 블록(142)의 환형 테(141)를 눈 주위에 접촉시킬 때 환형 테(141)와 눈 주위에 대한 밀착을 더욱 증가시켜 결국 환형 테(141)와 피부에 대한 접촉 면적이 증가하여 효과적으로 눈 주위의 피부를 마사지할 수 있게 된다.

[0046] 예를 들어, 접촉 블록(142)에 통공(143)이 형성되지 않고 플레이트의 형상을 갖게 되면 접촉 블록(142)을 눈에 접촉시킬 때 접촉 블록(142)에 눈동자가 가장 먼저 접촉하게 되어 진동이 눈동자에 그대로 전달됨으로써 눈동자의 떨림에 따른 어지럼증, 일시적인 시력 저하 등이 발생하게 된다.

[0047] 그러나, 본 발명과 같이 접촉 블록(142)에 통공(143)이 형성되면 도 6에 도시된 바와 같이 접촉 블록(142)에 형성된 통공(143) 내에 눈동자가 위치하고 눈 주위의 피부에 접촉 블록(142)의 테(141)가 접촉하게 됨으로써 바이브레이터(110)의 작동시 그 진동이 눈 주위의 피부로 전달됨으로써 효과적으로 눈 주위의 피부를 마사지할 수 있게 된다.

[0048] 한편, 상기 접촉 블록(142)은 케이스(120)로부터 일정 각도로 경사지게 형성되는 것이 바람직하다. 부연하자면, 상기 접촉 블록(142)은 상기 프로브(130)와 결속된 캡(144)의 축선으로부터 경사지게 형성되는데, 이렇게 접촉 블록(142)이 케이스(120)로부터 일정 각도로 경사지게 형성되면 사용자가 한 손으로 케이스(120)를 감싸 쥐고 눈 주위를 접촉 블록(142)을 접촉시킬 때 손과 안면 사이로 일정 거리를 확보할 수 있어 사유롭게 손을 움직여 눈 주위의 피부를 마사지할 수 있게 된다.

[0049] 이와 같이 케이스(120)의 선단에 형성된 프로브(130)와 마사지부(140)는 캡(144)에 의해 연결되는데, 상기 캡(144)은 마사지부(140)의 접촉 블록(142)과 일체로 형성된다. 이때, 상기 캡(144)은 혼(HORN)의 형상으로 이루어진다.

[0050] 즉, 상기 캡(144)은 프로브(130)에서 접촉 블록(142)으로 갈수록 그 직경이 좁아지는 대략 원뿔 기둥의 형상을 갖게 된다. 이와 같이 캡(144)이 혼의 형상을 갖게 되면 프로브(130)로부터 전달되는 진동이 캡(144)에서 집중된 상태로 접촉 블록(142)으로 전달됨으로써, 결국 접촉 블록(142)의 진동을 향상시키는 효과를 얻을 수 있고, 이러한 향상된 진동에 의해 접촉 블록(142)과 접촉하는 눈 주위의 피부를 미세하게 떨리게 하여 눈 주위의 피부 건강 및 시력 개선에 도움을 주는 마사지를 할 수 있게 된다.

[0051] 한편, 상기 접촉 블록(142)에는 지압 돌기(146)가 형성되는데, 상기 지압 돌기(146)는 환형의 테(141)를 따라 돌출되어 눈 주위의 피부를 가압하게 된다. 이렇게, 접촉 블록(142)의 테(141)에서 돌출된 지압 돌기(146)는 접촉 블록(142)의 테(141)를 따라 여러 형태로 분포되어 형성될 수 있다.

[0052] 예를 들어, 상기 접촉 블록(142)에 형성된 지압 돌기(146)는 도면에 도시된 바와 같이 접촉 블록(142)의 표면으

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로부터 일정한 높이로 돌출된 반구 형태로 형성될 수도 있으며, 이러한 지압 돌기(146)가 접촉 블록(142)의 앞면과 뒷면에 형성된다.

[0053] 이렇게, 상기 접촉 블록(142)의 테(141)에 형성된 지압 돌기(146)는 접촉 블록(142)이 눈 주위에 밀착되었을 때 테(141)의 표면과 피부가 접촉하는 부분에 비해 지압 돌기(146)가 형성된 부분은 더욱 강력하게 피부를 가압하게 되는 마사지 효과를 얻을 수 있게 된다.

[0054] 상기와 같은 구성을 갖는 본 발명의 눈 마사지기(100)에 대한 사용을 도 6에 의거하여 설명한다.

[0055] 도 6은 본 발명에 따른 눈 마사지기의 사용을 나타낸 사용 상태도이다. 도면을 참조하여 설명하면, 사용자가 눈 주위의 피부를 마사지하기 위해 먼저 케이스(120)를 한 손으로 감싸 쥔 상태로 마사지부(140)의 접촉 블록(142)을 눈에 위치시키게 된다.

[0056] 이때, 상기 접촉 블록(142)에 형성된 통공(143) 내에 눈동자를 위치시킨 상태에서 케이스(120)의 커버(122)에 실치된 스위치(124)를 조작해 바이브레이터(110)를 작동시키게 된다. 이와 같이 바이브레이터(110)가 작동되면 진동이 프로브(130)와 캡(144)을 통해 접촉 블록(142)에 전달되어 피부가 미세하게 떨리게 되고, 상기와 같은 미세한 떨림에 의해 피부가 자극을 받아 혈액순환이 개선되어 눈 주위의 피부 건강과 혈액 순환에 따른 시력 개선에 도움을 주게 된다.

[0057] 특히, 상기와 같은 본 발명에 따른 눈 마사지기(100)는 휴대가 간편하여 사무실에서 업무 중 또는 차량의 운전 중과 같은 틈새 시간에 눈 주위의 피부를 마사지할 수 있을 뿐만 아니라 마사지 중에도 접촉 블록(142)에 형성된 통공(143)을 통해 사용자 전방의 시야를 확보할 수 있어 안전사고의 발생을 미연에 발생할 수 있다.

[0058] 또한, 본 발명의 눈 마사지기(100)는 케이스(120)의 선단에 마사지부(140)가 형성되되 상기 마사지부(140)의 접촉 블록(142)이 케이스(120)로부터 경사지게 형성되어 사용자가 팔을 높이 들어올리지 않고 마사지할 수 있어 팔의 근력 사용에 따른 피로 누적을 최소화시킬 수 있어 사용이 편리하다.

[0059] 한편, 본 발명은 앞서 설명한 실시예로 한정되는 것이 아니라 본 발명의 요지를 벗어나지 않는 범위 내에서 수정 및 변형하여 실시할 수 있고, 그러한 수정 및 변형이 가해진 것도 본 발명의 기술적 사상에 속하는 것으로 보아야 한다.

[0060] 예를 들어, 상기 접촉 블록에 형성된 지압 돌기는 앞선 설명 및 도면에 도시된 것으로 한정되지 않고 다양하게 변형되어 실시될 수 있다. 이를 도 7에 의거하여 설명한다.

[0061] 도 7은 본 발명에 따른 눈 마사지기 중 지압 돌기의 다른 실시예를 나타낸 사시도이다. 도면을 참조하여 설명하면, 상기 접촉 블록(142)에 형성된 지압 돌기(146)는 통공(143)의 둘레를 감싸는 테(141)에 형성되는데, 이때 상기 지압 돌기(141)는 통공(143)의 상하에 위치하는 테(141)에 타원형의 형태로 돌출되도록 형성하게 된다.

[0062] 이렇게, 상기 통공(143)의 상하에 지압 돌기(146)가 형성되면, 눈 마사지 시 지압 돌기(146)가 각각 눈동자와 눈썹 사이의 피부와 눈가 밑으로 생기는 다크서클이 발생하는 피부를 마사지하게 됨으로써, 혈액 순환 개선에 따른 피부 건강 및 시력 개선에 도움을 주게 된다.

부호의 설명

[0063]

100 : 눈 마사지기	110 : 바이브레이터
112 : 구동 모터	114 : 회전축
116 : 편심추	120 : 케이스
121 : 수납 공간	122 : 커버
123 : 리드 선	124 : 스위치
130 : 프로브	140 : 마사지부
141 : 테	142 : 접촉 블록
143 : 통공	144 : 캡

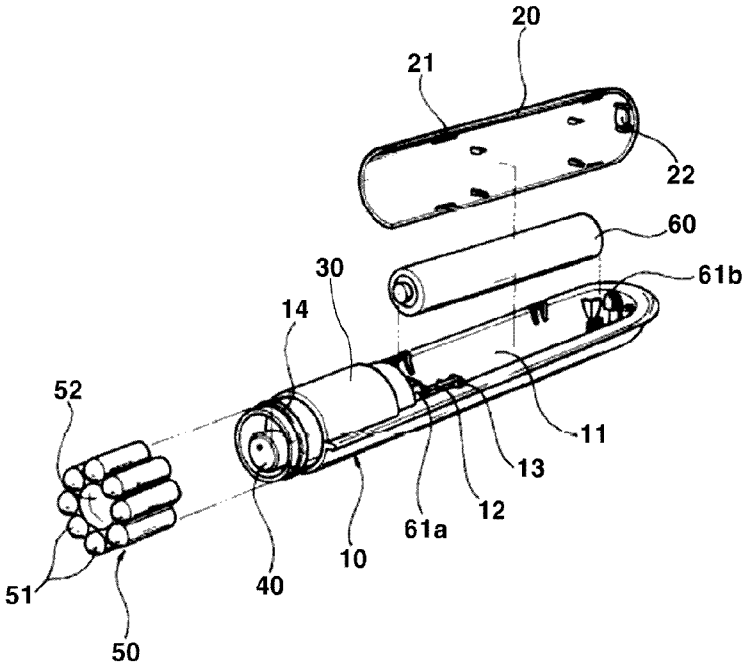
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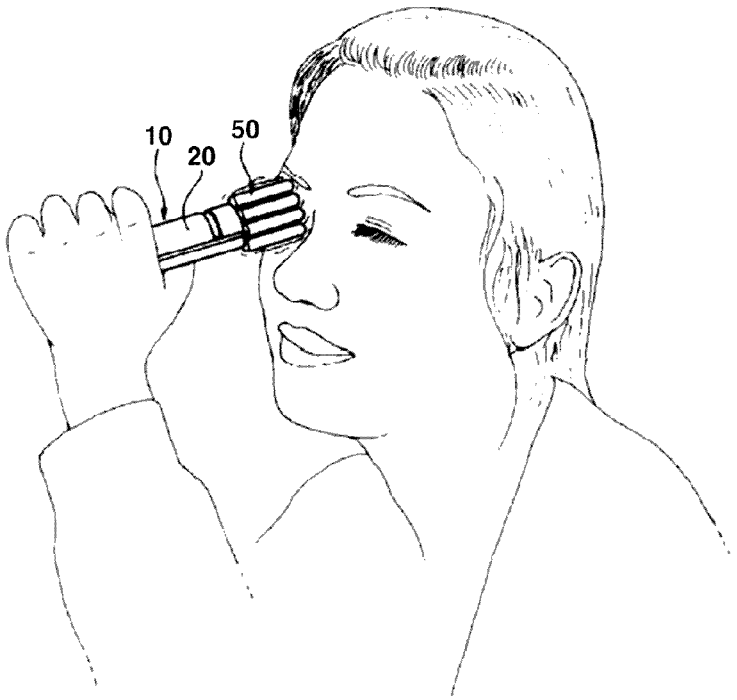
146 : 지압 돌기 150 : 건전지

도면

도면1



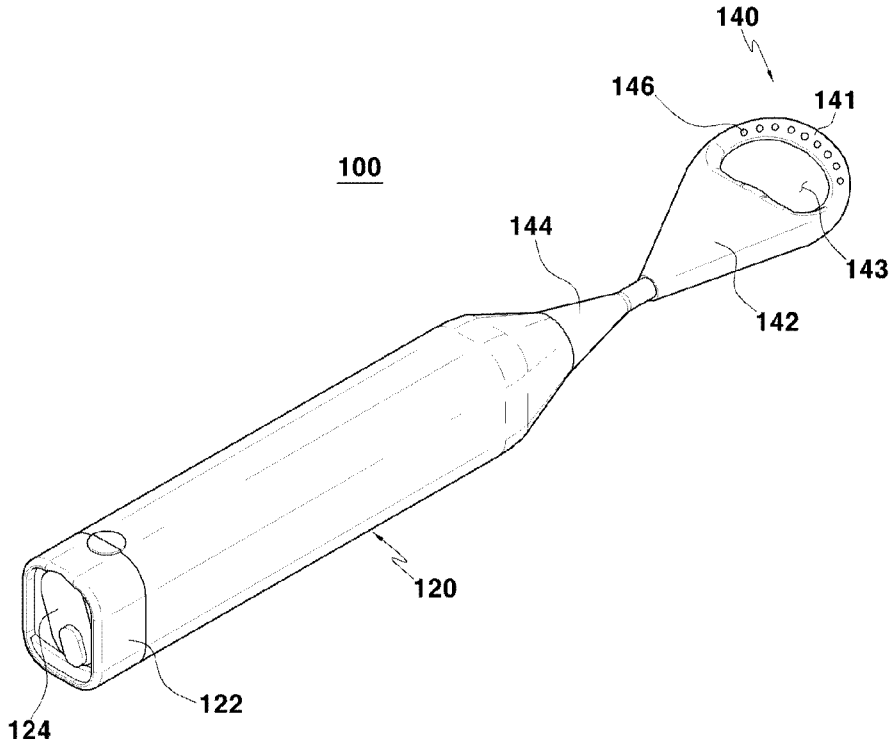
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Petitioner Therabody Ex-1004, 0927

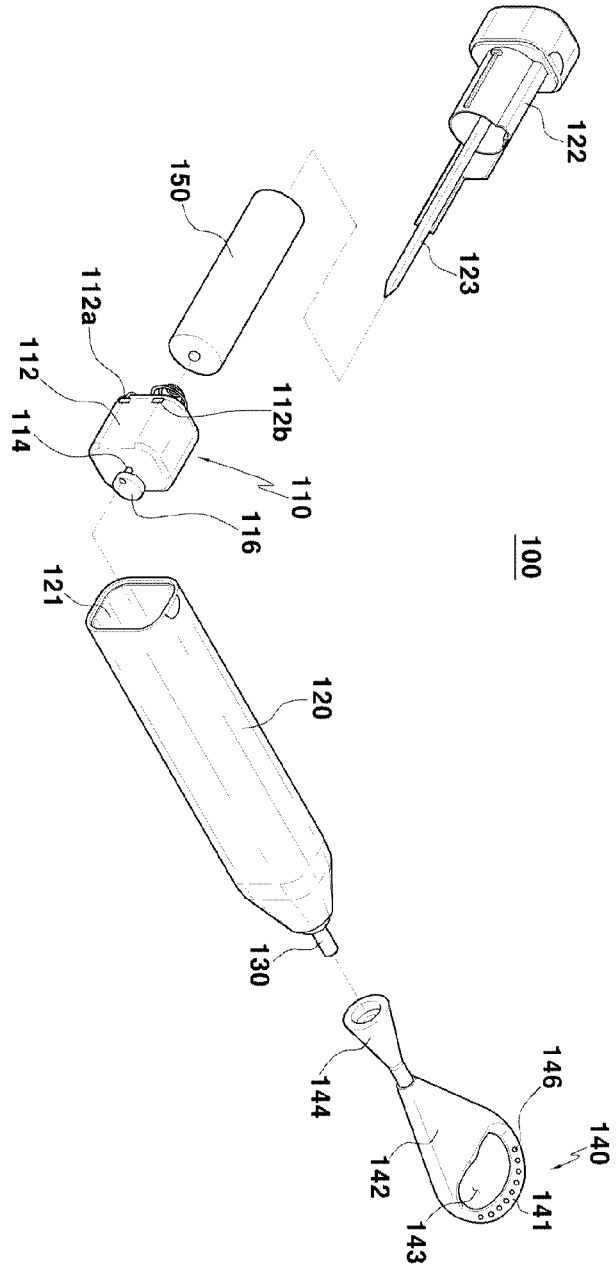
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Petitioner Therabody Ex-1004, 0928

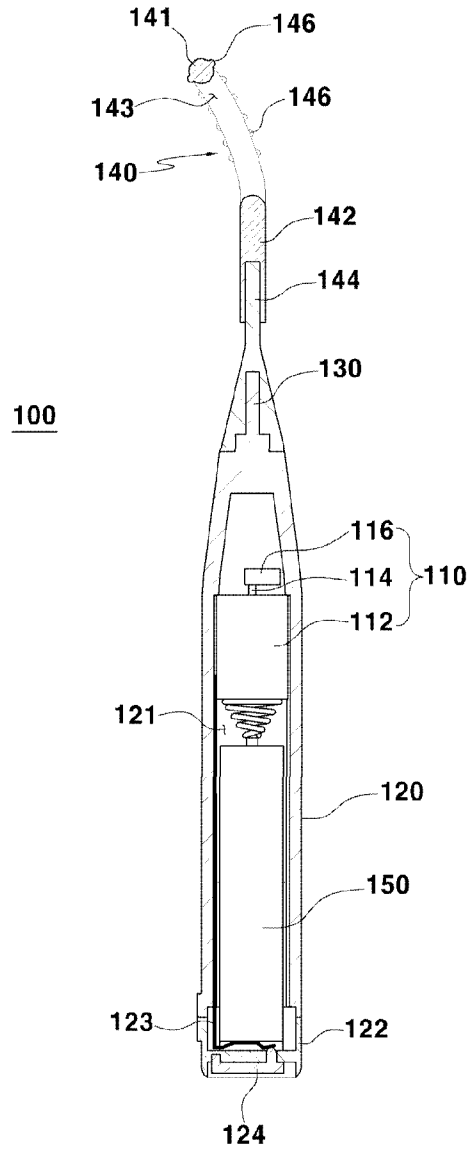
도면4



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Petitioner Therabody Ex-1004, 0929

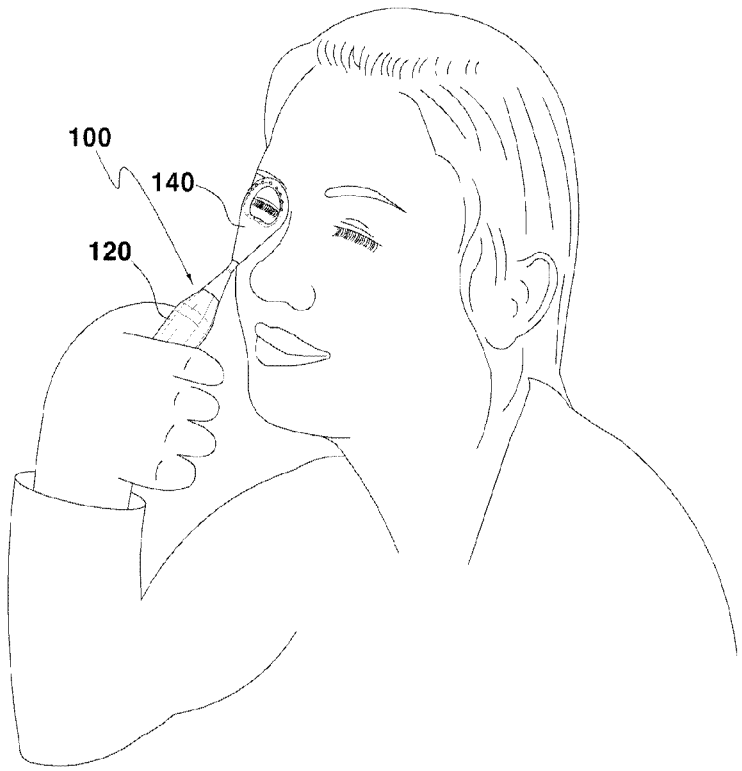
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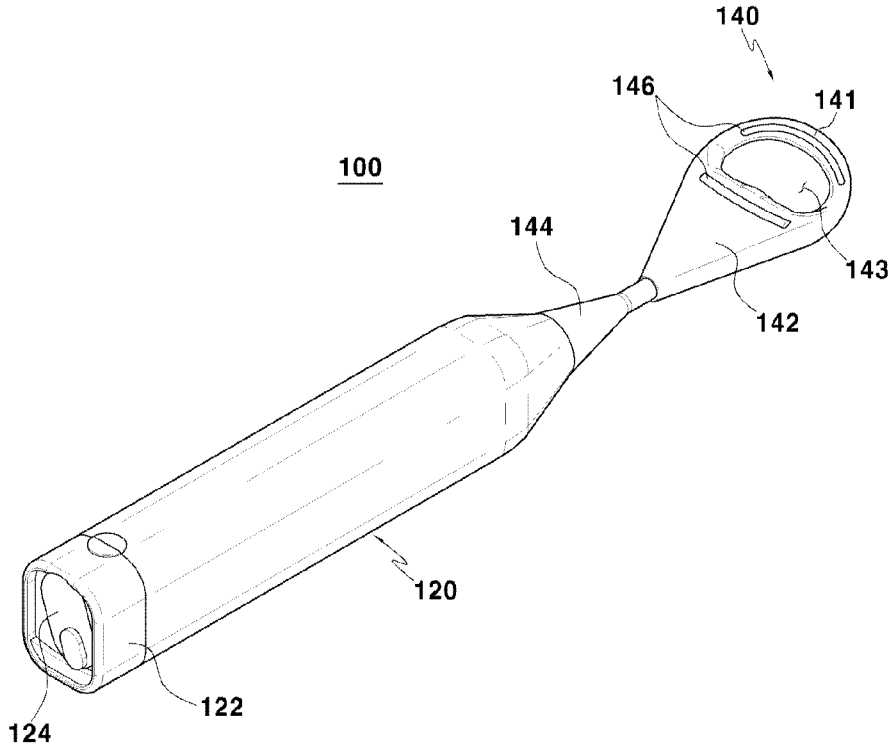
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도면6



도면7



【심사관 직권보정사항】

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【직권보정 1】

【보정항목】 청구범위

【보정세부항목】 청구항5

【변경전】

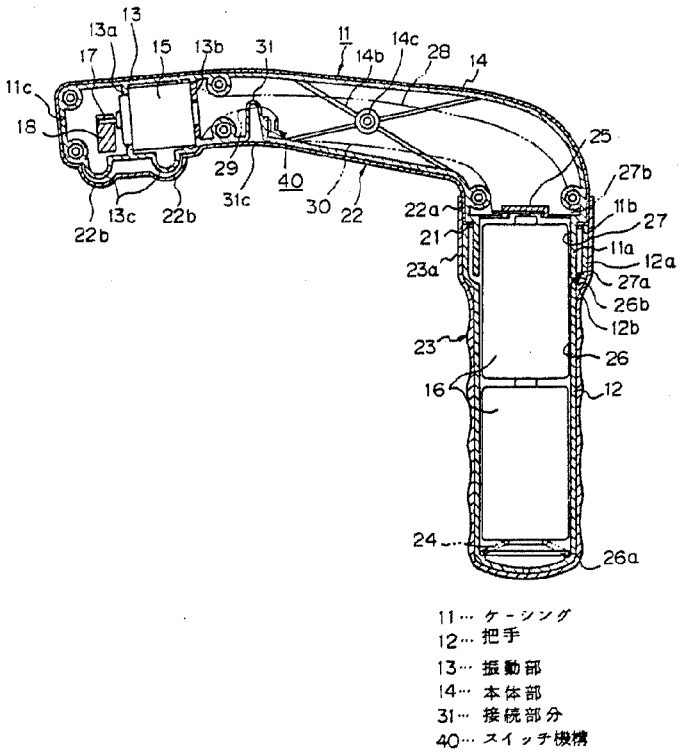
청구항 1 내지 4 중 적어도 어느 한 항에 있어서

【변경후】

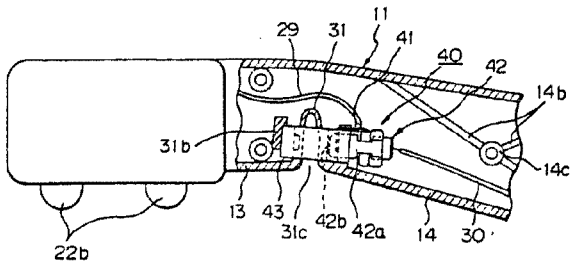
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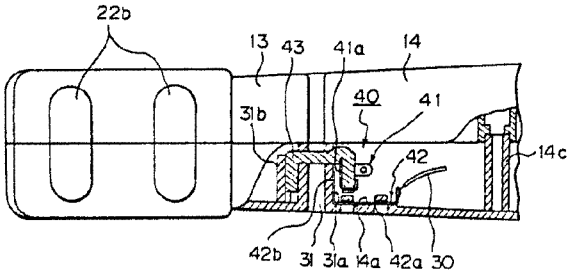
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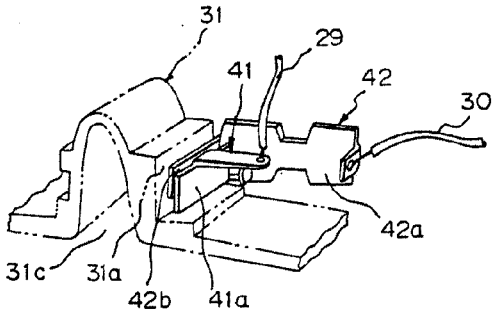
第 1 図



第 2 図



第 3 図　1047



第 4 図

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DESCRIPTION JPS6389158A

10 BACKGROUND OF THE INVENTION 1. Field of the Invention The present invention relates to a pine surger that vibrates and is pressed against an affected area. [Prior Art and Problems] Conventionally, as this type of Matsumatsu surger, an arm having a vibrating part to be pressed against the affected part is connected to a handle by a hinge, and a switch is activated by relative rotational displacement of the arm and the handle to cause vibration. It is known that parts vibrate. In other words, in use, when the vibration part is pressed against the affected part, the arm is rotationally displaced with respect to the handle in use, whereby the switch is turned on. However, in this conventional pine surger, the vibration of the vibrating part is transmitted to the handle, the vibration force applied to the affected part is weakened accordingly, and not only the pine surge effect cannot be sufficiently exerted, but also the handle vibrates. There is a problem that the hand holding the object feels uncomfortable. [Means for Solving Problems] In order to solve the above problems, the pine surger according to the present invention is integrally formed of a power source and a flexible material, and includes a vibrating portion and a main body portion that are pressed against an affected area. A casing having, a handle connected to the main body portion, a vibration source housed in the vibrating portion and driven by being supplied with electric power from the power source, and a switch for electrically connecting the power source and the vibration source. The casing is formed so as to be elastically deformed at the connecting portion between the vibrating portion and the main body portion, the switch mechanism is provided at the connecting portion, and the vibrating portion is bent by a predetermined amount or more with respect to the main body portion. It is characterized in that it is electrically conductive in the state. [Examples] The present invention will be described below with reference to illustrated examples. 1 to 4 show an embodiment of the present invention. In FIG. 1, a casing 11 and a handle 12 are made of polypropylene, for example, and the casing 11 has a vibrating portion 13 and a main body portion 14. A motor 15 is accommodated inside the vibrating portion 13, a switch mechanism 40 is accommodated inside the main body portion 14, and a dry battery 16 is accommodated inside the handle 12. An unbalanced portion jF118, which is eccentric to the shaft center, is attached to the output shaft 17 of the motor 15. When the switch R

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structure 40 is in the ONN state, the motor 15 is driven by being supplied with electric power from the dry battery 16, whereby the unbalance weight 18 rotates and the vibrating portion 13 of the casing 11 vibrates. The casing 11 and the handle 12 each have a cylindrical shape with a bottom, and an internal thread formed on the inner peripheral surface of the opening 12a of the handle 12 is screwed onto a male screw formed on the outer peripheral surface of the opening 11a of the casing 11. Are connected to each other by.

44 An O-ring 21 is inserted between the step 11b formed on the outer periphery of the base of the opening 11a of the casing 11 and the end surface of the opening 12g of the handle 12, whereby the inside and outside of the casing 11 and the handle 12 are watertight. Keep and shut off. The casing 11 and the handle 12 thus combined are covered with the first and second covers 22 and 23, which are cylindrical and have a bottom and are made of a flexible material such as polyvinyl chloride. The first cover 22 is in close contact with and covers the casing 11, and the opening 22g of this cover extends to the step portion flb of the casing opening 11a. On the other hand, the second cover 23 closely adheres to and covers the handle 12, and the opening 23a of this cover extends beyond the handle opening 12m to the outer peripheral surface of the opening 22m of the first cover 22 and closely adheres to this outer peripheral surface. And then fit. Thus, the inside and outside of the covers 22 and 23 are watertightly cut off, so that the insides of the casing 11 and the handle 12 are surely protected from the outside watertightness. The motor 15 is held by a pair of ribs 13a and 13b formed in the vibrating portion 13, and the output shaft 17 extends toward the bottom portion 11c of the casing 11. The vibrating portion 13 is formed with protrusions 1gc protruding outward, and the first cover 22 is formed with protrusions 22b corresponding to these protrusions 13c. The projections 13c and 22b are pressed against the affected area, and the vibration generated by the weight 18 is transmitted to the affected area via the projections. Two dry batteries 16 are accommodated in the handle 12 and connected in series.

0 The negative electrode of the dry battery 16 located in the lower part of the drawing abuts a spring 24 provided at the bottom of the handle 12, and the dry battery 16 located above The positive electrode contacts a contact fitting 25 provided at the base of the opening 11 a of the casing 11. The spring 24 is connected to a lower end portion 26a of a belt-shaped conductive member 26 provided along the inner wall of the handle 12, and an upper end portion 26b of the conductive member 26 is a hole formed at the base of the opening 12g of the handle 12. Lock to 12b. A conductive member 27 is provided on the inner wall surface 1 of the opening 11 a of the casing 11. The lower end portion 27a of the conductive member 27 is formed in an annular shape and is locked to the edge portion of the opening portion 11a to contact the upper end portion 26b of the conductive member 26 of the handle 12, and the upper end portion 27b of the conductive member 27 is located at the base portion of the opening portion 11a. Extend to. The lead wire 28 electrically connects the motor 15 to the upper end portion 27 b of the conductive member 27, that is, the negative electrode of the dry battery 16. On the other hand, the lead wires 29 and 30 electrically connect the motor 15 to the contact fitting 25, that is, the positive electrode of the dry battery 16 via the switch mechanism 40.

78 The switch mechanism 40 is provided at the connecting portion 31 between the vibrating portion 13 and the main body portion 14. The connecting portion 31 is thinner than the other

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portions, is formed by projecting inward of the casing 11 and is bent, and an opening 31c is formed below the connecting portion 31, and is provided over the entire width of the casing 11. The casing 11 is integrally molded from a flexible material, but substantially only the connecting portion 31 flexes. Therefore, when the vibration part 13 vibrates due to the rotation of the motor 15, this vibration is absorbed in the connection part 31 and is not transmitted to the main body part 14. Reinforcing ribs 14b and columns 14c are provided on the inner wall surface of the main body 14 to prevent the main body 14 itself from bending. 2 to 4 show the structure of the switch mechanism 40. The first contact fitting 41 is connected to the lead wire 29 on the motor 15 side, and the second contact fitting 42 is connected to the contact fitting 25 on the dry battery 16 side. It is connected to the lead wire 30. The second contact fitting 42 has a mounting portion 42 a fixed to the inner wall surface 14 a of the main body portion 14 and a contact portion 42 b that abuts on the outer surface 31 a of the connecting portion 31. The first contact metal fitting 41 is attached to a U-shaped mounting member 43 held between the connection portion 31 and the protrusion 31b provided in the vicinity thereof, and electrically connected to the contact portion 42b of the second contact metal fitting 42. It has a contact part 41a which can be contacted. When the vibrating part 13 is not pressed against the affected part of the user of the Matsumatsu surger, the connecting part 31 is in the illustrated state, and the contact parts 41a and 42b of the first and second contact fittings 41 and 42 are difficult to contact each other. Therefore, the switch nti40 is in the OFF state, and the motor 15 is stationary. On the other hand, when the protrusion 22b side of the vibrating portion 13 is pressed against the affected area, the connecting portion 31 is elastically deformed in the direction in which the opening 31c expands, whereby the second contact fitting 42 is displaced to the right in the figure, and the first contact fitting 42 is displaced. The 1st and 2nd contact point parts 41a and 42b electrically contact. As a result, the motor 15 rotates and the vibrating portion 13 vibrates. Next, when the vibrating part 13 is released from the affected part, the connection part 31 narrows the opening 31c and restores to the state shown in the drawing, and the contact parts 41a and 42b again pass N1 and the motor 15 stops. As described above, in this embodiment, the vibration part 13 is formed so as to be elastically deformed at the connection part 31 with respect to the main body part 14, and when the vibration part 13 is bent with respect to the main body part 14 by a predetermined amount or more, the switching device $ 140 is configured to be electrically conductive. Therefore, the switch Rt7A40 is not only reliable for 0N-OFF operation, but also has a simple structure and is inexpensive.

113 Further, substantially only the connecting portion 31 elastically bends and the other portions hardly bend, so that the vibration of the vibrating portion 13 is absorbed by the connecting portion 31 and is hardly transmitted to the main body portion 14. Therefore, most of the vibration of the vibrating part 13 is transmitted to the affected part, and the original effect of the pine surger is sufficiently exerted. Further, since the vibration of the handle 12 is small, it is easy to hold the handle 12. Further, since the casing 11 and the handle 12 are kept watertight and shielded from the outside to be assembled, the pine surge machine can be used in a place with a lot of water such as a bathroom. [Advantages of the Invention] As described above, according to the present invention, the vibration of the vibrating portion is

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sufficiently large, the pine surge effect is increased, and the vibration of the handle is reduced to facilitate the handling. ..

124 Brief description of the drawings

125 FIG. 1 is a sectional view showing an embodiment of the present invention, FIG. 2 is a side view showing a switch mechanism, FIG. 3 is a horizontal sectional view of the switch mechanism, and FIG. 4 is positions of first and second contact fittings. It is a perspective view which shows a relationship. 11... Casing, 12... Grip, 13... Vibrating part, 14... Main body part, 15... Motor, 16... Dry battery, 18... Unbalance weight, 31... Connection part, 40...Switch mechanism. 2nd 3rd 1047 40th

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⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　昭63－89158

⑤1Int.Cl.⁴	識別記号	庁内整理番号	⑬公開　昭和63年(1988)4月20日
A 61 H 23/02	332	7242－4C	

審査請求　有　発明の数 1　（全4頁）

⑤4発明の名称　マッサージ器

⑳特　願　昭61－233330
㉒出　願　昭61(1986)10月2日

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明　細　書

1．発明の名称

マッサージ器

2．特許請求の範囲

1．電源と、可撓性材料から一体的に成形され、患部に押当てられる振動部と本体部を有するケーシングと、上記本体部に連結される把手と、上記振動部に収容され、上記電源から電力を供給されて駆動される振動源と、上記電源と振動源を電気的に接続させるためのスイッチ機構とを備え、上記ケーシングは、振動部と本体部の接続部分において弾性変形するように成形され、上記スイッチ機構は該接続部分に設けられ、振動部が本体部に対して所定量以上撓んだ状態において電気的に導通することを特徴とするマッサージ器。

3．発明の詳細な説明

〔産業上の利用分野〕

本発明は振動して患部に押当てられるマッサージ器に関する。

〔従来の技術および問題点〕

従来この種のマッサージ器として、患部に押当てられる振動部を有するアームが把手に対してヒンジにより連結され、アームと把手の相対回転変位によりスイッチが作動して振動部が振動するものが知られている。すなわち、使用に際しこのマッサージ器は、振動部を患部に押当てるとアームが把手に対して回転変位し、これによりスイッチがオン状態となる。ところがこの従来のマッサージ器は、振動部の振動が把手に伝わり、この分だけ患部に付与される振動力が弱められてマッサージ効果が充分発揮し得ないばかりでなく、把手が振動するためにこれを保持する手が不快感を覚えるという問題がある。

〔問題点を解決するための手段〕

上記問題点を解決するため、本発明に係るマッサージ器は、電源と可撓性材料から一体的に成形され、患部に押当てられる振動部と本体部を有するケーシングと、上記本体部に連結される把手と、

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上記振動部に収容され、上記電源から電力を供給されて駆動される振動源と、上記電源と振動源を電気的に接続させるためのスイッチ機構とを備え、上記ケーシングは、振動部と本体部の接続部分において弾性変形するように成形され、上記スイッチ機構は接続部分に設けられ、振動部が本体部に対して所定量以上撓んだ状態において電気的に導通することを特徴としている。

〔実施例〕

以下図示実施例により本発明を説明する。

第１図～第４図は本発明の一実施例を示す。第１図において、ケーシング１１と把手１２は例えばポリプロピレンから成形され、ケーシング１１は、振動部１３と本体部１４を有する。振動部１３の内部にはモータ１５が、本体部１４の内部にはスイッチ機構４０が、また把手１２内には乾電池１６がそれぞれ収容される。モータ１５の出力軸１７には軸心に対して偏心するアンバランス分銅１８が取付けられる。モータ１５は、スイッチ機構４０がＯＮ状態となった時、乾電池１６から電力を供給されて駆動され、これによりアンバランス分銅１８が回転してケーシング１１の振動部１３が振動する。

ケーシング１１と把手１２はそれぞれ有底筒状を有し、把手１２の開口部12a の内周面に形成された雌ねじをケーシング１１の開口部11a の外周面に形成された雄ねじに螺合させることにより相互に結合される。ケーシング１１の開口部11a の基部外周に形成された段部11b と把手１２の開口部12a の端面との間にはＯリング２１が介挿され、これによりケーシング１１および把手１２の内外は水密を保って遮断される。このようにして結合されたケーシング１１および把手１２は、例えばポリ塩化ビニル等の可撓性材料から成形される有底筒状の第１および第２カバー22，23により被覆される。第１カバー２２はケーシング１１に密着してこれを覆い、このカバーの開口部22a はケーシング開口部11a の段部11b まで延びる。一方、第２カバー２３は把手１２に密着してこれを覆い、このカバーの開口部23a は把手開口部12a を越えて第１カバー２２の開口部22a の外周面まで延び、この外周面に密着して嵌合する。しかしてこれらカバー22，23の内外は水密を保って遮断され、これによりケーシング１１および把手１２の内部は確実に外部から水密を保って保護される。

モータ１５は振動部１３内に形成された一対のリブ13a，13bによって保持され、出力軸１７はケーシング１１の底部11c に向けて延びる。振動部１３には外方へ突出する突起13c が形成され、また第１カバー２２ にはこれらの突起13cに対応して突起22b が形成される。これらの突起13c，22b の部分は患部に押当てられ、分銅１８により生じる振動はこの突起の部分を介して患部に伝達される。

乾電池１６は把手１２の中に２個収容されて直列に接続される。図中下方に位置する乾電池１６の負極は把手１２の底部に設けられたばね２４に当接し、上方に位置する乾電池１６の正極はケーシング１１の開口部11a の基部に設けられた接点金具２５に当接する。ばね２４は、把手１２の内壁に沿って設けられた帯状の導電部材２６の下端部26a に接続し、この導電部材２６の上端部 26b は把手１２の開口部12aの基部に穿設された孔12b に係止する。ケーシング１１の開口部11a の内壁面には導電部材２７が設けられる。導電部材２７の下端部27a は環状に成形され開口部11a の縁部に係止して把手１２の導電部材２６の上端部26b に接触し、導電部材２７の上端部27bは開口部11a の基部まで延びる。リード線２８は、モータ１５を導電部材２７の上端部27b 、すなわち乾電池１６の負電極に電気的に接続させる。一方リード線29，30はスイッチ機構４０を介してモータ１５を接点金具２５、すなわち乾電池１６の正電極に電気的に接続させる。

スイッチ機構４０は、振動部１３と本体部１４の接続部分３１に設けられる。この接続部分３１は、他の部分よりも薄肉であり、ケーシング１１の内方へ突出させて折曲成形され、下方には開口31c が形成されており、ケーシング１１の全幅に

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わたって設けられている．ケーシング１１は可撓性材料から一体的に成形されるが、実質的に撓むのは接続部分３１のみである．したがって、モータ１５の回転により振動部１３が振動する時、この振動は接続部分３１において吸収され、本体部１４には伝達されない。なお本体部１４の内壁面には補強用リブ14b および支柱14c が設けられ、本体部１４自体の撓みが防止されている．

第２図～第４図はスイッチ機構４０の構造を示す．第１接点金具４１はモータ１５側のリード線２９に接続され、第２接点金具４２は乾電池１６側の接点金具２５に連結されるリード線３０に接続される．第２接点金具４２は本体部１４の内壁面14a に固定される取付部42a と、接続部分３１の外面31a に当接する接点部42b とを有する．第１接点金具４１は、接続部分３１とこれに近接して設けられた突起31b とにより挟持されるコ字状の取付部材４３に取付けられ、第２接点金具４２の接点部42b に電気的に接触可能な接点部41a.を有する．

振動部１３が本マッサージ器の使用者の患部に押当てられない時、接続部分３１は図示状態にあり、第１および第２接点金具41，42の各接点部41a，42bは互に離間し、したがってスイッチ機構４０はＯＦＦ状態にあり、モータ１５は静止している。これに対し、振動部１３の突起22b 側が患部に押当てられる時、接続部分３１は開口31c が拡大する方向に弾性変形し、これにより第２接点金具４２が図中右方へ変位して第１および第２接点部41a，42bが電気的に接触する．この結果、モータ１５が回動し、振動部１３が振動する．次で、振動部１３を患部から解放すると、接続部分３１が開口31c を狭めて図示状態まで復元し、接点部41a，42bが再び離間してモータ１５が停止する．

このように本実施例は、振動部１３が本体部１４に対し接続部分３１において弾性変形するように形成され、振動部１３が本体部１４に対して所定量以上撓んだ状態においてスイッチ機構４０が電気的に導通するように構成されている．したがってスイッチ機構４０は、ON－OFF 動作が確実であるばかりでなく、構造が簡単であり、安価なものとなる．また実質的に接続部分３１のみにおいて弾性的に撓み、他の部分はほとんど撓まないため、振動部１３の振動は接続部分３１において吸収され、本体部１４へはほとんど伝達されない．このため、振動部１３の振動はほとんど患部へ伝わり、マッサージ器の本来の効果が充分発揮されるようになり、また把手１２の振動が小さいために把手１２の保持が容易になる．さらに、ケーシング１１と把手１２は水密を保って外部から遮断されて組立てられるので、本マッサージ器を浴室等のように水分の多い所で使用することが可能となる．

〔発明の効果〕

以上のように本発明によれば、振動部の振動が充分大きなものとなってマッサージ効果が増大し、また把手の振動が減少して取扱いが容易になるという効果が得られる．

4．図面の簡単な説明

第１図は本発明の一実施例を示す断面図、

第２図はスイッチ機構を示す側面図、

第３図はスイッチ機構の水平断面図、

第４図は第１および第２接点金具の位置関係を示す斜視図である．

１１…ケーシング、

１２…把手、

１３…振動部、

１４…本体部、

１５…モータ、

１６…乾電池、

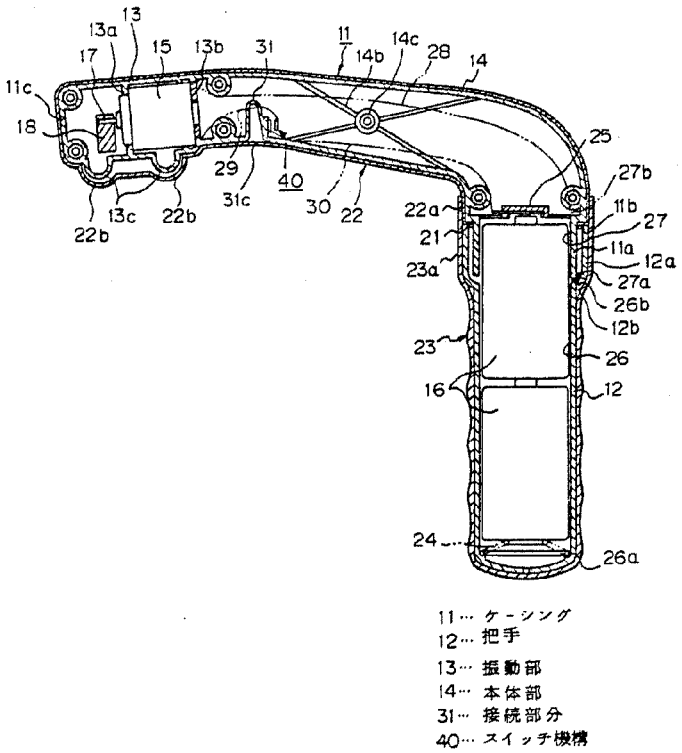
１８…アンバランス分銅、

３１…接続部分、

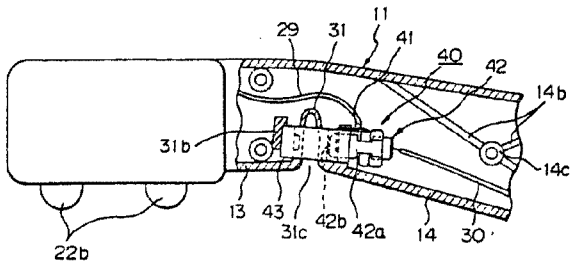
４０…スイッチ機構．

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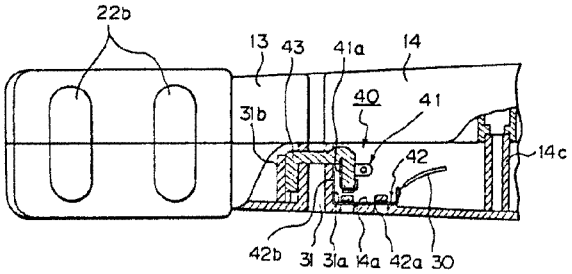
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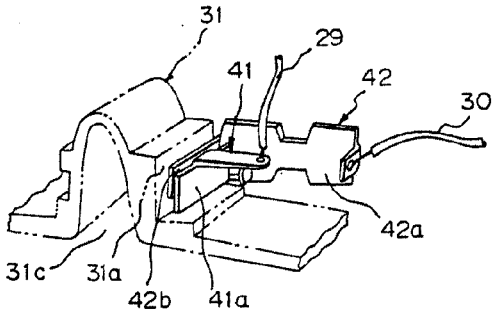
第 1 図



第 2 図



第 3 図　1047



第 4 図

MassagerPriorArt0000839

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(19) National Intellectual Property Administration, PRC

(12) Utility Model Patent

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*A61H **23/02**(2006.01)*

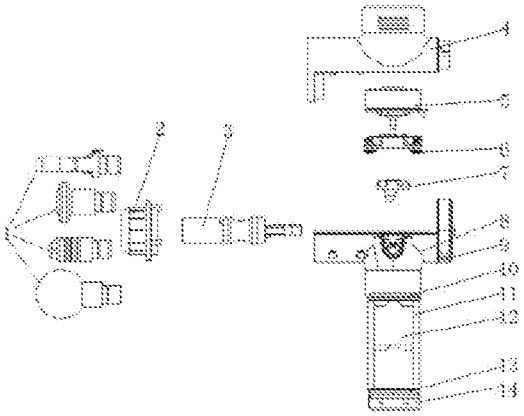
Claims: 1 page Description: 3 pages Drawings: 3 pages

(54) Title

Comfortable massager

(57) Abstract

The utility model discloses a comfortable massager, comprising an upper battery cover, internally installed with a battery pack, and the bottom end of the battery pack is connected with a PCB charging panel; the PCB charging panel is externally installed with a bottom battery cover, and the top end of the battery pack is connected with a PCB mainboard; the PCB mainboard is externally provided with a lower cover, the lower cover is internally installed with a transmission shaft; the top end of the right side of the transmission shaft is connected with an eccentric wheel, and the top end of the eccentric wheel is installed with a motor bracket; the top end of the motor bracket is connected with a motor, and the lower part of the motor is connected with the PCB mainboard; the top end of the motor is installed with an upper cover, and the bottom end of the upper cover is externally connected with a lower cover; the right side of the upper cover is externally installed with a rear cover, and the lower end of the left side of the rear cover is connected with the lower cover; the left end of the lower cover is externally installed with a front cover, and the external right side of the massage head is connected with the front cover. It may be convenient for the comfortable massage hammer to replace the massage head with a different shape. The vibration noise is smaller, and the massage hammer force is more appropriate.



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1. A comfortable massager, comprising an upper battery cover (11), wherein the upper battery cover (11) is internally installed with a battery pack (12), and the bottom end of the battery pack (12) is connected with a PCB charging panel (13); the PCB charging panel (13) is externally installed with a bottom battery cover (14), and the top end of the battery pack (12) is connected with a PCB mainboard (10); the PCB mainboard (10) is externally provided with a lower cover (8), and the lower cover (8) is internally installed with a transmission shaft (3); the top end of the right side of the transmission shaft (3) is connected with an eccentric wheel (7), and the top end of the eccentric wheel (7) is installed with a motor bracket (6); the top end of the motor bracket (6) is connected with a motor (5), and the lower part of the motor (5) is connected with the PCB mainboard (10); the top end of the motor (5) is installed with an upper cover (4), and the bottom end of the upper cover (4) is externally connected with a lower cover (8); the right side of the upper cover (4) is externally installed with a rear cover (9), and the lower end of the left side of the rear cover (9) is connected with the lower cover (8); the left end of the lower cover (8) is externally installed with a front cover (2), and the front cover (2) is internally connected with the transmission shaft (3); the left end of the transmission shaft (3) is internally installed with a massage head (1), and the external right side of the massage head (1) is connected with the front cover (2).

2. The comfortable massager of claim 1, wherein the transmission shaft (3) comprises a massage head metal connecting block (301), soft plastic (302), an eccentric wheel metal connecting block (303), a connecting through hole (304) and metal thread iron blocks (305); the left end of the eccentric wheel metal connecting block (303) is internally installed with the metal thread iron blocks (305), and the left end of the metal thread iron blocks (305) is externally installed with soft plastic (302); the left end of the soft plastic (302) is internally connected with the metal thread iron blocks (305), and the left end of the soft plastic (302) is externally installed with the massage head metal connecting block (301); the left end of the massage head metal connecting block (301) is internally provided with the connecting through hole (304).

3. The comfortable massager of claim 2, wherein the left and right sides of the soft plastic (302) are installed with the metal thread iron blocks (305), and vertical bisectors of two metal thread iron blocks (305) coincide with the left and right end faces of the soft plastic (302) respectively.

4. The comfortable massager of claim 2, wherein the inner diameter of the connecting through hole (304) is equal to the diameter of the right end of the massage head (1), and the massage head (1) is fixed with the connecting through hole (304) through the front cover (2).

5. The comfortable massager of claim 2, wherein the metal thread iron blocks (305) are fixed with the soft plastic (302) through injection molding, and the metal thread iron blocks (305) are fixed with the massage head metal connecting block (301) and the eccentric wheel metal connecting block (303) through thread structure.

6. The comfortable massager of claim 1, wherein the motor bracket (6) is made of nylon.

Comfortable Massager

Technical Field

[0001] The present utility model relates to the technical field of massage hammer, and specifically to a comfortable massager.

Background

[0002] Massage, also called Tuina, is a bright pearl in the treasure of traditional medicine in China. It has such functions as activating blood and alleviating pain, opening occlusions, dredging the channel, keeping Ying and Wei in balance, lubricating joints, running blood, regulating liver functions and enhancing disease resistance. The traditional Chinese medicine believes that, meridians can run blood, communicate the inside and the outside, connect organs, and run through the top and bottom. The human body connects all tissues and organs into an organic whole, in order to carry out normal life activities. The massager with high-frequency vibration is a health care instrument for dredging blood channel obstacles and promoting blood circulation quickly. It is one of symbols of human wisdom to use the massage instrument to eliminate fatigue or aches.

[0003] The commonly used small massage hammer has the massage head that is non-replaceable and with a fixed shape, large vibration and noise as well as stronger massage force.

Summary

[0004] The present utility model is to provide a comfortable massager, in order to solve the problem proposed in the above background that the massage head of the commonly used small massage hammer is non-replaceable and with a fixed shape, large vibration and noise as well as stronger massage force.

[0005] To achieve the above purpose, the present utility model discloses the following technical solutions: a comfortable massager, comprising an upper battery cover, wherein the upper battery cover is internally installed with a battery pack, and the bottom end of the battery pack is connected with a PCB charging panel; the PCB charging panel is externally installed with a bottom battery cover, and the top end of the battery pack is connected with a PCB mainboard; the PCB mainboard is externally provided with a lower cover, and the lower cover is internally installed with a transmission shaft; the top end of the right side of the transmission shaft is connected with an eccentric wheel, and the top end of the eccentric wheel is installed with a motor bracket; the top end of the motor bracket is connected with a motor, and the lower part of the motor is connected with the PCB mainboard; the top end of the motor is installed with an upper cover, and the bottom end of the upper cover is externally connected with a lower cover; the right side of the upper cover is externally installed with a rear cover, and the lower end of the left side of the rear cover is connected with the lower cover; the left end of the lower cover is externally installed with a front cover, and the front cover is internally connected with the transmission shaft; the left end of the transmission shaft is internally installed with a massage head, and the external right side of the massage head is connected with the front cover.

[0006] Preferably, the transmission shaft comprises a massage head metal connecting block, soft plastic, an eccentric wheel metal connecting block, a connecting through hole and a metal thread iron block; the left end of the eccentric wheel metal connecting block is internally installed with the metal thread iron blocks, and the left end of the metal thread iron blocks is externally installed with the soft plastic; the left end of the soft plastic is internally connected with the metal thread iron blocks, and the left end of the soft plastic is externally installed with the massage head metal connecting block; the left end of the massage head metal connecting block is internally provided with the connecting through hole.

[0007] Preferably, the left and right sides of the soft plastic are installed with metal thread iron blocks, and vertical bisectors of two metal thread iron blocks coincide with the left and right end faces of the soft plastic respectively.

[0008] Preferably, the inner diameter of the connecting through hole is equal to the diameter of the right end of the massage head, and the massage head is fixed with the connecting through hole through the front cover.

[0009] Preferably, the metal thread iron blocks are fixed with the soft plastic through injection molding, and the metal thread iron blocks are fixed with the massage head metal connecting block and the eccentric wheel metal connecting block through thread structure.

[0010] Preferably, the motor bracket is made of nylon.

[0011] Compared with the prior arts, the present utility model has the following beneficial effects: It may be convenient for the comfortable massage hammer to replace the massage head with a different shape. The vibration noise is smaller, and the massage hammer force is more appropriate. The motor bracket of the comfortable massage hammer is made of nylon; when the motor is connected with the motor bracket, the vibration of the motor is smaller, and the sound is very small, which reduce the volume of noise. The metal

thread iron blocks of the comfortable massage hammer are fixed with the soft plastic through injection molding, and the metal thread iron blocks are fixed with the massage head metal connecting block and the eccentric wheel metal connecting block through thread structure, so that the metal thread iron blocks can improve the connecting effects among the soft plastic by injection molding and the massage head metal connecting block, eccentric wheel metal connecting block, and prolong the useful life of the transmission shaft.

Brief Description of the Drawings

[0012] Fig. 1 is a decomposition structure diagram of the present utility model;

[0013] Fig. 2 is a schematic diagram of the overhead structure of the present utility model;

[0014] Fig.3 is a schematic diagram of the main view structure of the transmission shaft of the present utility model.

[0015] Callouts: 1. massage head, 2. front cover, 3. transmission shaft, 301. massage head metal connecting block, 302. soft plastic, 303. eccentric wheel metal connecting block, 304. connecting through hole, 305. metal thread iron block, 4. upper cover, 5. motor, 6. motor bracket, 7. eccentric wheel, 8. lower cover, 9. rear cover, 10. PCB mainboard, 11. upper battery cover, 12. battery pack, 13. PCB charging panel, 14. bottom battery cover.

Detailed Description

[0016] The technical solutions in the embodiment of the present utility model will be described clearly and completely in connection with the drawings in the embodiment of the present utility model in the following paragraphs. Obviously, the described embodiment is only part, but not all, of the embodiments of the present utility model. Based on the embodiment of the present utility model, other embodiments obtained by an ordinary person skilled in the art without creative efforts are also within the protection scope of the present utility model.

[0017] As shown in Figs. 1-3, the present utility model provides a technical solution: a comfortable massager, comprising an upper battery cover 11, wherein the upper battery cover 11 is internally installed with a comfortable massager 12, and the bottom end of the battery pack 12 is connected with a PCB charging panel 13; the PCB charging panel 13 is externally installed with a bottom battery cover 14, and the top end of the battery pack 12 is connected with a PCB mainboard10; the PCB mainboard 10 is externally provided with a lower cover 8, and the lower cover 8 is internally installed with a transmission shaft 3; the top end of the right side of the transmission shaft 3 is connected with an eccentric wheel 7, and the transmission shaft 3 comprises a massage head metal connecting block 301, soft plastic 302, an eccentric wheel metal connecting block 303, a connecting through hole 304 and metal thread iron blocks 305; the left end of the eccentric wheel metal connecting block 303 is internally installed with the metal thread iron block 305, and the left end of the metal thread iron block 305 is externally installed with soft plastic 302; the left end of the soft plastic 302 is internally connected with the metal thread iron blocks 305, and the left end of the soft plastic 302 is externally installed with the massage head metal connecting block 301; the left end of the massage head metal connecting block 301 is internally provided with the connecting through hole 304. Such structure makes the front and rear ends of the transmission shaft 3 are metal blocks, and the middle part is a soft rubber. In the massage & beating process, the soft rubber in the middle part can buffer some force, therefore, such a massager is more comfortable to massage. The left and right sides of the soft plastic 302 are installed with the metal thread iron blocks 305, and the vertical bisectors of two metal thread iron blocks 305 coincide with the left and right end faces of the soft plastic 302, respectively. This structure enables the metal thread iron blocks 305 to be evenly distributed in the soft plastic 302, massage head metal connecting block 301 and the eccentric wheel metal connecting block 303 for good connection and reinforcement. The inner diameter of the connecting through hole 304 is equal to the diameter of the right end of the massage head, and the massage head 1 is fixed with the connecting through hole 304 through the front cover 2, so that a user can unscrew the front cover 2 to pull the massage head out of the connecting through hole 304, in order to replace the massage head 1 of another shape for targeted massage on other body parts. The metal thread iron blocks 305 is fixed with the soft plastic 302 through injection molding, and the metal thread iron blocks 305 are fixed with the massage head metal connecting block 301 and the eccentric wheel metal connecting block 303 through thread structure, so that the metal thread iron blocks 305 can improve the connecting effects among the soft plastic 302 by injection molding and the massage head metal connecting block 301, eccentric wheel metal connecting block 303, and prolong the useful life of the transmission shaft 3. The top end of the eccentric wheel 7 is installed with a motor bracket 6; the top end of the motor bracket 6 is connected with a motor 5, and the motor bracket 6 is made of nylon; when the motor 5 is connected with the motor bracket 6, the vibration of the motor 5 is smaller, and the sound is very small, thus reducing the volume of noise. The lower part of the motor 5 is connected with the PCB mainboard 10; the top end of the motor 5 is installed with an upper cover 4, and the bottom end of the upper cover 4 is externally connected with a lower cover 8; the right side of the upper cover 4 is externally installed with a rear cover 9, and the lower end of the left side of the rear cover 9 is connected with the lower cover 8; the

left end of the lower cover 8 is externally installed with a front cover 2, and the front cover 2 is internally connected with a transmission shaft 3; the left end of the transmission shaft 3 is internally installed with a massage head 1, and the externalright side of the massage head 1 is connected with the front cover 2.

[0018] Working principles: When using the comfortable massage hammer, first inspect whether this device is damaged, cracked and dirty; start use if everything is in good condition; charge the PCB charging panel 13 in the upper battery cover 11 to make the battery pack 12 full of electric energy, then install the bottom battery cover 14, and the PCB mainboard 10 starts the motor 5 to work. This process is a public and transparent technology which will not be described here anymore. The motor 5 is externally connected with the motor bracket 6 to reduce noise; the shaft of the motor 5 is connected with the eccentric wheel 7, and the eccentric wheel 7 is connected with the transmission shaft 3 through the eccentric wheel metal connecting block 303 to move; the transmission shaft 3 is connected with the massage head 1 through the massage head metal connecting block 301 so that the massage head 1 vertically massage. The soft plastic 302 connected with the massage head metal connecting block 301 and the eccentric wheel metal connecting block 303 through the metal thread iron blocks 305 can buffer some force in the massage process, so that a user feels more comfortable when using the massager. When the user needs to replace the massage head, just unscrew the front cover 2 and pull out the massage head 1 from the connecting through hole 304, then replace it with another massage head 1, and then screw the front cover 2, consequently to complete a series of work.

[0019] Although the present utility model is illustrated in detail with reference to the above embodiment, those skilled in the art can still modify the technical solutions described in the above embodiment, or equivalently replace some technical features therein, and any modification, equivalent replacement, improvement, etc. made within the spirit and principle of the present utility model shall be included in the protection scope of the present utility model.

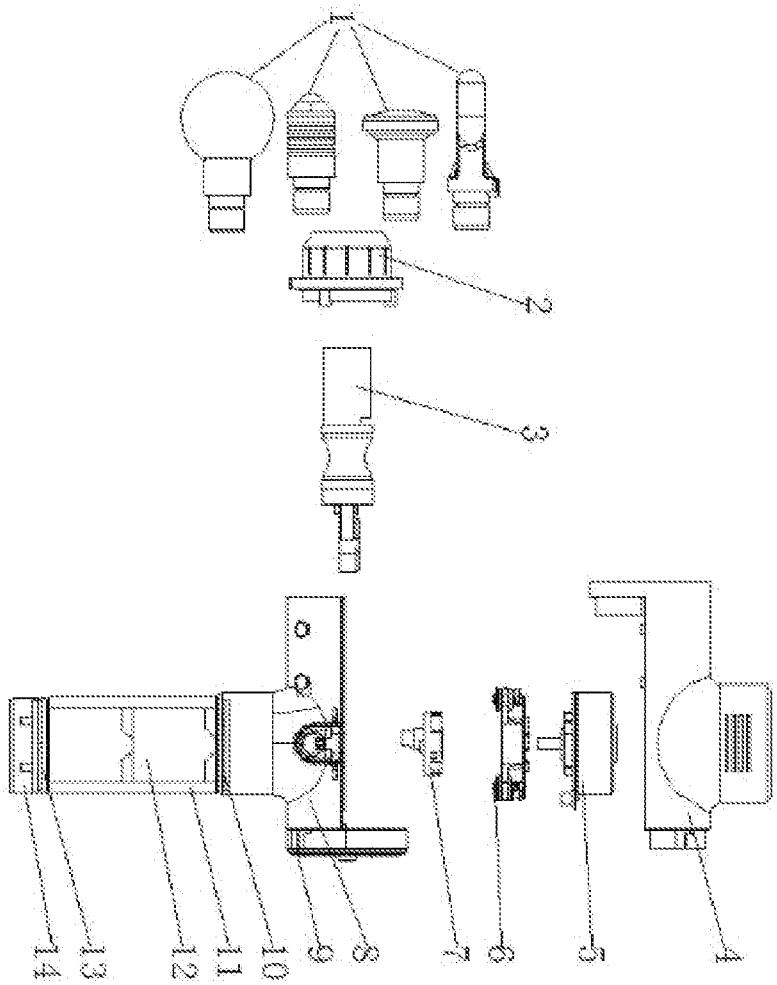


Fig. 1

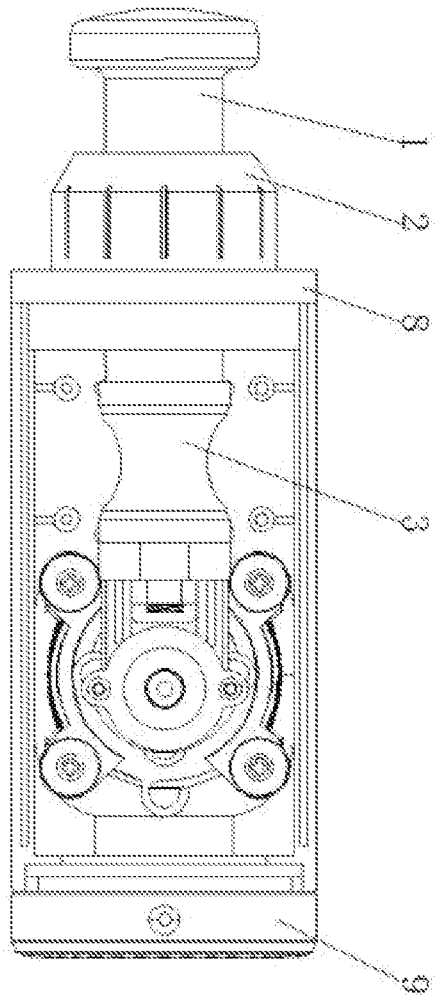


Fig. 2

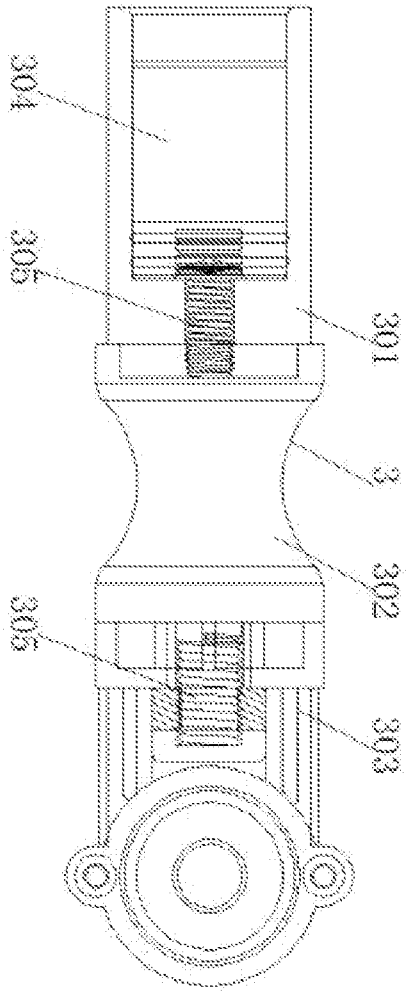


Fig. 3

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(19)中华人民共和国国家知识产权局

(12)实用新型专利

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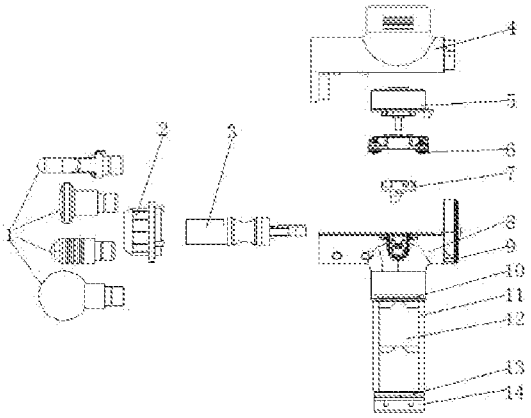
权利要求书1页 说明书3页 附图3页

(54)实用新型名称

一种舒适型按摩器

(57)摘要

本实用新型公开了一种舒适型按摩器，包括电池上盖，所述电池上盖内部安装有电池组，且电池组底端连接有PCB充电板，所述PCB充电板外部安装有电池底盖，所述电池组顶端连接有PCB主板，且PCB主板外部设置有下盖，所述下盖内部安装有传动轴，且传动轴右侧顶端连接有偏心轮，所述偏心轮顶端安装有电机支架，且电机支架顶端连接有电机，所述电机下部连接有PCB主板，且电机顶端安装有上盖，所述上盖底端外侧连接有下盖，且上盖右侧外部安装有后盖，所述后盖左侧下端连接有下盖，且下盖左端外部安装有前盖，所述按摩头外部右侧连接有前盖。该舒适型按摩锤可以方便的替换不同形状的按摩头，且震动传递的噪音较小，按摩捶打力度较为合适。



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1.一种舒适型按摩器，包括电池上盖(11)，其特征在于：所述电池上盖(11)内部安装有电池组(12)，且电池组(12)底端连接有PCB充电板(13)，所述PCB充电板(13)外部安装有电池底盖(14)，所述电池组(12)顶端连接有PCB主板(10)，且PCB主板(10)外部设置有下盖(8)，所述下盖(8)内部安装有传动轴(3)，且传动轴(3)右侧顶端连接有偏心轮(7)，所述偏心轮(7)顶端安装有电机支架(6)，且电机支架(6)顶端连接有电机(5)，所述电机(5)下部连接有PCB主板(10)，且电机(5)顶端安装有上盖(4)，所述上盖(4)底端外侧连接有下盖(8)，且上盖(4)右侧外部安装有后盖(9)，所述后盖(9)左侧下端连接有下盖(8)，且下盖(8)左端外部安装有前盖(2)，所述前盖(2)内部连接有传动轴(3)，且传动轴(3)左端内部安装有按摩头(1)，所述按摩头(1)外部右侧连接有前盖(2)。

2.根据权利要求1所述的一种舒适型按摩器，其特征在于：所述传动轴(3)包括按摩头金属连接块(301)、软塑胶(302)、偏心轮金属连接块(303)、连接通孔(304)和金属螺纹铁块(305)，偏心轮金属连接块(303)左端内部安装有金属螺纹铁块(305)，且金属螺纹铁块(305)左端外部安装有软塑胶(302)，软塑胶(302)左端内部连接有金属螺纹铁块(305)，软塑胶(302)左端外部安装有按摩头金属连接块(301)，按摩头金属连接块(301)左端内部设置有连接通孔(304)。

3.根据权利要求2所述的一种舒适型按摩器，其特征在于：所述软塑胶(302)左右两侧均安装有金属螺纹铁块(305)，2个金属螺纹铁块(305)的竖向平分线分别与软塑胶(302)左右端面重合。

4.根据权利要求2所述的一种舒适型按摩器，其特征在于：所述连接通孔(304)内径等于按摩头(1)右端直径，且按摩头(1)通过前盖(2)与连接通孔(304)为固定结构。

5.根据权利要求2所述的一种舒适型按摩器，其特征在于：所述金属螺纹铁块(305)通过注塑与软塑胶(302)成固定结构，金属螺纹铁块(305)通过螺纹结构与按摩头金属连接块(301)和偏心轮金属连接块(303)成固定结构。

6.根据权利要求1所述的一种舒适型按摩器，其特征在于：所述电机支架(6)为尼龙材质。

一种舒适型按摩器

技术领域

[0001] 本实用新型涉及按摩锤技术领域，具体为一种舒适型按摩器。

背景技术

[0002] 按摩又称推拿，是我国医学宝库的一颗明珠，按摩具有活血止痛、开通闭塞、疏通经络、调和营卫、滑利关节、运行气血、调整脏肝功能、增强抗病能力等作用，中医学认为，经络在人体内有运行气血，沟通内外，联络脏腑，贯穿上下的作用，人体通过经络系统把各个组织器官连成一个有机的整体，以进行正常的生命活动，高频振动的按摩器是迅速疏通血路障碍促进血液循环的保健器械，借助按摩器材来消除疲劳或酸疼部分，是人类智慧象征之一。

[0003] 常用的小型按摩锤存在按摩头为固定形状不可替换，震动以及噪音较大，且按摩力度较大的情况。

发明内容

[0004] 本实用新型的目的在于提供一种舒适型按摩器，以解决上述背景技术中提出的常用的小型按摩锤存在按摩头为固定形状不可替换，震动以及噪音较大，且按摩力度较大的问题。

[0005] 为实现上述目的，本实用新型提供如下技术方案：一种舒适型按摩器，包括电池上盖，所述电池上盖内部安装有电池组，且电池组底端连接有PCB充电板，所述PCB充电板外部安装有电池底盖，所述电池组顶端连接有PCB主板，且PCB主板外部设置有下盖，所述下盖内部安装有传动轴，且传动轴右侧顶端连接有偏心轮，所述偏心轮顶端安装有电机支架，且电机支架顶端连接有电机，所述电机下部连接有PCB主板，且电机顶端安装有上盖，所述上盖底端外侧连接有下盖，且上盖右侧外部安装有后盖，所述后盖左侧下端连接有下盖，且下盖左端外部安装有前盖，所述前盖内部连接有传动轴，且传动轴左端内部安装有按摩头，所述按摩头外部右侧连接有前盖。

[0006] 优选的，所述传动轴包括按摩头金属连接块、软塑胶、偏心轮金属连接块、连接通孔和金属螺纹铁块，偏心轮金属连接块左端内部安装有金属螺纹铁块，且金属螺纹铁块左端外部安装有软塑胶，软塑胶左端内部连接有金属螺纹铁块，软塑胶左端外部安装有按摩头金属连接块，按摩头金属连接块左端内部设置有连接通孔。

[0007] 优选的，所述软塑胶左右两侧均安装有金属螺纹铁块，2个金属螺纹铁块的竖向平分线分别与软塑胶左右端面重合。

[0008] 优选的，所述连接通孔内径等于按摩头右端直径，且按摩头通过前盖与连接通孔为固定结构。

[0009] 优选的，所述金属螺纹铁块通过注塑与软塑胶成固定结构，金属螺纹铁块通过螺纹结构与按摩头金属连接块和偏心轮金属连接块成固定结构。

[0010] 优选的，所述电机支架为尼龙材质。

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[0011] 与现有技术相比，本实用新型的有益效果是：该舒适型按摩锤可以方便的替换不同形状的按摩头，且震动传递的噪音较小，按摩捶打力度较为合适。本舒适型按摩锤的电机支架为尼龙材质，电机连接电机支架时电机震动比较小，而且声音也很小，降低了噪音的音量，本舒适型按摩锤的金属螺纹铁块通过注塑与软塑胶成固定结构，金属螺纹铁块通过螺纹结构与按摩头金属连接块和偏心轮金属连接块成固定结构，使得金属螺纹铁块能够提高注塑与软塑胶与按摩头金属连接块和偏心轮金属连接块之间的连接效果，延长传动轴的使用寿命。

附图说明

[0012] 图1为本实用新型分解结构示意图；

[0013] 图2为本实用新型俯视结构示意图；

[0014] 图3为本实用新型传动轴主视结构示意图。

[0015] 图中：1、按摩头，2、前盖，3、传动轴，301、按摩头金属连接块，302、软塑胶，303、偏心轮金属连接块，304、连接通孔，305、金属螺纹铁块，4、上盖，5、电机，6、电机支架，7、偏心轮，8、下盖，9、后盖，10、PCB主板，11、电池上盖，12、电池组，13、PCB充电板，14、电池底盖。

具体实施方式

[0016] 下面将结合本实用新型实施例中的附图，对本实用新型实施例中的技术方案进行清楚、完整地描述，显然，所描述的实施例仅仅是本实用新型一部分实施例，而不是全部的实施例。基于本实用新型中的实施例，本领域普通技术人员在没有做出创造性劳动前提下所获得的所有其他实施例，都属于本实用新型保护的范围。

[0017] 请参阅图1-3，本实用新型提供一种技术方案：一种舒适型按摩器，包括电池上盖11，电池上盖11内部安装有电池组12，且电池组12底端连接有PCB充电板13，PCB充电板13外部安装有电池底盖14，电池组12顶端连接有PCB主板10，且PCB主板10外部设置有下盖8，下盖8内部安装有传动轴3，且传动轴3右侧顶端连接有偏心轮7，传动轴3包括按摩头金属连接块301、软塑胶302、偏心轮金属连接块303、连接通孔304和金属螺纹铁块305，偏心轮金属连接块303左端内部安装有金属螺纹铁块305，且金属螺纹铁块305左端外部安装有软塑胶302，软塑胶302左端内部连接有金属螺纹铁块305，软塑胶302左端外部安装有按摩头金属连接块301，按摩头金属连接块301左端内部设置有连接通孔304，此结构使得传动轴3前后两端为金属块，中间部分为软性胶体，在按摩捶打的过程中，中间的软胶可以缓冲一部分的力量，这样的按摩器按摩起来较为舒适，软塑胶302左右两侧均安装有金属螺纹铁块305，2个金属螺纹铁块305的竖向平分线分别与软塑胶302左右端面重合，此结构使得金属螺纹铁块305能够均匀的分布在软塑胶302、按摩头金属连接块301和偏心轮金属连接块303内部，起到良好的连接加固作用，连接通孔304内径等于按摩头1右端直径，且按摩头1通过前盖2与连接通孔304为固定结构，此结构使得使用者可以旋转拧开前盖2将按摩头1从连接通孔304内拔出，以替换其他形状的按摩头1对其他身体部位进行针对性的按摩捶打，金属螺纹铁块305通过注塑与软塑胶302成固定结构，金属螺纹铁块305通过螺纹结构与按摩头金属连接块301和偏心轮金属连接块303成固定结构，此结构使得金属螺纹铁块305能够提高注塑与软塑胶302与按摩头金属连接块301和偏心轮金属连接块303之间的连接效果，延长传

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动轴3的使用寿命，偏心轮7顶端安装有电机支架6，且电机支架6顶端连接有电机5，电机支架6为尼龙材质，电机5连接电机支架6时电机5震动比较小，而且声音也很小，降低了噪音的音量，电机5下部连接有PCB主板10，且电机5顶端安装有上盖4，上盖4底端外侧连接有下盖8，且上盖4右侧外部安装有后盖9，后盖9左侧下端连接有下盖8，且下盖8左端外部安装有前盖2，前盖2内部连接有传动轴3，且传动轴3左端内部安装有按摩头1，按摩头1外部右侧连接有前盖2。

[0018] 工作原理：在使用该舒适型按摩锤时，先检查本装置有无破损、开裂、脏污之处，若一切完好则开始使用，首先对电池上盖11内的PCB充电板13进行充电动作令电池组12蓄满电能之后安装上电池底盖14，PCB主板10启动电机5工作，此过程为公开透明技术，在此不做过多描述，电机5外部连接电机支架6能够减小噪音，电机5的电机轴连接偏心轮7，偏心轮7通过偏心轮金属连接块303连接传动轴3运动，传动轴3通过按摩头金属连接块301连接按摩头1使按摩头1垂直运动击打按摩，通过金属螺纹铁块305与按摩头金属连接块301和偏心轮金属连接块303连接的软塑胶302在按摩捶打的过程中能够缓冲掉一部分的力量，令按摩器按摩时使用者更加舒适，当使用者需要更换按摩头1时，只需拧开前盖2，将按摩头1从连接通孔304内拔出，然后替换上其它的按摩头1即可，然后再拧上前盖2，从而完成一系列工作。

[0019] 尽管参照前述实施例对本实用新型进行了详细的说明，对于本领域的技术人员来说，其依然可以对前述各实施例所记载的技术方案进行修改，或者对其中部分技术特征进行等同替换，凡在本实用新型的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本实用新型的保护范围之内。

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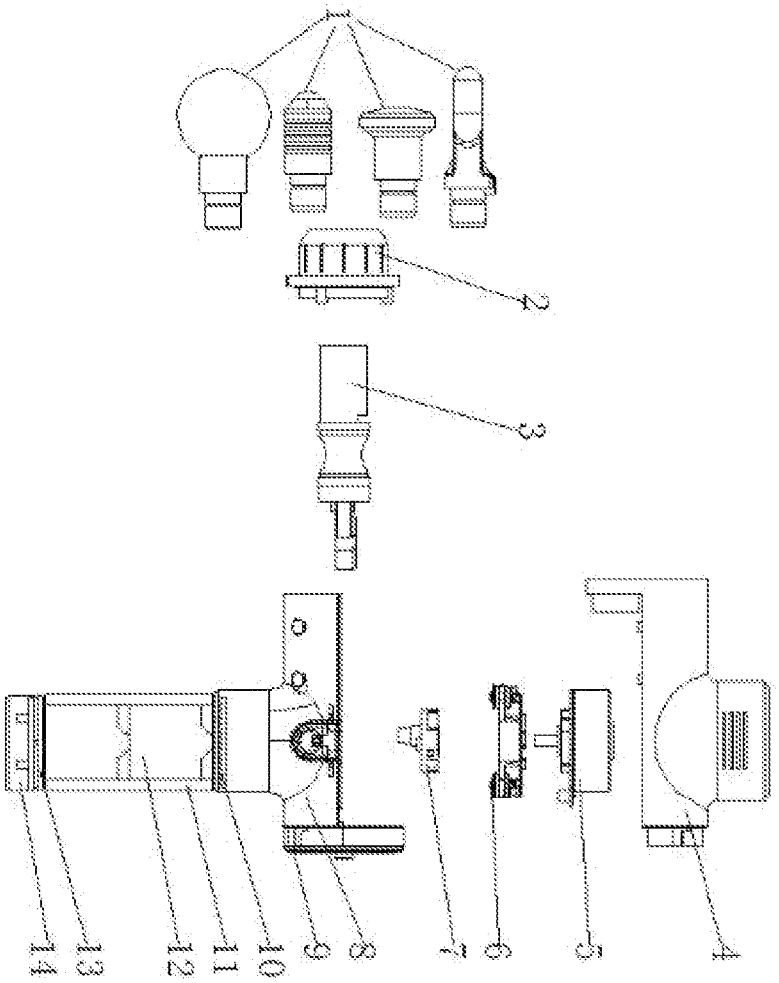


图1

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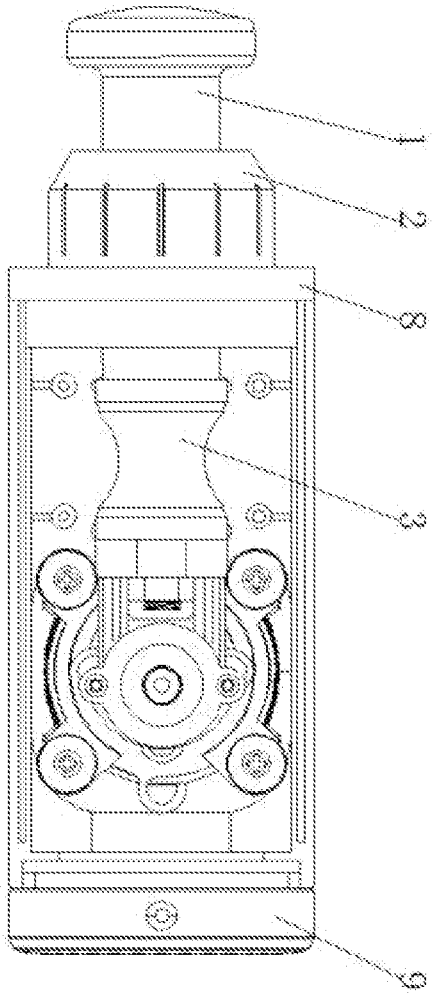


图2

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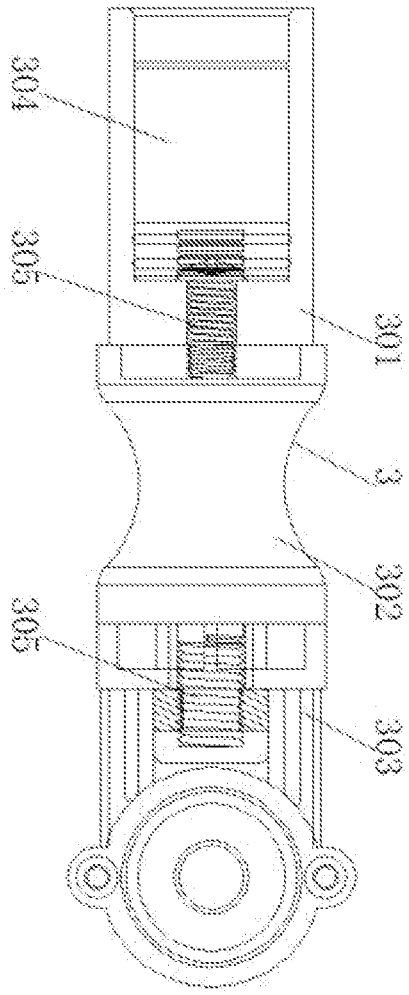


图3

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FI199003376A MASSAGEAPPARAT.

Publication Number: FI199003376A

Title: MASSAGEAPPARAT.

Abstract:

The invention relates to massage apparatus comprising a body 1, a rotating member 3 or similar provided with at least one cam 2, a motor 4 designed to drive the member 3, at least one arm component 6, one end of which presses against the cam 2 while the other end extends beyond the body, so that rotation of the member 3 brings about a backward and forward motion in that end extending beyond the body, the actual massage device 8, a device for regulation of the motor 4 and wheel members 9,10. In order to make the apparatus versatile it has at least one motor 11,12 designed to drive and turn the wheel members 9,10 and a remote control device RL, with which the person undergoing massage can control the motor 11,12 acting upon the wheel members in order to move the apparatus to the correct position. <IMAGE>

Claims:

Description:

Inventor - w/address: MIRFAKHRAEI KAVEH

Assignee - DWPI:

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UTLAGGNINGSSKRIFT
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C (45) Patentti myönnetty
Patent meddelat 10 04 1992

(51) Kv.lk.5 - Int.cl.5

A 61H 23/02, 7/00

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(41) Tullut julkiseksi - Blivit offentlig 31.12.91

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(FI)

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Patent- och registerstyrelsen

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(72) Keksijä - Uppfinnare

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(54) Keksinnön nimitys - Uppfinningens benämning

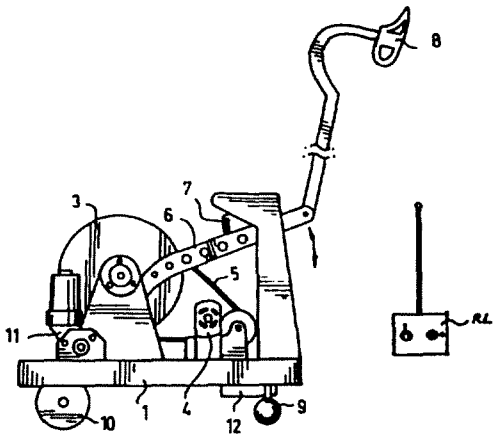
Hierontalaite
Massageapparat

(56) Viitejulkaisut - Anförda publikationer

US A 3996929 (A 61H 11/00)

(57) Tiivistelmä - Sammandrag

Keksinnön kohteena on hierontalaite, joka käsittää runko-osan (1), ainakin yhdellä nokalla (2) varustetun pyörivän elimen (3) tai vastaavan, moottorin (4), joka on sovitettu pyörittämään elintä (3), ainakin yhden varsiosan (6), jonka toinen pää painautuu nokkaa (2) vasten ja toinen pää ulottuu runko-osan ulkopuolelle, jolloin elimen (3) pyöriminen saa aikaan varsiosan runko-osan ulkopuolelle ulottuvan pään edestakaisen liikkeen, varsinaisen hierontavälineen (8), välineet moottorin (4) säätämiseksi ja pyöräelimet (9,10). Monipuolisen laitteen aikaansaamiseksi laitteessa on ainakin yksi moottori (11, 12), joka on sovitettu pyörittämään ja kääntämään pyöräelimiä (10,9) ja kauko-ohjuslaitteen (RL), jolla hieronnan kohteena oleva ihminen voi ohjata pyöräelimiin vaikuttavaa moottoria (11,12) laitteen siirtämiseksi oikeaan kohtaan.



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Uppfinningen avser en massageapparat omfattande en stomdel (1), ett med åtminstone en nock (2) försett roterande organ (3) eller motsvarande, en motor (4) anordnad att driva organet (3), åtminstone en armkomponent (6), vars ena ända trycker mot nocken (2) och andra ända går utanför stomdelen, varvid organets (3) rotation åstadkommer en fram och åter gående rörelse i den utanför stomdelen gående ändan, det egentliga massageorganet (8), organ för reglering av motorn (4) och hjulorganen (9, 10). För åstadkommande av en mångsidig apparat har apparaten åtminstone en motor (11, 12) anordnad att driva och vända hjulorganen (9, 10), och en fjärrstyrningsanordning (RL), med vilken den massage undergående personen kan styra den på hjulorganen inverkande motorn (11, 12) för att förflytta apparaten till rätt ställe.

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Hierontalaite

Keksinnön kohteena on hierontalaite, joka käsittää runko-osan ja runko-osan varaan sovitetut ainakin yhdellä nokalla tai vastaavalla varustetun pyörivästi sovitetun elimen, moottorin ja voimansiirtovälineet, jotka on sovitettu pyörittämään nokilla varustettua elintä tai vastaavaa, ainakin yhden pitkänomaisen varsiosan, jonka toinen pää on sovitettu painautumaan nokkaa tai vastaavaa vasten ja toinen pää on sovitettu ulottumaan runko-osan ulkopuolelle, jolloin moottorin pyörittäessä nokilla varustettua elintä tai vastaavaa, varsiosan nokkaa tai vastaavaa vasten painautuva pää liikkuu nokan liikkeiden mukaisesti ja aikaansaa varsiosan toisen pään edestakaisen liikkeen, runko-osan ulkopuolelle ulottuvaan varsiosan päähän sovitettavan, hieronnan kohteena olevaan ihmiseen koskettavan varsinaisen hierontavälineen ja välineet nokilla varustettua elintä tai vastaavaa pyörittävän moottorin säätämiseksi, jolloin runko-osan alapintaan on sovitettu pyöräelimet, joiden varassa runko-osa on sovitettu olemaan lattialla tai muulla vastaavalla tukipinnalla.

Tällaiset laitteet ovat nykyään hyvin tunnettuja. Esimerkkinä alalla tunnetusta tekniikasta voidaan mainita laite, joka on kuvattu US-patenttijulkaisussa 3 616 793.

Edellä mainitussa US-patenttijulkaisussa kuvatun laitteen ja myös muiden vastaavien laitteiden epäkohtana on kuitenkin esimerkiksi se, että niiden käyttö yksin on vaivalloista ja usein jopa mahdotonta. Edellä mainitulla seikalla tarkoitetaan sitä, että laitteen käyttäjällä täytyy olla mukana toinen henkilö, joka asettaa laitteen oikealle kohdalle ja säätää hierontavoimakkuutta hierottavan ohjeiden mukaan. Tunnettujen laitteiden käyttö yksin on usein jopa täysin terveelle hankalaa ja sairaalle, jotka tarvitsevat usein hierontaa, useimmissa tapauksissa täysin mahdotonta. Edellä mainituista syistä johtuen aiemmin tunnettu-

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jen laitteiden käyttö onkin jäänyt suhteellisen vähäiseksi varsinkin kotikäytössä.

Keksinnön tarkoituksena on saada aikaan hierontalaite, jonka avulla aiemmin tunnetun tekniikan epäkohdat voidaan eliminoida. Tähän on päästy keksinnön mukaisen hierontalaitteen avulla, joka on tunnettu siitä, että laitteessa on ainakin yksi moottori, joka on sovitettu pyörittämään ja kääntämään runko-osan alapintaan sovitettuja pyöräelimiä ja kauko-ohjauslaitteen, jolla hieronnan kohteena oleva ihminen voi ohjata pyöräelimiin vaikuttavaa moottoria laitteen siirtämiseksi oikeaan kohtaan.

Keksinnön mukaisen laitteen etuna on ennen kaikkea se, että laitteen käyttäjä voi ohjata ja säätää laitetta täysin oman halunsa mukaan ilman avustavan henkilön läsnäoloa. Käyttäjä voi ohjata laitteen täysin vapaasti haluamaansa kohtaan, ts. laitteen avulla voidaan hieroa mitä tahansa ruumiin kohtaa, esimerkiksi selkää eri kohdista jne. ilman että hieronnan kohteena olevan ihmisen tarvitsee liikkua tai käyttää laitteen siirtoon toista henkilöä. Keksinnön etuna on myös sen yksinkertaisuus, jolloin sen toteutus ja käyttö muodostuvat edulliseksi. Etuna on edelleen se, että keksinnön mukainen laite voidaan tehdä suhteellisen pienikokoiseksi, jolloin laitteen siirtäminen kantamalla paikasta toiseen ja säilytys on yksinkertaista. Ko. seikalla on olennainen merkitys varsinkin kotikäytössä.

Keksintöä ryhdytään selvittämään seuraavassa tarkemmin oheisessa piirustuksessa esitetyn erään edullisen suoritusesimerkin avulla, jolloin

kuvio 1 esittää keksinnön mukaista laitetta periaatteellisena sivulta nähtynä kuvantona,

kuvio 2 esittää kuvion 1 laitetta toiselta sivulta nähtynä kuvantona,

kuvio 3 esittää kuvioiden 1 ja 2 mukaista laitetta takaa nähtynä kuvantona,

kuvio 4 esittää kuvioiden 1-3 mukaista laitetta

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edestä nähtynä kuvantona,

kuvio 5 esittää kuvioiden 1-4 mukaista laitetta alapuolelta nähtynä kuvantona ja

kuvio 6 esittää kuvioiden 1-5 mukaista laitetta yläpuolelta nähtynä kuvantona.

Kuvioissa 1-6 on esitetty periaatteellisesti keksinnön mukaisen laitteen eräs sovellutusmuoto. Viitenumeron 1 avulla on esitetty laitteen runko-osa. Runko-osan 1 varaan on sovitettu nokilla 2 varustettu elin 3. Nokilla varustettu elin 3 on sovitettu pyörivästi alustan 1 varaan. Nokilla 2 varustettua elintä pyöritetään moottorin 4 ja voimansiirtovälineen 5 avulla. Kuvioiden suoritusesimerkissä moottori 4 on sähkömoottori ja voimansiirtoelin 5 on hihna.

Viitenumeron 6 avulla kuvioihin on merkitty pitkänomaiset varsiosat, joiden toiset päät on sovitettu painautumaan nokkia 2 vasten ja toiset päät on sovitettu ulottumaan runko-osan 1 ulkopuolelle. Varsiosien päät saadaan painautumaan nokkia 2 vasten esimerkiksi jousielinten 7 avulla. Moottorin 4 pyörittäessä nokilla 2 varustettua elintä, varsiosien 6 nokkia 2 vasten painautuvat päät liikkuvat nokkien 2 liikkeiden ja muotojen mukaisesti, jolloin aikaansaadaan varsiosien toisten päiden edestakaiset liikkeet. Varsiosat 6 on kiinnitetty kääntyvästi päiden väliseltä alueelta runko-osaan 1 niin, että runko-osan 1 ulkopuolelle ulottuvat päät muodostavat toiset vipuvarret ja nokkia 2 vasten painautuvat päät vastaavasti toiset vipuvarret. Edellä esitetty yksityiskohta näkyy erityisen selvästi kuvioissa 1 ja 2.

Pitkänomaisten varsiosien 6 runko-osan ulkopuolelle ulottuviin päihin voidaan kiinnittää hieronnan kohteena olevaan ihmiseen koskettavat varsinaiset hierontavälineet 8.

Laitteessa on vielä lisäksi välineet nokilla 2 varustettua elintä 3 pyörittävän moottorin 4 säätämiseksi ja runko-osan alapintaan sovitetut pyöräelimet 9, 10, joiden

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varassa runko-osa 1 on sovitettu olemaan lattialla tai muun vastaavan tukipinnan varassa.

Keksinnön mukaisesti laittessa on ainakin yksi moottori 11, 12, joka on sovitettu pyörittämään ja kääntämään runko-osan 1 alapintaan sovitettuja pyöräelimiä 9, 1. Laitteeseen liittyy vielä lisäksi kauko-ohjauslaite, jolla hieronnan kohteena oleva ihminen voi ohjata pyöräelimiin 9, 10 vaikuttavaa moottoria 11, 12 ja nokilla 2 varustettua elintä 3 pyörittävää moottoria 4 laitteen siirtämiseksi oikeaan kohtaan ja oikean hierontatehon aikaansaamiseksi. Kuvioiden mukaisessa sovellutusesimerkissä käytetään kahta pyöräelimiin 9, 10 vaikuttavaa moottoria 11, 12, jolloin toinen moottori 11 on sovitettu pyörittämään runko-osan toisessa päässä olevia pyöräelimiä 10 ja toinen moottori 12 on sovitettu kääntämään runko-osan toisessa päässä olevia pyöräelimiä 9.

Kuvioiden esimerkissä moottori 11 pyörittää pyöräelintä 10 kitkavälityksen avulla ja moottori 12 kääntää pyöräelimiä 9 sopivan tankovälityksen avulla.

Kauko-ohjauslaite voi olla ns. langaton laite, esimerkiksi radio-ohjauslaite RL tai vaihtoehtoisesti myös ns. lankaohjausperiaatteella toimiva laite, jolloin kauko-ohjauslaite on yhdistetty hierontalaitteeseen esimerkiksi sähköjohtimen avulla.

Viitteen PK avulla kuvioon 4 on merkitty pääkytkin, joka voi olla mikä tahansa ns. ON/OFF kytkin. Viitteiden TS ja JS avulla kuvioon 4 on merkitty säätimet, joiden avulla voidaan säätää tehoa ja jousielimen 7 jäykkyyttä.

Keksinnön mukainen laite toimii periaatteessa seuraavasti. Hieronnan kohteena oleva henkilö asettuu esimerkiksi pitkälleen lattialle ja ohjaa kuvioissa 1-6 esitetyn laitteen kauko-ohjauslaitteen avulla oikeaan kohtaan niin, että hierontavälineet 8 ovat hierontakohdan yläpuolella. Moottori pyörittää elintä 3, jolloin nokat 2 synnyttävät varsiosiin 6 liikkeen, jolloin varsiosien runko-osan ulko-

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puolelle ulottuvat päät liikkuvat ylös-alas-suunnassa kuten kuvioissa 1 ja 2 on esitetty. Edellä esitetty liike aikaansaa varsinaisten hierontavälineiden 8 vastaavanlaisen ylös-alas-liikkeen, ts. varsinaisen hierontaliikkeen. Hierontaliikkeen, ts. taputuksen taajuutta voidaan säätää säätämällä moottoria 4 esimerkiksi säätimen TS avulla. Hieronnan tehon säätiminen voi tapahtua esimerkiksi säätimen JS avulla, ts. säätämällä jousielimen jäykkyyttä. Kaikki em. säädöt voidaan kuitenkin sovittaa tehtäväksi myös kauko-ohjauslaitteen avulla mikäli tällainen toiminta katsotaan tarpeelliseksi. Myöskin on mahdollista, että laitteessa on molemmat toiminnot, ts. säätimillä TS ja JS tehtävät säädöt ja kauko-ohjauslaitteen avulla tehtävät vastaavat säädöt.

Edellä kuvatun hierontavaiheen jälkeen hieronnan kohteena oleva henkilö voi ohjata laitteen liikkumaan niin, että hierontavälineet 8 ulottuvat toiseen hierontakohteeseen jne.

Laitetta voidaan käyttää myös niin, että hierontavälineet 8 säädetään painamaan esimerkiksi selän tiettyyn kohtaan, jolloin ohjaamalla laitetta kauko-ohjauslaitteen avulla niin, että se liikkuu edestakaisin lattialla aikaansaadaan hierontaliike. Tässä tilanteessa varret pysyvät paikallaan. Hieronnan kohteena oleva henkilö voi tehdä tämänkin toiminnan ilman avustavaa henkilöä. Em. toiminnon aikaansaamiseksi hierontavälineiden varret kiinnitetään käännettävästi varsiosiin 6. Kiinnitys voidaan tehdä esimerkiksi ruuvien avulla, jolloin varret voidaan kääntää helposti ja nopeasti haluttuun asentoon ja myös lukita ko. asentoon. Varsien pysyminen paikallaan voidaan aikaansaada esimerkiksi kolmiasentoisen kytkimen TS avulla niin, että kytkimessä TS on yksi asento, jossa varret eivät liiku ja em. asennon lisäksi kaksi muuta asentoa min ja max, joiden välillä on portaaton säätö. Luonnollisesti em. toiminto voidaan aikaansaada myös erillisillä kytkimillä.

Keksinnön olennaisena seikkana on siis se, että

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hieronnan kohteena oleva henkilö voi ohjata laitetta itse niin, että laite hieroo kehoa halutuista kohdista ja halutulla tavalla. Laite siirtyy siis itse omalla voimanlähteellään haluttuun kohtaan jne.

Edellä esitettyä suoritusesimerkkiä ei ole tarkoitettu mitenkään rajoittamaan keksintöä, vaan keksintöä voidaan muunnella patenttivaatimusten puitteissa täysin vapaasti. Näinollen on selvää, että keksinnön mukaisen laitteen tai sen yksityiskohtien ei välttämättä tarvitse olla juuri sellaisia kuin kuvioissa on esitetty, vaan muunlaisetkin ratkaisut ovat mahdollisia. Hierontavälineiden muoto ja niiden varsien pituus voidaan valita täysin vapaasti. Laitteen vetävät pyörät voidaan tehdä myös kääntyviksi jne. Pyöräelinten kääntyminen voidaan aikaansaada myös erilaisten servolaitteiden avulla. Pyöräeliminä voidaan käyttää mitä tahansa sinänsä tunnettuja elimiä. Moottoreiden voimansiirrot voidaan toteuttaa millä tahansa sinänsä tunnetulla voimansiirtojärjestelyllä, hammaspyörillä, nestevälityksillä yms. Laitteen ulkomuoto voidaan myös tehdä millaiseksi tahansa. Laite voidaan esimerkiksi koteloida ja tehdä myös kotelon avulla kannettavaksi yksiköksi. Nokilla varustetun elimen tilalla voidaan käyttää myös elintä, johon varren toinen pää on kiinnitetty ja liikkuu elimen pyöriessä pakko-ohjattuna ennaltamäärätyllä tavalla. Tällaisessa suoritusmuodossa varsien täytyy olla pituudeltaan muuttuvia, esimerkiksi teleskooppiperiaatteella toimivia osia. Nokilla varustetun elimen tai vastaavan ei myöskään välttämättä tarvitse olla pystysuorassa asennossa kuten kuvioissa on esitetty, vaan vaakasuora asento on myös mahdollinen. Tällöin hieronta on erityyppistä kuin kuvioiden esimerkissä, sillä varret liikkuvat vaakatasossa. On lisäksi täysin mahdollista valmistaa laite, jossa nokilla varustettu elin tai vastaava on käännettävissä pystyasennosta vaaka-asentoon ja päinvastoin halutusta hierontatyypistä riippuen.

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Patenttivaatimukset:

1. Hierontalaite, joka käsittää runko-osan (1) ja runko-osan (1) varaan sovitetut ainakin yhdellä nokalla tai vastaavalla (2) varustetun pyörivästi sovitetun elimen (3), moottorin (4) ja voimansiirtovälineet (5), jotka on sovitettu pyörittämään nokilla (2) varustettua elintä (3) tai vastaavaa, ainakin yhden pitkänomaisen varsiosan (6), jonka toinen pää on sovitettu painautumaan nokkaa (2) tai vastaavaa vasten ja toinen pää on sovitettu ulottumaan runko-osan (1) ulkopuolelle, jolloin moottorin (4) pyörittäessä nokilla (2) varustettua elintä (3) tai vastaavaa, varsiosan (6) nokkaa (2) tai vastaavaa vasten painautuva pää liikkuu nokan tai vastaavan liikkeiden mukaisesti ja aikaansaa varsiosan (6) toisen pään edestakaisen liikkeen, runko-osan (1) ulkopuolelle ulottuvaan varsiosan (6) päähän sovitettavan, hieronnan kohteena olevaan ihmiseen koskettavan varsinaisen hierontavälineen (8) ja välineet nokilla varustettua elintä (3) tai vastaavaa pyörittävän moottorin (4) säätämiseksi, jolloin runko-osan (1) alapintaan on sovitettu pyöräelimet (9,10), joiden varassa runko-osa (1) on sovitettu olemaan lattialla tai muulla vastaavalla tukipinnalla, t u n n e t t u siitä, että laitteessa on ainakin yksi moottori (11,12), joka on sovitettu pyörittämään ja kääntämään runko-osan (1) alapintaan sovitettuja pyöräelimiä (10,9) ja kauko-ohjauslaitteen (RL), jolla hieronnan kohteena oleva ihminen voi ohjata pyöräelimiin (10,9) vaikuttavaa moottoria (11,12) laitteen siirtämiseksi oikeaan kohtaan.

2. Patenttivaatimuksen 1 mukainen hierontalaite, t u n n e t t u siitä, että pyöräelimiin (10,9) vaikuttavia moottoreita (11,12) on kaksi, jolloin toinen moottori (11) on sovitettu pyörittämään runko-osan (1) toisessa päässä olevia pyöräelimiä (10) ja toinen moottori (12) on sovitettu kääntämään runko-osan (1) toisessa päässä olevia pyörä-

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elimiä (9).

3. Patenttivaatimuksen 1 tai 2 mukainen hierontalaite, t u n n e t t u siitä, että kauko-ohjauslaite on radio-ohjauslaite (RL).

4. Patenttivaatimuksen 1 tai 2 mukainen hierontalaite, t u n n e t t u siitä, että kauko-ohjauslaite on yhdistetty johdinvälineellä hierontalaitteeseen.

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Patentkrav

1. Massageapparat som omfattar en stomdel (1) och på stomdelen (1) anordnade: ett med minst en nock eller liknande (2) försett roterande anordnat organ (3), en motor (4) och kraftöverföringsmedel (5) anordnade att rotera det med nockar (2) försedda organet (3) eller liknande, åtminstone en långsträckt armdel (6), vars ena ände är anordnad att anligga mot nocken (2) eller liknande och vars andra ände är anordnad att sträcka sig utanför stomdelen (1), varvid då motorn (4) roterar det med nockar (2) försedda organet (3) eller liknande rör sig armdelens (6) mot nocken (2) eller liknande anliggande ände i enlighet med rörelsen av nocken eller liknande och åstadkommer en fram och åter gående rörelse i armdelens (6) andra ände, ett i den utanför stomdelen (1) sig sträckande armdelens (6) ände anordnat egentligt massageorgan (8) som berör människan som utgör massageföremålet, och medel för reglering av motorn (4) som roterar det med nockar försedda organet (3) eller liknande, varvid i stomdelens (1) undre yta har anordnats hjulorgan (9,10) av vilka stomdelen (1) är anordnad att uppbäras på golvet eller annan motsvarande stödyta, k ä n n e t e c k n a d därav, att apparaten uppvisar åtminstone en motor (11,12) anordad att rotera och vrida de i stomdelens (1) undre yta anordande hjulorganen (10,9) och en fjärrstyrapparat (RL), medelst vilken människan som mottager massage kan styra motorn (11,12) som verkar på hjulorganen (10,9) för att förflytta apparaten till rätt ställe.

2. Massageapparat enligt patentkravet 1, k ä n n e t e c k n a d därav, att det finns två på hjulorganen (10, 9) verkande motorer (11,12), varvid den ena motorn (11) är anordnad att rotera hjulorganen (10) i stomdelens (1) ena ände och den andra motorn (12) är anordnad att vrida hjulorganen (9) i stomdelens (1) andra ände.

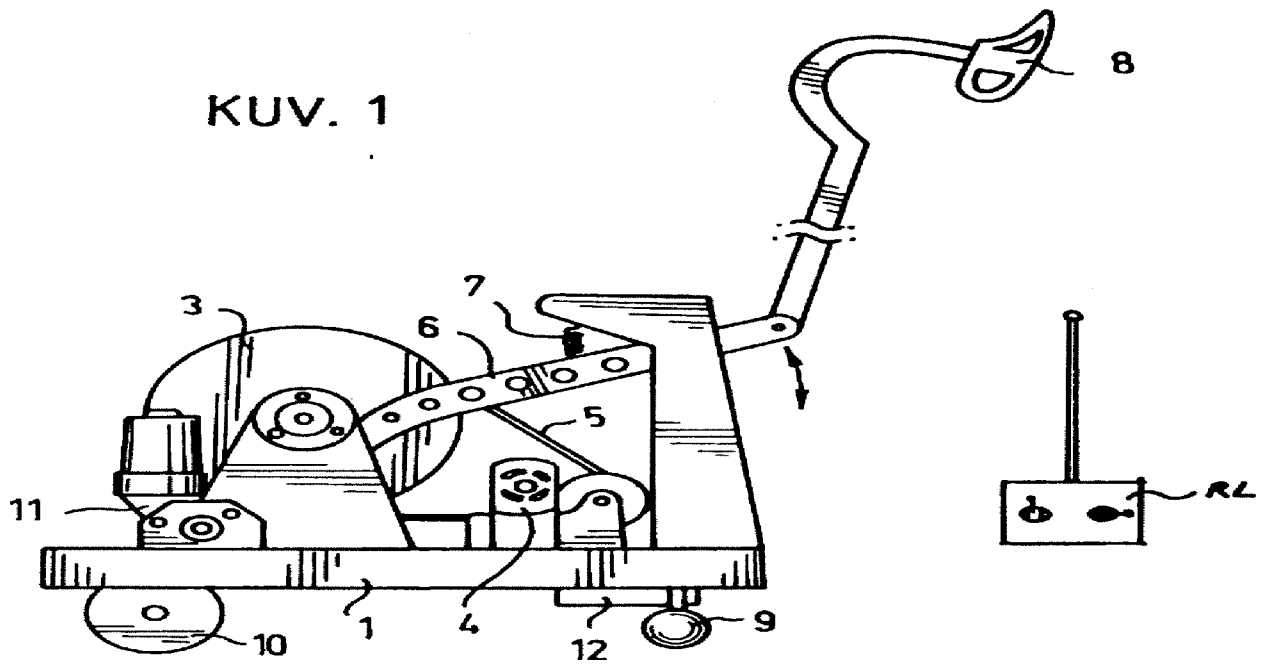
Petitioner Therabody Ex-1004, 0969

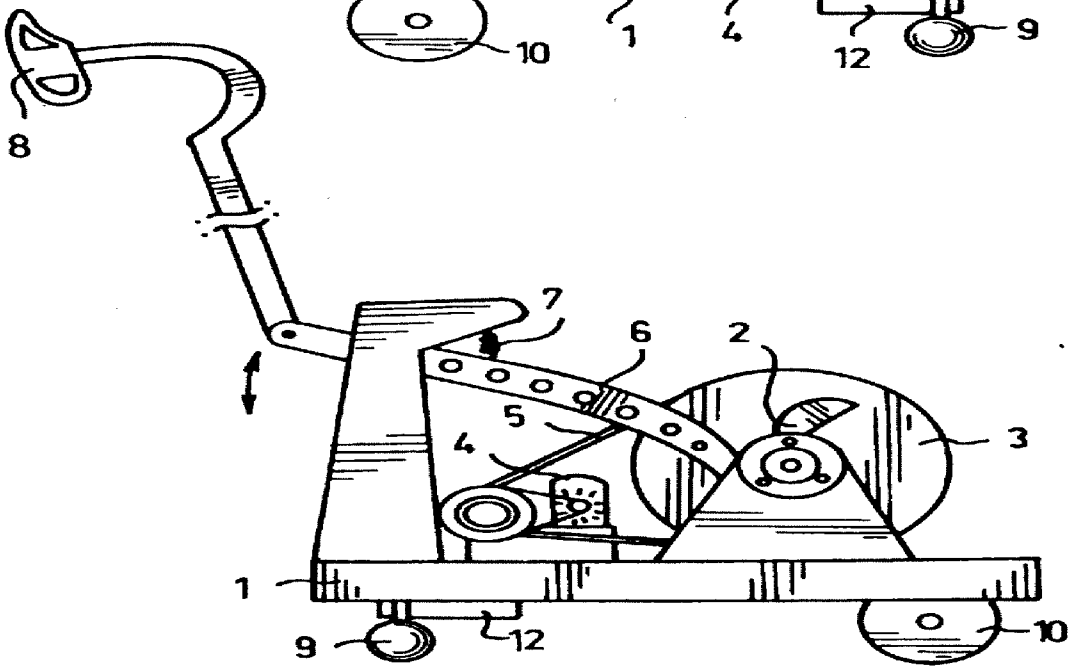
3. Massageapparat enligt patentkravet 1 eller 2, k ä n n e t e c k n a d därav, att fjärrstyrapparaten är en radiostyrd anordning (RL).

4. Massageapparat enligt patentkravet 1 eller 2, k ä n n e t e c k n a d därav, att fjärrstyrapparaten är kopplad till massageapparaten med ett ledarmedel.

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KUV. 1

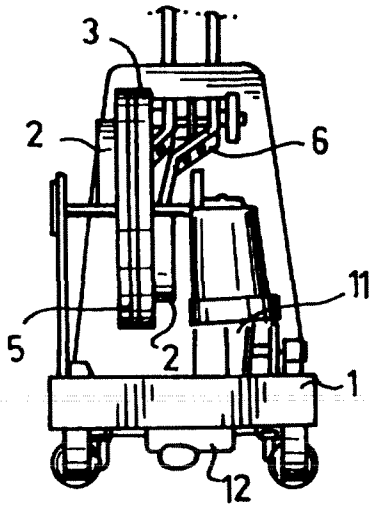




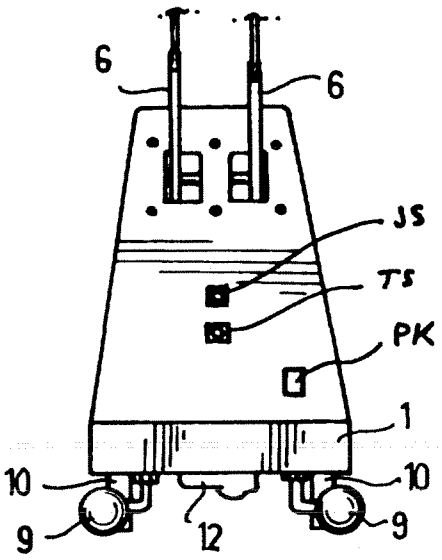
KUV. 2

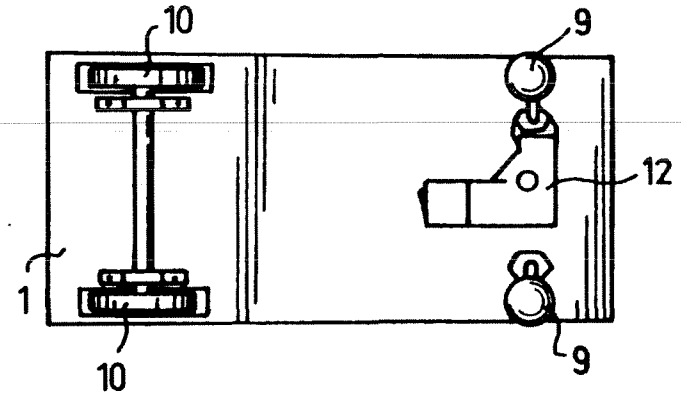
Petitioner Therabody Ex-1004, 0971

KUV. 3

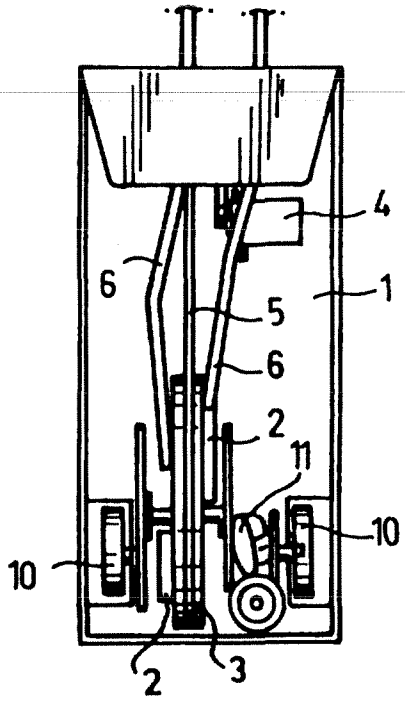


KUV. 4





KUV. 5



KUV. 6

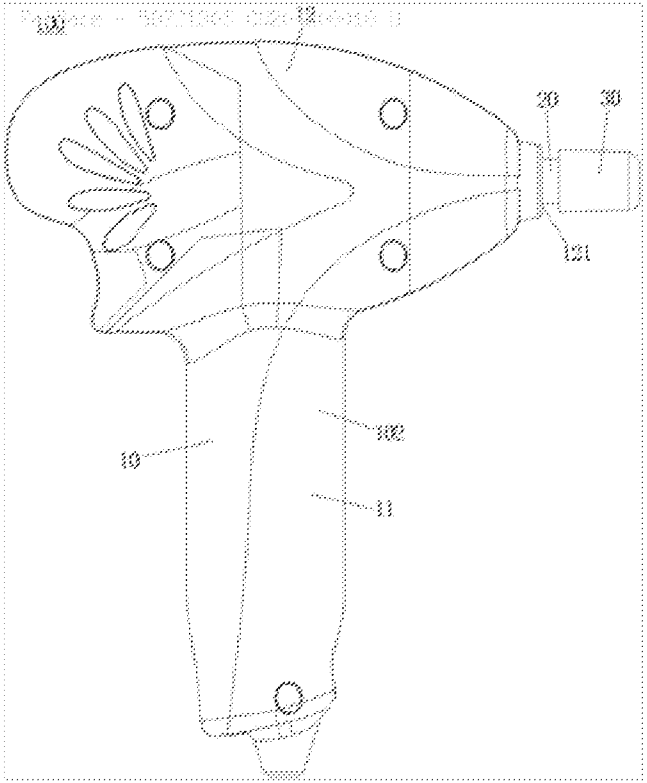
Petitioner Therabody Ex-1004, 0972

CN204208018 U PatBase number: 58721396

© PatBase

Title: MASSAGING GUN

Abstract:
Source: CN204208018 U The utility model discloses a massaging gun. The massaging gun comprises a shell, a power supply, a control circuit board, a motor, an eccentric shaft, a circular bar and a massaging head, wherein the shell comprises a gun handle part and a gun body part; the inner end of the gun body part is vertically connected to the upper end of the gun handle part; a massaging connection hole is formed in the outer end of the gun body pat; the power supply is arranged inside the gun handle part; the control circuit board, the motor, the eccentric shaft and the circular bar are arranged in the gun body part; both the power supply and the motor are electrically connected with the control circuit board; one end of the eccentric shaft is connected with an output shaft of the motor; the outer end of the eccentric shaft is connected with one end of the circular bar; the other end of the circular bar extends out of the massaging connection hole and is connected with the massaging head; the shell is provided with a switch which is electrically connected with the control circuit board, and an adjusting knob. The massaging gun has the advantages of light weight, simple structure and low cost.



Owner(s) / Assignee(s): WU ZAIMIN

Inventor(s): WU ZAIMIN

Published in: (family)

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Priority: CN201420607508U 20141020

International class: A61H23/02 (Core/Invention)

Petitioner Therabody Ex-1004, 0973

(19)中华人民共和国国家知识产权局

(12)实用新型专利

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代理人 薛晨光

(51)Int.Cl.
A61H 23/02(2006.01)

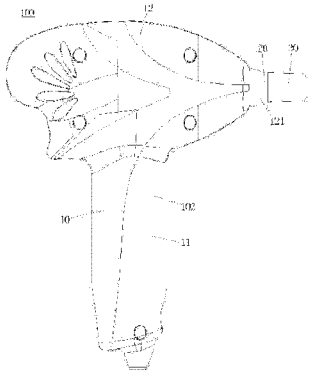
权利要求书1页 说明书2页 附图1页

(54)实用新型名称

一种按摩枪

(57)摘要

本实用新型公开一种按摩枪，包括壳体、电源、控制电路板、马达、偏心轴、圆棒及按摩头，所述壳体包括把枪柄部及枪身部，所述枪身部的内端垂直连通连接于所述枪柄部的上端，所述枪身部的外端开设有按摩接孔，所述电源安装于所述枪柄部内，所述控制电路板、马达、偏心轴及圆棒均安装于所述枪身部中，所述电源及所述马达均与所述控制电路板电性相接，所述偏心轴的一端与所述马达的输出轴相接，所述偏心轴的另一端与所述圆棒的一端相接，所述圆棒的另一端伸出所述按摩接孔与所述按摩头相接，所述壳体上开设有与所述控制电路板电性连接的开关及调节旋钮。该按摩枪轻巧、结构简单且成本低。



CN 204208018 U

MassagerPriorArt0000276

Petitioner Therabody Ex-1004, 0974

1. 一种按摩枪，其特征在于：包括壳体、电源、控制电路板、马达、偏心轴、圆棒及按摩头，所述壳体包括把枪柄部及枪身部，所述枪身部的内端垂直连通连接于所述枪柄部的上端，所述枪身部的外端开设有按摩接孔，所述电源安装于所述枪柄部内，所述控制电路板、马达、偏心轴及圆棒均安装于所述枪身部中，所述电源及所述马达均与所述控制电路板电性相接，所述偏心轴的一端与所述马达的输出轴相接，所述偏心轴的另一端与所述圆棒的一端相接，所述圆棒的另一端伸出所述按摩接孔与所述按摩头相接，所述壳体上开设有与所述控制电路板电性连接的开关及调节旋钮。

2. 如权利要求 1 所述的按摩枪，其特征在于：所述电源为直流电池。

3. 如权利要求 1 所述的按摩枪，其特征在于：所述壳体包括左壳盖及右壳盖，所述左壳盖与所述右壳盖互相螺钉固接。

MassagerPriorArt0000277

Petitioner Therabody Ex-1004, 0975

一种按摩枪

技术领域

[0001] 本实用新型涉及保健机械领域，尤其涉及一种按摩枪。

背景技术

[0002] 现时的按摩装置体积较大、结构复杂、成本较高。

[0003] 因此，亟待一种轻巧、结构简单且成本低的按摩枪。

实用新型内容

[0004] 本实用新型的目的在于提供一种轻巧、结构简单且成本低的按摩枪。

[0005] 为了实现上述目的，本实用新型的技术方案为：提供一种按摩枪，包括壳体、电源、控制电路板、马达、偏心轴、圆棒及按摩头，所述壳体包括把枪柄部及枪身部，所述枪身部的内端垂直连通连接于所述枪柄部的上端，所述枪身部的外端开设有按摩接孔，所述电源安装于所述枪柄部内，所述控制电路板、马达、偏心轴及圆棒均安装于所述枪身部中，所述电源及所述马达均与所述控制电路板电性相接，所述偏心轴的一端与所述马达的输出轴相接，所述偏心轴的另一端与所述圆棒的一端相接，所述圆棒的另一端伸出所述按摩接孔与所述按摩头相接，所述壳体上开设有与所述控制电路板电性连接的开关及调节旋钮。

[0006] 所述电源为直流电池。

[0007] 所述壳体包括左壳盖及右壳盖，所述左壳盖与所述右壳盖互相螺钉固接。

[0008] 与现有技术相比，本实用新型按摩枪轻巧、结构简单且成本低。

[0009] 通过以下的描述并结合附图，本实用新型将变得更加清晰，这些附图用于解释本实用新型的实施例。

附图说明

[0010] 图 1 为本实用新型按摩枪一个角度的结构图。

[0011] 图 2 为本实用新型按摩枪另一个角度的结构图。

具体实施方式

[0012] 参考图 1 及图 2，本实用新型按摩枪 100 包括壳体 10、电源（图未示）、控制电路板（图未示）、马达（图未示）、偏心轴（图未示）、圆棒 20 及按摩头 30。本实施例中，所述电源为直流电池。

[0013] 所述壳体 10 包括把枪柄部 11 及枪身部 12。所述枪身部 12 的内端垂直连通连接于所述枪柄部 11 的上端，所述枪身部 12 的外端开设有按摩接孔 121。所述电源安装于所述枪柄部 11 内。所述控制电路板、马达、偏心轴及圆棒 20 均安装于所述枪身部 12 中。所述电源及所述马达均与所述控制电路板电性相接，所述偏心轴的一端与所述马达的输出轴相接，所述偏心轴的另一端与所述圆棒 20 的一端相接，所述圆棒 20 的另一端伸出所述按摩接孔 121 与所述按摩头 30 相接，所述壳体 10 上开设有与所述控制电路板电性连接的开关

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（图未示）及调节旋钮（图未示）。

[0014] 具体地，所述壳体 10 包括左壳盖 101 及右壳盖 102。所述左壳盖 101 与所述右壳盖 102 互相螺钉固接。

[0015] 本实用新型按摩枪 100 使用时，打开开关，旋转调节旋钮，通过控制电路板控制马达的转速从而调节按摩头的转速和震颤的力量，然后将按摩头放至需要按摩的部位即可。

[0016] 本实用新型按摩枪轻巧、结构简单且成本低。

[0017] 以上结合最佳实施例对本实用新型进行描述，但本实用新型并不局限于以上揭示的实施例，而应当涵盖各种根据本实施例的本质进行的修改、等效组合。

MassagerPriorArt0000279

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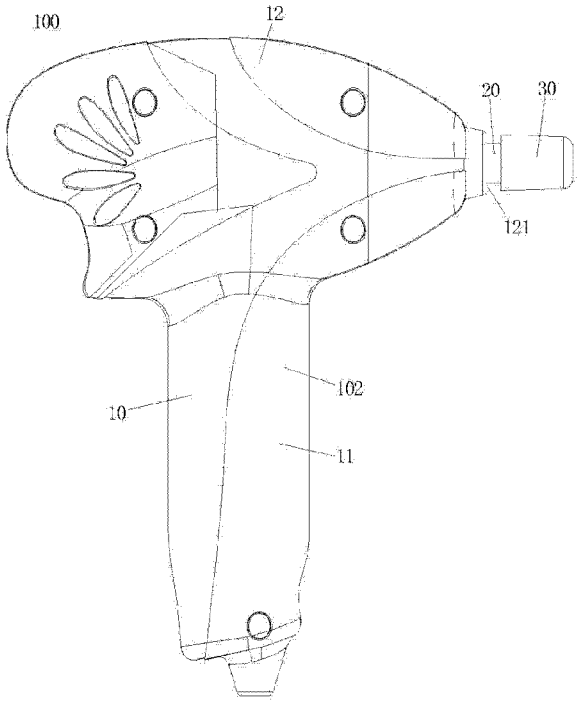


图 1

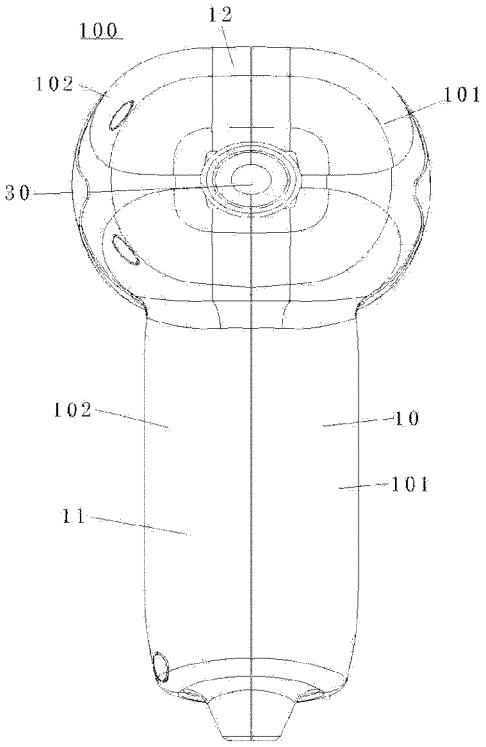


图 2

MassagerPriorArt0000280

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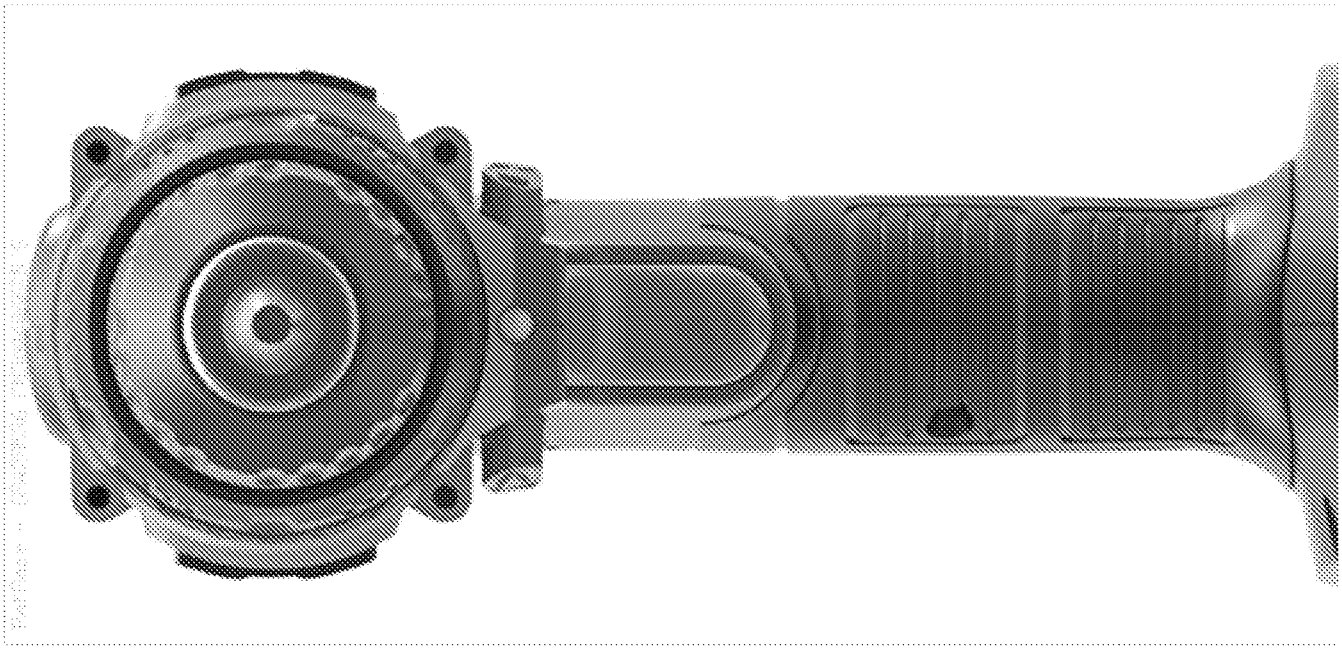
CN304486625 S Patbase number: 6047853

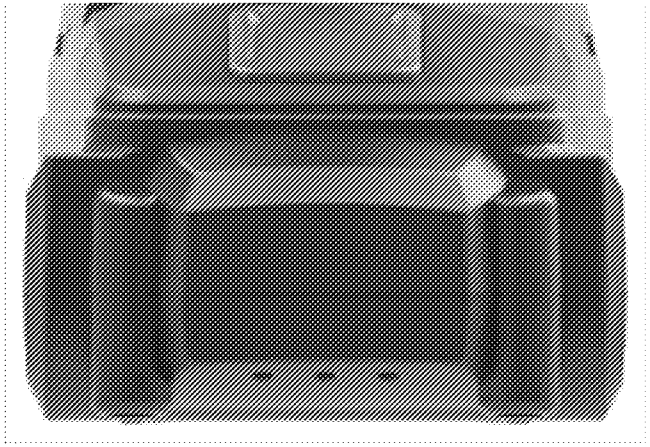
Title: Charging drill

Abstract:
Source: CN304486625 S 1. The design product name: Charging drill; 2. The product design uses: This design products for drilling or screwing; 3. The design product design points are: The design of each view reflect the shape of the product; 4. The best indicator of the design elements of the picture or photo: Perspective view.

Owner(s) / Assignee(s): NINGBO GEMAY IND CO LTD

Petitioner Therabody Ex-1004, 0979





Published in: (family)

Country	Publication number	Publication date	Application number	Application date	
CHINA	CN304486625 S	Feb 2, 2018	CN201730280730F	Jun 30, 2017	S

Priority: CN201730280730F 20170630

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(12)外观设计专利

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(51)LOC(11)Cl.
08-01

图片或照片 7 幅 简要说明 1 页

(54)使用外观设计的产品名称

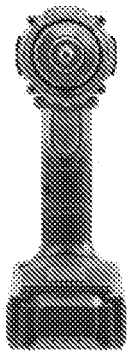
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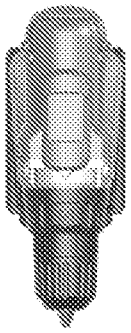
立体图

CN 304486625 S

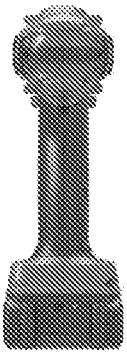
Petitioner Therabody Ex-1004, 0982



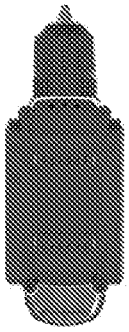
主视图



俯视图



后视图



仰视图



左视图



立体图



右视图

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1.本外观设计产品的名称:充电钻;

2.本外观设计产品的用途:本外观设计产品用于钻孔或拧螺丝;

3.本外观设计产品的设计要点:本外观设计各视图体现的产品形状;

4.最能表明本外观设计设计要点的图片或照片:立体图。

Petitioner Therabody Ex-1004, 0984

Clean face device of area brush head

List of publications

Application number	Publication date
CN205458346 U Regi…	2016-08-17

Abstract

The utility model discloses a clean face device of area brush head, it relates to skin care instrument technical field. The front end of handle is provided with the threaded connection head, the below threaded connection of threaded connection head and fixing base, one side of fixing base is provided with square groove, the sponge brush head is installed in the first fixing base of sponge brush, the outside of the first fixing base of sponge brush is provided with the buckle, the first fixing base of sponge brush passes through buckle fixed mounting at square inslot, the opposite side of fixing base is provided with two and corresponds the connecting rod that sets up, the connecting rod is connected with the pivot, and rotate in the pivot and be connected with silica gel massage head, the inside of handle is provided with the battery, be provided with the switch on the lateral wall of handle. The sponge brush head is fixed on the fixing base through first fixing base of sponge brush and buckle, need not hand the sponge brush head and carry out cleaning surface portion, be difficult for losing, and safety and sanitation, the sponge brush head that can more renew can utilize many times, and still installs the massage device, lighting device, the function is comparatively various.

English Abstract (Native or MT)

The utility model discloses a clean face device of area brush head, it relates to skin care instrument technical field. The front end of handle is provided with the threaded connection head, the below threaded connection of threaded connection head and fixing base, one side of fixing base is provided with square groove, the sponge brush head is installed in the first fixing base of sponge brush, the outside of the first fixing base of sponge brush is provided with the buckle, the first fixing base of sponge brush passes through buckle fixed mounting at square inslot, the opposite side of fixing base is provided with two and corresponds the connecting rod that sets up, the connecting rod is connected with the pivot, and rotate in the pivot and be connected with silica gel massage head, the inside of handle is provided with the battery, be provided with the switch on the lateral wall of handle. The sponge brush head is fixed on the fixing base through first fixing base of sponge brush and buckle, need not hand the sponge brush head and carry out cleaning surface portion, be difficult for losing, and safety and sanitation, the sponge brush head that can more renew can utilize many times, and still installs the massage device, lighting device, the function is comparatively various.

Other Abstracts

本实用新型公开了种带刷头的洁面装置，它涉及护肤工具技术领域。手柄的前端设置有螺纹连接头,螺纹连接头与固定座的下方螺纹连接，固定座的侧设置有方形槽,海绵刷头安装在海绵刷头固定座内，海绵刷头固定座的外侧设置有卡

扣，海绵刷头固定座通过卡扣固定安装在方形槽内，固定座的另侧设置有两个对应设置的连接杆，连接杆连接有转轴，且转轴上转动连接有硅胶按摩头，手柄的内部设置有电池,手柄的外侧壁上设置有开关。海绵刷头通过海绵刷头固定座和卡扣固定在固定座上，不需要手持海绵刷头进行清洁面部，不易丢失，安全卫生，可以更换新的海绵刷头，能多次进行利用，且还安装有按摩装置，照明装置，功能较为多样。

Inventor(s)	HE LONGBO
Applicant/Assignee	DONG QINGFANG [CN] owned by XIANG JIANG
Applicant/Assignee Address	DONG QINGFANG , CN
Patent Assignee History	DONG QINGFANG [CN]
Application Numbers & Dates	CN201620089780U 2016-01-29 [2016CN-U089780]
Priority Numbers & Dates	CN201620089780U 2016-01-29 [2016CN-U089780]
Technology domain	Furniture, games Other consumer goods
IPC codes	A47K-007/04* A46B-007/04 A46B-015/00
Notes	Number of Claims: 3 Number of Pages: 6 Gazette number: 32-33 Gazette date: 2016-08-17

Claims

1. A chair with a brush head of the cleansing device, characterized in: it comprises a handle (1), battery (2), switch (3), threaded joint (4), fixing seat (5), a sponge brush head (6), a sponge brush-holders (7), a snap (8), rectangular grooves (9), LED lamp (10), a connecting rod (11), shaft (12), silica gel massaging head and the (13) pivot holes (13-1), provided with a threaded connector (4) end of the handle (1), a threaded joint with (4) the anchor block (5) of the lower threaded connection, one side of the fixing seat (5) is provided with a square groove (9), a sponge brush head is mounted on (6) the brush-holders (7) within, a sponge brush-holders (7) are disposed outside of the snap (8), a sponge brush-holders (7) through snap-fit (8) mounted onto a square slot (9) within, on the other side of the fixing seat (5) is provided with two corresponding connecting rods (11), a connecting rod (11) connected with the rotary shaft (12), and the rotation shaft (12) on rotation of the massaging head (13) is connected with a silica gel, is provided inside the battery (2), a handle (1) is arranged at the (3) outside wall of the handle (1).

2. In accordance with a brush head of the cleansing apparatus belt according to claim 1, characterized in: silica gel of the massaging head (13) both ends provided with pivot holes (13 - 1), pivot holes (13 - 1) and the rotary shaft (12) is connected, and the silica gel particles is uniformly distributed with silica gel massaging of the massaging head (13).

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3. In accordance with a chair with a brush head of the cleansing device according to claim 1, characterized in: using a see-through plastic fixing seat (5), provided with a plurality of LED lamp (10) fixed seat (5) within, and the LED lamp and the (10) battery (2) through wire connections between.

Original Claims

1.一种带刷头的洁面装置，其特征在于：它包含手柄(1)、电池(2)、开关(3)、螺纹连接头(4)、固定座(5)、海绵刷头(6)、海绵刷头固定座(7)、卡扣(8)、方形槽(9)、LED灯(10)、连接杆(11)、转轴(12)、硅胶按摩头(13)和转孔(13-1), 手柄(1)的前端设置有螺纹连接头(4), 螺纹连接头(4)与固定座(5)的下方螺纹连接，固定座(5)的一侧设置有方形槽(9),海绵刷头(6)安装在海绵刷头固定座(7)内，海绵刷头固定座(7)的外侧设置有卡扣(8)，海绵刷头固定座(7)通过卡扣(8)固定安装在方形槽(9)内，固定座(5)的另一侧设置有两个对应设置的连接杆(11)，连接杆(11)连接有转轴(12)，且转轴(12)上转动连接有硅胶按摩头(13)，手柄(1)的内部设置有电池(2), 手柄(1)的外侧壁上设置有开关(3)。

2.按照权利要求1所述的一种带刷头的洁面装置，其特征在于：所述的硅胶按摩头(13)的两侧设置有转孔(13-1), 转孔(13-1)与转轴(12)连接，且硅胶按摩头(13)上均匀分布有硅胶按摩颗粒。

3.按照权利要求1所述的一种带刷头的洁面装置，其特征在于：所述的固定座(5)采用透明塑料制成，固定座(5)内设置有数个LED灯(10),且LED灯(10)与电池(2)之间通过导线连接。

Description

Clean face device of area brush head

Technical Field

The present utility model relates to a belt brush head of the cleansing device, which belongs to the technical field of skin care tool.

Background Art

Now people, particularly women, make-up more and more attention to the face. However, some relatively coarse pores in the skin of a person's face, or because there is too much grease or oily skin due to make-up residue from clogging pores, leaving the face and a blackhead acne and the like, which are greatly affected by the woman's facial cosmetic, and will cause certain injuries to the skin of the face.

In order to solve these problems, people will be used in cleaning the facial skin of a skin cleansing oil face lotions and to clean, and may cooperate with the face is cleaned using a sponge washing the face, but existing facial washing sponge is only one panel of conventional sponge, to hold the scrubbing face is not convenient, after washing with the sponge to conveniently placed, easily forgotten, and also is not sanitary.

Summary

For the problem, the present utility model to solve the technical problem is to provide a chair with a cleansing apparatus of the brush head.

The present utility model of the head to a chair with a cleansing device, which comprises a handle 1, battery 2, switch 3, 4 threaded connector, the anchor

block 5, a sponge brush head 6, a sponge brush-holders 7, 8 snaps, rectangular grooves 9, 10 LED lamp, the connecting rod 11, the rotary shaft 12, 13 and the massaging head silica gel pivot holes 13-1, front end of the handle 1 is provided with a threaded connector 4, Below the threaded connector 4 and the fixing seat 5 is threaded, one side of the fixing seat 5 is provided with a square groove 9, a sponge brush head 6 mounted on a sponge brush head within the anchor block 7, a sponge brush-holders 7 8 are disposed outside of the snap-fit, a sponge brush-holders 7 8 9 fixedly mounted within the square slot snap-through, the other side of the fixed seat 5 is provided with two corresponding connecting rods 11, 12 connecting rod 11 is connected with the rotary shaft, and the rotation shaft 12 pivotally connected with silica gel on the massaging head 13, the interior of the handle 1 is provided with a battery 2, the outer sidewall of the handle 1 is provided with a switch 3.

Advantageously, the massage heads 13 disposed on both sides of the silica gel pivot holes 13-1, pivot holes 13-1 connected with the rotary shaft 12, and the silica gel massaging head 13 is uniformly distributed with silica gel massaging particles.

Advantageously, the anchor block 5 using a transparent plastic material, fixed seat is provided with a plurality of LED lamp 10 within 5, and the LED lamp 10 and the battery 2 through wire connections between.

The present utility model has the advantages: it can overcome the drawbacks of the prior art, reasonable and novel structure design, a sponge brush head through a sponge brush head holder and a snap-fixed on the fixing base, need not be hand-held sponge brush head for cleaning the face, more convenient to use, and is not easily lost, safe and sanitary, when the sponge brush head may be replaced with a fresh sponge brush head is worn out, is performed using a plurality of times, resource saving,

And also provided with a massage device, may also be performed on the massaging, while it also is provided with illuminating means, may be used as an illumination device, a greater variety functions.

In the drawings:

For ease of description, the present utility model is made to the following detailed description and the drawings described in detail.

FIG. 1 is a schematic diagram of the present utility model structure;

FIG. 2 is a schematic view of the massaging head of the present utility model silica gel in the structure;

FIG. 3 is a sponge brush head of the present utility model in which, a sponge brush head holder and a snap-fit connection structure schematic diagram.

1-handle; 2-battery; 3-switch; 4-threaded connector; 5-fixing seat; 6-sponge brush head; 7-sponge brush-holders; 8-snap; 9-square slot; 10-LED lamp; 11-connecting rod; 12-rotating shaft; 13-silica gel massaging head; 13-1-pivot holes.

Specific embodiments:

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As shown in FIG. 1-3 shown, this embodiment adopts the following technical scheme: it comprises a handle 1, battery 2, switch 3, 4 threaded connector, the anchor block 5, a sponge brush head 6, a sponge brush-holders 7, 8 snaps, rectangular grooves 9, 10 LED lamp, the connecting rod 11, the rotary shaft 12, 13 and the massaging head silica gel pivot holes 13-1, front end of the handle 1 is provided with a threaded connector 4, threaded connector 4 and the fixing seat 5 an underlying threaded connection, the anchor block 5 is provided with one side of the square groove 9, a sponge brush head 6 mounted on a sponge brush-holders within 7, a sponge brush-holders 7 are disposed outside of the catch 8, a sponge brush-holders 7 8 9 fixedly mounted within the square slot snap-through, the other side of the fixed seat 5 is provided with two corresponding connecting rods 11, connecting rod 11 is connected with the rotary shaft 12, and the rotation shaft 12 pivotally connected with silica gel on the massaging head 13, the interior of the handle 1 is provided with a battery 2, the outer sidewall of the handle 1 is provided with a switch 3.

Advantageously, the massage heads 13 disposed on both sides of the silica gel pivot holes 13-1, pivot holes 13-1 connected with the rotary shaft 12, and the silica gel massaging head 13 is uniformly distributed with silica gel massaging particles.

Advantageously, the anchor block 5 using a transparent plastic material, fixed seat is provided with a plurality of LED lamp 10 within 5, and the LED lamp 10 and the battery 2 through wire connections between.

The present utility model is shown and described above and principle of the advantages of the present utility model the main feature and. It should be understood by those skilled in the art, the present utility model is not to be limited by the embodiment, the present utility model are simply illustrative embodiment and the description of the principles of the described, without departing from the spirit and scope of the present utility model, the present utility model will also have a variety of changes and modifications, such changes and modifications are within the scope of the claimed utility model. The present utility model by the appended claims and their equivalents of the claims are defined.

(19)中华人民共和国国家知识产权局

(12)实用新型专利

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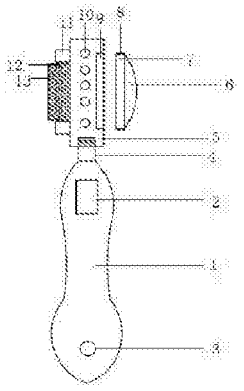
权利要求书1页 说明书2页 附图2页

(54)实用新型名称

一种带刷头的洁面装置

(57)摘要

本实用新型公开了一种带刷头的洁面装置，它涉及护肤工具技术领域。手柄的前端设置有螺纹连接头，螺纹连接头与固定座的下方螺纹连接，固定座的一侧设置有方形槽，海绵刷头安装在海绵刷头固定座内，海绵刷头固定座的外侧设置有卡扣，海绵刷头固定座通过卡扣固定安装在方形槽内，固定座的另一侧设置有两个对应设置的连接杆，连接杆连接有转轴，且转轴上转动连接有硅胶按摩头，手柄的内部设置有电池，手柄的外侧壁上设置有开关。海绵刷头通过海绵刷头固定座和卡扣固定在固定座上，不需要手持海绵刷头进行清洁面部，不易丢失，安全卫生，可以更换新的海绵刷头，能多次进行利用，且还安装有按摩装置，照明装置，功能较为多样。



CN 205458346 U

MassagerPriorArt0000307

Petitioner Therabody Ex-1004, 0990

1.一种带刷头的洁面装置，其特征在于：它包含手柄(1)、电池(2)、开关(3)、螺纹连接头(4)、固定座(5)、海绵刷头(6)、海绵刷头固定座(7)、卡扣(8)、方形槽(9)、LED灯(10)、连接杆(11)、转轴(12)、硅胶按摩头(13)和转孔(13-1)，手柄(1)的前端设置有螺纹连接头(4)，螺纹连接头(4)与固定座(5)的下方螺纹连接，固定座(5)的一侧设置有方形槽(9)，海绵刷头(6)安装在海绵刷头固定座(7)内，海绵刷头固定座(7)的外侧设置有卡扣(8)，海绵刷头固定座(7)通过卡扣(8)固定安装在方形槽(9)内，固定座(5)的另一侧设置有两个对应设置的连接杆(11)，连接杆(11)连接有转轴(12)，且转轴(12)上转动连接有硅胶按摩头(13)，手柄(1)的内部设置有电池(2)，手柄(1)的外侧壁上设置有开关(3)。

2.按照权利要求1所述的一种带刷头的洁面装置，其特征在于：所述的硅胶按摩头(13)的两侧设置有转孔(13-1)，转孔(13-1)与转轴(12)连接，且硅胶按摩头(13)上均匀分布有硅胶按摩颗粒。

3.按照权利要求1所述的一种带刷头的洁面装置，其特征在于：所述的固定座(5)采用透明塑料制成，固定座(5)内设置有数个LED灯(10)，且LED灯(10)与电池(2)之间通过导线连接。

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一种带刷头的洁面装置

技术领域

[0001] 本实用新型涉及一种带刷头的洁面装置，属于护肤工具技术领域。

背景技术

[0002] 现在的人们，尤其是女性，对面部的美容越来越在意。但是，有的人的面部皮肤中的毛孔较为粗大，或者因为油性皮肤而导致有过多的油脂或化妆品残留物堵塞毛孔，在面部留下黑头和暗疮等，这些都大大的影响了女性的面部美容，且会对面部的皮肤造成一定的伤害。

[0003] 为了解决这些问题，人们在清洁面部皮肤时都会采用洗面奶和卸妆油来清洗脸部皮肤，并且会配合使用洗脸海绵来清洗面部，但是现有的洗脸海绵仅仅为一块普通的海绵，拿着擦洗面部不够方便，且洗脸后将海绵随手放置，容易遗忘，并且也不够卫生。

发明内容

[0004] 针对上述问题，本实用新型要解决的技术问题是提供一种带刷头的洁面装置。

[0005] 本实用新型一种带刷头的洁面装置，它包含手柄1、电池2、开关3、螺纹连接头4、固定座5、海绵刷头6、海绵刷头固定座7、卡扣8、方形槽9、LED灯10、连接杆11、转轴12、硅胶按摩头13和转孔13-1，手柄1的前端设置有螺纹连接头4，螺纹连接头4与固定座5的下方螺纹连接，固定座5的一侧设置有方形槽9，海绵刷头6安装在海绵刷头固定座7内，海绵刷头固定座7的外侧设置有卡扣8，海绵刷头固定座7通过卡扣8固定安装在方形槽9内，固定座5的另一侧设置有两个对应设置的连接杆11，连接杆11连接有转轴12，且转轴12上转动连接有硅胶按摩头13，手柄1的内部设置有电池2，手柄1的外侧壁上设置有开关3。

[0006] 作为优选，所述的硅胶按摩头13的两侧设置有转孔13-1，转孔13-1与转轴12连接，且硅胶按摩头13上均匀分布有硅胶按摩颗粒。

[0007] 作为优选，所述的固定座5采用透明塑料制成，固定座5内设置有数个LED灯10，且LED灯10与电池2之间通过导线连接。

[0008] 本实用新型的有益效果：它能克服现有技术的弊端，结构设计合理新颖，海绵刷头通过海绵刷头固定座和卡扣固定在固定座上，不需要手持海绵刷头进行清洁面部，使用更加方便，并且不易丢失，安全卫生，当海绵刷头磨损时可以更换新的海绵刷头，能多次进行利用，节约资源，

[0009] 且还安装有按摩装置，还可以对面部进行按摩，同时它还设置有照明装置，可以作为照明装置使用，功能较为多样。

[0010] 附图说明：

[0011] 为了易于说明，本实用新型由下述的具体实施及附图作以详细描述。

[0012] 图1为本实用新型结构示意图；

[0013] 图2为本实用新型中硅胶按摩头的结构示意图；

[0014] 图3为本实用新型中海绵刷头、海绵刷头固定座和卡扣的连接结构示意图。

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[0015] 1-手柄;2-电池;3-开关;4-螺纹连接头;5-固定座;6-海绵刷头;7-海绵刷头固定座;8-卡扣;9-方形槽;10-LED灯;11-连接杆;12-转轴;13-硅胶按摩头;13-1-转孔。

[0016] 具体实施方式:

[0017] 如图1-3所示,本具体实施方式采用以下技术方案:它包含手柄1、电池2、开关3、螺纹连接头4、固定座5、海绵刷头6、海绵刷头固定座7、卡扣8、方形槽9、LED灯10、连接杆11、转轴12、硅胶按摩头13和转孔13-1,手柄1的前端设置有螺纹连接头4,螺纹连接头4与固定座5的下方螺纹连接,固定座5的一侧设置有方形槽9,海绵刷头6安装在海绵刷头固定座7内,海绵刷头固定座7的外侧设置有卡扣8,海绵刷头固定座7通过卡扣8固定安装在方形槽9内,固定座5的另一侧设置有两个对应设置的连接杆11,连接杆11连接有转轴12,且转轴12上转动连接有硅胶按摩头13,手柄1的内部设置有电池2,手柄1的外侧壁上设置有开关3。

[0018] 作为优选,所述的硅胶按摩头13的两侧设置有转孔13-1,转孔13-1与转轴12连接,且硅胶按摩头13上均匀分布有硅胶按摩颗粒。

[0019] 作为优选,所述的固定座5采用透明塑料制成,固定座5内设置有数个LED灯10,且LED灯10与电池2之间通过导线连接。

[0020] 以上显示和描述了本实用新型的基本原理和主要特征和本实用新型的优点。本行业的技术人员应该了解,本实用新型不受上述实施例的限制,上述实施例和说明书中描述的只是说明本实用新型的原理,在不脱离本实用新型精神和范围的前提下,本实用新型还会有各种变化和改进,这些变化和改进都落入要求保护的本实用新型范围内。本实用新型要求保护范围由所附的权利要求书及其等效物界定。

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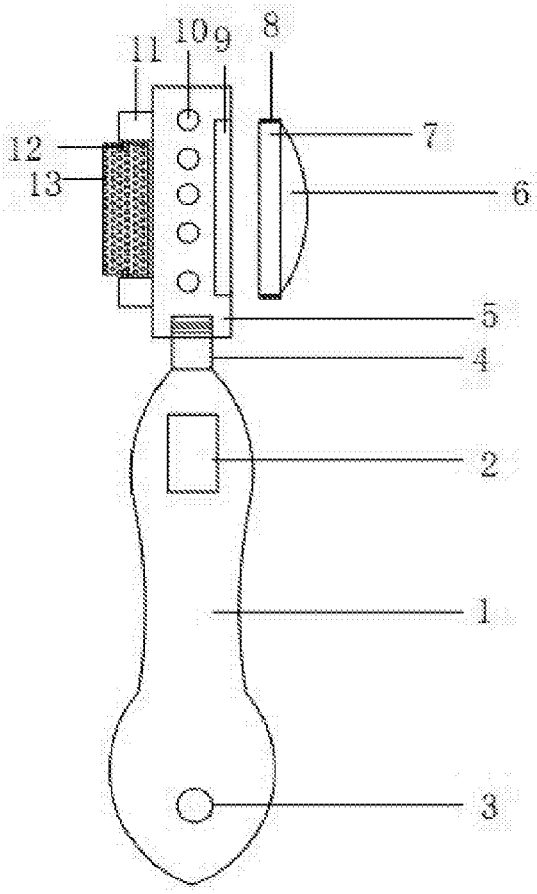


图1

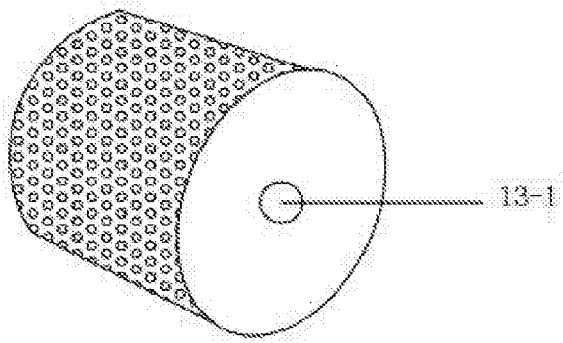


图2

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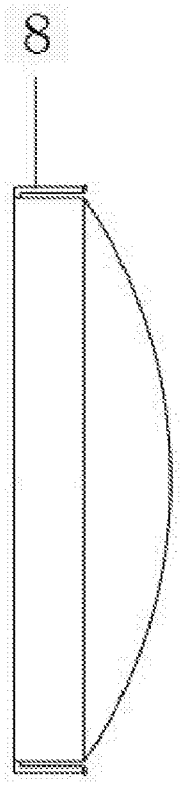


图3

MassagerPriorArt0000312

Petitioner Therabody Ex-1004, 0995

Main and collateral channels massage appearance

List of publications

Application number	Publication date
CN206183628 U Regi…	2017-05-24

Abstract

The utility model discloses a main and collateral channels massage appearance includes: the handle, the inside battery jar that is equipped with of handle, battery jar are equipped with battery groove cover, and the battery jar is inside to be equipped with the battery, is equipped with switch on the handle, and the afterbody of handle is equipped with the charging circuit who is connected with the battery, the charging plug be connected with charging circuit, the head of handle is equipped with massage seat, and massage seat is last to be equipped with human induction system, main and collateral channels massage appearance carries out the gear as required and selects, and the first dynamics of massage is adjusted according to gear control power module to the controller, and the electric current size and orientation for electromagnetic induction coil is exported to controller control power module, and electromagnetic induction coil changes according to the change of arrival current size, the dynamics of strikeing that drives the massage head, has realized the massage effect different according to different gears, and massage force is adjustable, plays the health of releiving and relieves tired effect.

English Abstract (Native or MT)

The utility model discloses a main and collateral channels massage appearance includes: the handle, the inside battery jar that is equipped with of handle, battery jar are equipped with battery groove cover, and the battery jar is inside to be equipped with the battery, is equipped with switch on the handle, and the afterbody of handle is equipped with the charging circuit who is connected with the battery, the charging plug be connected with charging circuit, the head of handle is equipped with massage seat, and massage seat is last to be equipped with human induction system, main and collateral channels massage appearance carries out the gear as required and selects, and the first dynamics of massage is adjusted according to gear control power module to the controller, and the electric current size and orientation for electromagnetic induction coil is exported to controller control power module, and electromagnetic induction coil changes according to the change of arrival current size, the dynamics of strikeing that drives the massage head, has realized the massage effect different according to different gears, and massage force is adjustable, plays the health of releiving and relieves tired effect.

Other Abstracts

本实用新型公开种经络按摩仪包括：手柄，手柄内部设有电池槽，电池槽设有电池槽盖，电池槽内部设有电池，手柄上设有电源开关，手柄的尾部设有与电池连接的充电电路，与充电电路连接的充电插头；手柄的头部设有按摩座，按

摩座上设有人体感应装置；经络按摩仪根据需要进行档位选择，控制器根据档位控制功率模块调节按摩头力度，控制器控制功率模块输出给电磁感应线圈的电流大小和方向，电磁感应线圈根据输入电流大小的改变，带动按摩头的敲击力度进行改变，实现了根据不同档位不同的按摩效果，按摩力度可调，起到舒缓身体解除疲劳的作用。

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Applicant/Assignee	SHANDONG JIALIN ELECTRONIC TECHNOLOGY owned by SHANDONG JIALIN INTERNATIONAL BUSINESS DEVELOPMENT
Patent Assignee History	SHANDONG JIALIN ELECTRONIC TECHNOLOGY CO., LTD.
Application Numbers & Dates	CN201620987775U 2016-08-30 [2016CN-U987775]
Priority Numbers & Dates	CN201620987775U 2016-08-30 [2016CN-U987775]
Technology domain	Medical technology
IPC codes	A61H-023/02*
Notes	Number of Claims: 5 Number of Pages: 9 Gazette number: 33-21 Gazette date: 2017-05-24

Claims

1. One meridian massage device, characterized in, including: a handle, the handle is provided inside the battery case, battery slot is provided with a slot cover battery, a battery container internally provided with a battery, a handle is provided with a power switch, a charging circuit connected to the end of the handle is provided with a battery, and the charging circuit is connected to charge plug; part massaging seat is provided with a head of the handle, the human body detection device is provided with a massage seat;

Part massaging seat is provided within the massage assembly, massage assembly includes a housing, secured within the housing of the massaging head and the electromagnetic induction coil, an electromagnetic induction coil and the power module is connected, are formed in both side walls of the housing through hole and the 1st 2nd through-hole, the electromagnetic induction coil is formed with a telescopic shaft, 1st pass out of the 1st through-hole of the telescopic shaft of the massaging head connection end, 2nd pass out of the 2nd through-hole end of the telescopic shaft is connected to the securing members, 2nd pass out of the outer sleeve is provided with a spring through hole of the telescopic shaft, comes into contact with the positioning member whose one end, abuts against the wall of the case for the other end; seat for seating groove which is provided with a massaging of the massaging head;

The handle is further disposed with a step-up module and a controller, the step-up module is connected power modules, power modules connected to the controller; human body detection device connected to the controller;

The power module includes: a drive circuit, single-phase bridge circuit and an overcurrent protection circuit, drive circuit, single-phase bridge circuit and the overcurrent protection circuit to sequentially connect, single-phase bridge circuit is further coupled controller;

The charging circuit includes: 1st resistance, resistance 2nd, 3rd resistance, resistance 4th, 5th resistance, 6th resistance, 1st transistor, 2nd transistor, 3rd transistor, a controllable voltage regulator tube, a diode, 1st 2nd potentiometer and the potentiometer, 1st to 3rd 1st end at the same time with the resistance of the DC power supply connected to the emitter and anode triode, 1st to 4th resistance of the DC power supply to the cathode terminal is connected, 1st 2nd 1st 2nd end of the resistance of the resistance at the same time and the end, 3rd 1st end and a 1st transistor has a collector connected to resistors, 2nd 3rd 2nd end of the resistance of the transistor is connected to the base, 3rd 5th of the 1st end connected to the collector of the triode resistance, 1st 2nd 3rd simultaneously with the end of the resistance of the transistor base and a controllable voltage regulator tube has a cathode connected, controllable anode of the 4th to 2nd resistance of the voltage regulator tube end at the same time, 1st 1st end of the potentiometer, 1st to 6th of the cathode connecting end and a battery resistance, the emitter of the 2nd 1st transistor and emitter of transistor simultaneously with the 1st 2nd end of the potentiometer connected, 1st slide of the potentiometer connected to the control terminal of the controllable voltage regulator tube end and, at the same time with the 2nd base of the triode 2nd 1st 2nd end and a sliding end of the potentiometer connected potentiometer, 2nd 2nd 6th 2nd end of the resistance of the potentiometer connected to the end, 2nd transistor the collector of the anode and the cathode of the diode is connected to the battery of the same time, with the anode of the diode of the 2nd 5th resistance is connected.

2. Meridian massage device according to claim 1, characterized in,

A plurality of LED lamps is provided with a massage support is, each of the LED lamps are respectively connected to the battery.

3. Meridian massage device according to claim 1, characterized in,

The step-up module includes a sequential arrangement of the MOS switch circuit, transformer and rectifier unit, MOS switch circuit connects the battery, the rectifier unit has an output connected the input of the driver circuit, a trigger circuit switch MOS tube end of a controller connected to the signal terminal.

4. Meridian massage device according to claim 1, characterized in,

A handle is provided on the massage adjustment range switch, a switch connected to the controller adjusting the position of the massage, the massage adjustment range switch comprises: a zero gear, a gear, second gear position, a third-speed position.

5. Meridian massage device according to claim 4, characterized in,

Human body sensing device includes: a thermistor, the thermistor end of the second leg coupled to the amplifier, amplifier connected to the other end of the tripod, + 5V power supply VCC1 of the four-pin connection of the amplifier, amplifier eleven feet feet of the ground, the amplifier output is connected to a four-pin of the timer, and a foot at the same time of the timer is a six-pin connected to resistors (R4) 2nd end and a capacitor (C1) between the ends of the 1st, the resistance (R4) of the 1st end and the resistance (R3) 2nd end connection; resistance (R3) resistances through 1st end (R2) connected to the power supply VCC2, capacitor (C1) 2nd end grounded, the power source VCC3 eight-pin of the timer, the timer of the one foot is grounded, the output of the timer of the tripod into a signal, a signal output from the connection controller.

Original Claims

1.一种经络按摩仪，其特征在于，包括：手柄，手柄内部设有电池槽，电池槽设有电池槽 盖，电池槽内部设有电池，手柄上设有电源开关，手柄的尾部设有与电池连接的充电电路， 与充电电路连接的充电插头；手柄的头部设有按摩座，按摩座上设有人体感应装置；

按摩座内部设有按摩组件，按摩组件包括壳体、按摩头和固定在壳体内的电磁感应线 圈，所述电磁感应线圈与功率模块连接，所述壳体的两侧壁上分别开设有第一通孔和第二 通孔，所述电磁感应线圈内穿设有伸缩轴，伸缩轴的第一端穿出第一通孔与按摩头连接，伸 缩轴第二端穿出第二通孔连接有定位件，穿出第二通孔的伸缩轴外部套设有弹簧，弹簧一 端与定位件相抵接，弹簧另一端与壳体壁相抵接；按摩座上设有用于安置按摩头的安置槽；

手柄内部还设有升压模块和控制器，所述升压模块连接功率模块，功率模块与控制器 连接；人体感应装置与控制器连接；

所述功率模块包括：驱动电路、单相桥式电路和过流保护电路，所述驱动电路、单相桥 式电路和过流保护电路依次连接，单相桥式电路还连接控制器；

充电电路包括：第一电阻、第二电阻、第三电阻、第四电阻、第五电阻、第六电阻、第一三 极管、第二三极管、第三三极管、可控稳压管、二极管、第一电位器和第二电位器，所述第一 电阻的第一端同时与所述第三三极管的发射极和直流电源的正极连接，所述直流电源的负 极与所述第四电阻的第一端连接，所述第一电阻的第二端同时与所述第二电阻的第一端、 所述第三电阻的第一端和所述第一三极管的集电极连接，所述第二电阻的第二端与所述第 三三极管的基极连接，所述第三三极管的集电极与所述第五电阻的第一端连接，所述第三 电阻的第二端同时与所述第一三极管的基极和所述可控稳压管的负极连接，所述可控稳压 管的正极同时与所述第四电阻的第二端、所述第一电位器的第一端、所述第六电阻的第一 端和所述电池的负极连接，所述第一三极管的发射极同时与所述第二三极管的发射极和所 述第一电位器的第二端连接，所述第一电位器的滑动端与所述可控稳压管的控制端连接， 所述第二三极管的基极同时与所述第二电位器的第一端和所述第二电位器的滑动端连接， 所述第二电位器的第二端与所述第六电阻的第二端连接，所述第二三极管的集电极同时与 所述电池的正极和所述二极管的负极连接，所述二极管的正极与所述第五电阻的第二端连接。

2.根据权利要求1所述的经络按摩仪，其特征在于，

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所述按摩座上设有设置有多个LED灯，每个LED灯分别与电池连接。

3.根据权利要求1所述的经络按摩仪，其特征在于，

所述升压模块包括依次连接的MOS 开关电路、变压器和整流单元，所述MOS 开关电路 连接电池，所述整流单元的输出端连接驱动电路的输入端，所述 MOS 管开关电路的触发信 号端连接控制器的输出端。

4.根据权利要求1所述的经络按摩仪，其特征在于，

手柄上还设有按摩调节档位开关，按摩调节档位开关与控制器连接，按摩调节档位开 关包括：零档位，一档位，二档位，三档位。

5.根据权利要求4所述的经络按摩仪，其特征在于，

人体感应装置包括：热敏电阻，热敏电阻一端接到放大器的二脚，另一端连接放大器的 三脚，放大器的四脚连接+5V的电源VCC1，放大器的十一脚脚接地，放大器的输出端连接定 时器的四脚，定时器的六脚和二脚同时接至电阻（R4）第二端和电容（C1）第一端的之间，电 阻（R4）的第一端与电阻（R3）第二端连接；电阻（R3）第一端通过电阻（R2）连接电源VCC2，电容（C1）第二端接地，定时器的八脚接电源VCC3，定时器的一脚接地，定时器的三脚为信号的 输出端，输出的信号连接控制器。

Description

Meridian massage device

Technical Field

The present utility model relates to the field of meridian massage, and more particularly to one meridian massage device.

Background Art

Meridians are to hand, foot and the three female and sanyang rendu two veins as a main component, a biasing circuit a systemic integrated network system, it is inline organs, or external to qiqiao sense organs, limbs bai hai, communication between the front and back, upper and lower, inner and outer, the entirety of each of the organic portions are joined to the human body, a through meridians, resistance, related to the health of people, so that the human meridian must be kept open at all times. It is through the use or finding masseur massage to the massage hammer. It is not intended strength is insufficient, the effect of a fatigue does not come to soothe the body, is the cost is high, it is possible to massage effect cannot be achieved at their leisure.

Summary

In order to overcome the shortcomings of the prior art, an object of the present utility model, to provide a meridian massage device, comprising: a handle, the handle is provided inside the battery case, battery cell is provided with a battery slot cover, a battery container internally provided with a battery, a power switch on the handle, the handle is provided with a charging circuit connected to the end of the battery, the charging circuit connected to the charging plug; part massaging seat of the handle is provided with a head, a massage seat is provided with a human body sensing device;

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Is provided inside part massaging seat massage assembly, massage assembly includes a housing, the massage heads and fixed within the housing of the electromagnetic induction coil, an electromagnetic induction coil and the power module is connected, two side walls of the housing are formed in the 1st through hole and the 2nd through-hole, the electromagnetic induction coil is formed with a telescopic shaft, 1st end of the telescopic shaft through-hole and the massaging head connected to pass out of the 1st, 2nd end of the telescopic shaft is connected with a positioning element passing out of the through-hole 2nd, out of the 2nd through-hole of the outer sleeve is provided with a spring of the telescopic shaft, with the positioning member abuts on the one hand, for the other end abuts against the wall of the case; massage support is used for mounting the massaging head of the receiving groove;

The handle is further disposed with a step-up module and a controller, the step-up module is connected to the power module, power module connected to the controller; human body sensing device connected to the controller;

The power module includes: a drive circuit, single-phase bridge circuit and the overcurrent protection circuit, drive circuit, single-phase bridge circuit and the over-current protection circuit to sequentially connect, single-phase bridge circuit is also connected to the controller;

The charging circuit includes: a resistance 1st, 2nd resistance, the resistance 3rd, 4th resistance, the resistance 5th, 6th resistance, 1st transistor, 2nd transistor, 3rd transistor, a controllable voltage regulator tube, a diode, 1st 2nd potentiometer and the potentiometer, 1st to 3rd 1st end of the resistance of the transistor at the same time the emitter and the anode of the DC source is connected, the DC power supply of the 1st to the 4th resistance of the cathode terminal is connected, 1st 2nd 1st 2nd end of the resistance of the resistance simultaneously with the end, 3rd 1st end and connected to the collector of the transistor resistance of the 1st, 2nd 3rd 2nd end of the resistance connected to the base of the transistor is, 3rd 1st end is connected to the collector of the transistor with the resistance of the 5th, 1st 2nd 3rd of the resistance of the transistor can be controlled simultaneously with the end of the tube cathode connected to the base and regulated, a controllable voltage regulator tube 2nd end of the resistance of the anode at the same time with the 4th, 1st end of the potentiometer 1st, 6th resistance of the cathode connection of the 1st end and a battery, the emitter of the transistor 1st 2nd 1st simultaneously with the emitter and the transistor of the potentiometer connected to the 2nd, 1st to the free end of the potentiometer is connected to the control terminal of the controllable voltage regulator tube, the base of the transistor is 2nd 1st 2nd simultaneously with the 2nd of the potentiometer connected to the free end of the potentiometer end and, 2nd to the 6th 2nd end of the resistance of the potentiometer connected to the 2nd, 2nd to the collector of the transistor is connected to the anode and the cathode of the diode to the battery at the same time, anode of the diode connected to the 2nd to the 5th resistance.

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Preferably, the massage support is provided with a plurality lamp LED, LED lamps connected respectively to each of the battery.

Preferably, the step-up module includes a sequential arrangement of the MOS switch circuit, transformer and the rectifying unit, MOS switch circuit is connected battery, the output of the rectifying unit connected to the drive input of the circuit, MOS tube connected to the trigger signal at the output of the controller of the switch circuit.

Preferably, adjustment range switch handle is also is provided with massage, the massage adjustment range switch connected to the controller, the massage adjustment range switch comprises: a zero gear, a gear, second gear position, a third-speed position.

Preferably, the human body detection device comprises: a thermistor, a thermistor coupled to the amplifier at one end of a foot, three foot at the other end connected to an amplifier, a power supply VCC1 a four-pin of the amplifier is connected to + 5V, eleven feet feet ground of the amplifier, the amplifier output is connected to a four-pin of the timer, the timer is connected to a six-foot and the foot at the same time between the end of the resistance R4 2nd end and a capacitor C1 1st, 1st end and the resistance of the resistance R4 R3 2nd end; resistance R3 1st end through resistance R2 connecting the power supply VCC2, capacitor C1 2nd end connected to ground, eight-pin of the power supply VCC3 of the timer, the timer a foot of the ground, the output of the timer of the tripod into a signal, a signal output from the connection controller.

As can be seen from the above technical scheme, the present utility model has the following advantages:

Meridian massage device according to the need for gear selection, speed stage control power module according to the massage head force controller, the controller controls the power module output to the electromagnetic induction coil current magnitude and direction, the electromagnetic induction coil according to a change in the magnitude of the current input, a tap force of the massaging head is driven to be changed, is performed according to the different gears of different massage effect, the massage force adjustable, acts to soothe a fatigue of the body.

The electromagnetic induction coil is energized to form the magnetic flux lines, the magnetic induction wire cutting a telescopic shaft, wherein the telescoping shaft is the core. After the electromagnetic induction coil is energized to drive the telescopic shaft in the axial direction, the electromagnetic induction coil input direction of electricity, cutting magnetic induction line direction to change as well, given the direction of current through the electromagnetic induction coil to drive the telescopic shaft to reciprocate in the axial direction. In order to increase the striking force, as the telescopic shaft to move forward at the same time the tension spring, an electromagnetic induction coil is de-energized the spring itself can be achieved through the telescopic axial shaft is moved backward recovery force, through the on-time control the output current of the power module can

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vary in size, the electromagnetic induction coil to drive the massaging head along the axial direction.

Description of Drawings

In order to more clearly illustrate the technical scheme of the present utility model, as will be described in the description simply requires the use of the accompanying drawings described, it will be apparent, the present utility model in the following description of the figures are only some of the embodiment, those skilled in the art, without making creative efforts thereof, may also be obtained from these drawings of the other figures.

FIG. 1 is a meridian massage device for an overall block diagram;

FIG. 2 is a massage device structure diagram;

FIG. 3 is a schematic diagram of a meridian massage device;

FIG. 4 is a circuit diagram human body sensing device;

FIG. 5 a circuit diagram as a charge circuit.

Embodiment

The present utility model is such that the utility model of the object, features, advantages can be more apparent and understandable, the following will use the specific embodiment and the accompanying drawings, the technical scheme of the present utility model protection be clearly, fully described, it will be apparent, the present utility model embodiment described below is only a portion of the embodiment, and not all of the embodiment. The present patent based on the embodiment, those skilled in the art without creative efforts are obtained by the all of the other embodiment, fall within the scope of patent protection.

Meridian massage device according to the present utility model provides a, as shown in FIG. 1 to 5 shown, comprising: a handle 1, a battery container 2 is provided inside the handle 1, a battery container 2 is provided with a battery slot cover, a battery container 2 is provided inside the battery 11, the handle 1 is provided with a power switch 3, the end of the handle 1 is provided with a battery connected to the charging circuit 11, and a charging circuit connected to the charging plug 4; part massaging seat 6 is provided with a head portion of the handle 1; part massaging seat 6 is provided with a human body sensing device 28;

Part massaging seat 6 is fixed inside the massage assembly, massage assembly includes a housing 23, the massage heads 8 and fixed to the housing 23 of the electromagnetic induction coil 24, the electromagnetic induction coil 24 and the power module is connected, two side walls of the housing 23 are formed in the 1st through-hole 25 and the 2nd through-hole 26, 24 in the electromagnetic induction coil 9 is formed with a telescopic shaft, telescoping shaft 9 of the 1st through hole 25 passing out of the 1st end connected to the massaging head 8, 9 2nd end of the telescopic shaft 26 is connected to the positioning member 22 pass out of the 2nd through-hole, pass out of the 2nd through-hole 26 of the outer sleeve is provided with a spring 9 telescopic shaft 21, 21 comes into contact with the positioning

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member 22 one end of the spring, the spring 21 and the other end wall 23 comes into contact with the housing; part massaging seat 6 7 8 are provided on the massaging head for placement of the receiving groove;

The handle 1 is further disposed with a step-up module and a controller 19, the step-up module is connected to the power module, power module and a controller 19 is connected, human body sensing device 28 is connected to the controller 19.

The power module includes: a drive circuit 15, 16 and the overcurrent protection circuit 17 the single phase bridge circuit, the driving circuit 15, 16 and the overcurrent protection circuit 17 is in turn connected single-phase bridge circuit, single-phase bridge circuit 17 is also connected to the controller; bridge-type circuit 17 as a single-phase single-phase common in the art bridge-type circuit.

Is provided with a plurality of LED lamp 6 is provided with a part massaging seat 5, each of the LED lamp are respectively connected to the battery. LED lamp includes: a power LED lamp, the charge LED lamp, LED lamp operation.

The step-up module includes a sequential arrangement of the MOS switch circuit 12, 13 and the rectifying unit 14 transformer, MOS switching circuit 12 is connected battery 11, the output of the rectifying unit 14 connected to the input of the driving circuit 15, MOS tube switch circuit 12 the output of the trigger signal end to controller 19. The massage adjustment range switch 10 is provided on the handle 1, the massage adjustment range switch 10 is connected to the controller 19. The massage adjustment range switch comprises: a zero gear, a gear, second gear position, a third-speed position.

The controller 19 according to the power switch 3 is opened, through MOS tube switch units connect the DC power into a single AC electric power and control output to the transformer 13, 13 steps up a voltage in the secondary-side winding of the transformer outputs the boosted current is rectified into a dc output to the drive circuit 15 filters, the drive circuit 15 is turned on to the single-phase bridge circuit 16 a certain pressure drop, and the controller 19 meridian massage device 16 operable to control a single-phase bridge-type circuit control operation.

There may be performed as desired gear selection, speed stage control power module adjusts the controller based on the strength of massage heads, the controller controls the power module output to the electromagnetic induction coil current magnitude and direction, changes in size of the electromagnetic induction coil according to the input current, to drive the massaging head of the tapping force is changed, is performed according to the different gears of different massage effect.

In the embodiment of the present, the electromagnetic induction coil is energized to form the magnetic flux lines, the magnetic induction wire cutting a telescopic shaft, wherein the telescoping shaft is the core. After the electromagnetic induction coil is energized to drive the telescopic shaft in the axial direction, the electromagnetic induction coil input direction of electricity,

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cutting magnetic induction line direction to change as well, given the direction of current through the electromagnetic induction coil to drive the telescopic shaft to reciprocate in the axial direction. In order to increase the striking force, as the telescopic shaft to move forward at the same time the tension spring, an electromagnetic induction coil is de-energized the spring itself can be achieved through the telescopic axial shaft is moved backward recovery force, through the on-time control the output current of the power module can vary in size, the electromagnetic induction coil to drive the massaging head along the axial direction.

Human body sensing device includes: a thermistor R1, a thermistor coupled to the amplifier U2 of a foot end of R1, the other end connected amplifier U2 of the tripod, amplifier U2 four feet of a power supply connected + 5V VCC1, amplifier U2 of the ground eleven feet feet, four feet of timer U3 is connected at the output of amplifier U2, U3 to a six-foot and second foot timer at the same time between the end of the capacitor C1 1st to the resistance R4 2nd end and, with the resistance R3 2nd 1st end of the resistance R4 is connected; resistance R3 1st end through resistance R2 connecting the power supply VCC2, capacitor C1 2nd end grounded, the power source VCC3 eight-pin of the timer, the timer U3 a foot of the ground, the output of timer U3 of the tripod into a signal, a signal output from the connection controller; when the massage adjustment range switch is in the zero position, and the meridian massage device is in the energized state, meridian massage device for near the body, thermistor R1 detect a human body heat emitted from the sensing signal to the amplifier, to amplify the sensing signal through amplifier U2, U3 amplify signal to the timer, the timer U3 of the foot is at a high level 4, the timer is in operating state of the trigger. The timer constitutes a multi-vibrator, wherein the resistance in the period of oscillation and the external circuit R2, R3, R4 and capacitor C1 related. Under the action of at-flop, a timer U3 of the tripod the output square wave signal to the controller. The controller controls the meridian massage device for operation.

The charging circuit includes: a resistance R1 1st, 2nd resistance R2, R3 resistance 3rd, 4th resistance R4, R5 resistance 5th, 6th resistance R6, 1st transistor Q1, Q2 transistor 2nd, 3rd transistor Q3, a controllable voltage regulator tube VS, diode D, 1st and the 2nd potentiometer RP2 potentiometer RP1, diode D is a light emitting diode, NPN-type transistor Q1 to 1st, 2nd and the 3rd transistor Q3 PNP-type transistor Q2 are, 1st to 3rd transistor Q3 1st end of the resistance R1 while the emitter of the anode connection of the DC and DC power supply, a DC power source of the 1st to the 4th DC resistance R4 of the cathode terminal is connected, 2nd 1st 2nd end of the resistance R1 of the resistance R2 simultaneously with the end of the 1st, 3rd resistance R3 of the 1st transistor Q1 connected to the collector of the 1st end and, 2nd to the 3rd transistor Q3 of the 2nd end of the resistance R2 connected to the base, the collector of the transistor Q3 of the 3rd to 5th resistance R5 connected to the 1st, 2nd 3rd resistance R3 of the 1st transistor Q1 to the base and end at the same time with the VS of the controllable voltage regulator tube cathode connection, a controllable voltage regulator tube

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simultaneously with the anode of the VS of the 4th resistance R4 2nd end, potentiometer RP1 1st end of the 1st, 6th resistance R6 of the cathode of the 1st end and a battery 11 is connected, the emitter of the transistor Q1 1st 2nd 1st and emitter of transistor Q2 at the same time with the RP1 of the potentiometer connected to the 2nd, 1st potentiometer RP1 VS of the sliding end of the control end is connected with the controllable voltage regulator tube, the base of the 2nd transistor Q2 of the 2nd 1st 2nd potentiometer RP2 simultaneously with the sliding end is connected to potentiometer RP2 end and, 2nd to 6th resistance of the potentiometer RP2 2nd end and R6 connected to the 2nd, 2nd transistor Q2 has a collector of the anode and the diode D 11 simultaneously with the cathode of the battery is connected, with the anode of the diode D of the 2nd 5th resistance R5 is connected.

Through the charging circuit to the battery 11 is charged, to ensure that no over-charged, the resistance R3 3rd, 1st transistor Q1, 1st potentiometer RP1 and a controllable voltage regulator tube comprising the precision tunable voltage-stabilizing circuit VS, 2nd transistor Q2, 2nd and the 6th resistance R6 form adjustable potentiometer RP2 constant current circuit, 3rd transistor Q3, R1 the resistance 1st, 2nd resistance R2, R5 and the diode D is a charging indicator circuit 5th resistance, an increase in voltage as it is chargeable battery 11, the charging current will gradually be reduced, the resistance R1 of the battery is fully charged to the pressure drop will reduce the 1st, 3rd transistor Q3 is turned off so that, diode D will be extinguished.

In the present specification with each embodiment described by way of a progressive, each embodiment will be mainly described with the other embodiment is different from the writing is made, with reference to each embodiment is the same as that between like parts with each other.

A description of the disclosed embodiment, those skilled in the art to make or use the utility model can be achieved. Various modifications to the embodiment in the art will be apparent to those skilled in the art, the general principles defined herein may be made without departing from the spirit or scope of the present utility model, implemented in the other embodiment. Thus, the present utility model will not be limited to these embodiment illustrated herein, but is to be accorded with the principles and novel features disclosed herein that conforms to the wide range.

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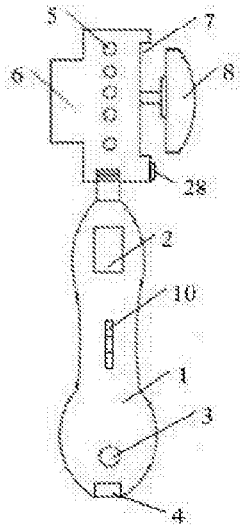
权利要求书2页 说明书4页 附图2页

(54)实用新型名称

一种经络按摩仪

(57)摘要

本实用新型公开一种经络按摩仪包括：手柄，手柄内部设有电池槽，电池槽设有电池槽盖，电池槽内部设有电池，手柄上设有电源开关，手柄的尾部设有与电池连接的充电电路，与充电电路连接的充电插头；手柄的头部设有按摩座，按摩座上设有人体感应装置；经络按摩仪根据需要进行档位选择，控制器根据档位控制功率模块调节按摩头力度，控制器控制功率模块输出给电磁感应线圈的电流大小和方向，电磁感应线圈根据输入电流大小的改变，带动按摩头的敲击力度进行改变，实现了根据不同档位不同的按摩效果，按摩力度可调，起到舒缓身体解除疲劳的作用。



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1.一种经络按摩仪，其特征在于，包括：手柄，手柄内部设有电池槽，电池槽设有电池槽盖，电池槽内部设有电池，手柄上设有电源开关，手柄的尾部设有与电池连接的充电电路，与充电电路连接的充电插头；手柄的头部设有按摩座，按摩座上设有人体感应装置；

按摩座内部设有按摩组件，按摩组件包括壳体、按摩头和固定在壳体内的电磁感应线圈，所述电磁感应线圈与功率模块连接，所述壳体的两侧壁上分别开设有第一通孔和第二通孔，所述电磁感应线圈内穿设有伸缩轴，伸缩轴的第一端穿出第一通孔与按摩头连接，伸缩轴第二端穿出第二通孔连接有定位件，穿出第二通孔的伸缩轴外部套设有弹簧，弹簧一端与定位件相抵接，弹簧另一端与壳体壁相抵接；按摩座上设有用于安置按摩头的安置槽；

手柄内部还设有升压模块和控制器，所述升压模块连接功率模块，功率模块与控制器连接；人体感应装置与控制器连接；

所述功率模块包括：驱动电路、单相桥式电路和过流保护电路，所述驱动电路、单相桥式电路和过流保护电路依次连接，单相桥式电路还连接控制器；

充电电路包括：第一电阻、第二电阻、第三电阻、第四电阻、第五电阻、第六电阻、第一三极管、第二三极管、第三三极管、可控稳压管、二极管、第一电位器和第二电位器，所述第一电阻的第一端同时与所述第三三极管的发射极和直流电源的正极连接，所述直流电源的负极与所述第四电阻的第一端连接，所述第一电阻的第二端同时与所述第二电阻的第一端、所述第三电阻的第一端和所述第一三极管的集电极连接，所述第二电阻的第二端与所述第三三极管的基极连接，所述第三三极管的集电极与所述第五电阻的第一端连接，所述第三电阻的第二端同时与所述第一三极管的基极和所述可控稳压管的负极连接，所述可控稳压管的正极同时与所述第四电阻的第二端、所述第一电位器的第一端、所述第六电阻的第一端和所述电池的负极连接，所述第一三极管的发射极同时与所述第二三极管的发射极和所述第一电位器的第二端连接，所述第一电位器的滑动端与所述可控稳压管的控制端连接，所述第二三极管的基极同时与所述第二电位器的第一端和所述第二电位器的滑动端连接，所述第二电位器的第二端与所述第六电阻的第二端连接，所述第二三极管的集电极同时与所述电池的正极和所述二极管的负极连接，所述二极管的正极与所述第五电阻的第二端连接。

2.根据权利要求1所述的经络按摩仪，其特征在于，

所述按摩座上设有设置有多个LED灯，每个LED灯分别与电池连接。

3.根据权利要求1所述的经络按摩仪，其特征在于，

所述升压模块包括依次连接的MOS 开关电路、变压器和整流单元，所述MOS 开关电路连接电池，所述整流单元的输出端连接驱动电路的输入端，所述MOS 管开关电路的触发信号端连接控制器的输出端。

4.根据权利要求1所述的经络按摩仪，其特征在于，

手柄上还设有按摩调节档位开关，按摩调节档位开关与控制器连接，按摩调节档位开关包括：零档位，一档位，二档位，三档位。

5.根据权利要求4所述的经络按摩仪，其特征在于，

人体感应装置包括：热敏电阻，热敏电阻一端接到放大器的二脚，另一端连接放大器的三脚，放大器的四脚连接+5V的电源VCC1，放大器的十一脚脚接地，放大器的输出端连接定时器的四脚，定时器的六脚和二脚同时接至电阻(R4)第二端和电容(C1)第一端的之间，电

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阻(R4)的第一端与电阻(R3)第二端连接;电阻(R3)第一端通过电阻(R2)连接电源VCC2,电容(C1)第二端接地,定时器的八脚接电源VCC3,定时器的一脚接地,定时器的三脚为信号的输出端,输出的信号连接控制器。

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一种经络按摩仪

技术领域

[0001] 本实用新型涉及经络按摩领域，尤其涉及一种经络按摩仪。

背景技术

[0002] 经络是以手、足三阴和三阳及任督二脉为主体，偏布全身的一个综合网络系统，它内联五脏六腑，外联五官七窍、四肢百骸，沟通表里、上下、内外，将人体的各部分连接成有机的整体，经络的通、阻，关系到人们的健康，所以人体经络必须时时保持畅通。人们通过采用按摩捶或找按摩师进行按摩。这样不是力度不够，达不到舒缓身体解除疲劳的作用，就是成本较高，无法实现在闲暇时就能按摩的效果。

发明内容

[0003] 为了克服上述现有技术中的不足，本实用新型的目的在于，提供一种经络按摩仪，包括：手柄，手柄内部设有电池槽，电池槽设有电池槽盖，电池槽内部设有电池，手柄上设有电源开关，手柄的尾部设有与电池连接的充电电路，与充电电路连接的充电插头；手柄的头部设有按摩座，按摩座上设有人体感应装置；

[0004] 按摩座内部设有按摩组件，按摩组件包括壳体、按摩头和固定在壳体内的电磁感应线圈，所述电磁感应线圈与功率模块连接，所述壳体的两侧壁上分别开设有第一通孔和第二通孔，所述电磁感应线圈内穿设有伸缩轴，伸缩轴的第一端穿出第一通孔与按摩头连接，伸缩轴第二端穿出第二通孔连接有定位件，穿出第二通孔的伸缩轴外部套设有弹簧，弹簧一端与定位件相抵接，弹簧另一端与壳体壁相抵接；按摩座上设有用于安置按摩头的安置槽；

[0005] 手柄内部还设有升压模块和控制器，所述升压模块连接功率模块，功率模块与控制器连接；人体感应装置与控制器连接；

[0006] 所述功率模块包括：驱动电路、单相桥式电路和过流保护电路，所述驱动电路、单相桥式电路和过流保护电路依次连接，单相桥式电路还连接控制器；

[0007] 充电电路包括：第一电阻、第二电阻、第三电阻、第四电阻、第五电阻、第六电阻、第一三极管、第二三极管、第三三极管、可控稳压管、二极管、第一电位器和第二电位器，所述第一电阻的第一端同时与所述第三三极管的发射极和直流电源的正极连接，所述直流电源的负极与所述第四电阻的第一端连接，所述第一电阻的第二端同时与所述第二电阻的第一端、所述第三电阻的第一端和所述第一三极管的集电极连接，所述第二电阻的第二端与所述第三三极管的基极连接，所述第三三极管的集电极与所述第五电阻的第一端连接，所述第二电阻的第二端同时与所述第一三极管的基极和所述可控稳压管的负极连接，所述可控稳压管的正极同时与所述第四电阻的第二端、所述第一电位器的第一端、所述第六电阻的第一端和所述电池的负极连接，所述第一三极管的发射极同时与所述第二三极管的发射极和所述第一电位器的第二端连接，所述第一电位器的滑动端与所述可控稳压管的控制端连接，所述第二三极管的基极同时与所述第二电位器的第一端和所述第二电位器的滑动端连

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接，所述第二电位器的第二端与所述第六电阻的第二端连接，所述第二三极管的集电极同时与所述电池的正极和所述二极管的负极连接，所述二极管的正极与所述第五电阻的第二端连接。

[0008] 优选地，所述按摩座上设有设置有多个LED灯，每个LED灯分别与电池连接。

[0009] 优选地，所述升压模块包括依次连接的MOS 开关电路、变压器和整流单元，所述MOS 开关电路连接电池，所述整流单元的输出端连接驱动电路的输入端，所述MOS 管开关电路的触发信号端连接控制器的输出端。

[0010] 优选地，手柄上还设有按摩调节档位开关，按摩调节档位开关与控制器连接，按摩调节档位开关包括：零档位，一档位，二档位，三档位。

[0011] 优选地，人体感应装置包括：热敏电阻，热敏电阻一端接到放大器的二脚，另一端连接放大器的三脚，放大器的四脚连接+5V的电源VCC1，放大器的十一脚脚接地，放大器的输出端连接定时器的四脚，定时器的六脚和二脚同时接至电阻R4第二端和电容C1第一端的之间，电阻R4的第一端与电阻R3第二端连接；电阻R3第一端通过电阻R2连接电源VCC2，电容C1第二端接地，定时器的八脚接电源VCC3，定时器的一脚接地，定时器的三脚为信号的输出端，输出的信号连接控制器。

[0012] 从以上技术方案可以看出，本实用新型具有以下优点：

[0013] 经络按摩仪根据需要进行档位选择，控制器根据档位控制功率模块调节按摩头力度，控制器控制功率模块输出给电磁感应线圈的电流大小和方向，电磁感应线圈根据输入电流大小的改变，带动按摩头的敲击力度进行改变，实现了根据不同档位不同的按摩效果，按摩力度可调，起到舒缓身体解除疲劳的作用。

[0014] 电磁感应线圈得电后形成磁感应线，磁感应线切割伸缩轴，这里的伸缩轴即为铁心。电磁感应线圈得电后带动伸缩轴沿轴向运动，随着电磁感应线圈输入的电流方向不同，切割磁感线方向也随之变化，因此电磁感应线圈通过给定电流的方向带动伸缩轴沿轴向往复运动。为了提高击打力度，随着伸缩轴向前运动同时拉伸弹簧，电磁感应线圈断电时通过弹簧自身恢复力度可实现伸缩轴轴向向后移动，通过功率模块的导通时间控制输出的电流大小变化，电磁感应线圈带动按摩头沿着轴向移动。

附图说明

[0015] 为了更清楚地说明本实用新型的技术方案，下面将对描述中所需要使用的附图作简单地介绍，显而易见地，下面描述中的附图仅仅是本实用新型的一些实施例，对于本领域普通技术人员来讲，在不付出创造性劳动的前提下，还可以根据这些附图获得其他的附图。

[0016] 图1为经络按摩仪的整体结构图；

[0017] 图2为按摩组件结构图；

[0018] 图3为经络按摩仪的示意图；

[0019] 图4为人体感应装置电路图；

[0020] 图5为充电电路电路图。

具体实施方式

[0021] 为使得本实用新型的实用新型目的、特征、优点能够更加的明显和易懂，下面将运

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用具体的实施例及附图，对本实用新型保护的技术方案进行清楚、完整地描述，显然，下面所描述的实施例仅仅是本实用新型一部分实施例，而非全部的实施例。基于本专利中的实施例，本领域普通技术人员在没有做出创造性劳动前提下所获得的所有其它实施例，都属于本专利保护的范围。

[0022] 本实用新型提供一种经络按摩仪，如图1至5所示，包括：手柄1，手柄1内部设有电池槽2，电池槽2设有电池槽盖，电池槽2内部设有电池11，手柄1上设有电源开关3，手柄1的尾部设有与电池11连接的充电电路，与充电电路连接的充电插头4；手柄1的头部设有按摩座6；按摩座6上设有人体感应装置28；

[0023] 按摩座6内部固定有按摩组件，按摩组件包括壳体23、按摩头8和固定在壳体23内的电磁感应线圈24，所述电磁感应线圈24与功率模块连接，所述壳体23的两侧壁上分别开设有第一通孔25和第二通孔26，所述电磁感应线圈24内穿设有伸缩轴9，伸缩轴9的第一端穿出第一通孔25与按摩头8连接，伸缩轴9第二端穿出第二通孔26连接有定位件22，穿出第二通孔26的伸缩轴9外部套设有弹簧21，弹簧21一端与定位件22相抵接，弹簧21另一端与壳体23壁相抵接；按摩座6上设有用于安置按摩头8的安置槽7；

[0024] 手柄1内部还设有升压模块和控制器19，所述升压模块连接功率模块，功率模块与控制器19连接，人体感应装置28与控制器19连接。

[0025] 所述功率模块包括：驱动电路15、单相桥式电路16和过流保护电路17，所述驱动电路15、单相桥式电路16和过流保护电路17依次连接，单相桥式电路17还连接控制器；单相桥式电路17为本领域常用的单相桥式电路。

[0026] 所述按摩座6上设有设置有多个LED灯5，每个LED灯分别与电池连接。LED灯包括：电源LED灯，充电LED灯，工作LED灯。

[0027] 所述升压模块包括依次连接的MOS 开关电路12、变压器13和整流单元14，所述MOS开关电路12连接电池11，所述整流单元14的输出端连接驱动电路15的输入端，所述MOS管开关电路12的触发信号端连接控制器19的输出端。手柄1上还设有按摩调节档位开关10，按摩调节档位开关10与控制器19连接。按摩调节档位开关包括：零档位，一档位，二档位，三档位。

[0028] 控制器19根据电源开关3的开启，通过MOS管开关单元把直流电变成单相交流电并控制输出给变压器13，变压器13进行升压在二次侧绕组上输出升压后的电流进行整流滤波成直流电发送给驱动电路15，驱动电路15导通给单相桥式电路16一定的压降，同时控制器19控制单相桥式电路16工作从而控制经络按摩仪工作。

[0029] 这里可以根据需要进行档位选择，控制器根据档位控制功率模块调节按摩头力度，控制器控制功率模块输出给电磁感应线圈的电流大小和方向，电磁感应线圈根据输入电流大小的改变，带动按摩头的敲击力度进行改变，实现了根据不同档位不同的按摩效果。

[0030] 本实施例中，电磁感应线圈得电后形成磁感应线，磁感应线切割伸缩轴，这里的伸缩轴即为铁心。电磁感应线圈得电后带动伸缩轴沿轴向运动，随着电磁感应线圈输入的电流方向不同，切割磁感线方向也随之变化，因此电磁感应线圈通过给定电流的方向带动伸缩轴沿轴向往复运动。为了提高击打力度，随着伸缩轴向前运动同时拉伸弹簧，电磁感应线圈断电时通过弹簧自身恢复力度可实现伸缩轴轴向向后移动，通过功率模块的导通时间控制输出的电流大小变化，电磁感应线圈带动按摩头沿着轴向移动。

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[0031] 所述人体感应装置包括：热敏电阻R1，热敏电阻R1一端接到放大器U2的二脚，另一端连接放大器U2的三脚，放大器U2的四脚连接+5V的电源VCC1，放大器U2的十一脚脚接地，放大器U2的输出端连接定时器U3的四脚，定时器U3的六脚和二脚同时接至电阻R4第二端和电容C1第一端的之间，电阻R4的第一端与电阻R3第二端连接；电阻R3第一端通过电阻R2连接电源VCC2，电容C1第二端接地，定时器的八脚接电源VCC3，定时器U3的一脚接地，定时器U3的三脚为信号的输出端，输出的信号连接控制器；当按摩调节档位开关处于零档位，且经络按摩仪处于通电状态时，经络按摩仪靠近人体，热敏电阻R1检测到人体热量向放大器发出感应信号，感应信号通过放大器U2进行放大，放大的信号经过定时器U3，定时器U3的4脚则为高电平，定时器处于触发的工作状态。定时器构成了多谐振荡器，其振荡的周期与外电路中的电阻R2、R3、R4和电容C1有关。在多谐振荡的作用下，定时器U3的三脚则输出方波信号给控制器。控制器控制经络按摩仪运行。

[0032] 充电电路包括：第一电阻R1、第二电阻R2、第三电阻R3、第四电阻R4、第五电阻R5、第六电阻R6、第一三极管Q1、第二三极管Q2、第三三极管Q3、可控稳压管VS、二极管D、第一电位器RP1 和第二电位器RP2，二极管D 为发光二极管，第一三极管Q1 为NPN 型，第二三极管Q2 和第三三极管Q3 均为PNP 型，第一电阻R1 的第一端同时与第三三极管Q3 的发射极和直流电源DC 的正极连接，直流电源DC 的负极与第四电阻R4 的第一端连接，第一电阻R1 的第二端同时与第二电阻R2 的第一端、第三电阻R3 的第一端和第一三极管Q1 的集电极连接，第二电阻R2 的第二端与第三三极管Q3 的基极连接，第三三极管Q3 的集电极与第五电阻R5 的第一端连接，第三电阻R3 的第二端同时与第一三极管Q1 的基极和可控稳压管VS 的负极连接，可控稳压管VS 的正极同时与第四电阻R4 的第二端、第一电位器RP1 的第一端、第六电阻R6 的第一端和电池11 的负极连接，第一三极管Q1 的发射极同时与第二三极管Q2 的发射极和第一电位器RP1 的第二端连接，第一电位器RP1 的滑动端与可控稳压管VS 的控制端连接，第二三极管Q2 的基极同时与第二电位器RP2 的第一端和第二电位器RP2 的滑动端连接，第二电位器RP2 的第二端与第六电阻R6 的第二端连接，第二三极管Q2 的集电极同时与电池11 的正极和二极管D 的负极连接，二极管D 的正极与第五电阻R5 的第二端连接。

[0033] 通过充电电路给电池11充电，确保不会过充，第三电阻R3、第一三极管Q1、第一电位器RP1 和可控稳压管VS 组成精密可调稳压电路，第二三极管Q2、第二电位器RP2 和第六电阻R6 构成可调恒流电路，第三三极管Q3、第一电阻R1、第二电阻R2、第五电阻R5 和二极管D 为充电指示电路，随着被充电池11电压的上升，充电电流将逐渐减小，待电池充满后第一电阻R1 上的压降将降低，从而使第三三极管Q3截止，二极管D将熄灭。

[0034] 本说明书中各个实施例采用递进的方式描述，每个实施例重点说明的都是与其他实施例的不同之处，各个实施例之间相同相似部分互相参考即可。

[0035] 对所公开的实施例的上述说明，使本领域专业技术人员能够实现或使用本实用新型。对这些实施例的多种修改对本领域的专业技术人员来说将是显而易见的，本文中所定义的一般原理可以在不脱离本实用新型的精神或范围的情况下，在其它实施例中实现。因此，本实用新型将不会被限制于本文所示的这些实施例，而是要符合与本文所公开的原理和新颖特点相一致的最宽的范围。

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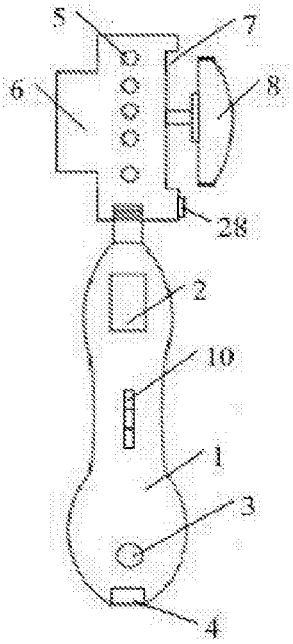


图1

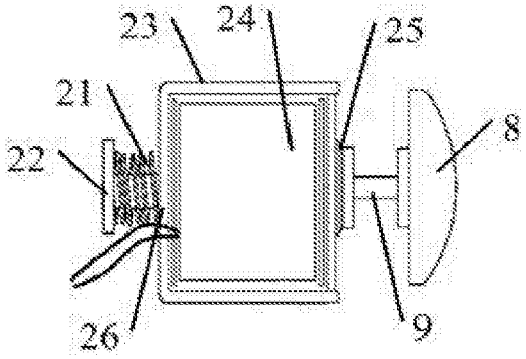


图2

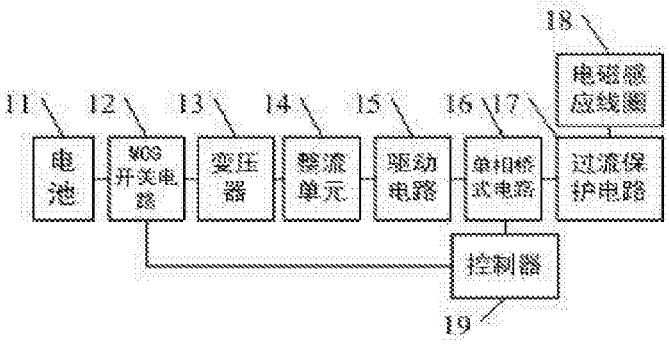


图3

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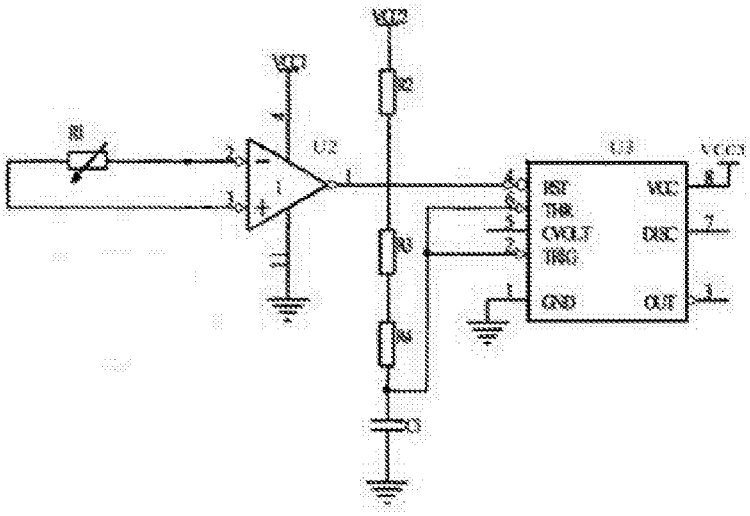


图4

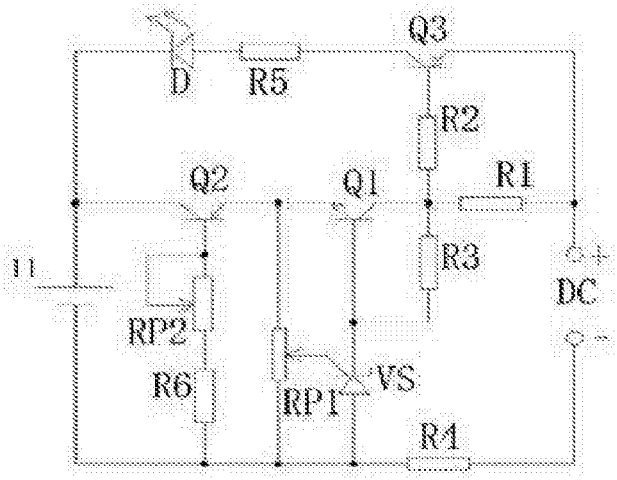


图5

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DESCRIPTION CN 202478137U

10 The utility model introduces a point pressing gun, which includes a shell and a handle. The shell is provided with a controller, a motor, a magnet group, a drive shaft, and a power plug. The power plug is connected to the city power and its output is connected to the controller. Input, the control end of the controller is connected with the adjusting knob and the power switch on the handle, and its output is connected to the motor; the magnet group is composed of the first and second magnet components, and the first magnet component is installed in the reducer The output shaft is axially fixed and rotates synchronously with the output end of the reducer; the second magnetic steel component is installed on the sliding shaft of the linear guide rail and opposite to the first magnetic steel component, and an anti-rotation device is installed on the sliding shaft. The linear guide rail is fixed in the shell, and the other end of the sliding shaft passes through the shell and is connected with the massage head. The acupoint pressing gun can provide linear thrust motions of different frequencies and strengths. The massage head is aimed at the acupoints for pressure, and it is convenient to carry and use, and is suitable for clinical treatment and family health care.

22 Acupoint click gun

23 Technical field

24 The utility model relates to a medical device used for clinical treatment, in particular to an acupoint pressing gun that can massage acupoints of the human body. The acupoint pressing gun can not only meet the needs of clinical treatment, but also can be used for family health care.

27 Background technique

28 At present, the commonly used vibration massagers on the market are divided into motor type and electromagnetic type. Among them, the working principle of motor type vibration massager is to drive the eccentric wheel and sliding shaft through the motor to produce back and forth reciprocating motion, which can massage the human body. . The structure of the motor type is relatively simple, but the eccentric structure in this structure is easy to wear, the vibration force and amplitude are fixed, and the power of small motors on the market is affected by the volume, and is often small. Therefore, the strength of the motor massager The amplitude is relatively weak, and its effect is often unsatisfactory on the parts of the human body where the soft tissue is relatively abundant. Electromagnetic vibration massager can avoid internal wear and tear. Its working principle is to use electromagnetic force to generate alternating magnetic field with alternating current to form the transformation of the magnetic direction, causing the reciprocating mechanical movement of the massage

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com ponent, thereby playing a m assage effect. For exam ple, the C hinese patent w ith the patent num ber 92110205.4 discloses a "vibrating m agnetic therm alm assager" and its subsequent im provem ents, and the patent num ber 98104518.9 discloses a "strong m agnetic and strong shock physiotherapy w ith m assage head", w hich The w orking m ethod is to use the changes of electrom agnetic and alternating m agnetic field to cause the m echanical m ovem ent of the m assage com ponent. Its advantage is that the vibration force is relatively large. H ow ever, the m ovem ent frequency of the m assager w ith this structure is relatively fixed by the AC frequency, resulting in the m echanical m ovem ent of the m assage com ponent The am plitude and strength are relatively constant, w hich is not suitable for the needs of different parts of the m assage am plitude and strength. A t the sam e tim e, the degree of dependence on the type of pow er supply is relatively large, and the internal structure is relatively com plex, requiring spring buffering, large volum e, and inconvenient to carry.

48 U tility m odel content

49 In view of the above-m entioned shortcom ings in the prior art, the m ain purpose of the present invention is to solve the problem that the vibration am plitude and frequency of the existing electrom agnetic vibration m assager are not adjustable, and to provide an adjustable vibration frequency, long service life, and can satisfy Press the gun at acupoints w ith different acupoint strength requirem ents. The acupoint pressing gun can not be restricted by pow er supply conditions, and m eets the needs of acupoint m assage therapy and fam ily health care.

55 The technical schem e of the utility m odel: an acupuncture point pressing gun, w hich is characterized in that it com prises a shell, a handle is installed on the shell, a m otor, a reducer, a m agnetic steel group and a sliding shaft are arranged in the shell; There is a pow er plug, the input of the pow er plug is connected to the m ains, the output of the pow er plug is connected to the input of the m otor, the control end of the m otor is connected to the pow er sw itch provided on the handle, and the output of the m otor is connected to the reducer and controls the speed of the reducer; The m agnetic steel assem bly is com posed of a first m agnetic steel com ponent and a second m agnetic steel com ponent. The first m agnetic steel com ponent is installed on the output shaft of the reducer and is axially fixed, and the second m agnetic steel com ponent is installed on the sliding shaft and connected to the The first m agnetic steel com ponent is opposite to the sam e pole, the sliding shaft is slidably installed in the sliding rail at the front end of the housing, and the other end of the sliding shaft is connected to the m assage head after passing through the housing.

66 The acupuncture point pressing gun of the utility m odel converts external AC pow er to DC pow er to the reducer by a pow er plug, and controls the current of the reducer through a capacitor-adjustable m otor, thereby achieving the purpose of controlling the rotation rate of the m otor shaft and m aking it fixed The rotation frequency of the first m agnetic steel com ponent on the m otor shaft is adjustable, and through the corresponding change of the alternating frequency of the m agnetic field, the second m agnetic steel com ponent fixed on the sliding shaft undergoes reciprocating m echanical m ovem ent at different frequencies and pushes The m assage head m ounted on the sliding shaft generates reciprocating m otion. Since the frequency and the am plitude are inversely proportional, the higher the frequency, the sm aller the am plitude, and the sm aller the force of the m assage head. C onversely, the low er the frequency, the greater the am plitude and the greater the force of the m assage head. Therefore, the point-pressing gun of this utility m odel is applicable It is used for the treatm ent of acupoints in different parts of the body tissue.

77 ☐ In a further technical solution, a plurality of linear guide rails are provided on the slide rail, and steel balls are respectively placed in the linear guide rails, and the sliding shaft slides in the slide rail through the steel balls.

79 ☐ For the further im provem ent of the m assage head, the m assage head is a double m assage head, the double

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massage head is provided with two massage contacts, and the distance between the two massage contacts is adjustable, such as a threaded connection, so that the massage When you can apply force to two symmetrical acupoints at the same time, the effect is better.

83 In a further technical solution, a controller is also provided in the handle, and the controller is electrically connected to the input end of the motor. The purpose of the controller is to use dry batteries as a backup power source when the external power is cut off or cut off, to ensure that the acupoint click gun can be used normally.

87 Furthermore, a magnetic sheet is also provided in the massage head, which can have a magnetic therapy effect on the human body.

89 Compared with the prior art, the utility model has the following beneficial effects:

1、

93 Adjustable vibration frequency: By controlling the working frequency of the reducer, the utility model makes the rotation frequency of the magnetic steel group driven by the reducer adjustable, so as to achieve the purpose of adjusting the telescopic frequency of the massage head, so that different acupuncture points can be set differently. Frequency of massage.

2、

100 Long service life: Because the magnetic force is used to push the massage head, the internal mechanical abrasion of the equipment is avoided. At the same time, a slide rail is set at the front end of the click gun, and the steel ball arranged in the slide rail is in contact with the sliding shaft. The abrasion between the sliding shaft and the housing can be minimized, and it is also conducive to smoother sliding of the massage head.

3、

107 Adjustable force: The click gun of the utility model is different from the traditional electromagnetic massager. The massage head is compressed by the reaction force of the human body on the massage head, and the massage head is pushed forward by the thrust of the magnetic steel group, thus making The thrust of the massage head can be continuously changed according to the pressure of the human body, and the user can freely adjust the massage strength according to the comfort level they feel, which is very convenient to use.

4、

115 The structure is simple, it can be powered by external alternating current or battery, and it is small in size and easy to carry.

117 Description of the drawings

118 Figure 1 is a three-dimensional view of the utility model of the acupuncture point pressing gun;

119 Figure 2 is a cross-sectional view of A-A in Figure 1;

120 Fig. 3 is a B-B cross-sectional view of Fig. 1.

121 In the figure, 1—housing, 2—handle, 3—motor, 4—reducer, 5—magnet group, 51—first magnet assembly,

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52—second magnet assembly, 6—sliding shaft, 7—power supply Plug, 8—power switch, 9—slide rail, 10—massage head, 11—linear guide rail, 12—steel ball, 13—controller.

124 detailed description

125 The present utility model will be further described below in conjunction with the drawings and specific embodiments.

127 As shown in Figure 1, Figure 2 and Figure 3, the acupuncture point pressing gun of the present invention includes a cylindrical shell 1, a handle 2 is installed below the middle of the shell 1, and a power switch 8 is provided on the handle 2.

130 A motor 3, a reducer 4, a magnetic steel group 5 and a sliding shaft 6 are arranged in the housing 1. A power plug 7 is also provided at the end of the housing 1. The input of the power plug 7 is connected to the mains, and the output of the power plug 7 is connected to the motor 3. The function of the power plug 7 is to convert the external alternating current into direct current.

134 The control end of the motor 3 is connected to the power switch 8. Pressing the power switch 8 can control the voltage output frequency of the motor 3, and the output of the motor 3 is connected to the reducer 4 and controls the speed of the reducer.

137 The magnetic steel assembly 5 is composed of a first magnetic steel component 51 and a second magnetic steel component 52. Both the first magnetic steel component 51 and the second magnetic steel component 52 are composed of 6 sets of overlapping small magnetic steel sheets. A magnetic steel component 51 is installed on the output shaft of the reducer 4 and axially fixed, and rotates synchronously with the output end of the reducer.

142 When the reducer starts, it will drive the first magnet assembly 51 to rotate; the second magnet assembly 52 is installed on the sliding shaft 6 and opposite to the first magnet assembly 51, and an anti-rotation device is installed on the sliding shaft to Ensure that it can move linearly instead of rotating inside the ball sleeve of the linear guide after receiving the magnetic thrust of the first rotating magnetic steel group. There is a certain gap between the first magnetic steel component 51 and the second magnetic steel component 52, and the distance is determined by the magnetic force of the magnetic sheet. In this way, the first magnetic steel component 51 will always remain opposite to the second magnetic steel component due to the action of the magnetic field. 52 produces an outward thrust. The sliding shaft 6 is slidably installed in the sliding rail 9 located at the front end of the housing 1. A number of evenly distributed linear guides 11 are provided on the inner wall of the sliding rail 9, and steel balls 12 are respectively placed in the linear guides 11. 6 The steel ball 12 slides back and forth in the slide rail 9, which can minimize mechanical wear and reduce mechanical noise. The other end of the sliding shaft 6 passes through the housing 1 and is connected to the massage head 10. The massage head 10 in the present invention can be a single massage head or a double massage head. The double massage heads can massage two acupoints at the same time, especially for the symmetrical acupoints at both ends of the spine. The spacing of the massage contacts is adjustable, which is very convenient to use.

157 Referring to Fig. 2, a controller 13 is also provided in the handle 2. The controller 13 is electrically connected to the input end of the motor 3. The function of the controller 13 is that when there is no external power supply, a battery can be installed to supply power to the equipment.

160 □□□□ According to needs, a core sleeve can also be provided in the shell 1, and a stretchable human acupoint scroll diagram is provided in the core sleeve; a magnetic sheet is also provided in the massage head 10, which can play a role in magnetic therapy. 10 is also covered with a flexible silicone sleeve, which can make people feel more comfortable.

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working principle:

When the power plug 7 is connected to the power source, the reducer 4 is energized, and the corresponding gear is selected through the power switch 8, and the motor 3 will control the speed of the reducer 4. The shaft of the reducer 4 drives the first magnet assembly 51 to rotate, and the second magnet assembly 52 opposite to the first magnet assembly 51 will be pushed out by the force generated by the change in the magnetic field. Therefore, the second magnet assembly 52 will push the sliding shaft 6 out of the housing 1, and the massage head 10 installed at the front end of the sliding shaft 6 will move forward.

When the massage head acts on the human body, the massage head is compressed due to the reaction force of the human body on the massage head. At this time, the distance between the first magnetic steel component 51 and the second magnetic steel component 52 is reduced, and the second magnetic steel component 52 is The thrust of the massage head becomes larger, so the first magnetic steel component 51 pushes out the second magnetic steel component 52 to reciprocate to form the reciprocating movement of the massage head. During this process, because the second magnetic steel component 52 receives different pressures, the sliding range of the massage head also varies with the magnitude of the reaction force of the human body, thereby achieving the purpose of adjusting the massage strength.

Compared with the existing electromagnetic massager, the utility model has many advantages such as reasonable structure, adjustable frequency and force, unlimited power supply type, small size, and easy to carry; compared with the existing electric motor massager, The utility model has a large pressing force and can adapt to the stimulation of the required frequency and strength of the acupoints of different parts of the human body. The design of different massage heads can fully adapt to the requirements of different individual acupoint treatments, and can also minimize friction. Avoid wear and tear, which is more energy efficient and has a longer service life.

Finally, it should be noted that the above embodiments are only used to illustrate the technical solutions of the utility model rather than to limit the technical solutions. Although the applicant has described the utility model in detail with reference to the preferred embodiments, those of ordinary skill in the art should understand that, Any modification or equivalent replacement of the technical solution of the present utility model without departing from the purpose and scope of the technical solution shall be covered by the scope of the claims of the present utility model.

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(12)实用新型专利

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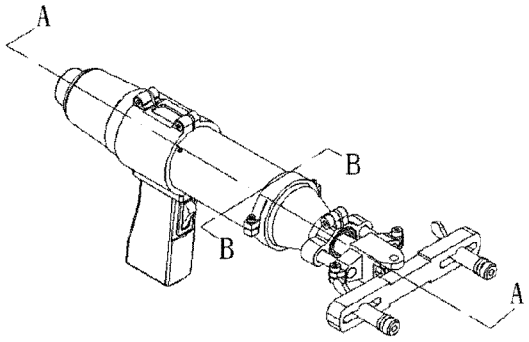
权利要求书 1 页 说明书 3 页 附图 2 页

(54)实用新型名称

穴位点按枪

(57)摘要

本实用新型介绍了一种穴位点按枪，它包括外壳和手柄，在外壳内设有控制器、电机、磁钢组和传动轴和电源插头，电源插头接市电，其输出接控制器的输入，控制器的控制端与设于手柄上的调节旋钮、电源开关相连，其输出连接电机；磁钢组由第一和第二磁钢组件构成，其中第一磁钢组件安装在减速机的输出轴上并轴向固定，与减速机输出端同步旋转；第二磁钢组件安装在直线导轨的滑动轴上并与第一磁钢组件同极相对，并在滑动轴上安装防转动装置。直线导轨固定在外壳内，滑动轴的另一端穿出外壳后与按摩头相连。本穴位点按枪能够提供不同频率和力量的直线推力运动，通过按摩头对准穴位进行压力作用，且携带、使用方便，适合临床治疗与家庭保健的需要。



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1. 一种穴位点按枪，其特征在于，包括外壳（1），在外壳（1）上安装有手柄（2），在外壳（1）内设有电机（3）、减速机（4）、磁钢组（5）和滑动轴（6）；在外壳（1）尾部还设有电源插头（7），电源插头（7）的输入接市电，电源插头（7）的输出连接电机（3）的输入，电机（3）的控制端与设于手柄（2）上的电源开关（8）相连，电机（3）的输出连接减速机（4）并控制所述减速机的转速；所述磁钢组（5）由第一磁钢组件（51）和第二磁钢组件（52）构成，其中第一磁钢组件（51）安装在减速机（4）的输出轴上并轴向固定，第二磁钢组件（52）安装在滑动轴（6）上并与第一磁钢组件（51）同极相对，所述滑动轴（6）可滑动的安装在位于外壳（1）前端的滑轨（9）内，滑动轴（6）的另一端穿出外壳（1）后与按摩头（10）相连。

2. 根据权利要求 1 所述的穴位点按枪，其特征在于，在滑轨（9）上设有若干条直线导轨（11），在直线导轨（11）内分别放置有钢珠（12），滑动轴（6）通过钢珠（12）在滑轨（9）内滑动。

3. 根据权利要求 1 所述的穴位点按枪，其特征在于，所述按摩头（10）为双按摩头。

4. 根据权利要求 1 所述的穴位点按枪，其特征在于，在手柄（2）内还设有控制器（13），所述控制器（13）与电机（3）的输入端电连接。

5. 根据权利要求 1 所述的穴位点按枪，其特征在于，在按摩头（10）内还设有磁片。

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穴位点按枪

技术领域

[0001] 本实用新型涉及一种用于临床治疗的医疗器械，具体为一种可以对人体穴位实施按摩的穴位点按枪，该穴位点按枪既可满足临床治疗需求，也可用于家庭保健。

背景技术

[0002] 目前，市面上常用的振动按摩器分为电动机式和电磁式两类，其中，电动机式振动按摩器的工作原理是通过电机带动偏心轮及滑动轴，产生前后往复运动，起到按摩人体的作用。电动机式的结构较为简单，但是，这种结构中偏心轮结构易磨损，振动力量和幅度都是固定的，而且市面上小型电机功率受体积影响，往往偏小，因此电动机式按摩器的力度及幅度都较弱，对人体局部软组织比较丰厚的部位，其作用效果往往不理想。电磁式振动按摩器则可避免内部磨损的情况，其工作原理是利用电磁力，用交流电产生交变磁场，形成磁力方向的转化，引起按摩组件的往返式机械运动，从而起到按摩作用。例如专利号为 92110205.4 的中国专利公开了一种“振动式磁热按摩器”及它的后续改进型，专利号为 98104518.9 公开的一种“带有按摩头的强磁强震理疗器”，其工作方式就是利用电磁及交变磁场的变化，引起按摩组件的机械运动，其优点是振动力量较大，但是，这种结构的按摩器运动频率受交流电频率影响相对固定，导致按摩组件机械运动作用幅度及力度相对恒定，不适于不同部位对按摩幅度及力度的需求。同时，对电源供应类型的依赖程度比较大，且内部结构较复杂，需要弹簧缓冲，体积偏大，携带使用也不方便。

实用新型内容

[0003] 针对现有技术中的上述不足，本实用新型的主要目的在于解决现有电磁式振动按摩器振动幅度及频率不可调的问题，并提供一种可调节振动频率、使用寿命较长、并且能满足不同穴位力度需求的穴位点按枪。该穴位点按枪可以不受电源条件的限制，满足穴位按摩治疗和家庭保健的需求。

[0004] 本实用新型的技术方案：一种穴位点按枪，其特征在于，包括外壳，在外壳上安装有手柄，在外壳内设有电机、减速机、磁钢组和滑动轴；在外壳尾部还设有电源插头，电源插头的输入接市电，电源插头的输出连接电机的输入，电机的控制端与设于手柄上的电源开关相连，电机的输出连接减速机并控制所述减速机的转速；所述磁钢组由第一磁钢组件和第二磁钢组件构成，其中第一磁钢组件安装在减速机的输出轴上并轴向固定，第二磁钢组件安装在滑动轴上并与第一磁钢组件同极相对，所述滑动轴可滑动的安装在位于外壳前端的滑轨内，滑动轴的另一端穿出外壳后与按摩头相连。

[0005] 本实用新型的穴位点按枪是由电源插头将外部的交流电转换为直流电供给减速机，并通过电容可调式的电机来控制减速机的电流大小，从而达到控制电机轴旋转速率的目的，使固定于电机轴上的第一磁钢组件旋转频率可调，并通过磁场交变频率发生的相应变化，使固定于滑动轴上的第二磁钢组件以不同频率出现前后往复式机械运动，并推动安装在滑动轴上的按摩头产生往复运动。由于频率和振幅成反比，频率越高振幅越小，按摩头

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的作用力也越小；反之，频率越低振幅越大，按摩头作用力也越大，因此，本实用新型的穴位点按枪可适用于人体组织丰厚程度不同部位穴位的治疗。

[0006] 进一步的技术方案，在滑轨上设有若干条直线导轨，在直线导轨内分别放置有钢珠，滑动轴通过钢珠在滑轨内滑动。

[0007] 针对按摩头作出的进一步改进，所述按摩头为双按摩头，该双按摩头上设有两个按摩触头，且两个按摩触头之间的距离可调，如螺纹连接，这样在按摩时可以给对称的两个穴位同时施加作用力，效果更好。

[0008] 进一步的技术方案，在手柄内还设有控制器，所述控制器与电机的输入端电连接。控制器的目的在于当外部停电或断电时，可以使用干电池作为备用电源使用，保证穴位点按枪能够正常使用。

[0009] 进一步，在按摩头内还设有磁片，这样能够对人体起到磁疗作用。

[0010] 相对于现有技术，本实用新型具有以下有益效果：

[0011] 1、振动频率可调：本实用新型通过控制减速机的工作频率，使得由减速机带动的磁钢组的转动频率可调，从而达到调节按摩头伸缩频率的目的，使得对不同的穴位可以设置不同的按摩频率。

[0012] 2、使用寿命较长：由于采用磁力变化的方式来推动按摩头，因此避免了设备内部的机械磨损，同时在点按枪的前端通过设置滑轨，用设于滑轨内的钢珠与滑动轴接触，能够最大限度的减小滑动轴与壳体之间的磨损，也有利于按摩头滑行更加顺畅。

[0013] 3、作用力可调：本实用新型的点按枪不同于传统的电磁式按摩器，由人体对按摩头的反作用力来压缩按摩头，又由磁钢组的推力来向前推出按摩头，从而使得按摩头的推力能够根据人体的压力而不断变化，使用者可以根据自己感觉到的舒适度，自由调节按摩力度，使用非常方便。

[0014] 4、结构简单，既可使用外部交流电，也可由蓄电池供电，而且体积较小，携带很方便。

附图说明

[0015] 图 1 为本实用新型穴位点按枪的立体图；

[0016] 图 2 为图 1 的 A-A 剖视图；

[0017] 图 3 为图 1 的 B-B 剖视图。

[0018] 图中，1—外壳，2—手柄，3—电机，4—减速机，5—磁钢组，51—第一磁钢组件，52—第二磁钢组件，6—滑动轴，7—电源插头，8—电源开关，9—滑轨，10—按摩头，11—直线导轨，12—钢珠，13—控制器。

具体实施方式

[0019] 下面结合附图和具体实施方式对本实用新型作进一步说明。

[0020] 如图 1、图 2 和图 3 所示，本实用新型的穴位点按枪，包括圆筒形状的外壳 1，在外壳 1 的中部下方安装有手柄 2，在手柄 2 上设有电源开关 8。在外壳 1 内设有电机 3、减速机 4、磁钢组 5 和滑动轴 6；在外壳 1 尾部还设有电源插头 7，电源插头 7 的输入接市电，电源插头 7 的输出连接电机 3 的输入，电源插头 7 的作用在于将外部交流电转换为直流电。电机 3

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的控制端与电源开关 8 相连，按动电源开关 8 可以控制电机 3 的电压输出频率，电机 3 的输出连接减速机 4 并控制减速机的转速。所述磁钢组 5 由第一磁钢组件 51 和第二磁钢组件 52 构成，第一磁钢组件 51 和第二磁钢组件 52 均是由 6 组重叠的小磁钢片构成，其中第一磁钢组件 51 安装在减速机 4 的输出轴上并轴向固定，并与减速机输出端同步旋转。当减速机启动时将带动第一磁钢组件 51 旋转；第二磁钢组件 52 安装在滑动轴 6 上并与第一磁钢组件 51 同极相对，并在滑动轴上安装防转动装置，以保证其受到第一组转动磁钢组的磁推力后能够在直线导轨的滚珠套筒内部直线移动而非转动。在第一磁钢组件 51 和第二磁钢组件 52 之间留有一定的间隙，其间距大小由磁片磁力决定，这样由于磁场作用第一磁钢组件 51 会始终保持对第二磁钢组件 52 产生一个向外的推力。所述滑动轴 6 可滑动的安装在位于外壳 1 前端的滑轨 9 内，在滑轨 9 内壁上设有若干条均匀分布的直线导轨 11，在直线导轨 11 内分别放置有钢珠 12，滑动轴 6 通过钢珠 12 在滑轨 9 内前后滑动，这样能最大限度的减少机械磨损，减弱机械噪音。滑动轴 6 的另一端穿出外壳 1 后与按摩头 10 相连。本实用新型中的按摩头 10 可以为单按摩头，也可以为双按摩头，其中双按摩头可以同时对两个穴位进行按摩，特别是对于脊柱两端的对称穴位治疗效果更好，并且两个按摩触头的间距可调，使用非常方便。

[0021] 参见图 2，在手柄 2 内还设有控制器 13，控制器 13 与电机 3 的输入端电连接，控制器 13 的作用在于当无外部电源时，可以安装蓄电池为设备供电。

[0022] 根据需要，在外壳 1 内还可设置芯套，在芯套内设有可拉伸的人体穴位卷轴图；在按摩头 10 内还设有磁片，它能够起到磁疗作用，在按摩头 10 上还套有柔性硅胶套，这样能够让人感觉更加舒适。

[0023] 工作原理：

[0024] 当电源插头 7 与电源连接后，减速机 4 通电，通过电源开关 8 选择相应的档位，电机 3 将控制减速机 4 的转速大小。减速机 4 的转轴带动第一磁钢组件 51 旋转，与第一磁钢组件 51 相对的第二磁钢组件 52 受磁场变化所产生的作用力，将被向外推出，因此第二磁钢组件 52 将推动滑动轴 6 伸出外壳 1，安装在滑动轴 6 前端的按摩头 10 产生向前的运动。

[0025] 当按摩头作用在人体上后，由于人体对按摩头的反作用力，又将按摩头压缩，此时第一磁钢组件 51 和第二磁钢组件 52 的间距缩小，第二磁钢组件 52 受到的推力变大，因此第一磁钢组件 51 又将第二磁钢组件 52 推出，以此往复，形成按摩头的往复运动。在此过程中，由于第二磁钢组件 52 受到的压力不同，因此按摩头的滑动幅度也随着人体的反作用力大小而不同，从而达到了调节按摩力度的目的。

[0026] 与现有电磁式按摩器相比，本实用新型具有结构合理、频率和作用力量可调、使用电源类型不限、体积较小、便于携带等众多优点；与现有电动机式按摩器相比，本实用新型具有较大的点按作用力，能适应人体不同部位穴位所需频率和力量强度的刺激，不同按摩头的设计能充分适应不同个体穴位治疗的要求，并且还能最大限度减少摩擦，避免耗损，这样更节能，使用寿命更长。

[0027] 最后需要说明的是，以上实施例仅用以说明本实用新型的技术方案而非限制技术方案，尽管申请人参照较佳实施例对本实用新型进行了详细说明，本领域的普通技术人员应当理解，那些对本实用新型的技术方案进行修改或者等同替换，而不脱离本技术方案的宗旨和范围，均应涵盖在本实用新型的权利要求范围当中。

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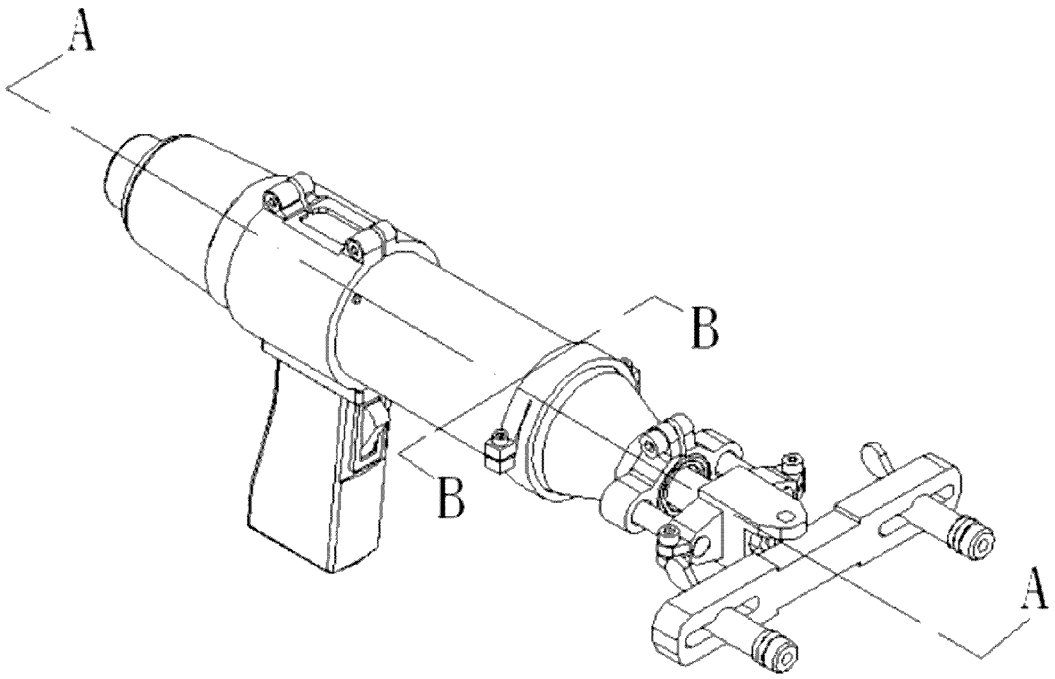


图 1

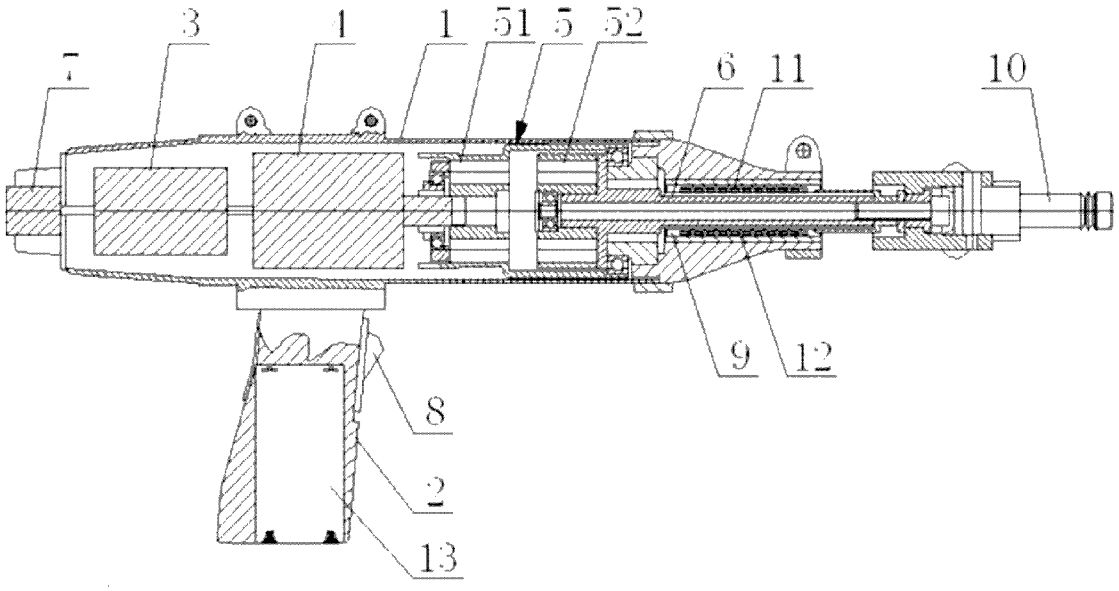


图 2

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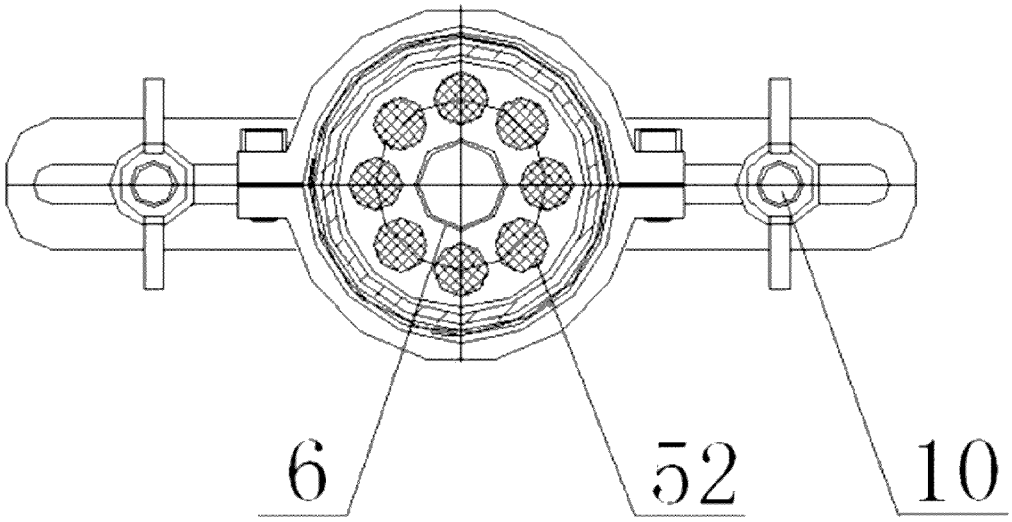


图 3

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Electronic Acknowledgement Receipt

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Application Number:	17681367
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First Named Inventor/Applicant Name:	Philip C. Danby
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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Espacenet

Bibliographic data: CN2049126 (U) — 1989-12-13

PORTABLE MULTIFUNCTIONAL MAGNETIC HEALING PERCUSSION HAMMER

Inventor(s): RENQUAN WAN [CN] ± (WAN RENQUAN)

Applicant(s): WAN RENQUAN [CN] ± (WAN RENQUAN)

Classification: **- international:*A61H11/00; A61H15/00; A61H23/06;***
(IPC1-7): A61H11/00; A61H15/00; A61H23/06
- cooperative:

Application number: CN19892008420U 19890605

Priority number (s): CN19892008420U 19890605

Abstract of CN2049126 (U)

The utility model relates to a portable multifunctional magnetic healing percussion hammer, which is composed of a magnetic hammer body and a magnetic hammer handle. The hammer body is provided with magnetic plum-blossom needles, a magnetic comb, a rubber round head beater and a magnetic roller. The portable multifunctional magnetic healing percussion hammer combines the advantages of the traditional acupuncture, the traditional massage method, the traditional beating method, the traditional magnetotherapy, etc. Into integration; the utility model is a magnet therapy device which has the functions of convenient carryover, easy operation and secure use; the portable multifunctional magnetic healing percussion hammer also has multiple treatment functions. The portable multifunctional magnetic healing percussion hammer is not only suitable for the medical use but also suitable for the home health care. The portable multifunctional magnetic healing percussion hammer has favorable treatment effect on the frequently encountered diseases, such as the neck shoulder lumbocrural pain, the rheumatic arthritis, the traumatic injury, the stomachache, the headache, the hypertension, the psoriasis, the neurodermatitis, the alopecia, etc.

〔19〕中华人民共和国专利局

〔11〕公告号 CN 2049126U

〔12〕实用新型专利申请说明书

〔21〕申请号 89208420.0

〔51〕Int.Cl⁴
A61H 23/06

〔43〕公告日 1989 年 12 月 13 日

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代理人 何英君

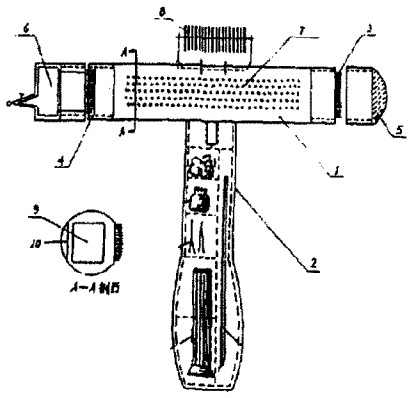
A61H 11/00 A61H 15/00 A61N 1/42

说明书页数: 2 附图页数: 1

〔54〕实用新型名称 多功能便携磁疗敲打器

〔57〕摘要

本实用新型多功能便携磁疗敲打器，由磁性锤体和锤柄组成。锤体上装有磁性梅花针、磁性梳、橡胶圆头敲打器，磁液。本磁疗器集传统的针灸、按摩敲打、磁疗诸方法之优点于一体，是一种便于携带，操作简便，使用安全，兼具多种治疗功能的磁疗器。既适合医疗单位，又适合家庭保健之用。对于颈肩腰腿痛、风湿性关节炎、跌打损伤、胃痛、头痛、高血压、牛皮癣、神经性皮炎、脱发等多发病均有良好的治疗效果。



〔BJ〕第1452号

MassagerPriorArt0000444

Petitioner Therabody Ex-1004, 1039

权 利 要 求 书

1、一种多功能磁疗器由磁性锤体和锤柄两部分连接为一体，其特征为锤体两端装有磁性梅花针，并且分别有一橡胶圆头敲打锤和药液塑料针套，套在梅花针外。锤体一面为磁梳，在与磁梳成90°方向，装有可折卸的磁滚，锤体上有一活动盖，锤体空腔内装有急救药盒和灸针，锤柄内腔装有体温表，消毒药，棉，镊子和小电筒。

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说　　明　　书

多功能便携磁疗敲打器

本实用新型多功能便携磁疗敲打器属医疗康复器具。

我国传统的针灸、按摩、敲打、磁疗等治病方法，是通过对人体各部位的穴位的适当刺激，起到疏通径络，加强血液循环和调理气机的作用，从而治疗疾病。已经问世的各种针灸仪、按摩器、磁疗仪等，各有其治疗效果。

本实用新型是集传统的针灸、按摩、敲打、磁疗诸方法之优点于一体，目的在于提供一个便于携带，操作简便，使用安全，兼具多种治疗功能的磁疗器，既适合医疗单位，又适合于作为家庭保健康复器具之用，对于颈肩腰腿痛、风湿性关节炎、跌打损伤及骨折、胃痛、牙痛、头痛、高血压、神经衰弱、牛皮癣、神经性皮炎、湿诊、脱发等多发病有很好的治疗效果。

本实用新型的目的是采用如下方式实现的：本实用新型多功能磁疗敲打器由磁性锤体和锤柄两部分连接为一体。锤体两端装有磁性梅花针，并且分别有一橡胶圆头敲打锤和药液塑料针套，套在梅花针外。锤体一面为磁杭，在与磁杭成90°方向，装有磁滚，锤体上有一活动盖，锤体空腔内装有急救药盒和灸针。锤柄内腔装有体温计，消毒剂，药棉和辅助医疗器具及小手电筒。

结合附图对本实用新型作以下详细说明：

附图说明

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附图为本实用新型之结构图。本实用新型由锤体(1)和锤柄(2)经连接机构（ 0 ）联为一体。锤体一端装有疏型梅花磁针(3)，其外是有弹性橡胶囵头(5)的套帽，另一端装有密型梅花磁针(4)，其外是可装药液的塑料针套帽(6)，锤体一面是有多排磁针的磁梳(7)，在与磁梳成90°方向，装有可拆卸的由磁片构成的磁滚(8)，锤体另有一可开动小盖(10)，其内腔(9)内装有急救药盒和灸针等。锤柄(2)内装有体温表，消毒药液，镊子和小手电筒等。

各部分均可拆卸，拆卸后装入小盒中便于携带，锤体锤柄由塑料制成，轻便实用。

本实用新型多功能便携磁疗器的磁性梅花针，磁梳有磁疗效果（磁梳可当梳子梳头），弹性橡胶头有敲打功能，磁滚既有滚动磁疗功能又有局部敲击功能，塑料针也可敲击穴位，加上塑料针药液渗透等作用，治疗效果更佳。

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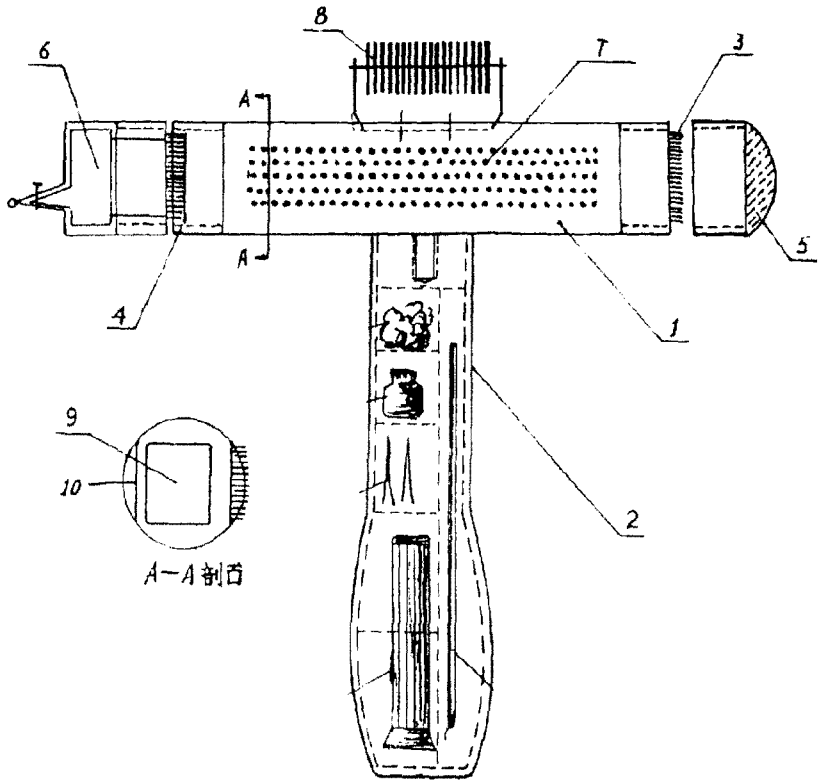


图1

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KR101162978B1

Vibration massage apparatus for muscle

Abstract

The present invention relates to a muscle massage device that can deliver a mechanical vibration to the muscles to relax the muscles, and more particularly, to a muscle vibration massage device composed of a gun (GUN) type to be easy to use by hand. will be.
In the present invention, the muscle vibration massage device in the construction of the muscle stimulation vibration massage device, by allowing the rotational force of the motor, which is the vibration force providing means to act on the muscle stimulation member in the horizontal direction, the power transmission can be effectively balanced, A separate center of gravity is unnecessary, and the structure thereof is simplified to make the handle portion even slimmer, thereby providing a beautiful and easy-to-use muscle stimulation massage device.

Images (7)



Classifications

A61H23/006 Percussion or tapping massage

View 5 more classifications

Other languages: Korean

Inventor: 최재민

Worldwide applications

2012 KR

Application KR1020120013068A events

2012-02-09 Application filed by 주식회사 에이티시스템

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Info: Patent citations (3), Cited by (4), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (6)

Hide Dependent

1. It is made of a main body 100 having a gun-shaped handle 110, the upper portion of the main body 100 is a horizontal reciprocating motion of the rotational force of the motor 200 and the motor 200 for generating vibration A space and a fixed part are formed for incorporating the vibration generating means for generating vibration by converting, and the motor for controlling the operation of the motor by supplying a driving voltage of the motor into the handle part 110 located below the main body 100. The control means is built and the fixing means thereof, the outside of the handle portion 110, where the finger is held by the hand where the gun switch 400 for providing a user operation command to the motor control means is formed,
The vibration generating means,
One side of the rotating shaft is coupled to the rotating shaft 210 of the motor 200 in a horizontal direction and rotates, and the horizontal movement displacement means having a horizontal movement displacement means having a horizontal movement displacement on the rotating shaft to form a horizontal movement formed on the cam 311 Vibration rotating part 310 for horizontal reciprocating movement of the vibration slide unit 320 in accordance with the displacement of the displacement means, combined with the horizontal movement displacement means formed on the vibration rotating unit 310, the horizontal movement according to the rotation of the vibration rotating unit 310 Vibration slide unit 320 for horizontal reciprocating motion with the displacement width of the displacement means, coupled to the front end of the vibration slide unit 320 and exposed to the outside of the main body 100 vibration slide unit 320 in contact with the user's muscles Vibration stimulation unit 330 to provide a vibration stimulation of the motor, and the motor 200, the vibration rotating unit 310, the vibration slide unit 320 is fixed to the vibration slide unit 320 in the horizontal reciprocating movement left and right Avoid being a guy Muscle vibration massage device characterized in that comprises a withdrawal prevention portion (340) for.

    2. The method of claim 1,
    The vibration rotating part 310 is formed with a disc 311b on a shaft 311a at a predetermined inclination so that a horizontal movement displacement occurs according to the rotation, and one side of the shaft 311a is rotated with the rotation shaft 210 of the motor 200. Rotating shaft coupling portion 311c to be coupled is formed and prevents the flow of the shaft 311a at a position spaced apart from the coupling position with the bearing 312 to the other side of the rotary shaft coupling portion 311c by the width of the bearing 312 A cam 311 with a fixing groove 311d therein, a bearing 312 coupled to the other side of the rotary shaft coupling part 311c so that the cam 311 can be stably rotated, and the shaft 311a. Shaft fixing means 313 for fixing the cam 311 coupled to the formed fixing groove 311d and the bearing 312 to the separation prevention portion 340, and the bearing 314 to the separation prevention portion 340 It comprises a bearing fixing means 314 for fixedly coupled to,
    The vibrating slide part 320 is formed on both sides of the disc 311b formed on the cam 311 of the vibrating rotating part 310 and rotates constantly in opposite directions with respect to the rotation of the disc 311b. Forward bearing 321, reverse bearing 322, the forward bearing 321, reverse bearing 322 and the slide for horizontally reciprocating the slide shaft 324 by the force applied in accordance with the horizontal displacement displacement A linker 323 connecting the shaft 324, a slide shaft 324 reciprocating horizontally by the linker 323, and a bush for coupling and fixing the front and rear ends of the slide shaft 324 to the release preventing part 340. Muscle vibrating massage device, characterized in that it comprises a ring (325).

    3. According to claim 2, The slide shaft 324 is each linker coupling portion 324a for coupling each linker 323 to the forward bearing 321, reverse bearing 322, and the separation prevention portion (A release preventing guide groove 324b for coupling the right angle fixing pin 342 configured in the 340, the release guide preventing groove 324b is a right angle fixed when the slide shaft 324 slides back and forth The pin 342 is formed to have a length greater than a distance moving in the direction of sliding back and forth so as not to be caught,
    The departure preventing part 340 is fixed to the motor 200, the vibration rotating part 310, the vibration slide part 320 to enable horizontal reciprocating movement of the slide shaft 324 and to prevent left and right departure during horizontal reciprocating movement Fixing bracket 341, and comprises a right angle fixing pin 342 for preventing left and right deviation during horizontal reciprocating movement,
    The fixing bracket 341 forms a rotary shaft through hole 341a for coupling the rotary shaft 210 of the motor 200 to the cam 311 at an upper end thereof, and a cam 311 is formed at the center thereof. On the opposite side of the 341a, a bearing coupling portion 341b to which a bearing 312 to which the shaft 311a of the cam 311 is coupled is formed is formed, and a slide shaft through hole into which the slide shaft 324 is fitted. 341c is formed, and the bushing ring which is

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