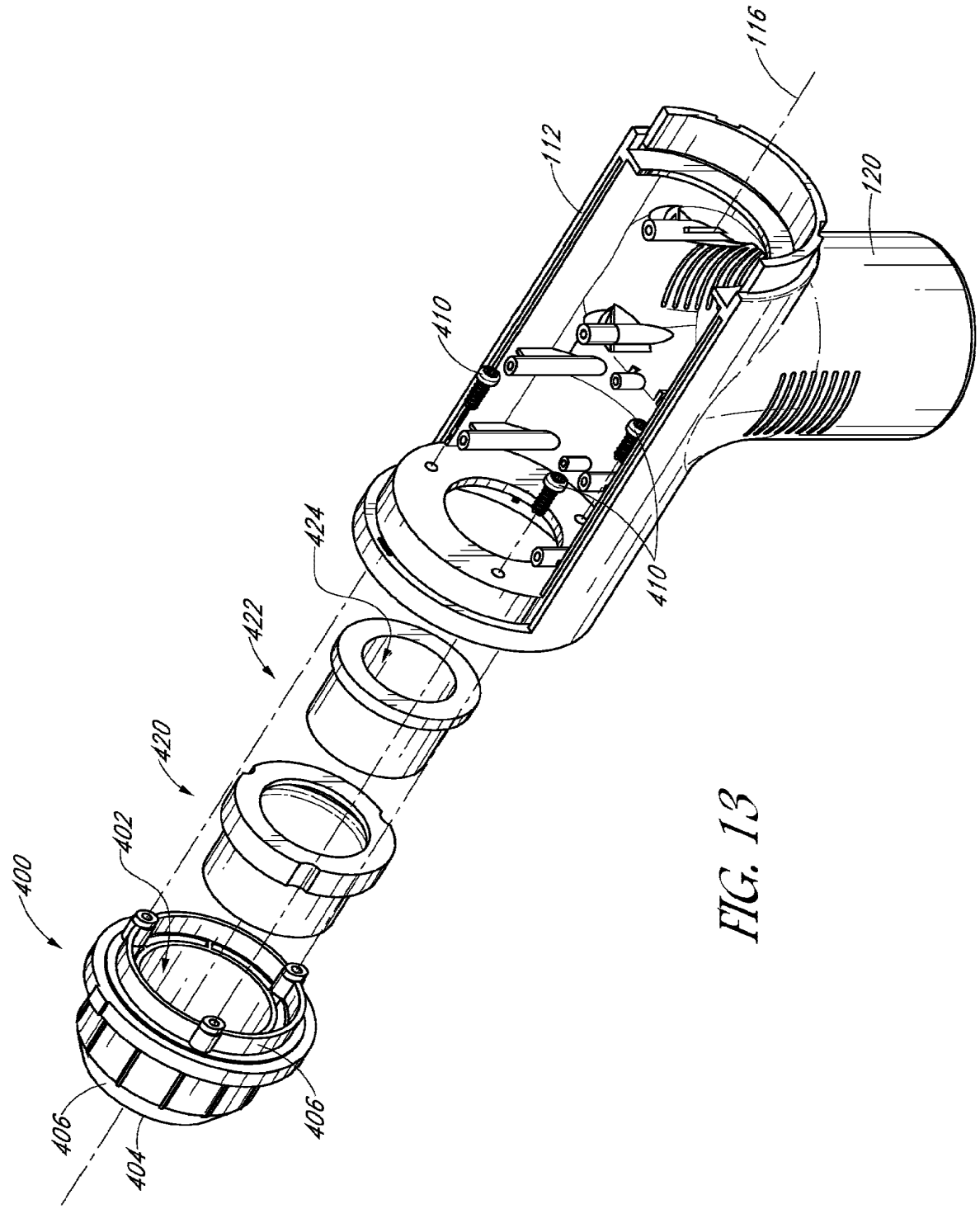

FIG. 13

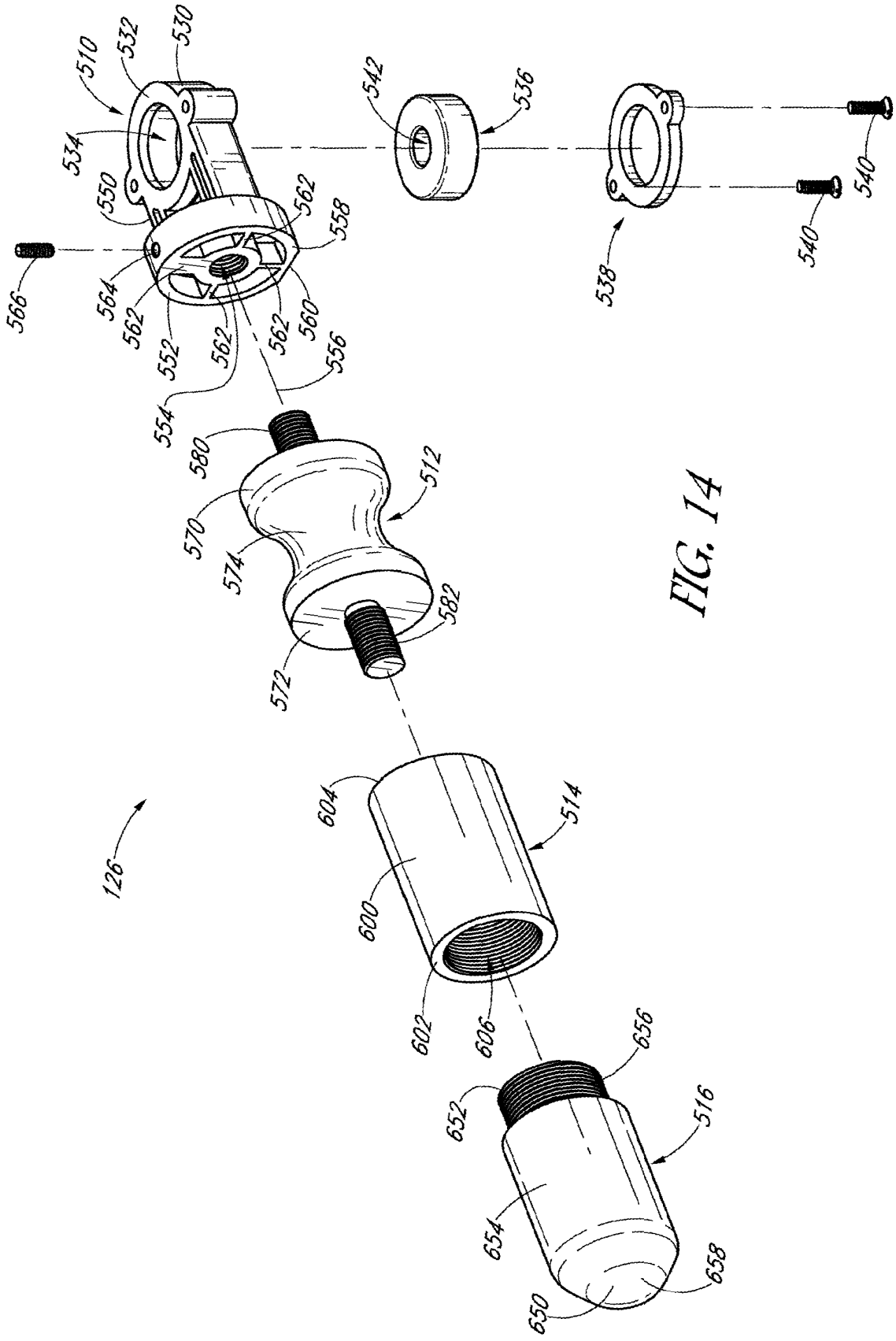
510
532
530
534
550
562
558
566
564
562
552
562
562
560
556
554
580
512
570
574
582
572
542
536
538
540
540
126
604
514
600
602
606
656
652
516
654
658
650

FIG. 14

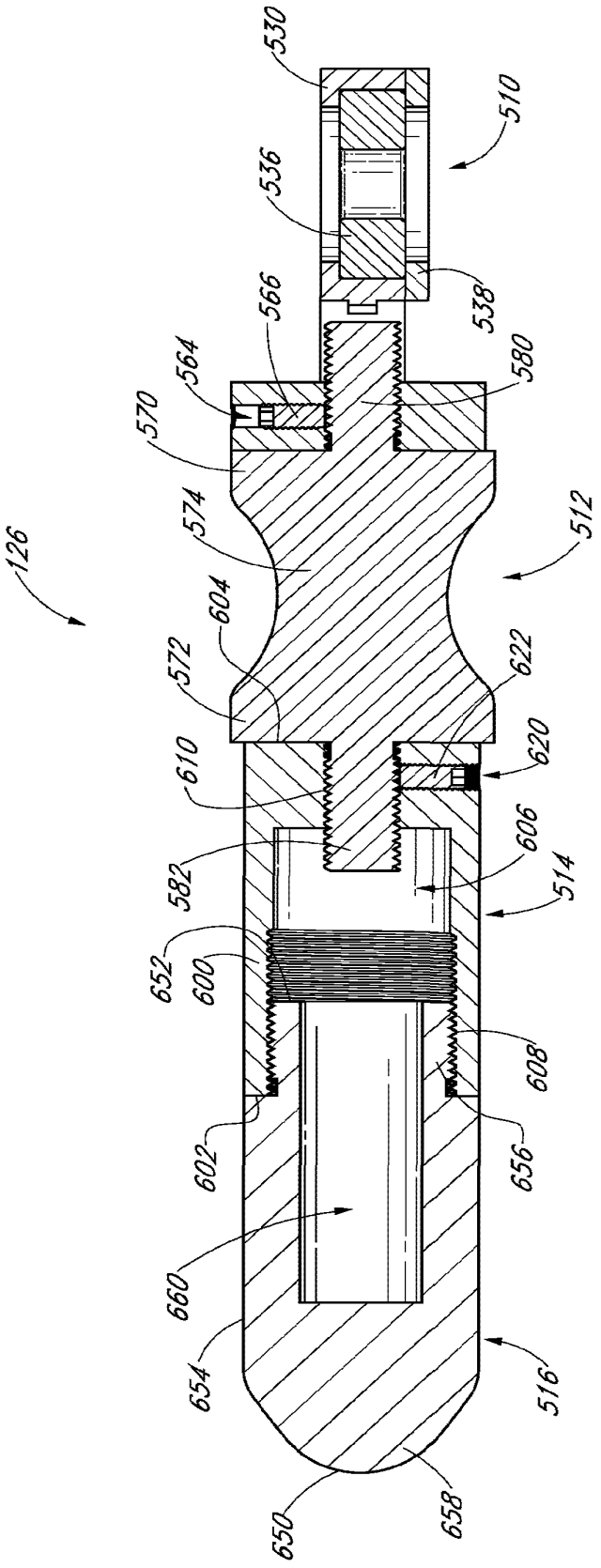

FIG. 15

Petitioner Therabody Ex-1004, 1591

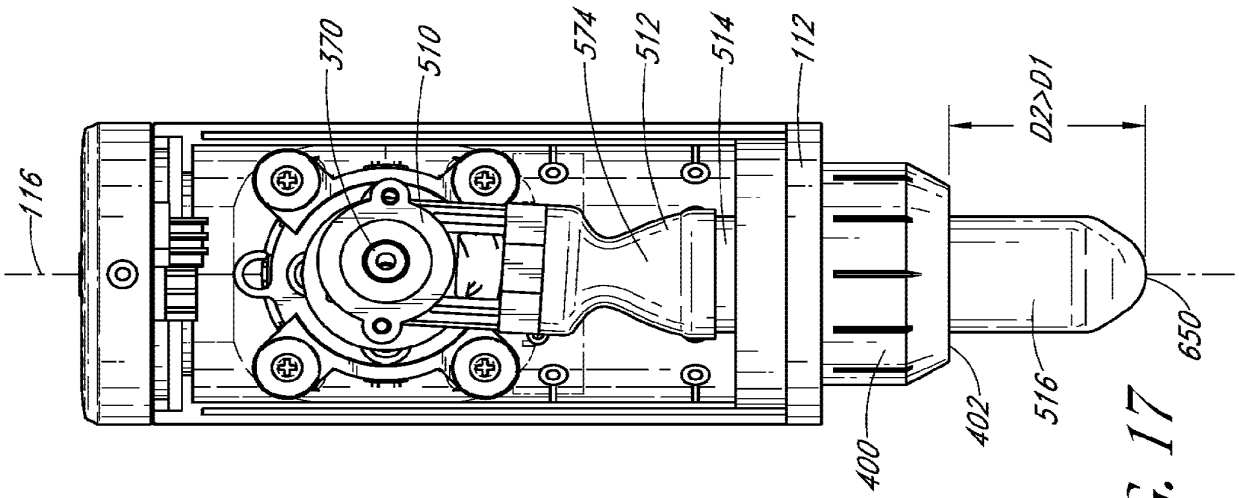

FIG. 17

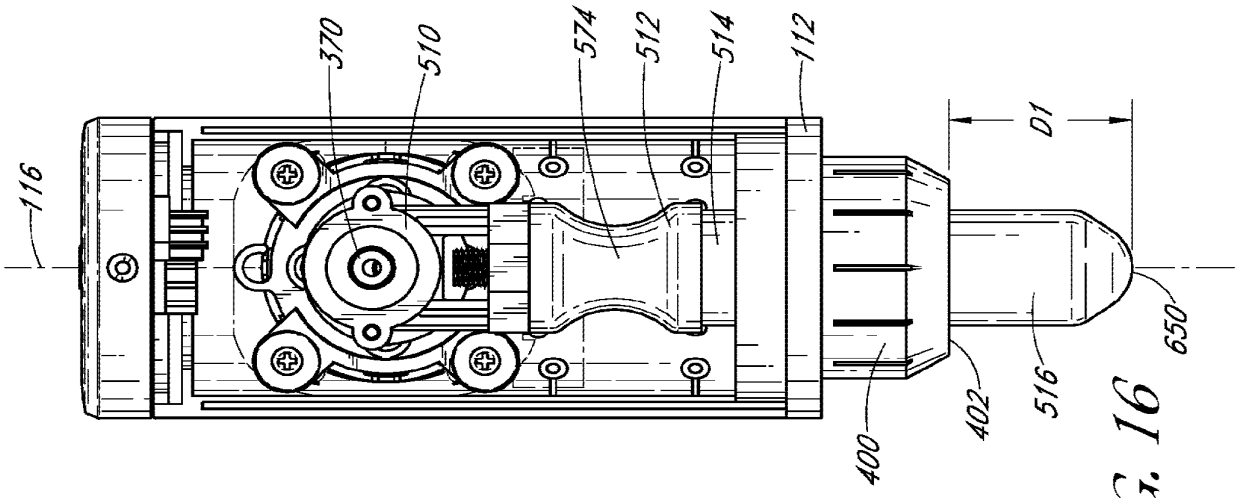

FIG. 16

Petitioner Therabody Ex-1004, 1592

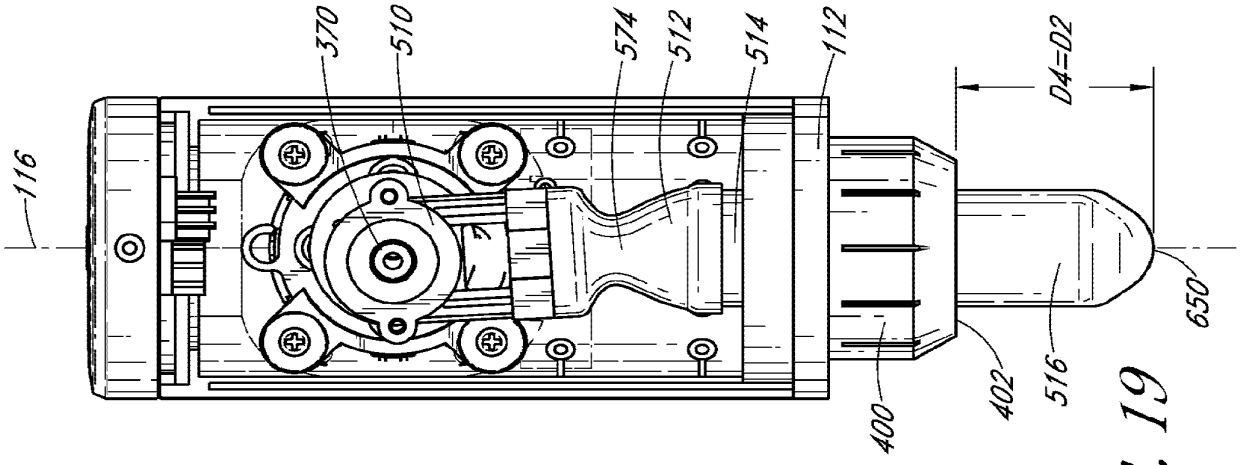
370
510
574
512
514
112
D4=D2
116
650
516
402
400

FIG. 19

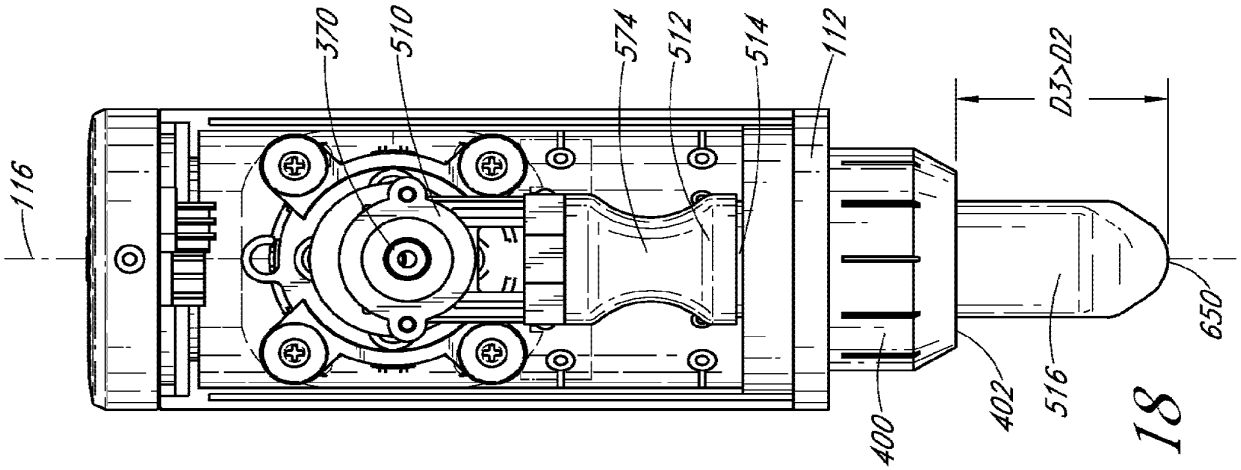
370
510
574
512
514
112
D3>D2
116
650
516
402
400

FIG. 18

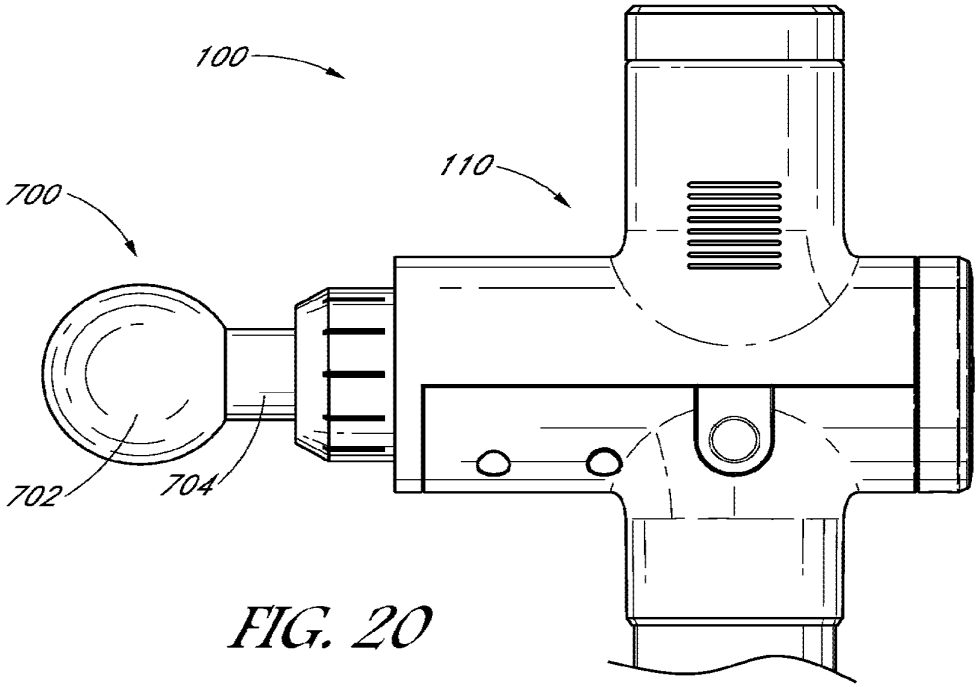

FIG. 20

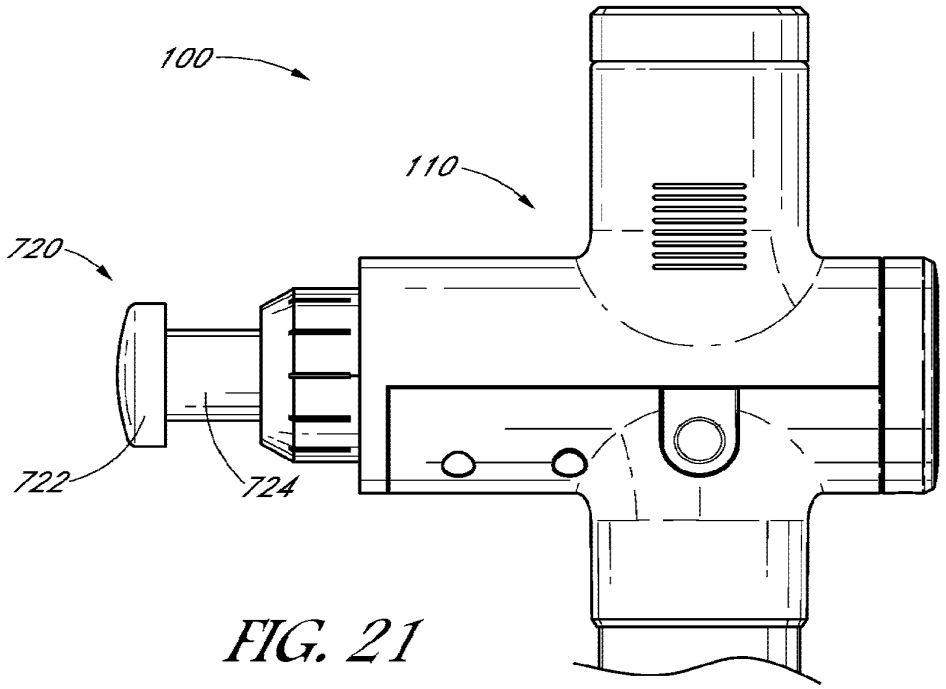

FIG. 21

Petitioner Therabody Ex-1004, 1594

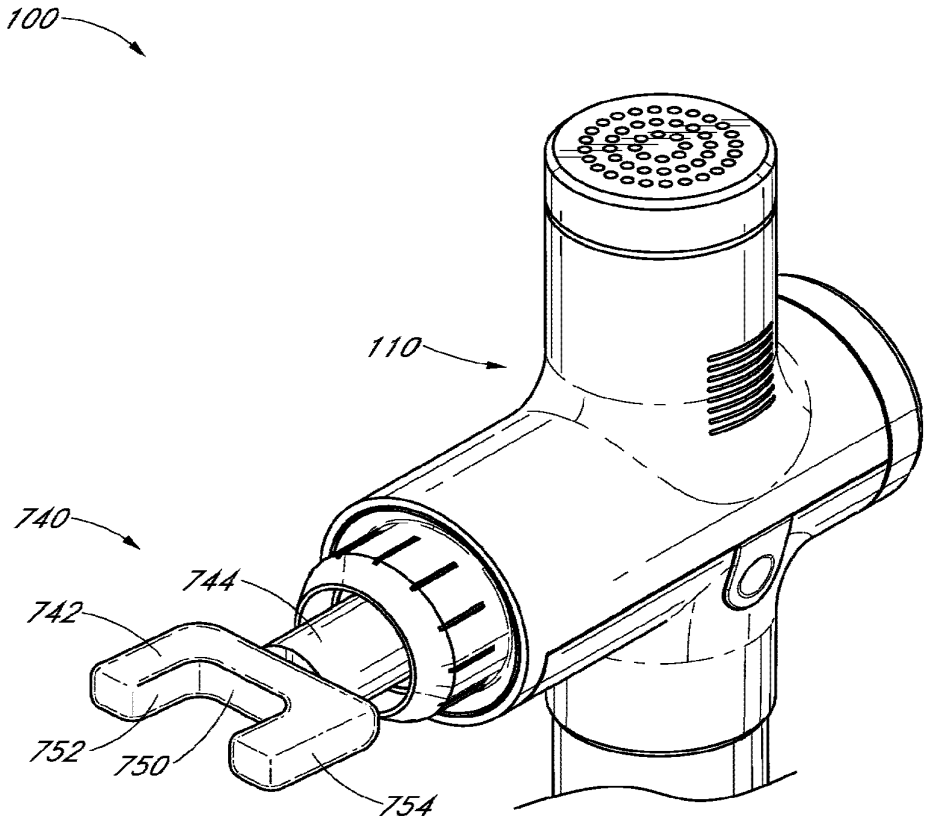

FIG. 22

Petitioner Therabody Ex-1004, 1595

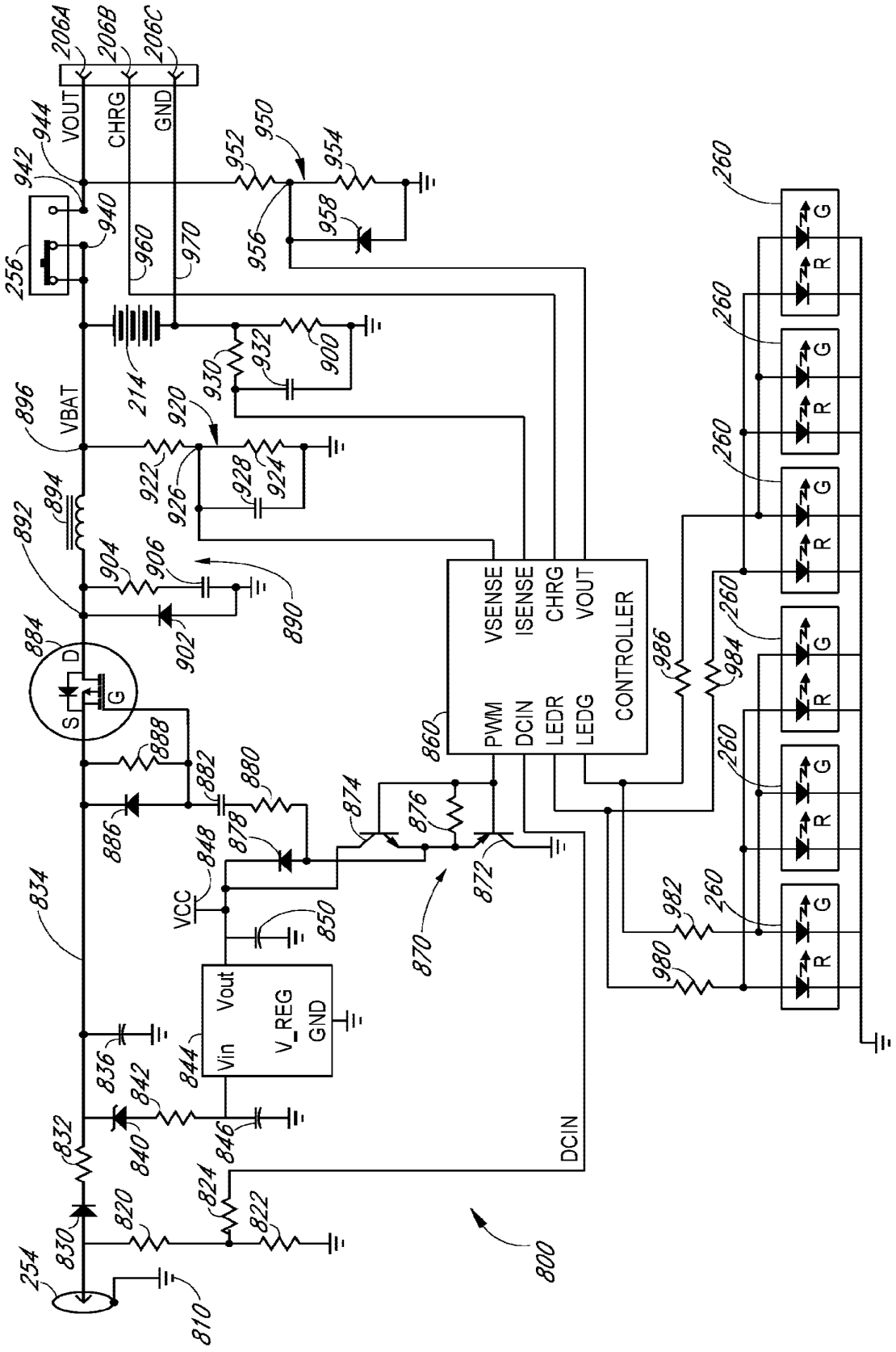
VOUT
CHRG
GND
VBAT
VSENSE
ISENSE
CHRG
VOUT
PWM
DCIN
LEDR
LEDG
CONTROLLER
VCC
Vin
Vout
V_REG
GND
DCIN
S
D
G
R
G

FIG. 23

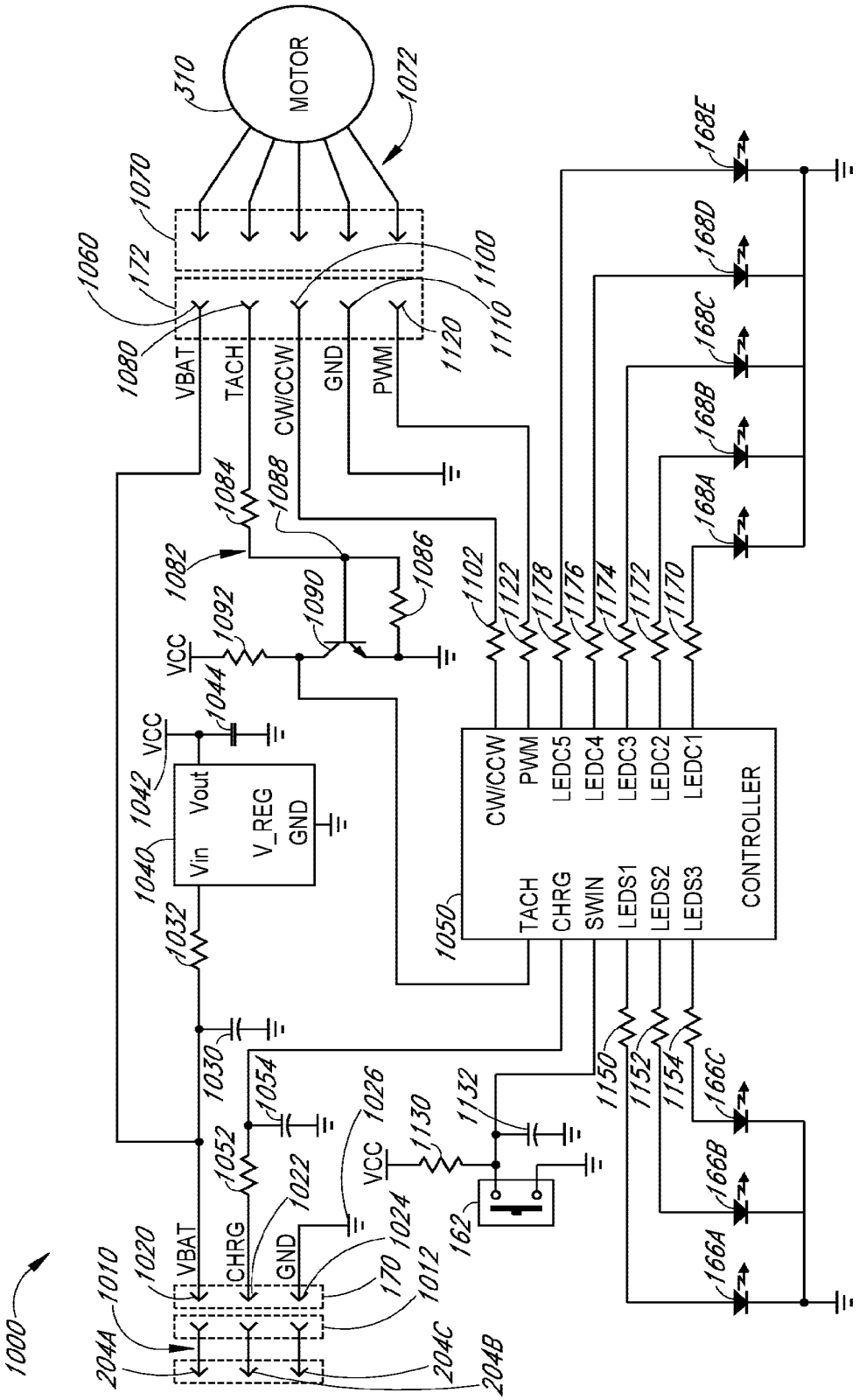

FIG. 24

Petitioner Therabody Ex-1004, 1597

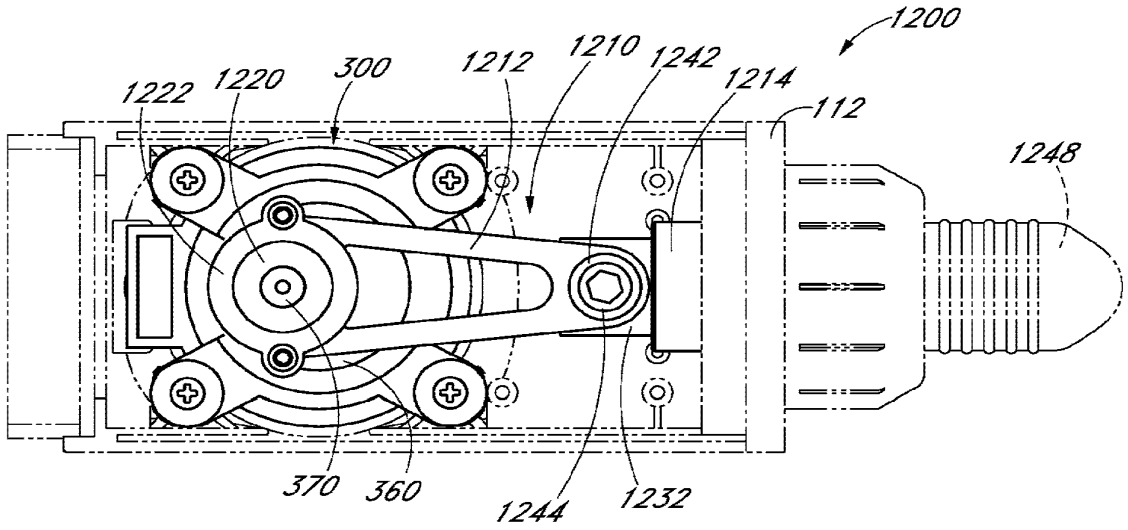

FIG. 25

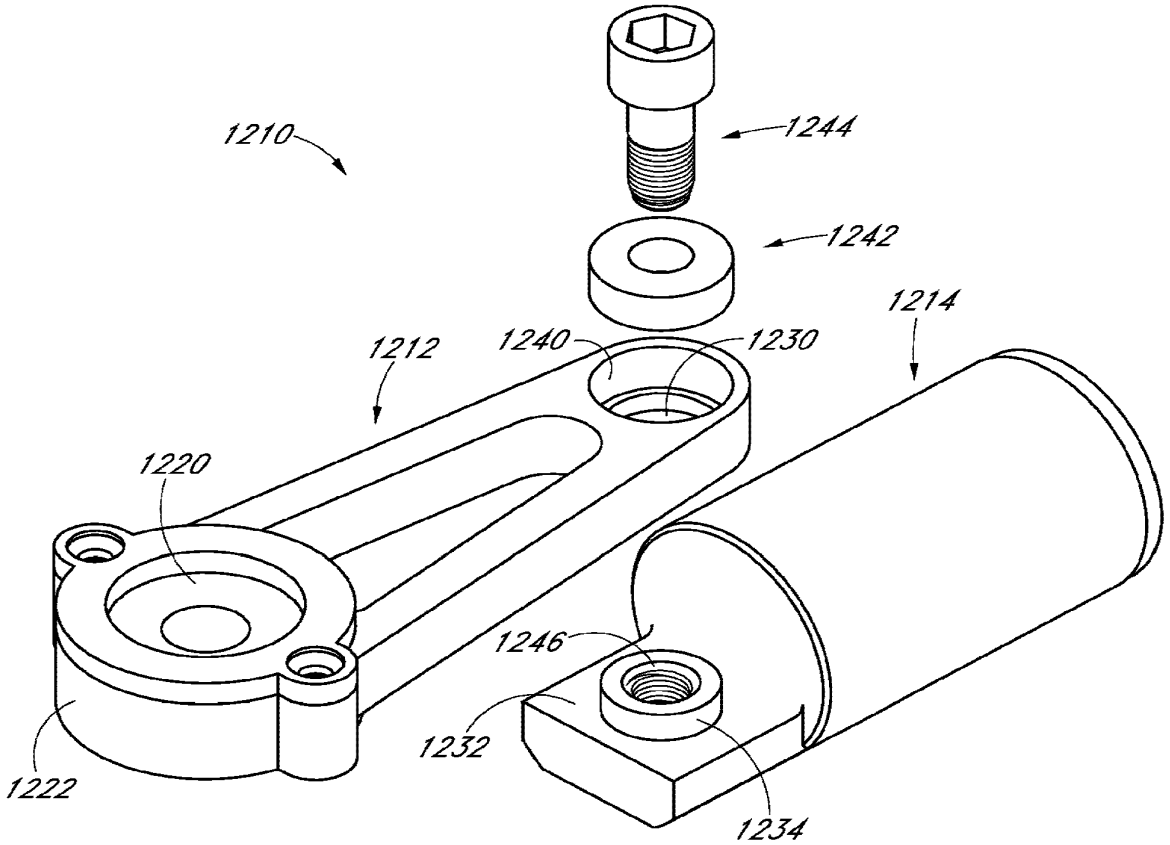

FIG. 26

Petitioner Therabody Ex-1004, 1598

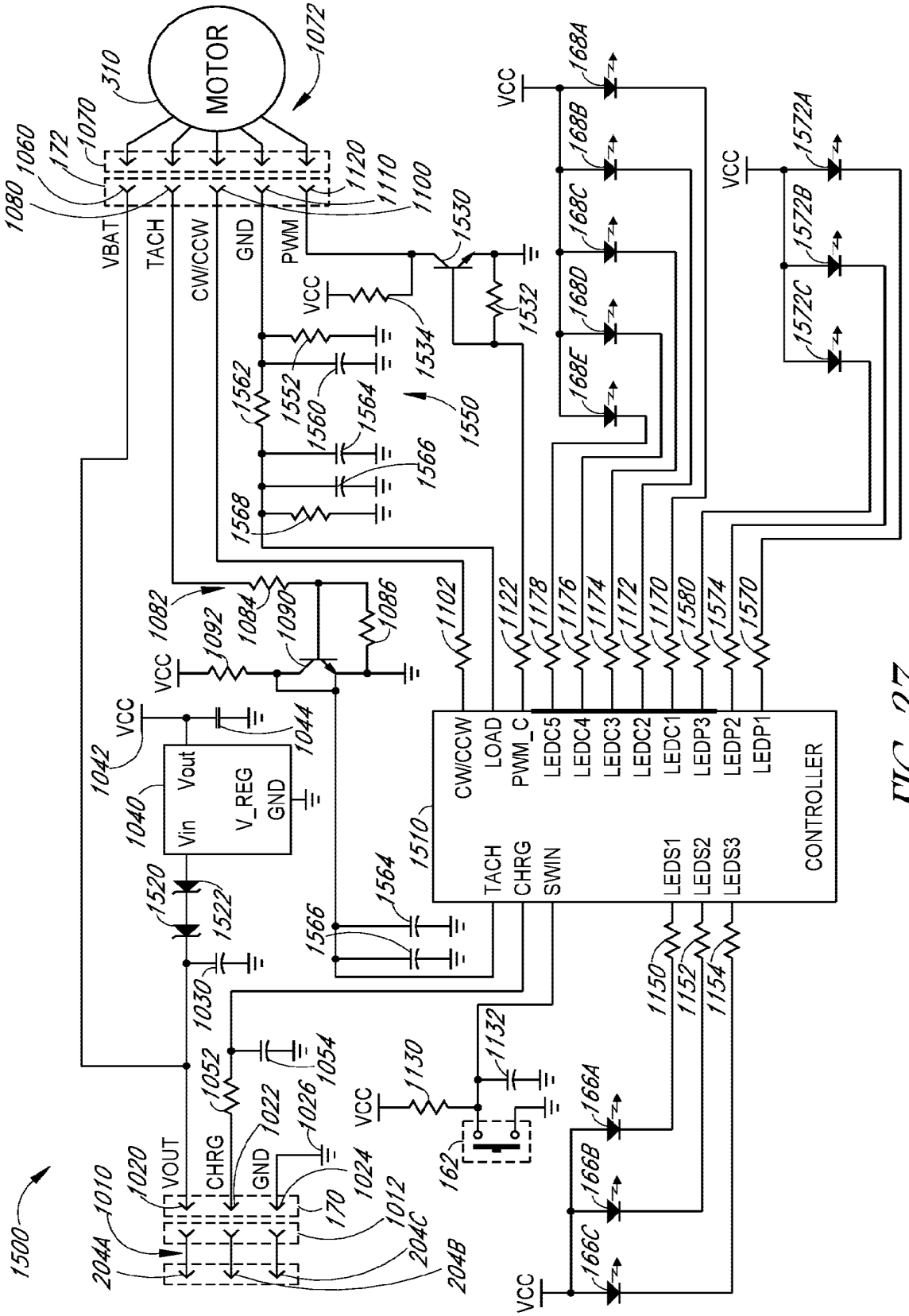
MOTOR
VBAT
TACH
CW/CCW
GND
PWM
VCC
V_REG
Vin
Vout
CONTROLLER
CW/CCW
LOAD
PWM_C
LEDC5
LEDC4
LEDC3
LEDC2
LEDC1
LEDP3
LEDP2
LEDP1
TACH
CHRG
SWIN
LEDS1
LEDS2
LEDS3
VOUT
CHRG
GND

FIG. 27

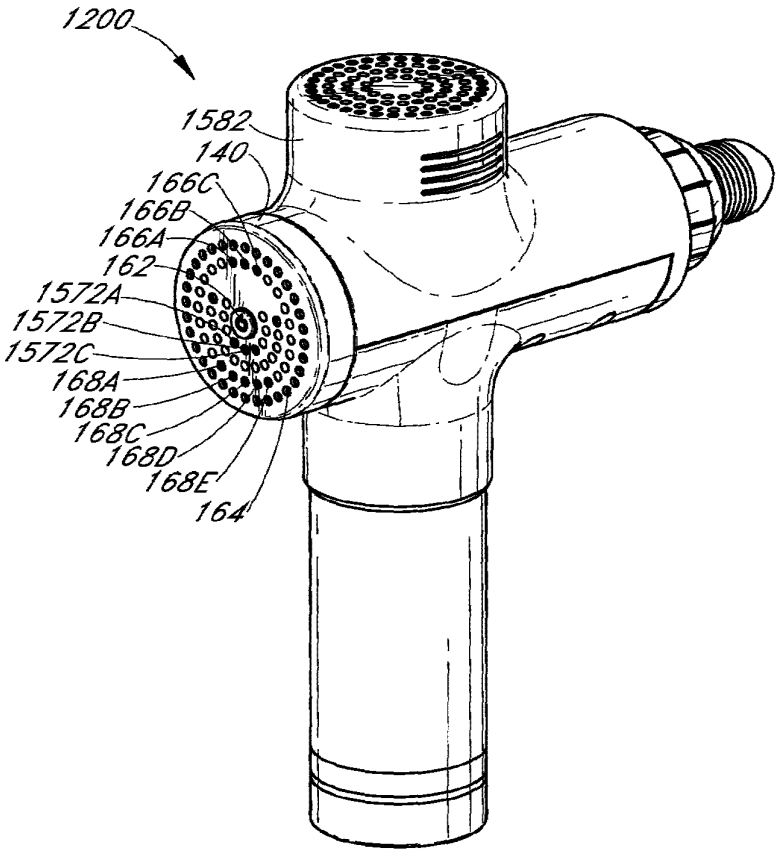

FIG. 28

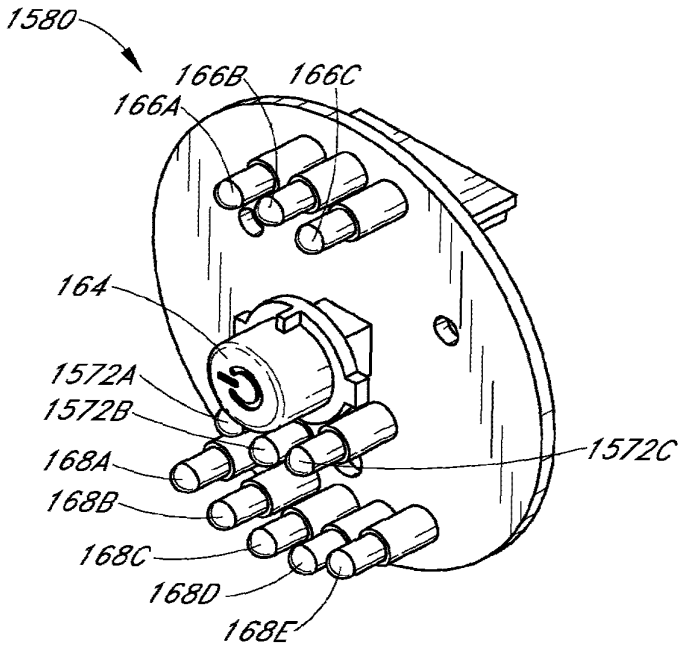

FIG. 29

Petitioner Therabody Ex-1004, 1600

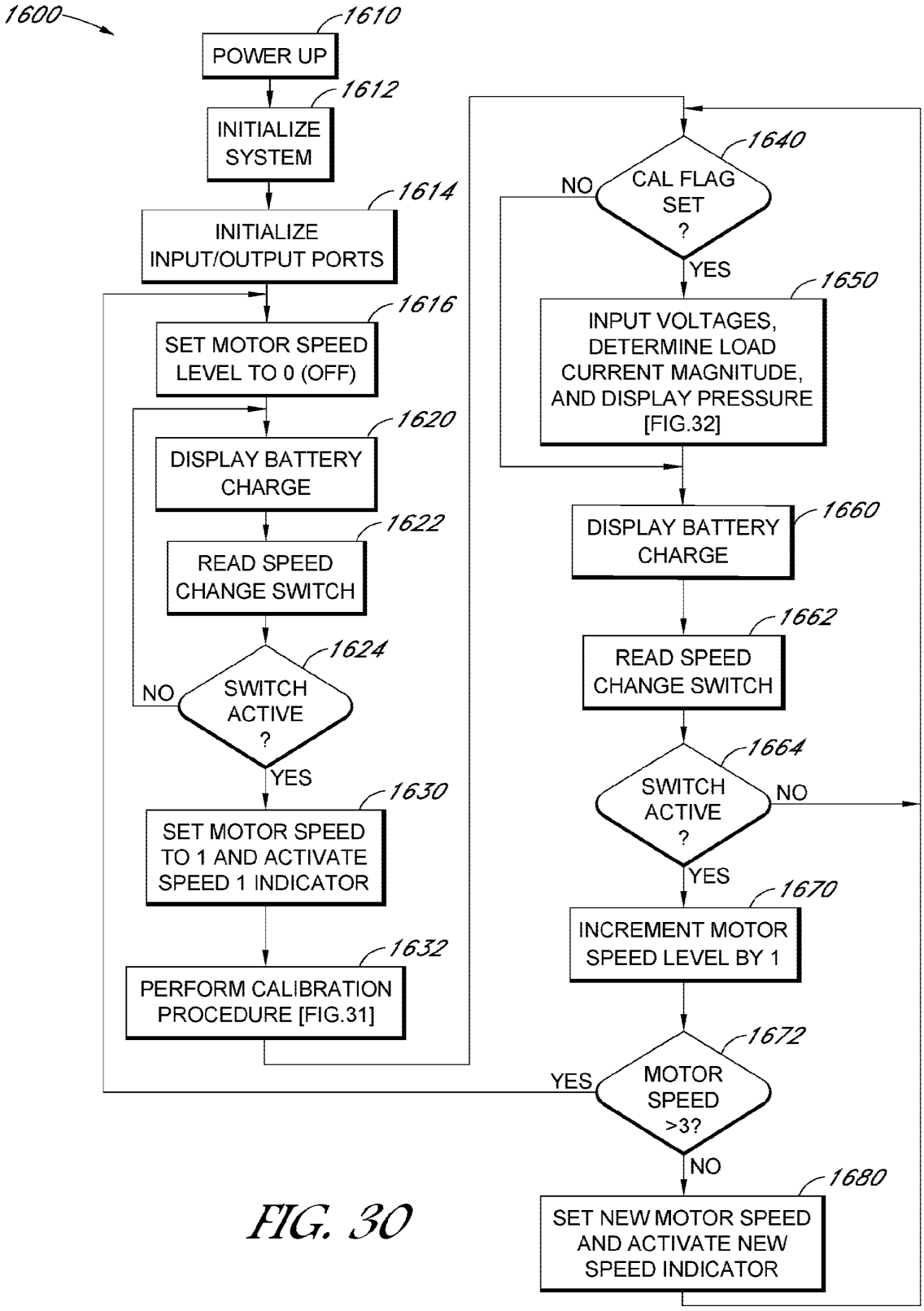
1600
1610
POWER UP
1612
INITIALIZE SYSTEM
1614
INITIALIZE INPUT/OUTPUT PORTS
1616
SET MOTOR SPEED LEVEL TO 0 (OFF)
1620
DISPLAY BATTERY CHARGE
1622
READ SPEED CHANGE SWITCH
1624
SWITCH ACTIVE ?
NO
YES
1630
SET MOTOR SPEED TO 1 AND ACTIVATE SPEED 1 INDICATOR
1632
PERFORM CALIBRATION PROCEDURE [FIG.31]
1640
CAL FLAG SET ?
NO
YES
1650
INPUT VOLTAGES, DETERMINE LOAD CURRENT MAGNITUDE, AND DISPLAY PRESSURE [FIG.32]
1660
DISPLAY BATTERY CHARGE
1662
READ SPEED CHANGE SWITCH
1664
SWITCH ACTIVE ?
NO
YES
1670
INCREMENT MOTOR SPEED LEVEL BY 1
1672
MOTOR SPEED >3?
YES
NO
1680
SET NEW MOTOR SPEED AND ACTIVATE NEW SPEED INDICATOR

FIG. 30

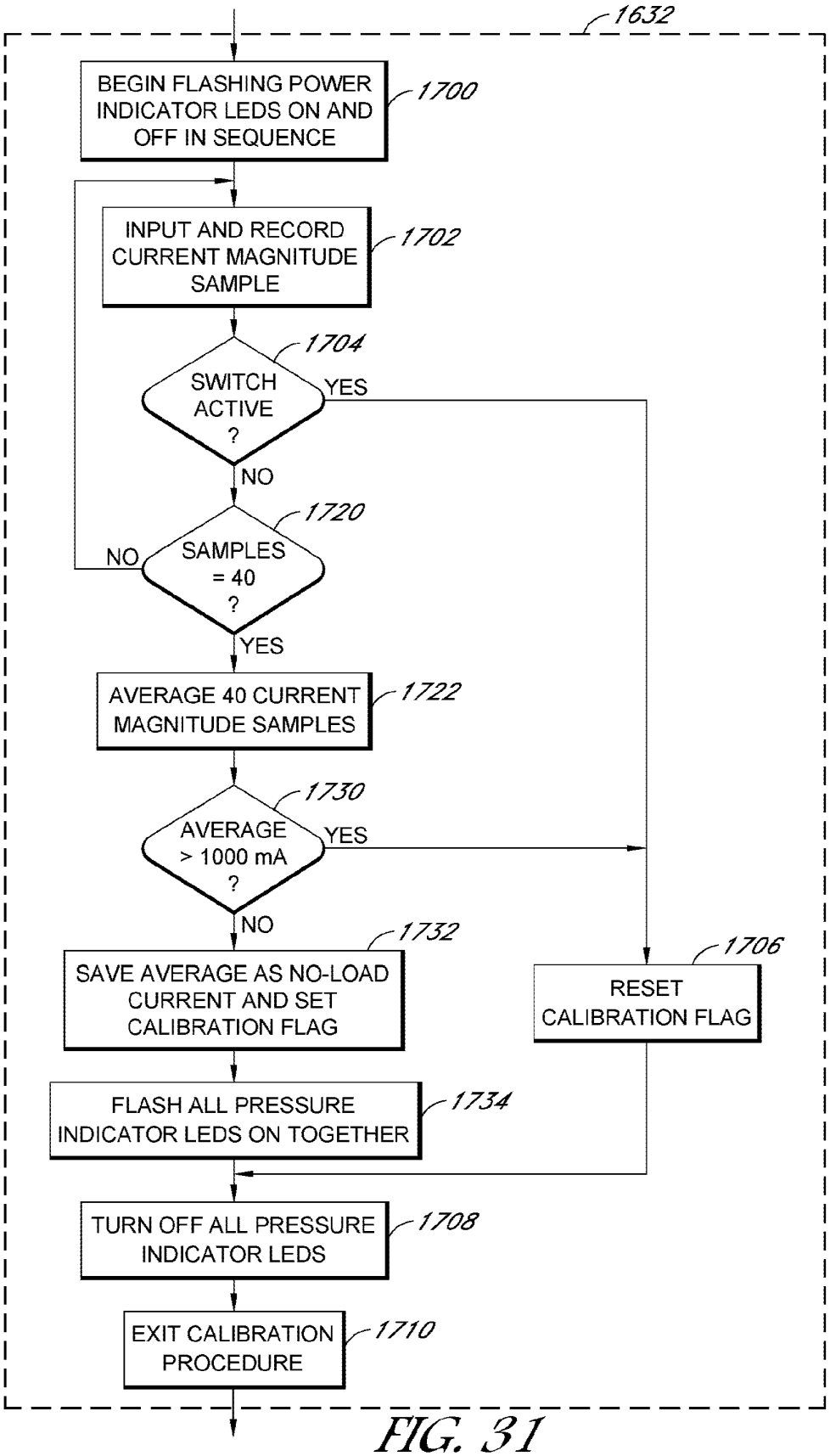

FIG. 31

Petitioner Therabody Ex-1004, 1602

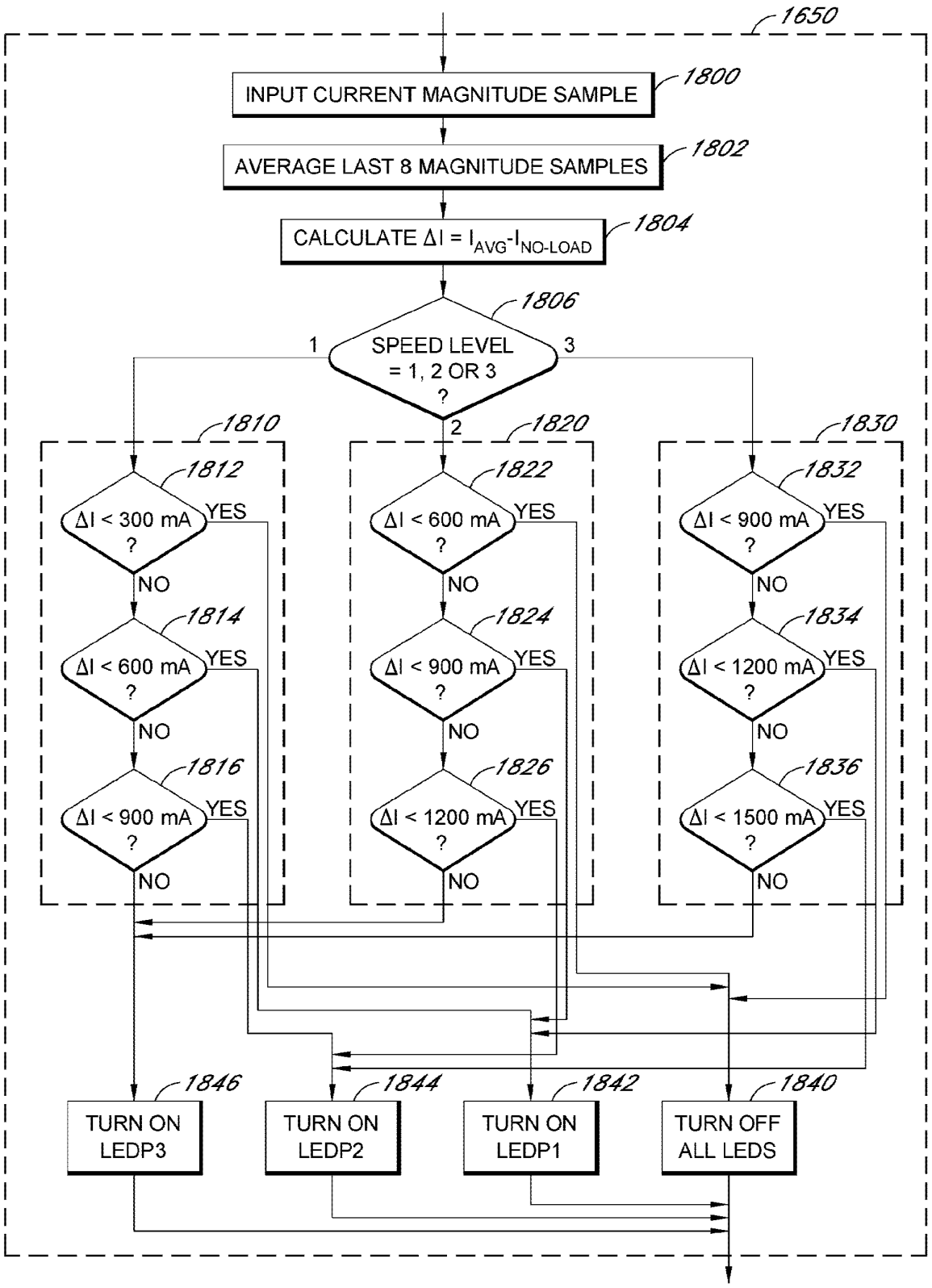

FIG. 32

Petitioner Therabody Ex-1004, 1603

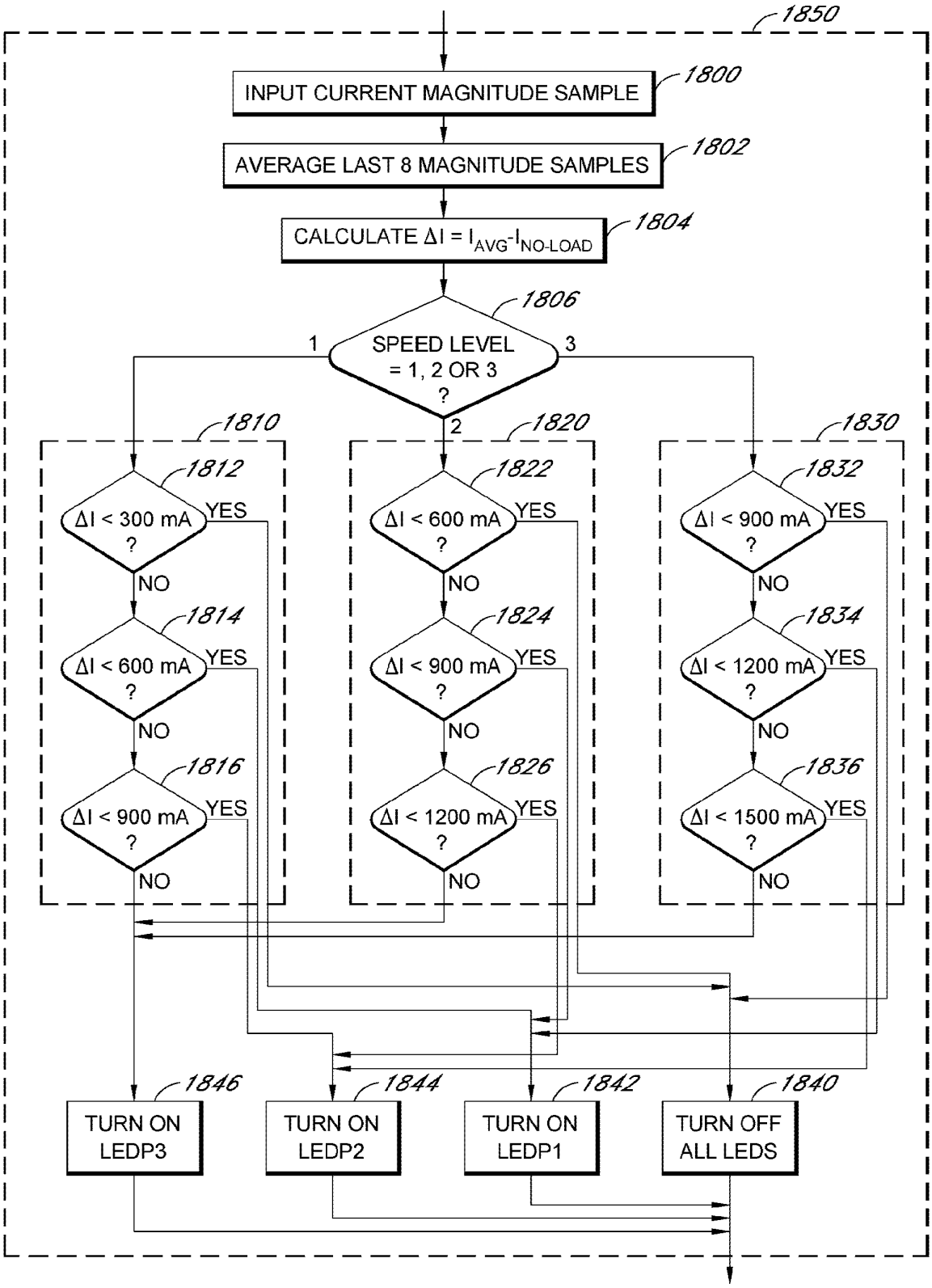

FIG. 33

Petitioner Therabody Ex-1004, 1604

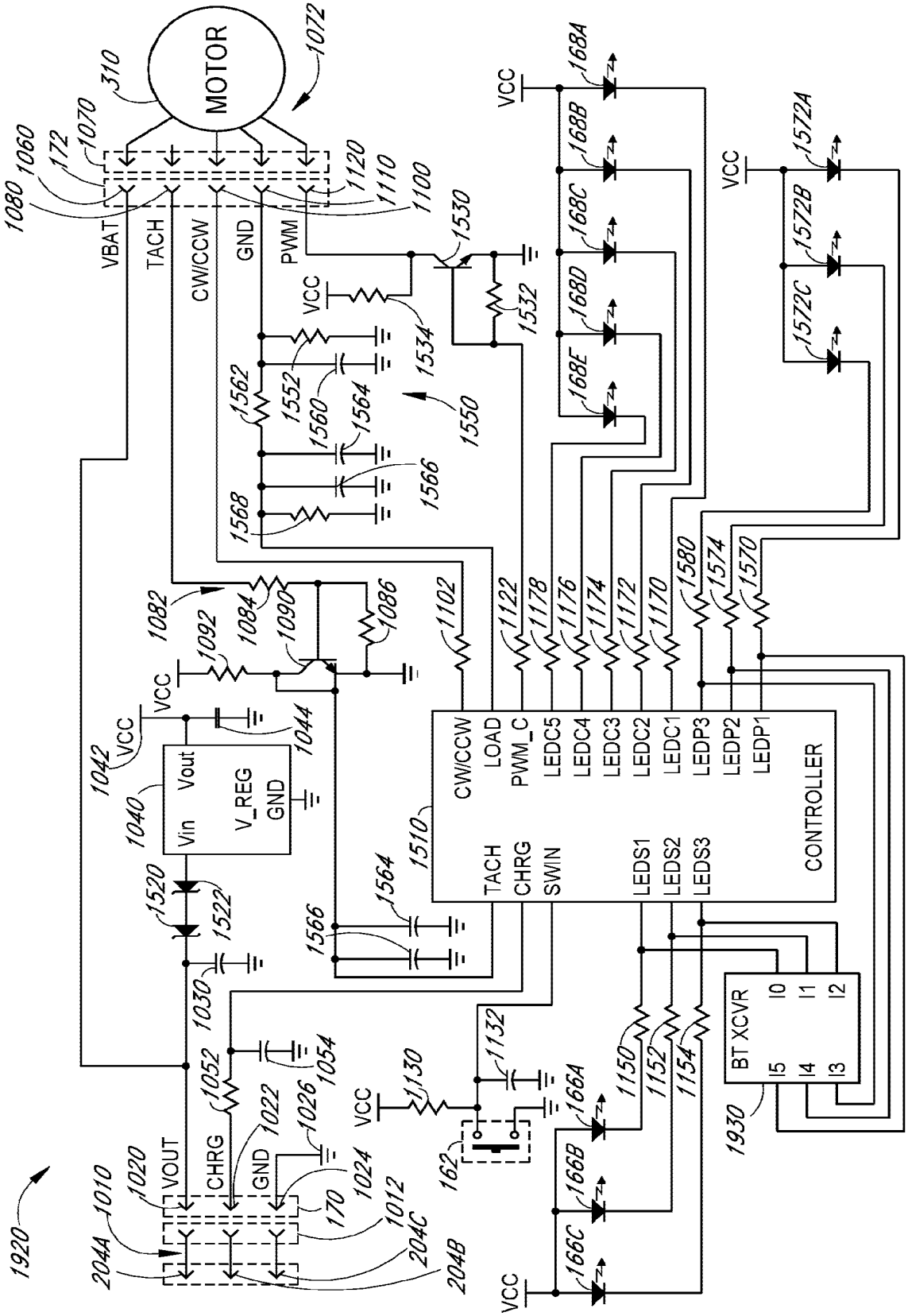

FIG. 34

Petitioner Therabody Ex-1004, 1605

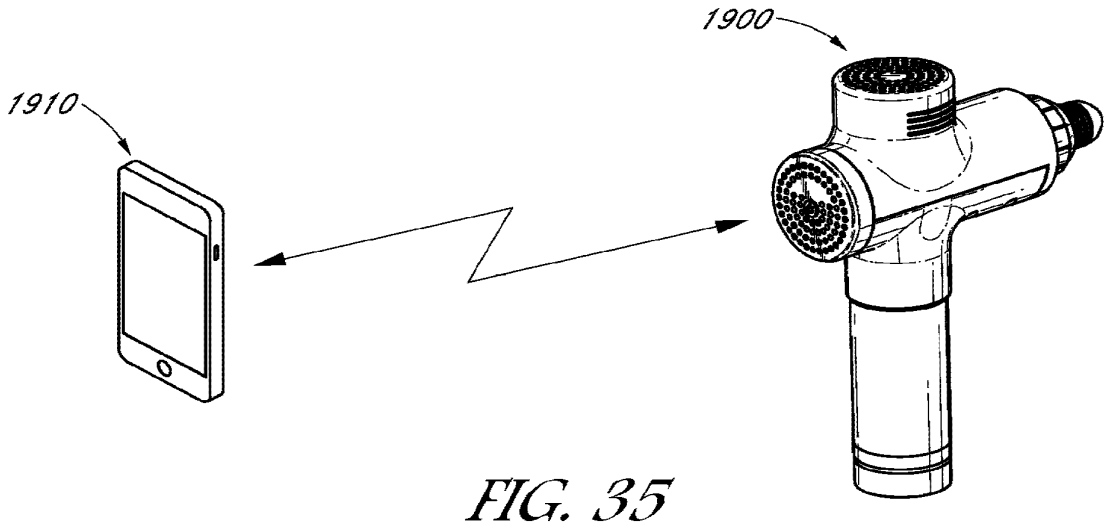

FIG. 35

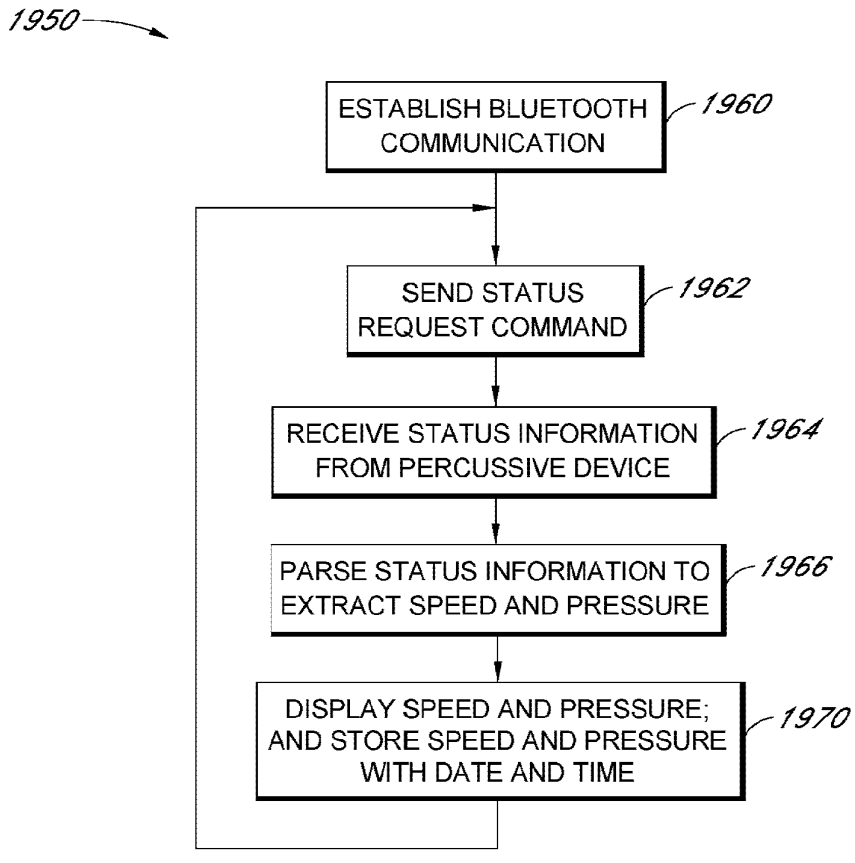

FIG. 36

Petitioner Therabody Ex-1004, 1606

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/013769

A. CLASSIFICATION OF SUBJECT MATTER

A61H 23/00(2006.01)i, A61H 23/02(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61H 23/00; A61F 5/00; A61H 1/00; A61H 23/02; A61H 7/00; B05B 11/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: massage, device, pressure, sensor, speed, motor, battery, power, piston

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4513737 A (MABUCHI, K.) 30 April 1985 See figures 1, 2; column 2, lines 42-62 and column 5, lines 39-51 and column 6, lines 24-37; claims 1-2.	1-3,5,7-9,11-12,14-17
A		4,6,10,13,18-19
Y	US 2014-0031866 A1 (ACTIVATOR METHODS INTERNATIONAL, LTD.) 30 January 2014 See paragraphs [0037], [0049], [0056]-[0057].	1-3,5,7-9,11-12,14-17
Y	US 5656017 A (KELLER, T. S. et al.) 12 August 1997 See column 4, lines 50-59 and column 12, lines 3-10, 34-39.	5,11-12,16
Y	US 2017-0333280 A1 (ASHLEY DIANA BLACK INTERNATIONAL HOLDINGS, LLC) 23 November 2017 See paragraph [0071].	15
A	US 2018-0168913 A1 (SEDIC, F.) 21 June 2018 See the whole document.	1-19

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 August 2019 (09.08.2019)	**09 August 2019 (09.08.2019)**

Name and mailing address of the ISA/KR
International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea
Facsimile No. +82-42-481-8578

Authorized officer
HAN, Inho
Telephone No. +82-42-481-3362

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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2019/013769

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4513737 A	30/04/1985	CA 1152842 A	30/08/1983
		DE 3048293 A1	15/10/1981
		FR 2472380 A1	03/07/1981
		FR 2472380 B1	27/09/1985
		GB 2066081 A	08/07/1981
		GB 2066081 B	20/06/1984
		JP 55-129715 A	07/10/1980
		JP 56-048806 B2	18/11/1981
		JP 56-109665 A	31/08/1981
		JP 56-133823 U	09/10/1981
		JP 59-037231 Y2	15/10/1984
US 2014-0031866 A1	30/01/2014	AU 2013-292319 A1	29/01/2015
		AU 2013-292319 B2	29/06/2017
		CA 2878013 A1	23/01/2014
		EP 2874592 A1	27/05/2015
		EP 2874592 A4	16/03/2016
		US 2016-0242985 A1	25/08/2016
		US 2017-0281450 A1	05/10/2017
		US 9345633 B2	24/05/2016
		US 9687405 B2	27/06/2017
		WO 2014-015301 A1	23/01/2014
US 5656017 A	12/08/1997	US 5626615 A	06/05/1997
		US 5653733 A	05/08/1997
		US 5897510 A	27/04/1999
US 2017-0333280 A1	23/11/2017	WO 2017-193054 A1	09/11/2017
		WO 2017-193054 A9	01/03/2018
US 2018-0168913 A1	21/06/2018	CN 107913174 A	17/04/2018
		CN 208525375 U	22/02/2019

Petitioner Therabody Ex-1004, 1608

Espacenet

Bibliographic data: KR102078829 (B1) — 2020-02-19

Compact muscle gun massage device with reduced noise

Inventor(s): CHANG BYONG TAEK ± (장병택)

Applicant(s): ST [KR] ± (주식회사 에스티)

Classification: - international: ***A61H23/00; A61H23/02***
- cooperative: **A61H23/006 (KR)**; **A61H23/0254 (KR)**; A61H2201/0169 (KR); A61H2201/1215 (KR); A61H2201/1454 (KR)

Application number: KR20190177752 20191230 Global Dossier

Priority number (s): KR20190177752 20191230

Abstract of KR102078829 (B1)

The present invention relates to a low-noise small muscle gun massage device, which comprises: an upper body; a lower body; a handle part; a body end cap; a driving motor; a vibration damping plate; a crank; and a mounting sleeve.

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Notice

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DESCRIPTION KR102078829B1

Compact muscle gun massage device with reduced noise}

[0001]

The present invention relates to a low-noise compact muscle gun massager, which achieves miniaturization and reduces noise from internal parts by securing space within the upper body and lower body and embedding the driving body.

[0002]

In general, it is desirable for massage to be performed in a quiet environment, and it is desirable for muscle gun massagers used for massage to reduce vibration, noise, size, and weight so that users can enjoy a comfortable massage on their own.

[0003]

Registered Patent Publication No. 10-2025760 relates to a battery-powered percussive massage device with a pressure sensor, and is provided with a linkage so that the rotation of the electric motor causes the piston to move in a straight line, but the electric motor is built into a motor enclosure. Since the motor enclosure extends upward from the upper main body, the massage device needs to be miniaturized for use by users, and the aesthetics of the product are also impaired.

[0004]

Registered Patent Publication No. 10-1237183 relates to a vibrating massager equipped with a magnetic field generator. The frequency of vibration of the magnetic field generator is adjusted by varying the magnetic flux density. However, compared to a massager with a structure that converts the rotation of an electric motor into a linear reciprocating motion, There is a problem in that it does not provide a comfortable massage to the user.

[0005]

Japanese Patent Publication No. 2012-71083 relates to a small massager. In order to apply various massage techniques, two axes are connected from the drive shaft of the motor and the crank. However, since the motor is built inside the body, miniaturization is difficult and vibration occurs. And there is a problem that it is difficult to reduce noise.

[0006]

Japanese Patent Laid-Open No. 2002-282322 relates to a small massage device. Although the output shaft of the drive motor is arranged to face the other end of the head, the drive motor is housed within the head, but there is a problem in that it is difficult to reduce vibration and noise.

Petitioner Therabody Ex-1004, 1610

[0007]

Registered Patent Publication No. 10-2025760 Registered Patent Publication No. 10-1237183 Japanese Patent Publication No. 2012-71083 Japanese Patent Publication No. 2002-282322

[0008]

The purpose of the present invention is to achieve miniaturization of a massage machine.

[0009]

Another object of the present invention is to reduce vibration and noise of the massage machine.

[0010]

Another purpose of the present invention is to increase the striking force of the massage horse by embedding the drive motor, which is the heaviest part, inside the upper and lower bodies.

[0011]

The problem to be solved by the present invention is not limited to the above object, and other technical problems not explicitly indicated above can be easily understood by those skilled in the art through the structure and operation of the present invention. You will be able to.

[0012]

The present invention includes the following configuration to solve the above problems.

[0013]

The present invention relates to a low-noise compact muscle gun massager, comprising: an upper body divided into a horizontal upper part around a central axis (O); a lower body divided into a horizontal lower part around the central axis (O); a handle extending downward from one side of the lower body; a body end cap that couples and secures the ends of the upper body and the lower body; A power source is built into the handle, and a drive motor is located above the handle and is fixed to the lower body. a vibration damping plate on which the drive motor is screwed and has a horizontal surface to reduce vibration of the drive motor; A crank located on the other side of the vibration damping plate and coupled to the drive shaft of the drive motor; The vibration damping plate is screwed to the lower body so that a predetermined height d2 is higher from the horizontal plane including the central axis O at the upper part of the handle to secure a space for installing the drive motor, and is separated from the lower body. a vibration damping fixture formed to have a predetermined height toward the top to dampen vibration from the vibration damping plate; A vibration damping packing located between the vibration damping plate and the vibration damping fixture to attenuate vibration from the vibration damping plate; a stepped connection part on one side of which is coupled to the eccentric shaft of the crank with a bearing interposed therebetween; a piston coupled to the other side of the step connection portion having a predetermined height (d1) lower than the one side with a bearing interposed therebetween; A massage member coupled to the piston; It includes a mounting sleeve that reduces noise generated by the linear reciprocating motion of the massage member and the piston, and has a predetermined height (d1) by the step connection portion and a predetermined height (d2) by the vibration damping fixing portion. By securing more installation space for the drive motor, the drive motor is screwed to the center of the lower surface of the vibration damping plate, and the vibration damping fixing part is screwed to the peripheral portion of the lower surface of the vibration damping plate. The driving motor and the vibration damping fixing part are coupled on the same horizontal plane of the vibration damping plate so that the driving motor can be built into the upper body and the lower body, so that the connection with the handle extending downward from one side of the lower body It is characterized by being maintained as a curved surface curved inward, enabling miniaturization.

[0014]

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The present invention is characterized in that it further includes a charging control circuit that charges the power source built into the handle.

[0015]

The present invention is characterized by further comprising a drive motor control circuit that controls the drive motor.

[0016]

The effect of the present invention is to achieve miniaturization of the massage device.

[0017]

Another effect of the present invention is to reduce vibration and noise of the massager.

[0018]

In addition, another effect of the present invention is to increase the striking force of the massage horse by having the drive motor, which is the component with the largest weight, built into the upper body and the lower body.

[0019]

The effects of the present invention are not limited to the above effects, and other effects not explicitly shown above will be easily understood by those skilled in the art through the structure and operation of the present invention.

[0020]

1 and 2 show overall external perspective views of the present invention. Figure 3 shows an overall exploded perspective view of the present invention. Figure 4 shows the specific configuration of the driving unit of the present invention. Figure 5 shows a specific coupling structure of the step connection part of the present invention. Figure 6 shows the specific structure of the lower body of the present invention. Figure 7 shows an overall side cross-sectional view of the present invention. Figure 8 shows the coupling structure of the outer sleeve and the mounting sleeve of the present invention. Figure 9 shows a circuit diagram of the charging control circuit of the present invention. Figure 10 shows a circuit diagram of the drive motor control circuit of the present invention.

[0021]

Hereinafter, the overall configuration and operation according to a preferred embodiment of the present invention will be described.

These examples are illustrative and do not limit the configuration and operation of the present invention, and other configurations and operations that are not explicitly shown in the examples are also provided by common knowledge in the technical field to which the present invention pertains through the examples below. If it can be easily understood by those who have it, it can be seen as the technical idea of the present invention.

[0022]

1 and 2 show overall external perspective views of the present invention.

[0023]

Referring to Figures 1 and 2, the upper body 10 and the lower body 20 of the present invention are coupled in a horizontal plane including the central axis (O), and a handle portion moves downward from one side of the lower body 20. (30) is extended and a body end cap 50 is coupled to the rear of the upper body 10 and the lower body 20 to fixedly couple the upper body 10 and the lower body 20. .

[0024]

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Figure 3 shows an overall exploded perspective view of the present invention.

[0025]

Referring to Figure 3, the upper body 10 and the lower body 20 of the present invention include a driving part 100, a step connection part 200, a piston 300, and a massage member 400, and the driving part (100 is coupled to a vibration damping fixing part 500 formed at a predetermined height upward from the lower body 20, and a printed circuit board 51 is attached to the body end cap 50 of the upper body 10.) and is coupled to the inner side of the lower body 20.

[0026]

Figure 4 shows the specific configuration of the driving unit of the present invention.

[0027]

Referring to FIG. 4, the driving unit 100 of the present invention includes a driving motor 110 and a crank 150 to convert the generated rotational motion into a linear reciprocating motion, and the driving motor 110 generates Rotational motion is transmitted to the crank 15 by the drive shaft 120 and converted into linear reciprocating motion by the eccentric shaft 151.

[0028]

A crank 150 is coupled to the drive shaft 120 of the drive motor 110, and a vibration damping plate 140 is disposed between the drive motor 110 and the crank 150. It is coupled and fixed to the drive motor 110 by a screw 141.

[0029]

The vibration damping plate 140 is screwed with the drive motor 100 and the lower body 20, and the vibration damping plate 140 is screwed with the drive motor 100 and the lower body (20) on the same horizontal plane. 20), the installation space for the driving unit 100 inside the upper body 10 and the lower body 20 can be minimized.

[0030]

In addition, the vibration damping plate 140 primarily attenuates the vibration generated from the drive motor 100 as it is transmitted from the part screwed with the drive motor 100 to the part screwed with the lower body 20. The vibration damping plate 140 is coupled and fixed to the lower body 20, and is further provided with a vibration damping packing 130 to further dampen the vibration occurring in the drive motor 110. .

[0031]

In addition, the vibration damping plate 140 is coupled to a vibration damping fixing part 500 formed at a predetermined height upward from the lower body 20, and the driving motor is operated by the vibration damping fixing part 500. The vibration occurring at (110) can be further attenuated in a third way.

[0032]

Figure 5 shows a specific coupling structure of the step connection part of the present invention.

[0033]

Referring to FIG 5(a), one side of the step connection portion 200 is coupled to the eccentric shaft 151 and friction can be reduced by placing a bearing 220 therebetween, and the other side of the step connection portion 200 One side is coupled to the piston 300, and friction can be reduced by placing a bearing 210 between them.

[0034]

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The rotational motion of the drive motor 100 is converted into linear reciprocating motion by the eccentric shaft 151 and transmitted, causing the piston 300 to perform a linear reciprocating motion, between the step connection portion 200 and the piston 300. By placing a bearing 210 on the piston 300 to reduce friction, the piston 300 can perform almost straight reciprocating motion without distortion.

[0035]

Referring to FIG. 5(b), one side of the step connection portion 200 and the other side are formed to have a step d1 to primarily define the installation space of the drive unit 100 coupled to one side of the step connection portion 200. It can be secured.

[0036]

In addition, the vibration damping plate 140 of the driving unit 100 is coupled to the vibration damping fixing part 500 formed at a predetermined height upward from the lower body 20. The vibration damping fixing part 500 As a result, it is possible to secondarily secure more installation space for the driving unit 100 coupled to one side of the step connection unit 200.

[0037]

Figure 6 shows the specific structure of the lower body of the present invention.

[0038]

Referring to FIG. 6, a vibration damping fixture 500 is formed in the lower body 20 with a predetermined height upward from the lower body 20, and the vibration damping fixture 500 is located along the central axis (It is formed to have a predetermined height (d2) greater than the horizontal plane including O).

[0039]

Accordingly, the vibration damping plate 140 of the driving unit 100 can be installed at a position where a predetermined height d2 is higher than the horizontal plane including the central axis O by the vibration damping fixing part 500.

[0040]

Figure 7 shows an overall side cross-sectional view of the present invention.

[0041]

Referring to FIG. 7, the drive motor 110 and the crank 150 are installed inside the upper body 10 and the lower body 20, and the step d1 and vibration secured by the step connection portion 200 It is completely built into the upper body 10 and the lower body 20 by the height d2 secured by the damping fixing part 500, so that the upper body 10 and the lower body 20 have an outer surface. It is formed in an elegantly streamlined shape.

[0042]

In particular, a handle portion 30 is formed extending downward from one side of the lower body 20, and a connection portion 40 where the lower body 20 and the handle portion 30 come into contact with each other is formed on the lower body 20. It is maintained as a curved surface curved inward, making miniaturization possible.

[0043]

Figure 8 shows the coupling structure of the outer sleeve and the mounting sleeve of the present invention.

[0044]

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Referring to FIG. 8, an external sleeve 600 and at least one mounting sleeve 610, 620, and 630 are coupled to one side of the upper body 10 and the lower body 20 of the present invention, and the mounting sleeve 610 , 620, 630, the piston 300 and the massage member 400 can perform linear reciprocating motion and minimize friction to reduce vibration and noise.

[0045]

Figure 9 shows a circuit diagram of the charging control circuit of the present invention.

[0046]

Referring to FIG. 9, a rechargeable battery may be built into the handle portion 30 of the present invention, and a charging control circuit for charging the rechargeable battery may be built into the printed circuit board 51.

[0047]

The terminal of each circuit part is connected to each terminal of the charging controller (U2 CNS89112), and the charging function can be operated by connecting to the rechargeable battery BAT from terminal AD.

[0048]

Diode D1 prevents current from flowing back from the battery to the charger, and transistor Q1 operates as an electronic switch to automatically enter power saving mode when the user turns the power switch on and leaves it for a long time.

[0049]

Transistor Q6, resistor R9, resistor R12, transistor Q7, resistor R17, and resistor R16 form a charger matching circuit so that the charging function operates only when the charger's current and voltage are matched.

[0050]

Figure 10 shows a circuit diagram of the drive motor control circuit of the present invention.

[0051]

Referring to FIG. 10, a drive motor control circuit for controlling the drive motor 110 of the present invention can be built into the printed circuit board 51.

[0052]

The terminal of each circuit part is connected to each terminal of the drive motor controller (U2 SC92F8362BX), and the terminal PWM OUT is connected to terminal P2 to control the drive motor 110 by supplying a pulse width modulation signal.

The driving motor 110 can change speed to 6 speeds by the pulse width modulation signal.

[0053]

As described above, one side of the step connection portion 200 of the present invention is coupled to the eccentric shaft 151 of the crank 150, and the other side has a predetermined height d1 lower than the one side of the step connection portion 200. The piston is coupled to the vibration damping plate 140, and the vibration damping plate 140 is formed to have a predetermined height from the lower body toward the top by the vibration damping fixing part 500. Preferably, the vibration damping plate 140 is connected to the handle portion. It is coupled to the upper part of (30) so that a predetermined height d2 is higher from the horizontal plane including the central axis O.

[0054]

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By this configuration, the present invention secures more installation space for the driving unit 100 inside the body, so that the connection part 40 with the handle extending downward from one side of the lower body is maintained as a curved surface curved inward. Miniaturization is possible.

[0055]

In addition, the vibration and noise generated from the drive motor 110 are triple attenuated by the vibration damping plate 140, the vibration damping packing 130, and the vibration damping fixing part 500, thereby providing the low-noise compact muscle gun massager of the present invention. Users can enjoy massage in a comfortable and quiet environment.

[0056]

10: Upper body 20: Lower body 30: Handle 40: Connection 50: Body end cap 51: Printed circuit board 52: Body partition 100: Drive unit 110: Drive motor 120: Drive shaft 130: Vibration damping packing 140: Vibration damping plate 141: Screw 150: Crank 151: Eccentric shaft 200: Step connection part 210, 220: Bearing 300: Piston 400: Massage member 500: Vibration damping fixing part 600: External sleeve 610, 620, 630: Mounting sleeve

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CLAIMS KR102078829B1

1.

A low-noise compact muscle gun massager, comprising: an upper body divided into a horizontal upper portion about a central axis (O); a lower body divided into a horizontal lower portion about the central axis (O); extending downward from one side of the lower body. A handle portion; A body end cap that couples and secures the ends of the upper body and the lower body; A power supply unit is built into the handle portion, and a drive motor is located in the upper part of the handle portion and is fixedly installed on the lower body; The drive motor A vibration damping plate screwed to one side and having a horizontal surface to reduce vibration of the drive motor; A crank located on the other side of the vibration damping plate and coupled to the drive shaft of the drive motor; The vibration damping plate is located on the upper part of the handle. It is screwed to the lower body so that a predetermined height d2 is higher from the horizontal plane including the central axis O to secure installation space for the drive motor, and is formed to have a predetermined height from the lower body upward. A vibration damping fixing part that attenuates vibration from the vibration damping plate; A vibration damping packing located between the vibration damping plate and the vibration damping fixing part to attenuate vibration from the vibration damping plate; A bearing on the eccentric shaft of the crank. A step connection part, one side of which is coupled with an intervening part; A piston, which is coupled to the other side of the step connection part with a predetermined height (d1) lower than the one side with a bearing therebetween; A massage member coupled to the piston; It includes a mounting sleeve that reduces noise generated by the linear reciprocating motion of the massage member and the piston, and is installed at a predetermined height (d1) by the step connection portion and a predetermined height (d2) by the vibration damping fixing portion. By securing more space for installing the drive motor, the drive motor is screwed to the center of the lower surface of the vibration damping plate, the vibration damping fixing part is screwed to the peripheral part of the lower surface of the vibration damping plate, and the driving motor is screwed to the center of the lower surface of the vibration damping plate. The motor and the vibration damping fixing part are coupled on the same horizontal plane of the vibration damping plate so that the driving motor can be built into the upper body and the lower body, so that the connection with the handle extending downward from one side of the lower body is inside. A low-noise, compact muscle gun massager characterized in that it can be miniaturized by maintaining a curved surface that is curved toward.

2.

The low-noise compact muscle gun massager according to claim 1, further comprising a charging control circuit for charging a power source built into the handle.

3.

The low-noise compact muscle gun massager according to claim 1, further comprising a drive motor control circuit that controls the drive motor.

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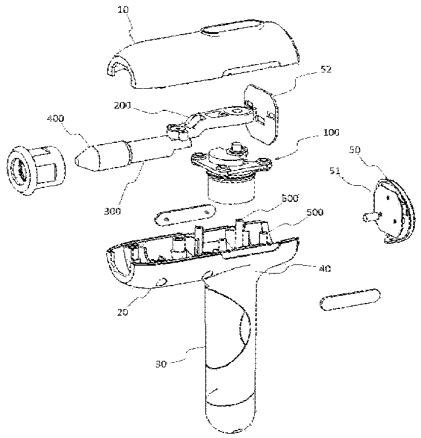
(54) 발명의 명칭 **저소음 소형 머슬건 안마기**

(57) 요 약

본 발명은 저소음 소형 머슬건 안마기에 관한 것으로서, 중심축(0)을 중심으로 수평 상부로 분리되는 상부 몸체; 상기 중심축(0)을 중심으로 수평 하부로 분리되는 하부 몸체; 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부; 상기 상부 몸체와 상기 하부 몸체의 단부를 결합 고정하는 몸체 단부캡; 상기 손잡이부에는 전원부가

(뒷면에 계속)

대 표 도 - 도3



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내장되고, 상기 손잡이부의 상부에 위치하여 하부 몸체에 고정 설치되는 구동 모터; 상기 구동 모터가 일면에 나사 결합되고 상기 구동 모터의 진동을 저감하도록 수평면을 갖는 진동 감쇄판; 상기 진동 감쇄판의 다른 일면에 위치하여 상기 구동 모터의 구동축에 결합되는 크랭크; 상기 진동 감쇄판은 상기 손잡이부의 상부에 상기 중심축(O)을 포함하는 수평면으로부터 소정의 높이(d_2)가 더 높아지도록 하부 몸체에 나사 결합되어 상기 구동 모터 설치 공간을 확보하고, 상기 하부 몸체로부터 상부를 향하여 소정의 높이를 가지도록 형성되어 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 고정부; 상기 진동 감쇄판과 진동 감쇄 고정부 사이에 위치하여 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 패킹; 상기 크랭크의 편심축에 베어링을 사이에 개재하여 일측이 결합되는 단차 연결부; 상기 단차 연결부의 상기 일측보다 소정의 높이(d_1)가 더 낮은 다른 일측에 베어링을 사이에 개재하여 결합되는 피스톤; 상기 피스톤에 결합되는 안마 부재; 상기 안마 부재와 상기 피스톤의 직선 왕복 운동에 의하여 발생하는 소음을 저감하는 장착 슬리브;를 포함하고, 상기 단차 연결부의 의한 소정의 높이(d_1)와 상기 진동 감쇄 고정부에 의한 소정의 높이(d_2)에 의하여 구동 모터 설치 공간을 좀 더 확보함으로써, 상기 진동 감쇄판의 하부 일면의 중심부에 상기 구동 모터가 나사 결합되고, 상기 진동 감쇄판의 하부 일면의 주변부에 상기 진동 감쇄 고정부가 나사 결합되며, 상기 구동 모터와 상기 진동 감쇄 고정부는 상기 진동 감쇄판의 동일한 수평면에서 결합되어 상기 구동 모터가 상기 상부 몸체와 상기 하부 몸체에 내장될 수 있어 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부와의 연결부가 내측을 향하여 만곡된 곡면으로 유지되어 소형화가 가능한 것을 특징으로 한다.

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A61H 2201/1215 (2013.01)
A61H 2201/1454 (2013.01)

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명 세 서

청구범위

청구항 1

저소음 소형 머슬건 안마기에 있어서,중심축(0)을 중심으로 수평 상부로 분리되는 상부 몸체;상기 중심축(0)을 중심으로 수평 하부로 분리되는 하부 몸체;상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부;상기 상부 몸체와 상기 하부 몸체의 단부를 결합 고정하는 몸체 단부캡;상기 손잡이부에는 전원부가 내장되고, 상기 손잡이부의 상부에 위치하여 하부 몸체에 고정 설치되는 구동 모터;상기 구동 모터가 일면에 나사 결합되고 상기 구동 모터의 진동을 저감하도록 수평면을 갖는 진동 감쇄판;상기 진동 감쇄판의 다른 일면에 위치하여 상기 구동 모터의 구동축에 결합되는 크랭크;상기 진동 감쇄판은 상기 손잡이부의 상부에 상기 중심축(0)을 포함하는 수평면으로부터 소정의 높이(d_2)가 더 높아지도록 하부 몸체에 나사 결합되어 상기 구동 모터 설치 공간을 확보하고, 상기 하부 몸체로부터 상부를 향하여 소정의 높이를 가지도록 형성되어 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 고정부;상기 진동 감쇄판과 진동 감쇄 고정부 사이에 위치하여 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 패킹;상기 크랭크의 편심축에 베어링을 사이에 개재하여 일측이 결합되는 단차 연결부;상기 단차 연결부의 상기 일측보다 소정의 높이(d_1)가 더 낮은 다른 일측에 베어링을 사이에 개재하여 결합되는 피스톤;상기 피스톤에 결합되는 안마 부재;상기 안마 부재와 상기 피스톤의 직선 왕복 운동에 의하여 발생하는 소음을 저감하는 장착 슬리브;를 포함하고,상기 단차 연결부의 의한 소정의 높이(d_1)와 상기 진동 감쇄 고정부에 의한 소정의 높이(d_2)에 의하여 구동 모터 설치 공간을 좀 더 확보함으로써, 상기 진동 감쇄판의 하부 일면의 중심부에 상기 구동 모터가 나사 결합되고, 상기 진동 감쇄판의 하부 일면의 주변부에 상기 진동 감쇄 고정부가 나사 결합되며, 상기 구동 모터와 상기 진동 감쇄 고정부는 상기 진동 감쇄판의 동일한 수평면에서 결합되어 상기 구동 모터가 상기 상부 몸체와 상기 하부 몸체에 내장될 수 있어 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부와의 연결부가 내측을 향하여 만곡된 곡면으로 유지되어 소형화가 가능한 것을 특징으로 하는 저소음 소형 머슬건 안마기.

청구항 2

제 1 항에 있어서,상기 손잡이부에 내장되는 전원부를 충전하는 충전 제어회로를 더 포함하는 것을 특징으로 하는 저소음 소형 머슬건 안마기.

청구항 3

제 1 항에 있어서,상기 구동 모터를 제어하는 구동 모터 제어회로를 더 포함하는 것을 특징으로 하는 저소음 소형 머슬건 안마기.

발명의 설명

기 술 분 야

[0001] 본 발명은 저소음 소형 머슬건 안마기에 관한 것으로서, 상부 몸체와 하부 몸체 내에 공간을 확보하여 구동 몸체를 내장하여 소형화를 달성하고 내부 부품의 소음을 저감하는 저소음 소형 머슬건 안마기에 관한 것이다.

배 경 기 술

[0002] 일반적으로 안마는 조용한 환경에서 이루어지는 것이 바람직하고, 안마를 위하여 사용되는 머슬건 안마기는 진동, 소음, 크기, 무게를 저감하여 사용자가 스스로 쾌적한 안마를 즐길 수 있도록 하는 것이 바람직하다.

[0003] 등록특허공보 제10-2025760호는 압력 센서를 갖는 배터리 구동식 퍼커시브 마사지 장치에 관한 것으로서, 전기 모터의 회전이 피스톤을 직선 왕복 운동시키도록 링키지를 구비하고 있으나, 상기 전기 모터는 모터 엔클로저에

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내장되고 상기 모터 엔클로저는 상부 본체 부분으로부터 상향으로 연장되고 있으므로, 상기 마사지 장치는 사용자가 사용하기에는 소형화가 필요하고 제품의 미적 감각도 저해한다는 문제점이 있다.

[0004] 등록특허공보 제10-1237183호는 자기장 발생부를 구비한 진동 안마기에 관한 것으로서 자속 밀도를 가변하여 자기장 발생부의 진동횟수를 조절하고 있으나, 전기 모터의 회전을 직선 왕복 운동으로 변환시키는 구조의 안마기에 비하여 사용자에게 쾌적한 안마를 제공하지 못한다는 문제점이 있다.

[0005] 일본 공개특허공보 특개2012-71083호는 소형 마사지기에 관한 것으로서, 여러가지 마사지 기법을 적용하기 위하여 모터의 구동축과 크랭크로부터 2개의 축이 연결되고 있으나, 모터가 몸체 내부에 내장되어 소형화가 이루지기 어렵고 진동 및 소음을 저감하기 어렵다는 문제점이 있다.

[0006] 일본 공개특허공보 특개2002-282322호는 소형 마사지 장치에 관한 것으로서, 구동 모터의 출력축이 헤드부의 타단을 향하도록 배치하여 구동 모터가 헤드 내에 수납한 구조이나 진동 및 소음을 저감하기 어렵다는 문제점이 있다.

선행기술문헌

특허문헌

[0007] (특허문헌 0001) 등록특허공보 제10-2025760호

(특허문헌 0002) 등록특허공보 제10-1237183호

(특허문헌 0003) 일본 공개특허공보 특개2012-71083호

(특허문헌 0004) 일본 공개특허공보 특개2002-282322호

발명의 내용

해결하려는 과제

[0008] 본 발명은 안마기의 소형화를 달성하는 것을 목적으로 한다.

[0009] 본 발명의 다른 목적은 안마기의 진동 및 소음을 저감하는 것이다.

[0010] 본 발명의 또 다른 목적은 무게가 가장 큰 부품인 구동 모터를 상부 몸체와 하부 몸체 내부에 내장되도록 하여 안마의 타격력을 높이는 것이다.

[0011] 본 발명이 해결하고자 하는 과제는 상기 목적으로만 제한하지 아니하고, 위에서 명시적으로 나타내지 아니한 다른 기술적 과제는 이하 본 발명의 구성 및 작용을 통하여 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 쉽게 이해할 수 있을 것이다.

과제의 해결 수단

[0012] 본 발명에서는, 상기 과제를 해결하기 위하여 이하의 구성을 포함한다.

[0013] 본 발명은 저소음 소형 머슬건 안마기에 관한 것으로서, 중심축(0)을 중심으로 수평 상부로 분리되는 상부 몸체; 상기 중심축(0)을 중심으로 수평 하부로 분리되는 하부 몸체; 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부; 상기 상부 몸체와 상기 하부 몸체의 단부를 결합 고정하는 몸체 단부캡; 상기 손잡이부에는 전원부가 내장되고, 상기 손잡이부의 상부에 위치하여 하부 몸체에 고정 설치되는 구동 모터; 상기 구동 모터가 일면에 나사 결합되고 상기 구동 모터의 진동을 저감하도록 수평면을 갖는 진동 감쇄판; 상기 진동 감쇄판의 다른 일면에 위치하여 상기 구동 모터의 구동축에 결합되는 크랭크; 상기 진동 감쇄판은 상기 손잡이부의 상부에 상기 중심축(0)을 포함하는 수평면으로부터 소정의 높이(d_2)가 더 높아지도록 하부 몸체에 나사 결합되어 상기 구동 모터 설치 공간을 확보하고, 상기 하부 몸체로부터 상부를 향하여 소정의 높이를 가지도록 형성되어 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 고정부; 상기 진동 감쇄판과 진동 감쇄 고정부 사이에 위치하여 상기 진동 감쇄판으로부터의 진동을 감쇄하는 진동 감쇄 패킹; 상기 크랭크의 편심축에 베어링을 사이에 개재하여 일측이 결합되는 단차 연결부; 상기 단차 연결부의 상기 일측보다 소정의 높이(d_1)가 더 낮은 다른 일

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측에 베어링을 사이에 개재하여 결합되는 피스톤; 상기 피스톤에 결합되는 안마 부재; 상기 안마 부재와 상기 피스톤의 직선 왕복 운동에 의하여 발생하는 소음을 저감하는 장착 슬리브;를 포함하고, 상기 단차 연결부의 의한 소정의 높이(d_1)와 상기 진동 감쇄 고정부에 의한 소정의 높이(d_2)에 의하여 구동 모터 설치 공간을 좀 더 확보함으로써, 상기 진동 감쇄판의 하부 일면의 중심부에 상기 구동 모터가 나사 결합되고, 상기 진동 감쇄판의 하부 일면의 주변부에 상기 진동 감쇄 고정부가 나사 결합되며, 상기 구동 모터와 상기 진동 감쇄 고정부는 상기 진동 감쇄판의 동일한 수평면에서 결합되어 상기 구동 모터가 상기 상부 몸체와 상기 하부 몸체에 내장될 수 있어 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부와의 연결부가 내측을 향하여 만곡된 곡면으로 유지되어 소형화가 가능한 것을 특징으로 한다.

[0014] 본 발명은 상기 손잡이부에 내장되는 전원부를 충전하는 충전 제어회로를 더 포함하는 것을 특징으로 한다.

[0015] 본 발명은 상기 구동 모터를 제어하는 구동 모터 제어회로를 더 포함하는 것을 특징으로 한다.

발명의 효과

[0016] 본 발명의 효과는 안마기의 소형화를 달성할 수 있도록 하는 것이다.

[0017] 또한 본 발명의 다른 효과는 안마기의 진동 및 소음을 저감할 수 있도록 하는 것이다.

[0018] 또한 본 발명의 또 다른 효과는 무게가 가장 큰 부품인 구동 모터를 상부 몸체와 하부 몸체 내부에 내장되도록 하여 안마의 타격력을 높일 수 있도록 하는 것이다.

[0019] 본 발명에 의한 효과는 상기 효과로만 제한하지 아니하고, 위에서 명시적으로 나타내지 아니한 다른 효과는 이하 본 발명의 구성 및 작용을 통하여 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 쉽게 이해할 수 있을 것이다.

도면의 간단한 설명

[0020] 도 1, 도 2는 본 발명의 전체적인 외부 사시도를 도시한다.

도 3은 본 발명의 전체적인 분해 사시도를 도시한다.

도 4는 본 발명의 구동부의 구체적인 구성을 도시한다.

도 5는 본 발명의 단차 연결부의 구체적인 결합 구조를 도시한다.

도 6은 본 발명의 하부 몸체의 구체적인 구조를 도시한다.

도 7은 본 발명의 전체적인 측면 단면도를 도시한다.

도 8은 본 발명의 외부 슬리브와 장착 슬리브의 결합 구조를 도시한다.

도 9는 본 발명의 충전 제어회로의 회로도를 도시한다.

도 10은 본 발명의 구동 모터 제어회로의 회로도를 도시한다.

발명을 실시하기 위한 구체적인 내용

[0021] 이하 본 발명의 바람직한 실시예에 따른 전체적인 구성 및 작용에 대해 설명하기로 한다. 이러한 실시예는 예시적인 것으로서 본 발명의 구성 및 작용을 제한하지는 아니하고, 실시예에서 명시적으로 나타내지 아니한 다른 구성 및 작용도 이하 본 발명의 실시예를 통하여 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 쉽게 이해할 수 있는 경우는 본 발명의 기술적 사상으로 볼 수 있을 것이다.

[0022] 도 1, 도 2는 본 발명의 전체적인 외부 사시도를 도시한다.

[0023] 도 1, 도 2를 참조하면, 본 발명의 상부 몸체(10)와 하부 몸체(20)가 중심축(O)을 포함하는 수평면에서 결합되고, 상기 하부 몸체(20)의 일측으로부터 하향으로 손잡이부(30)가 연장 형성되며, 상기 상부 몸체(10)와 상기 하부 몸체(20)의 후면에 몸체 단부캡(50)이 결합되어 상기 상부 몸체(10)와 상기 하부 몸체(20)를 고정 결합한다.

[0024] 도 3은 본 발명의 전체적인 분해 사시도를 도시한다.

[0025] 도 3을 참조하면, 본 발명의 상부 몸체(10)와 하부 몸체(20) 내부에는 구동부(100), 단차 연결부(200), 피스톤

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(300), 안마 부재(400)가 포함되고, 상기 구동부(100)는 상기 하부 몸체(20)로부터 상향으로 소정의 높이를 갖고 형성되어 있는 진동 감쇄 고정부(500)에 결합되며, 몸체 단부캡(50)에는 인쇄회로기판(51)가 상기 상부 몸체(10)와 상기 하부 몸체(20)의 내부 쪽에 결합되고 있다.

[0026] 도 4는 본 발명의 구동부의 구체적인 구성을 도시한다.

[0027] 도 4를 참조하면, 본 발명의 구동부(100)는 발생되는 회전 운동을 직선 왕복 운동으로 변환하기 위하여 구동 모터(110)와 크랭크(150)를 포함하고, 상기 구동 모터(110)에 의하여 발생되는 회전 운동이 구동축(120)에 의하여 크랭크(15)로 전달되고 편심축(151)에 의하여 직선 왕복 운동으로 변환되어 전달된다.

[0028] 상기 구동 모터(110)의 구동축(120)에 크랭크(150)가 결합되고 상기 구동 모터(110)와 상기 크랭크(150) 사이에는 진동 감쇄판(140)이 게재되고 상기 진동 감쇄판(140)은 나사(141)에 의하여 상기 구동 모터(110)에 결합 고정된다.

[0029] 상기 진동 감쇄판(140)은 상기 구동 모터(100)와 나사 결합되고 하부 몸체(20)와 나사 결합되는데, 상기 진동 감쇄판(140)은 동일한 수평면에서 상기 구동 모터(100)와 상기 하부 몸체(20)에 결합되어 상기 구동부(100)가 상부 몸체(10)와 하부 몸체(20) 내부에 설치되는 설치 공간을 최소화할 수 있다.

[0030] 또한 상기 진동 감쇄판(140)은 상기 구동 모터(100)로부터 발생되는 진동이 상기 구동 모터(100)와 나사 결합되는 부분으로부터 하부 몸체(20)와 나사 결합되는 부분으로 전달되면서 1차적으로 감쇄될 수 있고, 상기 진동 감쇄판(140)은 하부 몸체(20)에 결합 고정되는데, 진동 감쇄 패킹(130)을 더 구비하여 상기 구동 모터(110)에서 발생하는 진동을 2차적으로 더 감쇄할 수 있다.

[0031] 또한 상기 진동 감쇄판(140)은 상기 하부 몸체(20)로부터 상향으로 소정의 높이를 갖고 형성되어 있는 진동 감쇄 고정부(500)에 결합되는데, 상기 진동 감쇄 고정부(500)에 의하여 상기 구동 모터(110)에서 발생하는 진동을 3차적으로 더 감쇄할 수 있다.

[0032] 도 5는 본 발명의 단차 연결부의 구체적인 결합 구조를 도시한다.

[0033] 도 5(a)를 참조하면, 단차 연결부(200)의 일측은 편심축(151)에 결합되고 그 사이에 베어링(220)을 게재하여 마찰을 감소시킬 수 있으며, 상기 단차 연결부(200)의 다른 일측은 피스톤(300)에 결합되고 그 사이에 베어링(210)을 게재하여 마찰을 감소시킬 수 있다.

[0034] 구동 모터(100)의 회전 운동이 상기 편심축(151)에 의하여 직선 왕복 운동으로 변환되어 전달되어 상기 피스톤(300)이 직선 왕복 운동을 하게 되며, 상기 단차 연결부(200)와 피스톤(300) 사이에 베어링(210)을 게재하여 마찰을 감소하여 상기 피스톤(300)은 뒤틀림이 없이 거의 직선 왕복 운동이 가능하게 된다.

[0035] 도 5(b)를 참조하면, 단차 연결부(200)의 일측과 다른 일측은 단차(d_1)를 가지도록 형성되어 상기 단차 연결부(200)의 일측에 결합되는 구동부(100)의 설치 공간을 1차적으로 확보할 수 있게 된다.

[0036] 또한 상기 구동부(100)의 진동 감쇄판(140)은 상기 하부 몸체(20)로부터 상향으로 소정의 높이를 갖고 형성되어 있는 진동 감쇄 고정부(500)에 결합되는데, 상기 진동 감쇄 고정부(500)에 의하여 상기 단차 연결부(200)의 일측에 결합되는 구동부(100)의 설치 공간을 2차적으로 더 확보할 수 있게 된다.

[0037] 도 6은 본 발명의 하부 몸체의 구체적인 구조를 도시한다.

[0038] 도 6을 참조하면, 하부 몸체(20)에는 진동 감쇄 고정부(500)가 상기 하부 몸체(20)로부터 상향으로 소정의 높이를 갖고 형성되어 있는데, 상기 진동 감쇄 고정부(500)는 중심축(O)을 포함하는 수평면보다 소정의 높이(d_2)를 더 갖도록 형성된다.

[0039] 이에 따라 구동부(100)의 진동 감쇄판(140)은 상기 진동 감쇄 고정부(500)에 의하여 중심축(O)을 포함하는 수평면보다 소정의 높이(d_2)가 더 높은 위치에 설치될 수 있다.

[0040] 도 7은 본 발명의 전체적인 측면 단면도를 도시한다.

[0041] 도 7을 참조하면, 구동 모터(110)와 크랭크(150)는 상부 몸체(10)와 하부 몸체(20) 내부에 내장되어 설치되는데, 단차 연결부(200)에 의하여 확보되는 단차(d_1)와 진동 감쇄 고정부(500)에 의하여 확보되는 높이(d_2)에 의하여 상기 상부 몸체(10)와 상기 하부 몸체(20) 내부에 완전히 내장되어 상기 상부 몸체(10)와 상기

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하부 몸체(20)가 외면이 유려하게 유선형으로 형성된다.

[0042] 특히, 상기 하부 몸체(20)의 일측으로부터 하향으로 손잡이부(30)가 연장 형성되는데 상기 하부 몸체(20)와 상기 손잡이부(30)가 서로 맞닿는 연결부(40)가 상기 하부 몸체(20)의 내측을 향하여 만곡된 곡면으로 유지되어 소형화가 가능하게 된다.

[0043] 도 8은 본 발명의 외부 슬리브와 장착 슬리브의 결합 구조를 도시한다.

[0044] 도 8을 참조하면, 본 발명의 상부 몸체(10)와 하부 몸체(20)의 일측에는 외부 슬리브(600)와 적어도 하나의 장착 슬리브(610, 620, 630)가 결합되는데, 상기 장착 슬리브(610, 620, 630)를 통하여 피스톤(300)과 안마 부재(400)가 직선 왕복 운동을 하고 마찰을 최소화하여 진동 및 소음을 저감할 수 있다.

[0045] 도 9는 본 발명의 충전 제어회로의 회로도를 도시한다.

[0046] 도 9를 참조하면, 본 발명의 손잡이부(30)에 충전용 배터리가 내장될 수 있는데, 상기 충전용 배터리를 충전하기 위한 충전 제어회로를 인쇄회로기판(51)에 내장할 수 있다.

[0047] 충전 제어기(U2 CNS89112)의 각 단자에는 각 회로부의 단자가 연결되어 있고, 단자 AD로부터 충전용 배터리 BAT에 연결되어 충전 기능이 동작될 수 있다.

[0048] 다이오드 D1은 배터리로부터 충전기로 전류가 역류하는 것을 방지하고, 트랜지스터 Q1은 전자 스위치로 동작하여 사용자가 전원 스위치를 온(On)으로 하여 장시간 방치하는 경우에 자동적으로 절전 모드로 진입하도록 한다.

[0049] 트랜지스터 Q6, 저항 R9, 저항 R12, 트랜지스터 Q7, 저항 R17, 저항 R16는 충전기 정합 회로를 구성하여 충전기가 전류와 전압이 정합되는 경우에만 충전 기능이 동작되도록 한다.

[0050] 도 10은 본 발명의 구동 모터 제어회로의 회로도를 도시한다.

[0051] 도 10을 참조하면, 본 발명의 구동 모터(110)를 제어하기 위한 구동 모터 제어회로를 인쇄회로기판(51)에 내장할 수 있다.

[0052] 구동 모터 제어기(U2 SC92F8362BX)의 각 단자에는 각 회로부의 단자가 연결되어 있고, 단자 PWM OUT로부터 단자 P2에 연결되어 상기 구동 모터(110)를 펄스폭 변조 신호를 공급하여 제어하게 된다. 상기 펄스폭 변조 신호에 의하여 상기 구동 모터(110)는 6단의 속도로 변속 가능하다.

[0053] 앞서 설명한 바와 같이, 본 발명의 단차 연결부(200)의 일측은 크랭크(150)의 편심축(151)에 결합되고 상기 단차 연결부(200)의 상기 일측보다 소정의 높이(d_1)가 더 낮은 다른 일측에 피스톤이 결합되고, 진동 감쇄판(140)은 진동 감쇄 고정부(500)에 의하여 하부 몸체로부터 상부를 향하여 소정의 높이를 가지도록 형성되고 바람직하게는, 상기 진동 감쇄판(140)은 손잡이부(30)의 상부에 중심축(O)을 포함하는 수평면으로부터 소정의 높이(d_2)가 더 높아지도록 결합되고 있다.

[0054] 이러한 구성에 의하여 본 발명은 구동부(100)의 설치 공간을 몸체 내부에 좀 더 확보하여 상기 하부 몸체의 일측으로부터 하부로 연장되는 손잡이부와의 연결부(40)가 내측을 향하여 만곡된 곡면으로 유지되어 소형화가 가능하다.

[0055] 또한 구동 모터(110)로부터 발생하는 진동 및 소음은 진동 감쇄판(140), 진동 감쇄 패킹(130), 진동 감쇄 고정부(500)에 의하여 3중적으로 감쇄되어 본 발명의 저소음 소형 머슬건 안마기를 사용하는 사용자는 쾌적하고 조용한 환경에서 안마를 즐길 수 있다.

부호의 설명

[0056] 10: 상부 몸체

20: 하부 몸체

30: 손잡이부

40: 연결부

50: 몸체 단부캡

51: 인쇄회로기판

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52: 몸체 격벽

100: 구동부

110: 구동 모터

120: 구동축

130: 진동 감쇄 패킹

140: 진동 감쇄판

141: 나사

150: 크랭크

151: 편심축

200: 단차 연결부

210, 220: 베어링

300: 피스톤

400: 안마 부재

500: 진동 감쇄 고정부

600: 외부 슬리브

610, 620, 630: 장착 슬리브

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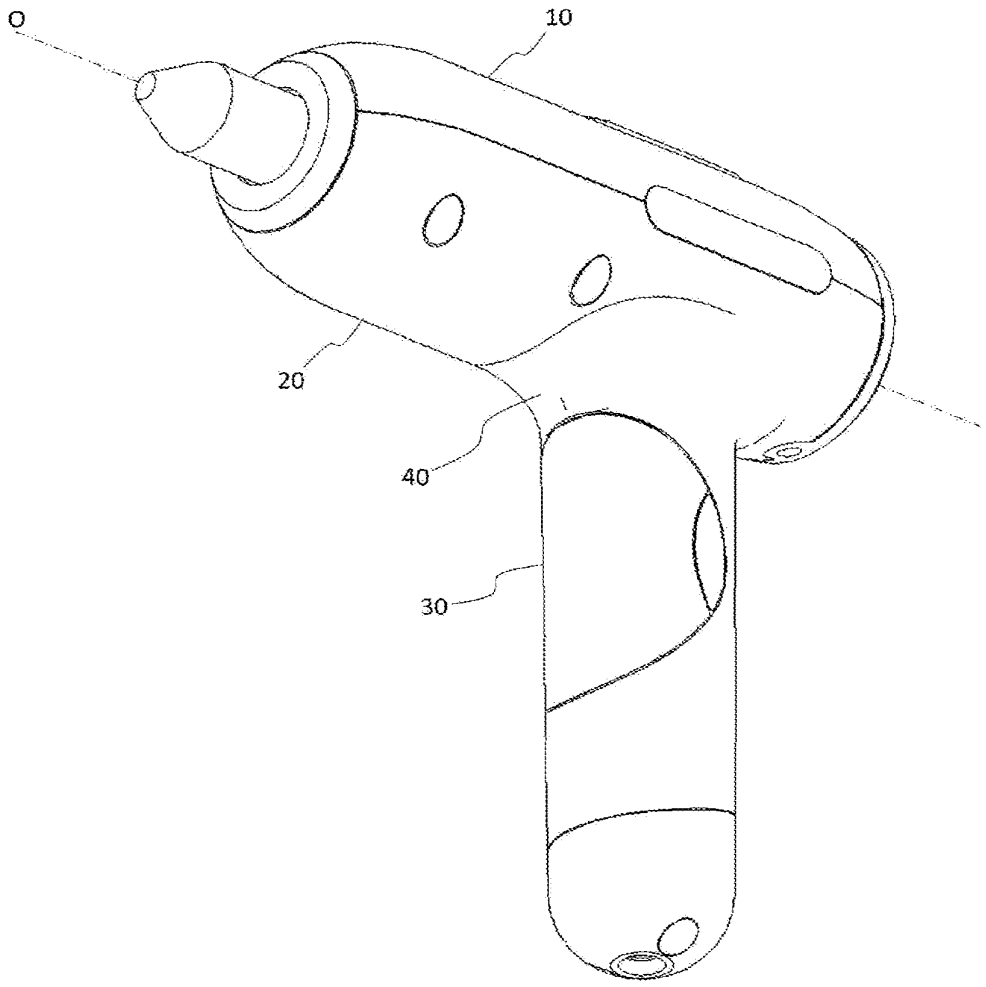
도면

도면1



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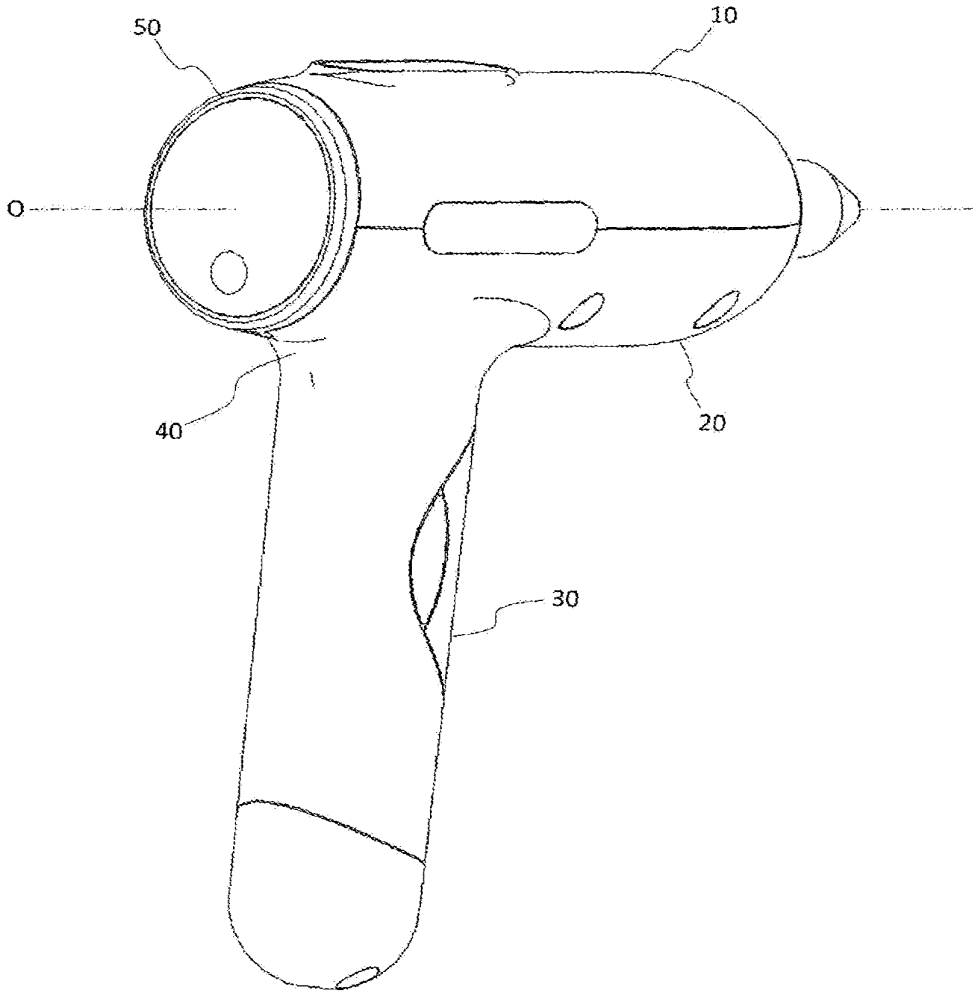

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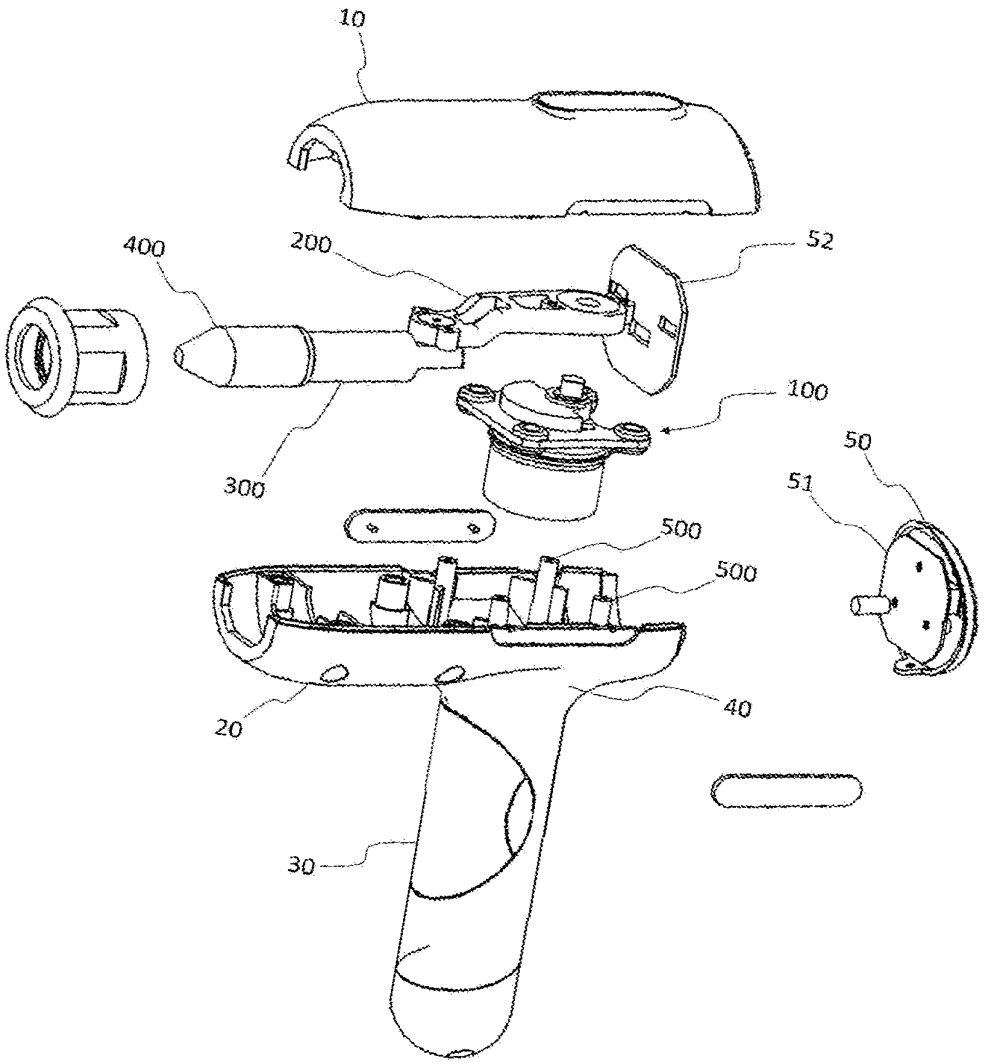

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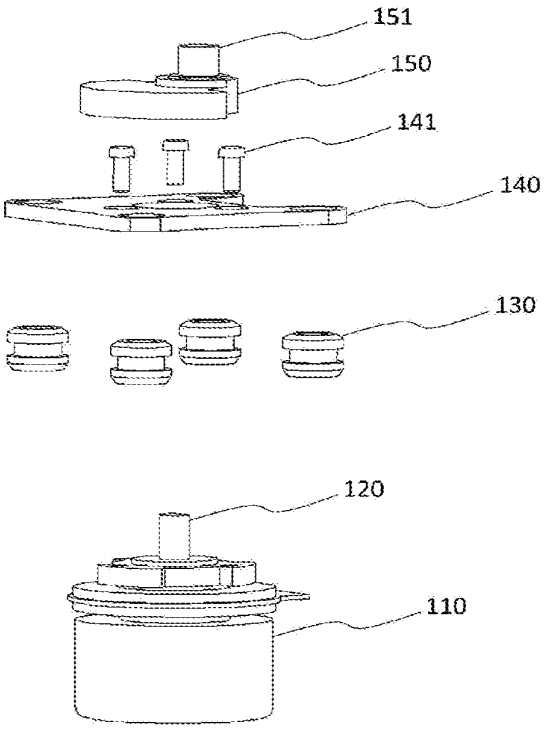
도면4



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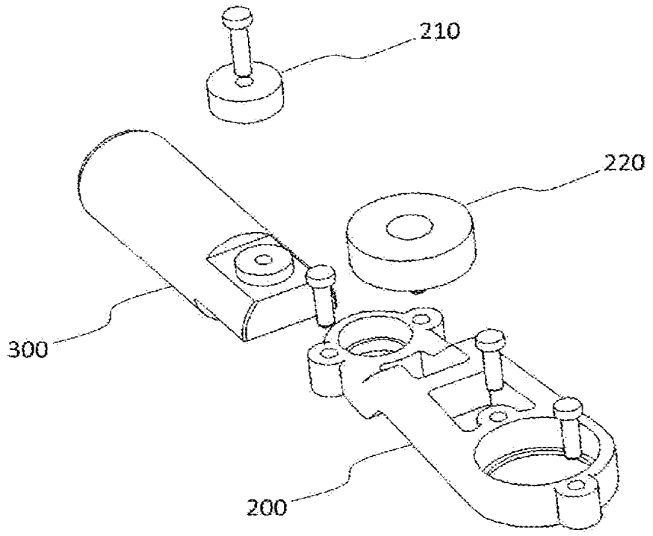
도면5

(a)



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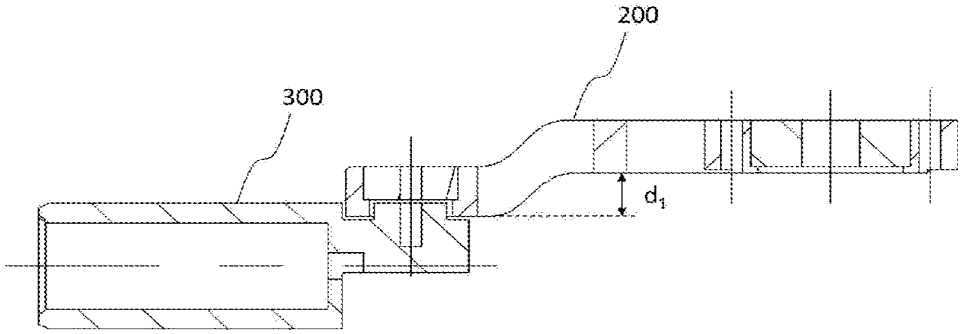

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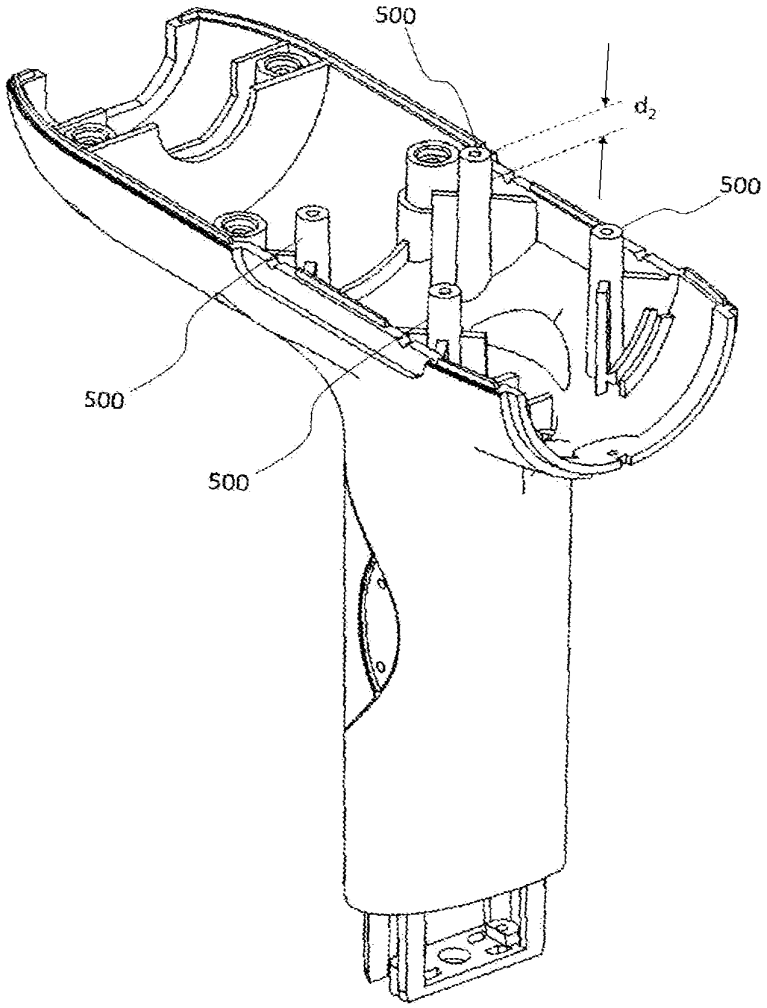

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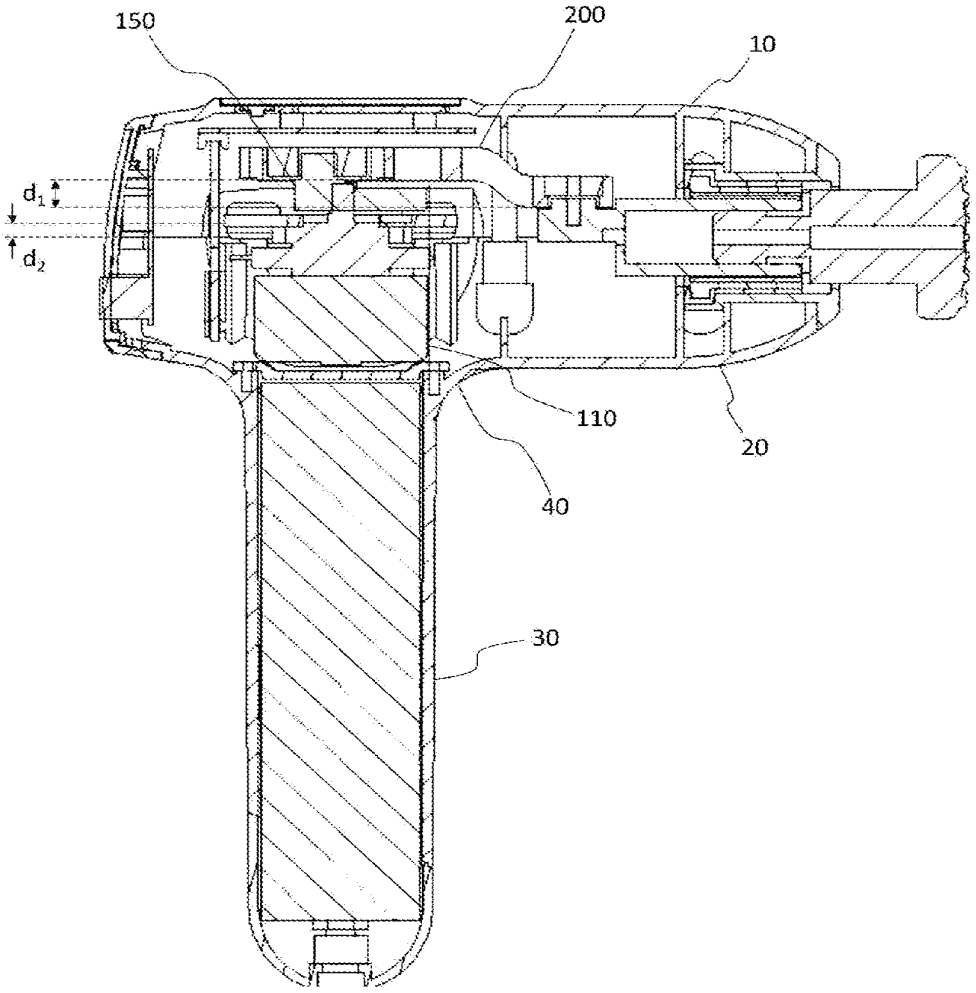
도면7



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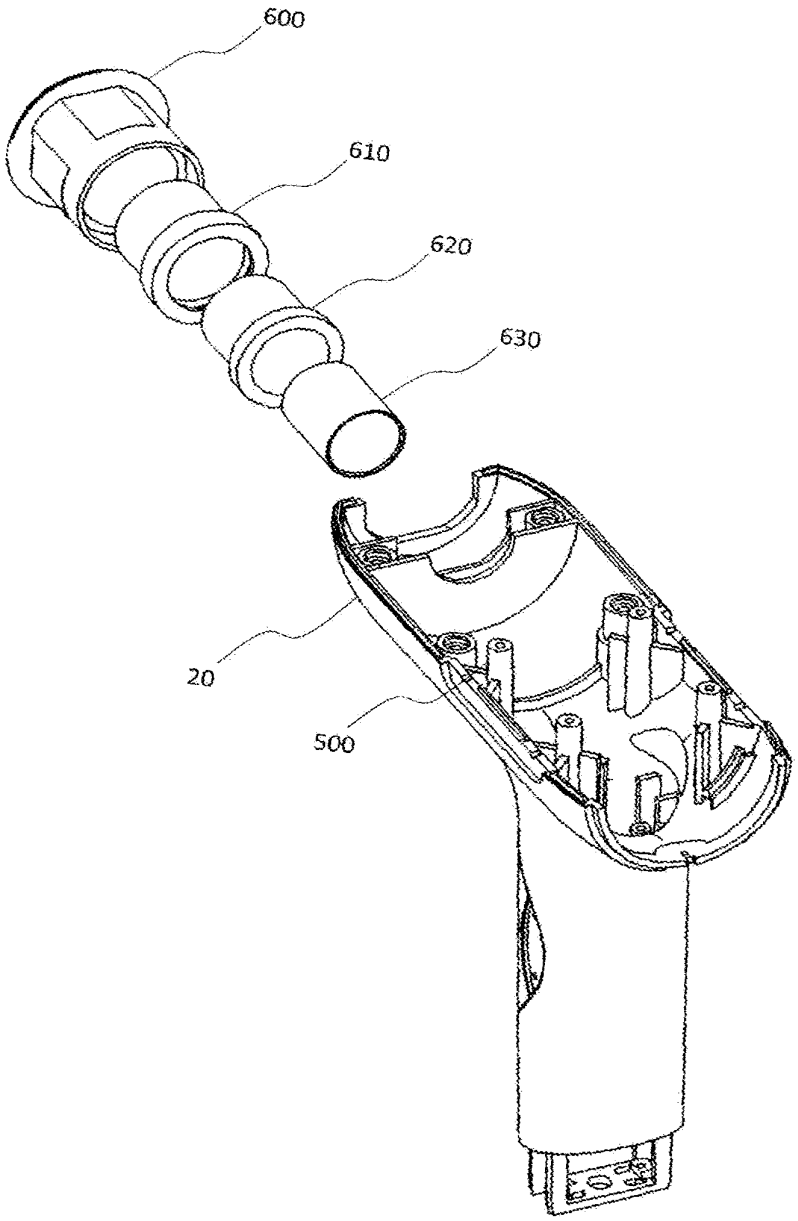

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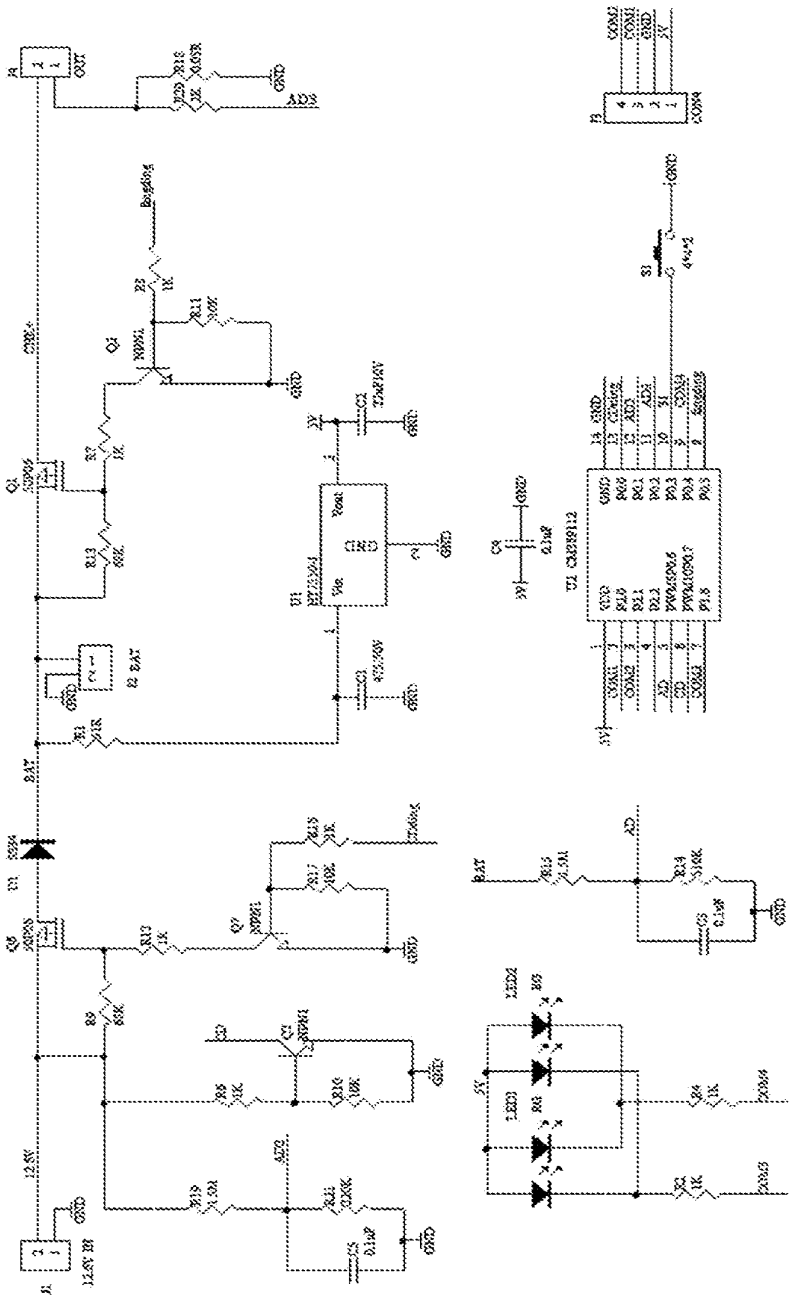
도면



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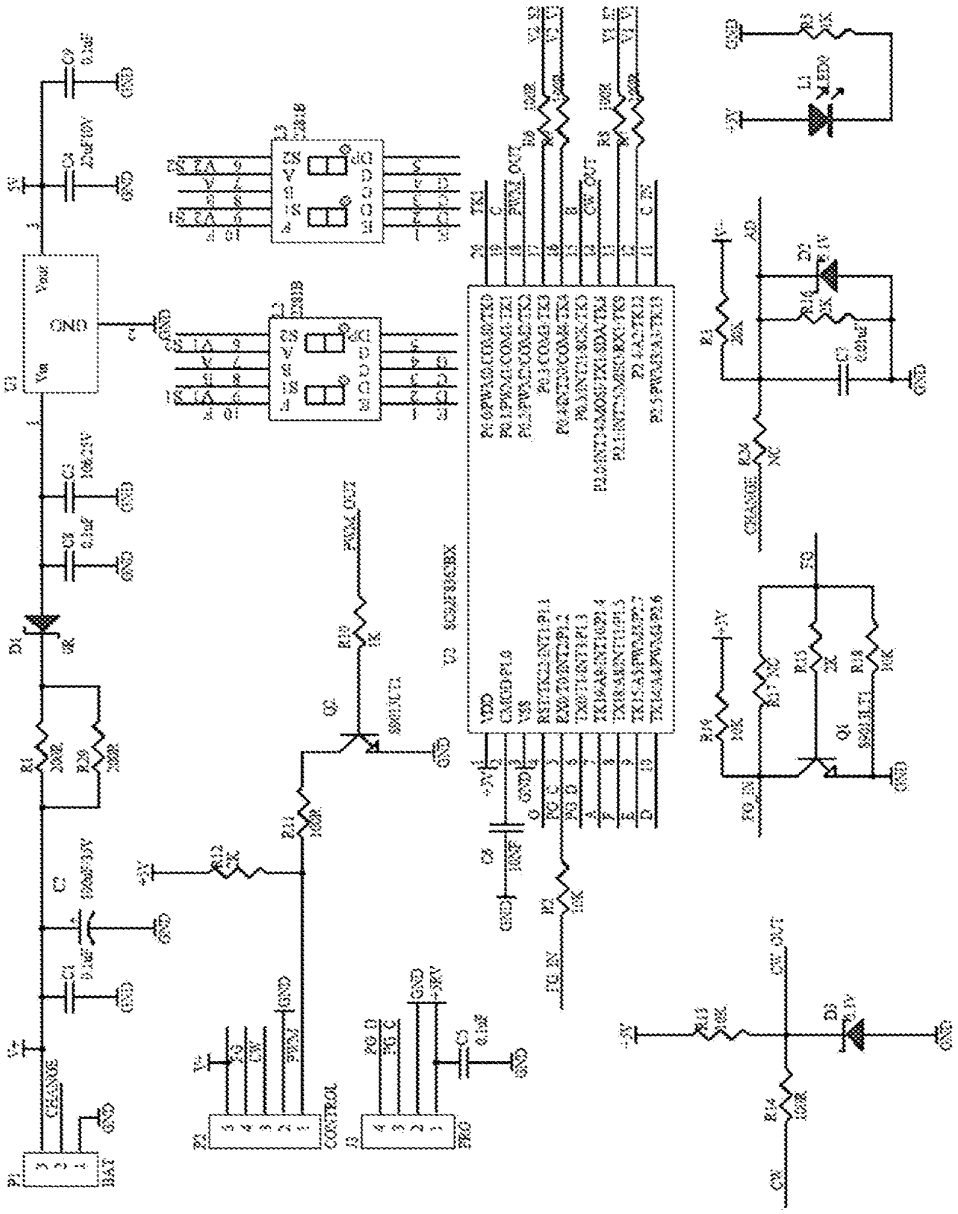
도면10



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MASSAGE MACHINE SYSTEM, MASSAGE MACHINE USED THEREIN, AND WEARABLE MEASRUREMENT INSTRUMENT USED THEREIN

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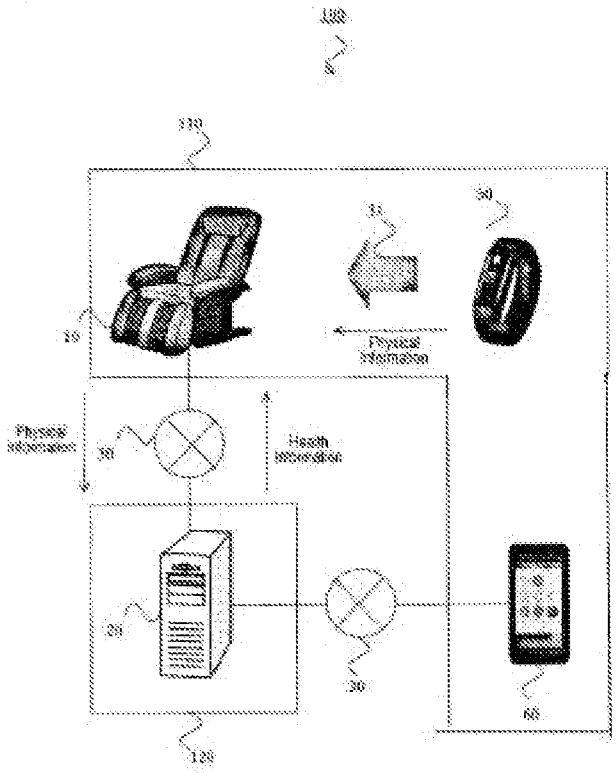
Abstract of EP3435381 (A1)

FIG. 1



There is provided a massage machine system capable of performing proper massage by using physical information such as a pulse rate acquired by a wearable measurement instrument. The massage machine system includes a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit, a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected by the detection unit, a server for storing the physical information detected by the wearable measurement instrument, and a portable electronic information communication terminal. The server is communicably connected to the massage machine and the electronic information communication terminal, respectively via a public network. The electronic information communication terminal includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

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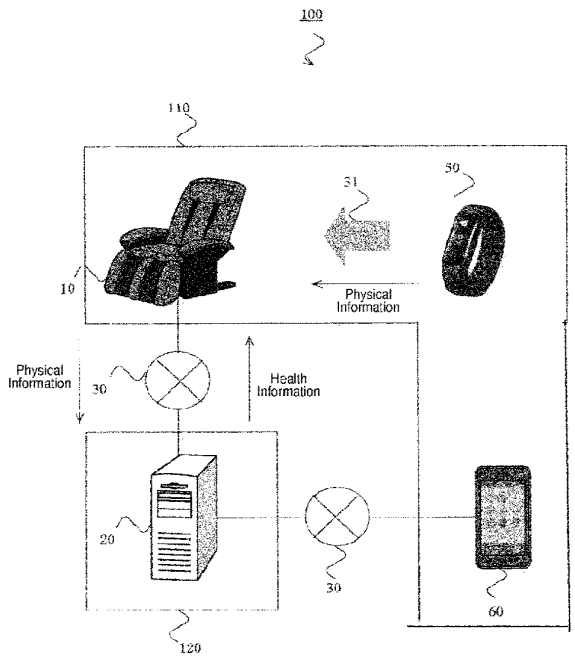
(54) MASSAGE MACHINE SYSTEM, MASSAGE MACHINE USED THEREIN, AND WEARABLE MEASRUREMENT INSTRUMENT USED THEREIN

(57) There is provided a massage machine system capable of performing proper massage by using physical information such as a pulse rate acquired by a wearable measurement instrument. The massage machine system includes a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit, a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected by the detection unit, a server for storing the physical information detected by the wearable measurement instrument, and a portable electronic information communication terminal. The server is communicably connected to the massage machine and the electronic information communication terminal, respectively via a public network. The electronic information communication terminal includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to a massage machine system including a massage machine for massaging a user, and a massage machine and a wearable measurement instrument which are used therein, and particularly relates to a massage machine which can perform proper massage by using physical information such as a pulse rate or a step count acquired by a wearable measurement instrument.

Background Art

[0002] A chair type or mattress type massage machine is widely known. For example, the chair type massage machine has a seat unit and a backrest unit and employs a structure in which a treatment unit for performing massage is disposed in the backrest unit. Then, a plurality of built-in motors are driven in combination with each other. In this manner, the treatment unit can selectively perform a plurality of operations (for example, a kneading operation, a patting operation, and changing a treatment target site). The massage machine which can perform the plurality of operations in this way has a controller and is operated by a user using the controller. In this manner, the user selects a massage course (a relaxation course, a stress relief course, or a professional course) corresponding to a predetermined combination of movements of the treatment unit and pressure applying operations.

[0003] Incidentally, a type of the massage course suitable for the user varies depending on a health condition of the user. Therefore, a massage machine has been proposed which includes a detection device for measuring biological information such as a heart rate, a blood pressure value, a body temperature, and a galvanic skin reflex of the user so as to select the massage course, based on the measured biological information (for example, refer to Patent Documents 1 and 2).

Related art Document

Patent Document

[0004]

Patent Document 1: JP-A-9-192186
Patent Document 2: JP-A-2000-070373

Summary of the Invention

Problem that the Invention is to Solve

[0005] However, the biological information measured in the massage machine as described above is obtained by a detection device included in the massage machine. Accordingly, the biological information is obtained through only measurement values when the massage machine is used. The measurement values are not perceived when the massage machine is not in use, such as during the user's exercise or sleep.

[0006] Therefore, it is not possible to recognize a real health condition of the user, which is perceived using the measurement values when the massage machine is not in use, such as during the user's exercise or sleep, thereby causing a problem in that a proper massage course cannot be selected.

[0007] On the other hand, various wearable measurement instruments are on sale. This wearable measurement instrument (for example, a wearable watch equipped with a measurement instrument) is used so that the user acquires a pulse rate during the user's exercise or sleep.

[0008] However, even though this pulse rate acquired during the user's exercise or sleep is important information in order to recognize the real health condition of the user, the information has not been used at all for massage (particularly in selecting the massage course).

[0009] Therefore, the present invention is made in view of the above-described problem, and an object thereof is to provide a massage machine system which can perform proper massage by using physical information such as a pulse rate acquired from a wearable measurement instrument, and a massage machine and a wearable measurement instrument which are used for the massage machine system.

Means for solving the problem

[0010] In order to achieve the above-described object, a massage machine system according to the present invention includes a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit, a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected by the detection unit, a server for storing the physical information detected by the wearable measurement instrument, and a portable electronic information communication terminal. The server is communicably connected to the massage machine and the electronic information communication terminal, respectively via a public network. The electronic information communication terminal includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

[0011] According to this configuration, for example, the user can acquire the physical information during the user's exercise or sleep for 24 hours, merely by wearing the wearable measurement instrument on the user's body. Based on the acquired physical information, the user can select a proper massage course (such as a stress relief treatment, a fatigue recovery treatment, a stiff shoulder treatment, an insomnia treatment, a blood

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pressure / edema treatment, or a slimming treatment) when the user receives the massage. For example, based on the acquired physical information, the massage machine may be able to select or recommend the proper massage course. Alternatively, based on the acquired physical information, the user himself or herself may be able to select the proper massage course (for example, the user himself or herself selects the stress relief treatment in a case where the user determines that a stress value is high based on the acquired physical information).

[0012] In addition, in the massage machine system according to the present invention, it is preferable that the massage machine includes a receiving unit capable of receiving the physical information transmitted from the transmission unit, and when the transmission unit of the wearable measurement instrument is located within a communicable distance with the receiving unit of the massage machine, the physical information is output to the receiving unit of the massage machine. It is preferable that when the transmission unit of the wearable measurement instrument is located outside a communicable distance with the receiving unit of the massage machine, the physical information is output to the receiving unit of the electronic information communication terminal.

[0013] According to this configuration, an output destination of the physical information acquired by the wearable measurement instrument can be changed in accordance with the communicable distance. Specifically, when the wearable measurement instrument and the massage machine are located within the communicable distance, the physical information is output to the receiving unit of the massage machine. When the wearable measurement instrument and the massage machine are located outside the communicable distance, the physical information is output to the receiving unit of the electronic information communication terminal. In addition, for example, the user can acquire the physical information during the user's exercise or sleep for 24 hours while the user wears the wearable measurement instrument on the user's body. Based on the acquired physical information, the user can select the proper massage course when the user receives the massage.

[0014] In the above-described invention, it is preferable that the communicable distance is 10 meters.

[0015] According to this configuration, an output destination (the massage machine or the electronic information communication terminal) of the physical information can be properly determined.

[0016] In addition, a massage machine system according to the present invention includes a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit, a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected by the detection unit, and a server for storing the physical information detected by the wearable measurement instrument. The server is communicably connected to the massage machine via a public network. The massage machine includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

[0017] According to this configuration, for example, the user can acquire the physical information during the user's exercise or sleep for 24 hours, merely by wearing the wearable measurement instrument on the user's body, and can cause the wearable measurement instrument to store the physical information. The stored physical information is output to the massage machine. In this manner, the user can select the proper massage course (such as a stress relief treatment, a fatigue recovery treatment, a stiff shoulder treatment, an insomnia treatment, a blood pressure / edema treatment, or a slimming treatment) when the user receives the massage.

[0018] In the above-described invention, it is preferable that the massage machine and/or the electronic information communication terminal transmit the received physical information to the server. It is preferable that the server prepares health information, based on the physical information, and transmits the health information to the massage machine.

[0019] According to this configuration, for example, in a case where the server is a computer installed in a selling agency of the massage machine, the physical information received by the massage machine and/or the electronic information communication terminal is transmitted to the server. In this manner, the user can acquire the health information based on the physical information prepared by the server. As a result, the user can more properly select the massage course when the user receives the massage.

[0020] In the above-described invention, it is preferable that the server prepares the health information of the user, based on the stored physical information.

[0021] According to this configuration, the server can prepare the proper health information.

[0022] In the above-described invention, it is preferable that the health information includes an advice for diseases and/or lifestyle habits.

[0023] According to this configuration, when the user receives the massage, the user can select the proper massage course including the advice for the diseases and the lifestyle habits (meals and exercise).

[0024] In the above-described invention, it is preferable that the physical information represents at least one type of information selected from the group consisting of a pulse rate, a step count, a walking distance, a blood pressure, a body temperature, a sweat rate, a blood glucose level, calorie consumption, a sleep state, a body weight, a body fat percentage, moisture content, muscle mass, bone mass, a basal metabolic rate, BMI, and an obesity index.

[0025] According to this configuration, when the user receives the massage, the user can select the proper massage course, based on the pulse rate, the step count, the walking distance, the blood pressure, the body tem-

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perature, the sweat rate, the blood glucose level, the calorie consumption, the sleep state, the body weight, the body fat percentage, the moisture content, the muscle mass, the bone mass, the basal metabolic rate, the BMI, and the obesity index.

[0026] In the above-described invention, it is preferable that the massage machine system further includes a portable second electronic information communication terminal that is provided for a third party. It is preferable that the second electronic information communication terminal and the server are communicably connected to each other via the public network. It is preferable that the second electronic information communication terminal receives the physical information.

[0027] According to this configuration, for example, the physical information of the user can be confirmed using the second electronic information communication terminal of a third party living in a place remote from the user. In this way, "monitoring" can be performed so that the remotely located third party confirms the physical information of the user.

[0028] In the above-described invention, it is preferable that when it is determined that the physical information is abnormal, the server transmits abnormality information to the second electronic information communication terminal.

[0029] According to this configuration, for example, in a case where the user (parent) is an elderly, the physical information of the user (parent) can be confirmed using the second electronic information communication terminal of the third party (child) living in a place remote from the user (parent). In a case where it is determined that the physical information is abnormal, the information is transmitted to the third party (child). Accordingly, the third party can be informed that there is a change in the physical information of the user. In this way, "monitoring" can be performed so that the remotely located third party (child) confirms the physical information of the user (parent).

[0030] In the above-described invention, it is preferable that the wearable measurement instrument has a clock function. It is preferable that at a preset timing, the detection unit automatically detects the physical information of the user.

[0031] According to this configuration, for example, if a detection timing is set to 11 o'clock every day, the physical information at the set timing (11 o'clock every day) can be automatically detected.

[0032] In the above-described invention, it is preferable that the massage machine and/or the electronic information communication terminal are communicably connected to a security organization, a health-related sales organization, or a medical institution via the public network.

[0033] Here, for example, the "security organization" includes a home security organization which provides services such as a notification service when the user is absent or an emergency assisting service.

[0034] In addition, for example, the "medical institution" includes a hospital and an institution which provides a 24-hour health consultation service.

[0035] Furthermore, for example, the "health-related sales organization" includes a health docking facility sales organization, a Chinese medicine sales organization, a supplement sales organization, a home esthetics sales organization, and a food sales organization.

[0036] According to this configuration, the user can select the proper massage course and can purchase Chinese medicines or supplements from the health-related sales organization.

[0037] A case will be described where the massage machine and/or the electronic information communication terminal are communicably connected to the security organization via the public network. For example, the user wears the wearable measurement instrument on the user's body. The user can acquire the physical information of the user while wearing the wearable measurement instrument on the user's body. Therefore, when the physical information becomes abnormal (for example, in a case where the pulse suddenly rises or the pulse cannot be monitored), the security organization is automatically notified of the abnormality via the public network. The security organization dispatches the emergency assisting service for the user, based on the notification. In this way, even in a case where the physical information of the user is suddenly changed, the security organization can flexibly cope with the sudden change.

[0038] The wearable measurement instrument is connected to the electronic information communication terminal such as a smartphone. In a case where the physical information acquired by the wearable measurement instrument is abnormal, that information is transmitted to the smartphone. The security organization is notified of the information transmitted to the smartphone via the public network.

[0039] In a case where the security organization is not connected to the electronic information communication terminal such as the smartphone, a configuration may be adopted in which the information is transmitted to the massage machine so that the massage machine notifies the security organization of the information.

[0040] A case will be described where the massage machine and/or the electronic information communication terminal are communicably connected to the medical institution via the public network. For example, the user wears the wearable measurement instrument on the user's body. The user can acquire the physical information of the user while wearing the wearable measurement instrument on the user's body. Since the massage machine and/or the electronic information communication terminal are communicably connected to the medical institution via the public network, the latest physical information of the user can always be transmitted to the medical institution. Based on the latest physical information of the user, the medical institution can carry out medical examinations, diagnoses, and health consultations.

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[0041] The wearable measurement instrument is connected to the electronic information communication terminal such as the smartphone. The physical information acquired by the wearable measurement instrument is transmitted to the smartphone. The information transmitted to the smartphone is transmitted to the medical institution via the public network. In a case where the acquired physical information needs attention, the user can smoothly receive various services (doctor's medical examinations) in the medical institution, based on the information transmitted to the medical institution.

[0042] A case will be described where the massage machine and/or the electronic information communication terminal are communicably connected to the health-related sales organization via the public network. For example, the user can acquire the physical information of the user while wearing the wearable measurement instrument on the user's body. Since the massage machine and/or the electronic information communication terminal are communicably connected to the health-related sales organization via the public network, the user can purchase a health-related product, based on the current physical information of the user.

[0043] The wearable measurement instrument is connected to the electronic information communication terminal such as the smartphone. The physical information acquired by the wearable measurement instrument is transmitted to the smartphone. The information transmitted to the smartphone is transmitted to the health-related sales organization via the public network. Based on the transmitted information, the health-related sales organization can encourage the user to purchase a health-related product suitable for the physical information of the user, from among health-related products on sale.

[0044] In addition, the massage machine used for the massage machine system as described above is communicably connected to the server via the public network, and the physical information transmitted from the transmission unit is received by the receiving unit.

[0045] Furthermore, the wearable measurement instrument used for the massage machine system as described above includes the detection unit that detects the physical information and the transmission unit capable of communicating with the receiving unit.

Advantage of the Invention

[0046] According to the massage machine system as described above, for example, the user can acquire the physical information during the user's exercise or sleep by using the wearable measurement instrument. Based on the acquired physical information, the user can select the proper massage course when the user receives the massage.

Brief Description of the Drawings

[0047]

Fig. 1 is a conceptual diagram illustrating a configuration of a massage machine system according to an embodiment of the present invention.

Fig. 2 is a conceptual diagram illustrating the configuration of the massage machine system according to the embodiment of the present invention.

Fig. 3 is a perspective view of a massage machine according to the embodiment of the present invention.

Fig. 4 is a block diagram illustrating a configuration of the massage machine.

Fig. 5 is a block diagram illustrating a configuration of a smartphone.

Fig. 6 illustrates an example of an advice display screen displayed on a display.

Fig. 7 illustrates an example of a massage course information screen displayed on the display.

Fig. 8 is a conceptual diagram illustrating a configuration of the massage machine system according to the embodiment of the present invention.

Fig. 9 is a conceptual diagram illustrating a configuration of a massage machine system according to another embodiment of the present invention.

Fig. 10 is a conceptual diagram illustrating a configuration of a massage machine system according to still another embodiment of the present invention.

Fig. 11 is a conceptual diagram illustrating a configuration of a massage machine system according to still another embodiment of the present invention.

Best Mode for Carrying Out the Invention

[0048] Hereinafter, embodiments according to the present invention will be described with reference to the drawings.

<Massage Machine System>

[0049] Figs. 1 and 2 are conceptual diagrams illustrating a configuration of a massage machine system according to an embodiment of the present invention. Fig. 1 is a diagram when a user is at home (distance between a wearable measurement instrument and a massage machine is 10 meters or shorter), and Fig. 2 is a diagram when the user goes out (distance between the wearable measurement instrument and the massage machine is 10 meters or longer). In addition, Fig. 4 is a block diagram illustrating a configuration of a massage machine (10), and Fig. 5 is a block diagram illustrating a configuration of a smartphone (60) serving as an electronic information communication terminal.

[0050] A massage machine system (100) includes a massage machine (10) installed at a home (110) of a

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user P, a cloud-type communication server (20) installed in a business operator (120), a wearable measurement instrument (50) carried by the user P, and the smartphone (60) serving as the electronic information communication terminal.

[0051] In the present embodiment, a case will be described where the smartphone (60) having a receiving unit (61) for wireless communication is used as the electronic information communication terminal. However, the present invention is not limited thereto, and a tablet terminal device may be used.

[0052] For example, the business operator includes a business operator who lends the massage machine (10), a business operator who manages the sold massage machine (10), and a hospital (medical institution). It is desirable that the hospital and the business operator cooperate with each other in order to prepare health information (to be described later).

[0053] A controller (11) of the massage machine (10) and the communication server (20) can be connected to each other using a public network (hereinafter, referred to as a "communication network") (30). The communication server (20) and the smartphone (60) can be connected to each other using the communication network (30).

[0054] For example, the communication network includes an internet network and a local network.

[0055] A transmission unit (51) of the wearable measurement instrument (50) and a receiving unit (11e) of the massage machine (10) can be connected to each other by wireless communication (31), and the transmission unit (51) of the wearable measurement instrument (50) and the receiving unit (61) of the smartphone (60) can be connected to each other by wireless communication (31).

[0056] As the above-described wireless communication, it is preferable that communication is available within a communicable distance (for example, within 10 meters). For example, the wireless communication includes the Bluetooth (registered trademark), a wireless local area network (LAN), and infrared data association (IrDA).

<Wearable Measurement Instrument>

[0057] The wearable measurement instrument (50) can be worn on the body of the user P. For example, the wearable measurement instrument (50) includes a wearable watch equipped with a measurement instrument, which can be worn on a wrist of the user P, or a headgear equipped with a measurement instrument, which can be worn on a head of the user P.

[0058] The wearable measurement instrument (50) includes a detection unit (52) which detects physical information, the receiving unit (11e) or the transmission unit (51) capable of communicating with the receiving unit (61) of the smartphone (60) by the wireless communication (31), and a clock unit (53).

[0059] For example, the physical information detected by the detection unit (52) includes a pulse rate, a step count, a walking distance, a blood pressure, a body temperature, a sweat rate, a blood glucose level, calorie consumption, a sleep state, a body weight, a body fat percentage, moisture content, muscle mass, bone mass, a basal metabolic rate, BMI, and a obesity index.

[0060] The clock unit (53) is configured to be able to clock the time, and the user P can set a measurement timing (for example, a measurement time).

[0061] The transmission unit (51) communicates with the receiving unit (11e) of the massage machine (10) or the receiving unit (61) of the smartphone (60). As illustrated in Fig. 1, if the massage machine (10) is located within the communicable distance, the physical information is output to the receiving unit (11e) of the massage machine (10). However, if the massage machine (10) is located outside the communicable distance, the physical information cannot be output to the receiving unit (11e) of the massage machine (10). Therefore, if the massage machine (10) does not exist within the communicable distance as illustrated in Fig. 2, the physical information is output to the receiving unit (61) of the smartphone (60) carried by the user P.

[0062] The transmission unit (51) outputs the physical information to the receiving unit (61) of the smartphone (60) if the smartphone (60) is located within the communicable distance. However, if the smartphone (60) is located outside the communicable distance, the physical information cannot be output to the receiving unit (61) of the smartphone (60). However, when the user P goes out, the smartphone (60) is carried by the user P in many cases. Therefore, the smartphone (60) is located within the communicable distance (for example, within 10 meters).

[0063] In the wearable measurement instrument (50) configured in this way, even if the user P exercises or sleeps, the physical information can be detected at the measurement time, merely by wearing the wearable measurement instrument on the body of the user P. If the smartphone (60) and the massage machine (10) are located within the communicable distance, the physical information is output to the massage machine (10). In addition, if the massage machine (10) is located outside the communicable distance, the physical information is output to the smartphone (60) carried by the user P. Furthermore, if only the massage machine (10) is located within the communicable distance, the physical information is output to the massage machine (10).

<Communication Server>

[0064] The communication server (20) is a cloud-type communication server installed in the business operator (120).

[0065] The communication server (20) and the controller (11) of the massage machine (10) can be connected to each other by the communication network (30). The communication server (20) and the smartphone (60) can be connected to each other by the communication net-

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work (30). The communication server (20) includes a receiving unit (21) which receives electronic data from the smartphone (60) or the controller (11), a transmission unit (22) which transmits the electronic data to the controller (11), and a storage unit (23).

[0066] In this manner, as the electronic data (for example, an E-mail), the communication server (20) receives the physical information detected by the wearable measurement instrument (50) by way of the controller (11) or the smartphone (60). That is, when the wearable measurement instrument (50) outputs the physical information to the massage machine (10), the physical information is received by way of the controller (11). When the wearable measurement instrument (50) outputs the physical information to the smartphone (60), the physical information is received by way of the smartphone (60). As a result, the physical information of the user P at the measurement time is received.

[0067] The storage unit (23) stores the physical information, and the physical information received from the smartphone (60) or the controller (11) by the receiving unit (21) is stored therein together with the date and time. That is, according to the present embodiment, the physical information is accumulated and searched for in a time-dependent manner, that is, a so-called database is established.

[0068] In this way, based on the physical information stored in the storage unit (23), the health information is prepared by the communication server (20). For example, the health information includes an advice based on big data, a proper massage course, and a doctor's advice. For example, a doctor, an examination technician, or a person of a business operator performs determination such as comparison between the past physical information and the current physical information. Thereafter, in a case where it is considered that a kidney function of the user P is poor, as the health information, an advice is prepared by the doctor, and information relating to the massage course is prepared by the person of the business operator (for example, "The massage suitable for a person whose kidney function is not active is recommended to receive a course for mainly massaging triple burner meridian (SJ-5) → spleen meridian (SP-6) → bladder meridian (BL-23). The triple burner meridian (SJ-5) is an acupuncture point on the wrist, and it is expected that the point has an effect to wake up the body. The spleen meridian (SP-6) is an acupuncture point inside the ankle, and it is expected that the point improves a moisture flow. The bladder meridian (BL-23) is an acupuncture point on the waist. It is expected that the point has an effect to treat a kidney disease. In addition, you may stimulate bladder meridian (BL-10) which is supposed to have an effect to relieve the tiredness showing a representative symptom of the kidney. A recommendable course is fatigue recovery course".

[0069] The transmission unit (22) performs control so as to transmit the health information as the electronic data (for example, the E-mail) to the controller (11). In this manner, as will be described later, when receiving the massage from the massage machine (10) at a later date, the user P can select a proper massage course by confirming the health information.

[0070] In the present embodiment, an example has been described in which the E-mail is exchanged as "information" exchange between the communication server (20) and the controller (11) or the smartphone (60). However, without being limited thereto, the information exchange may be made using an alternative method.

<Massage Machine>

[0071] Fig. 3 is a perspective view of the massage machine according to the embodiment of the present invention. The massage machine (10) is configured to mainly include a chair main body (14) provided with a seat unit, a backrest unit, a footrest, and an armrest, a massage unit (12) provided with a motor and a treatment unit, a control unit (13) which controls the massage unit (12), and a controller (11) which receives various operation inputs relating to massage operations.

[0072] For example, the massage unit (12) is built in the backrest unit, and is provided with the treatment unit driven by the motor. The massage unit (12) is configured so that an operation position (vertical position or width position) of the treatment unit, and operation speed and a displacement amount of the treatment unit can be changed.

[0073] The control unit (13) is configured to include a CPU, a RAM, a ROM, and a memory, and receives an instruction signal from operation control means (11b) of the controller (11) when the massage is performed. Based on the instruction signal, the control unit (13) outputs a control signal so as to operate the motor and to perform the massage using the treatment unit.

[0074] The controller (11) for outputting the instruction signal to the control unit (13) is configured to include the CPU, the RAM, the ROM, and the memory. The controller (11) has a display (display unit having a function as input means) (11f), and is configured to be detachably disposed in a stand (not illustrated) on a side portion of the chair main body (14). Then, the controller (11) is connected to the control unit (13) by a signal line in a wired or wireless manner.

[0075] The storage means (11g) disposed in the controller (11) stores data relating to the massage course indicating operation patterns of the treatment unit, and stores a plurality of massage courses in advance. For example, the massage courses are used in order to perform a kneading operation, a patting operation, an acupressure operation, a rolling operation, a leg kneading operation, a pulling/kneading operation, a buttocks kneading operation, and an anus vibration operation at specified speed (without being limited to constant speed, the speed may be changed). The respective operations may be performed in combination with each other through a predetermined procedure (simultaneously or

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sequentially). As the massage courses, depending on the purpose of the massage, courses are prepared such as an edema relief course, a fatigue recovery course, a stress relief course, and a good night's sleep course.

[0076] For example, the "fatigue recovery course" is a massage technique which employs an idea of "massage" that is originated from ancient Europe, and which encourages blood flow from ends of the body toward the heart. Blood which is less likely to return to the heart is delivered again to the heart, fatigue recovery is encouraged, and metabolism is promoted so as to refresh the body. The "good night's sleep course" is a massage technique which employs an idea of so-called "Anma" that is originated from ancient China, and which encourages blood flow from the heart to the ends of the body. The whole blood circulation is promoted, and the blood is circulated to the ends of the body so as to provide relaxation. The massage course may include not only various operations of the massage unit (12) but also a combination of an operation for changing a reclining angle and an operation for changing a footrest angle.

[0077] Then, the controller (11) has display control means (11a) for displaying selectable massage courses or various types of information as an image on a display (11f), operation control means (11b) for receiving various operation inputs from the user P which includes operations based on the image displayed on the display (11f), and outputting an instruction signal to the control unit (13), receiving means (11c) for receiving the electronic data (for example, the E-mail) from the communication server (20), transmission means (11d) for transmitting the electronic data (for example, the E-mail) to the communication server (20), and a receiving unit (11e) to which the physical information is input from the wearable measurement instrument (50).

[0078] If the wearable measurement instrument (50) is located within the communicable distance, the receiving unit (11e) receives an input of the physical information detected by the wearable measurement instrument (50) at predetermined time intervals, and controls the storage means (11g) to store the physical information together with the date and time.

[0079] The transmission means (11d) performs control so as to transmit the physical information stored in the storage means (11g) as the electronic data (for example, the E-mail) to the communication server (20).

[0080] When the massage machine (10) is turned on, the receiving means (11c) receives the health information from the communication server (20) as the electronic data (for example, the E-mail), and controls the storage means (11g) to store the health information.

[0081] The display control means (11a) performs control so as to display a health condition of the user P on the display (11f) as an image (health condition checking function), or so as to automatically select and recommend a specific massage course, based on the health condition of the user P (massage course selecting function). For example, if the user P performs an operation in order to confirm the health condition by using the image displayed on the display (11f) before the user receives the massage, the display control means (11a) displays an advice for the health condition stored in the storage means (11g). Fig. 6 illustrates an example of an advice display screen displayed on the display (11f). The display (11f) displays a message prepared by a doctor. In this manner, in the massage machine (10) according to the present embodiment, the user P can recognize which selectable massage course is useful to the user P, and thus, can select the proper massage course. For example, the kidney function can be restored.

[0082] In addition, Fig. 7 illustrates an example of a massage course information screen displayed on the display. The display (11f) displays a message indicating "The massage suitable for a person whose kidney function is not active is recommended to receive a course for mainly massaging triple burner meridian (SJ-5) → spleen meridian (SP-6) → bladder meridian (BL-23). The triple burner meridian (SJ-5) is an acupuncture point on the wrist, and it is expected that the point has an effect to wake up the body. The spleen meridian (SP-6) is an acupuncture point inside the ankle, and it is expected that the point improves a moisture flow. In addition, you may stimulate bladder meridian (BL-10) which is supposed to have an effect to relieve the tiredness showing a representative symptom of the kidney. A recommendable course is fatigue recovery course". In this manner, in the massage machine (10) according to the present embodiment, the user P can recognize that the fatigue recovery course is useful to the user P. For example, the kidney function can be restored. In this case, when the recommendable course such as the fatigue recovery course is not stored in the massage machine (10) of the user P, the user P may be provided with the recommendable course by the business operator (120), or may be offered to purchase the recommendable course.

[0083] In addition, in a case where a pulse rate is high as the acquired physical information, the massage machine (10) may determine that the body of the user P is not in a good state, and the massage machine (10) may select or recommend the proper massage course (for example, a centrifugal course for lowering the pulse). In this way, the user P can receive the proper massage course, based on the acquired physical information.

[0084] Furthermore, in a case where a stress value is high as the acquired physical information, the user P himself or herself may determine that the body of the user P is not in a good state, and the user P himself or herself may be able to select the massage course (for example, the stress relief treatment). In this way, the user P can receive the proper massage course, based on the acquired physical information.

[0085] As described above, according to the massage machine system (100) in the embodiment, for example, the user P can acquire the physical information during the user's exercise or sleep by using the wearable measurement instrument (50). Based on the acquired physical

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information, the user P can select the proper massage course when the user P receives the massage.

Other Embodiments

[0086]

(1) In the embodiment, a case has been described where the transmission unit (22) of the communication server (20) transmits the health information to only the controller (11) by using the E-mail. However, the embodiment is not limited thereto. When it is determined that the physical information is abnormal, a configuration may be adopted so that the communication server (20) transmits the E-mail to a second smartphone carried by a third party (child) P'.
In this way, in a case where the user P is an elderly person, the health condition of the user (parent) P can be confirmed using the second smartphone of the third party (child) P' living in a place remote from the user P. Therefore, "monitoring" can be performed so that the remotely located third party (child) P' confirms the health condition of the user (parent) P.
(2) In the embodiment, a case has been described where the massage machine system (100) includes the massage machine (10), the communication server (20), the wearable measurement instrument (50), and the smartphone (60). However, the massage machine system (100) may be configured to include the massage machine (10), the communication server (20), and the wearable measurement instrument (50). Fig. 8 is a conceptual diagram illustrating a configuration of a massage machine system according to an embodiment of the present invention. That is, the massage machine system (100) does not include the smartphone (60).
(3) In the embodiment, a case has been described where the massage machine (10) has the receiving unit (11e) to which the physical information is input from the wearable measurement instrument (50). However, the embodiment is not limited thereto. The massage machine (10) may be configured not to have the receiving unit (11e). Fig. 9 is a conceptual diagram illustrating a configuration of a massage machine system according to another embodiment of the present invention. That is, the physical information may always be received by way of the smartphone (60) and the communication server (20).
According to the massage machine system (100) configured in this way, the user P can also acquire the physical information during the user's exercise or sleep for 24 hours by using the wearable measurement instrument (50). Based on the acquired physical information, the user can select the proper massage course when the user receives the massage.
(4) In an embodiment, a configuration may be adopted so that the controller (11) of the massage machine (10) and/or the smartphone (60) and the security organization, the health-related sales organization, or the medical institution can be connected to each other by the communication network. Figs. 10 and 11 are conceptual diagrams illustrating a configuration of a massage machine system according to another embodiment of the present invention. Fig. 10 is a diagram when the user is at home (distance between the wearable measurement instrument and the massage machine is within 10 meters). Fig. 11 is a diagram when the user goes out (distance between the wearable measurement instrument and the massage machine is 10 meters or longer).

Industrial Applicability

[0087] The massage machine system according to the present invention is useful for the massage machine which can perform the proper massage using the physical information such as the pulse rates or the brain waves acquired by the wearable measurement instrument.

Description of Reference Numerals and Signs

[0088]

10 massage machine
11 controller
11a display control means
11b operation control means
11c receiving means
11d transmission means
11e receiving unit
11f display
11g storage means
12 massage unit
13 control unit
14 chair main body
20 communication server
50 wearable measurement instrument
51 transmission unit
60 smartphone
61 receiving unit
100 massage machine system

Claims

1. A massage machine system comprising:

a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit;
a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected

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by the detection unit;
a server for storing the physical information detected by the wearable measurement instrument; and
a portable electronic information communication terminal,
wherein the server is communicably connected to the massage machine and the electronic information communication terminal, respectively via a public network, and
wherein the electronic information communication terminal includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

2. The massage machine system according to Claim 1, wherein the massage machine includes a receiving unit capable of receiving the physical information transmitted from the transmission unit,
wherein when the transmission unit of the wearable measurement instrument is located within a communicable distance with the receiving unit of the massage machine, the physical information is output to the receiving unit of the massage machine, and
wherein when the transmission unit of the wearable measurement instrument is located outside a communicable distance with the receiving unit of the massage machine, the physical information is output to the receiving unit of the electronic information communication terminal.

3. The massage machine system according to Claim 2, wherein the communicable distance is 10 meters.

4. A massage machine system comprising:

a massage machine that includes a massage unit for massaging a body of a user and a control unit for controlling an operation of the massage unit;
a wearable measurement instrument that has a detection unit for detecting physical information of the user and a transmission unit capable of transmitting the physical information detected by the detection unit; and
a server for storing the physical information detected by the wearable measurement instrument,
wherein the server is communicably connected to the massage machine via a public network, and
wherein the massage machine includes a receiving unit capable of receiving the physical information transmitted from the transmission unit.

5. The massage machine system according to any one of Claims 1 to 4,
wherein the massage machine and/or the electronic information communication terminal transmit the received physical information to the server, and
wherein the server prepares health information, based on the physical information, and transmits the health information to the massage machine.

6. The massage machine system according to Claim 5, wherein the server prepares the health information of the user, based on the stored physical information.

7. The massage machine system according to Claim 5 or 6,
wherein the health information includes an advice for diseases and/or lifestyle habits.

8. The massage machine system according to any one of Claims 1 to 7,
wherein the physical information represents at least one type of information selected from the group consisting of a pulse rate, a step count, a walking distance, a blood pressure, a body temperature, a sweat rate, a blood glucose level, calorie consumption, a sleep state, a body weight, a body fat percentage, moisture content, muscle mass, bone mass, a basal metabolic rate, BMI, and an obesity index.

9. The massage machine system according to any one of Claims 1 to 8, further comprising:

a portable second electronic information communication terminal that is provided for a third party,
wherein the second electronic information communication terminal and the server are communicably connected to each other via the public network, and
wherein the second electronic information communication terminal receives the physical information.

10. The massage machine system according to Claim 9, wherein when it is determined that the physical information is abnormal, the server transmits abnormality information to the second electronic information communication terminal.

11. The massage machine system according to any one of Claims 1 to 10,
wherein the wearable measurement instrument has a clock function, and
wherein at a preset timing, the detection unit automatically detects the physical information of the user.

12. The massage machine system according to any one of Claims 1 to 11,
wherein the massage machine and/or the electronic information communication terminal are communi-

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cably connected to a security organization, a health-related sales organization, or a medical institution via the public network.

13. A massage machine used for the massage machine system according to any one of Claims 1 to 12, wherein the massage machine is connected to the server via the public network, and
wherein the physical information transmitted from the transmission unit is received by the receiving unit.

14. A wearable measurement instrument used for the massage machine system according to any one of Claims 1 to 12, comprising:

the detection unit that detects the physical information; and
the transmission unit capable of communicating with the receiving unit.

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FIG. 1

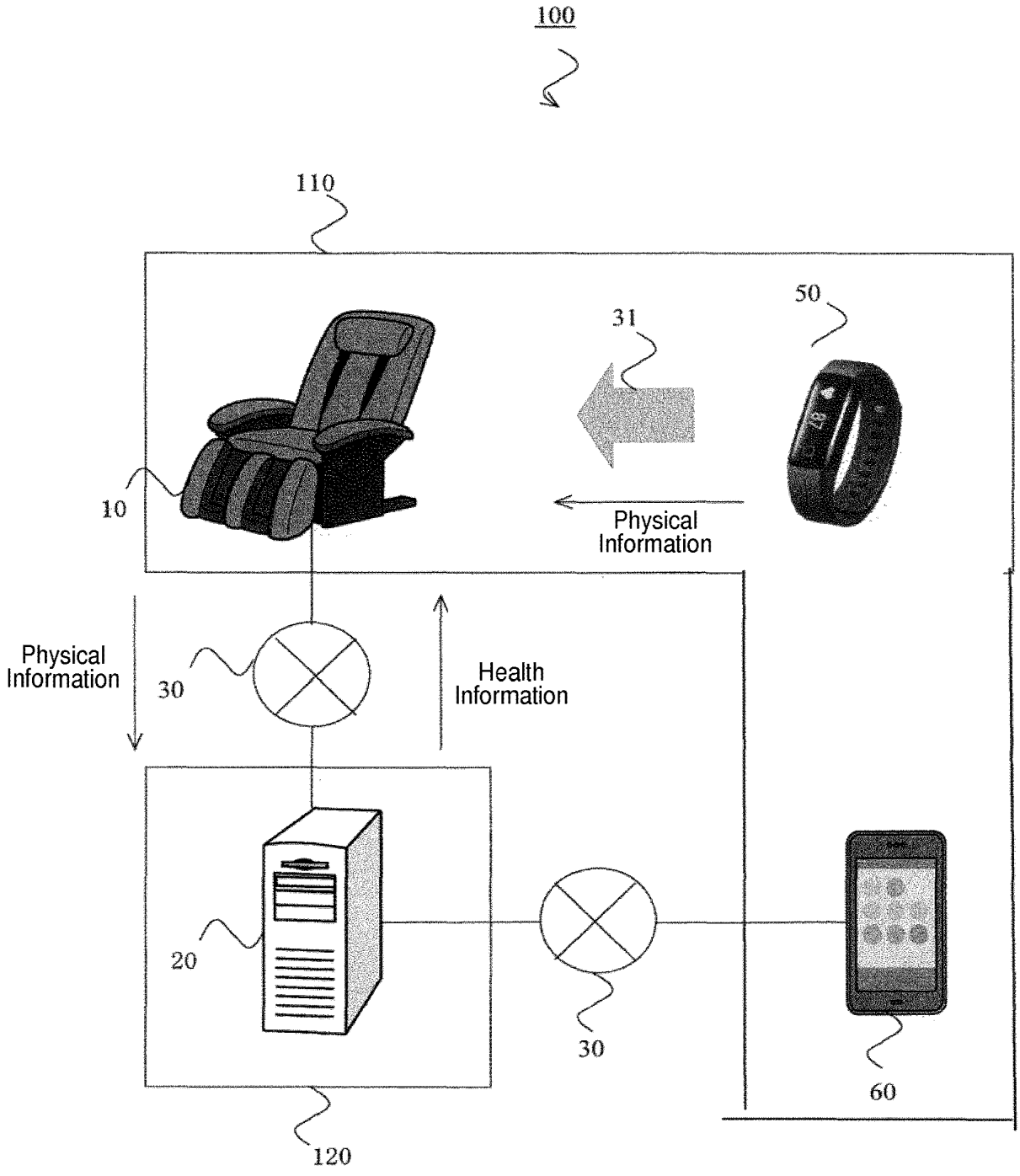

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FIG. 2

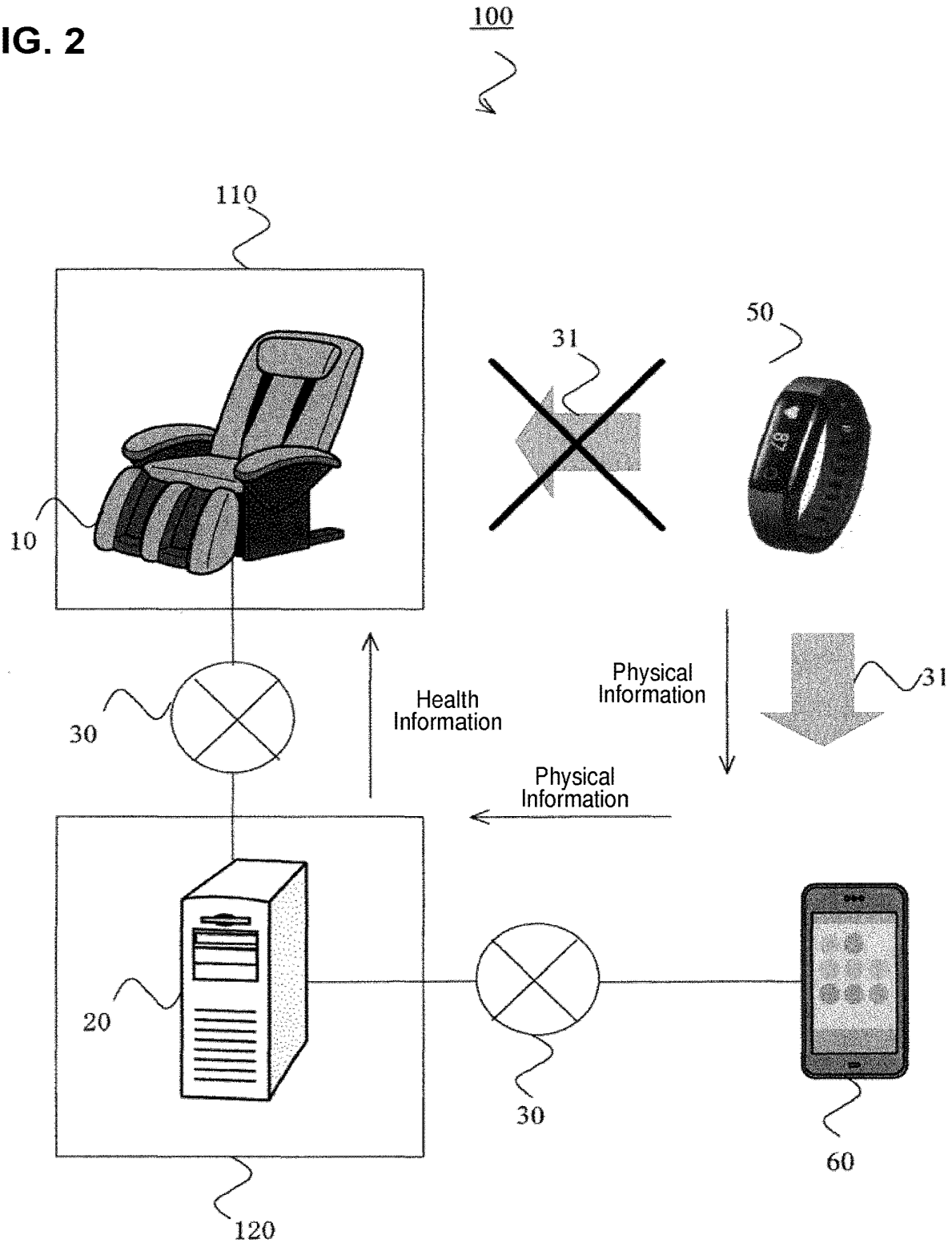

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FIG. 3

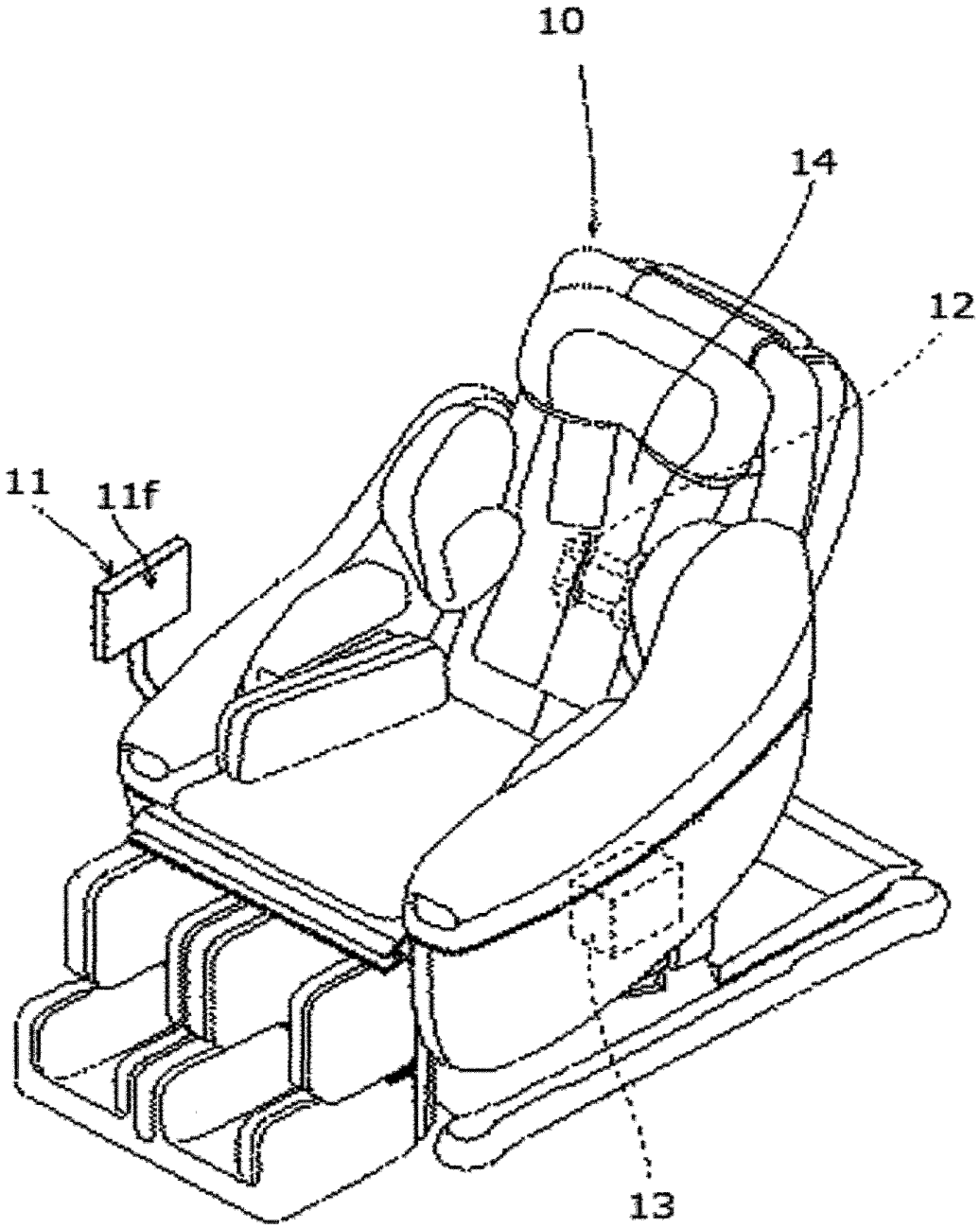

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FIG. 4

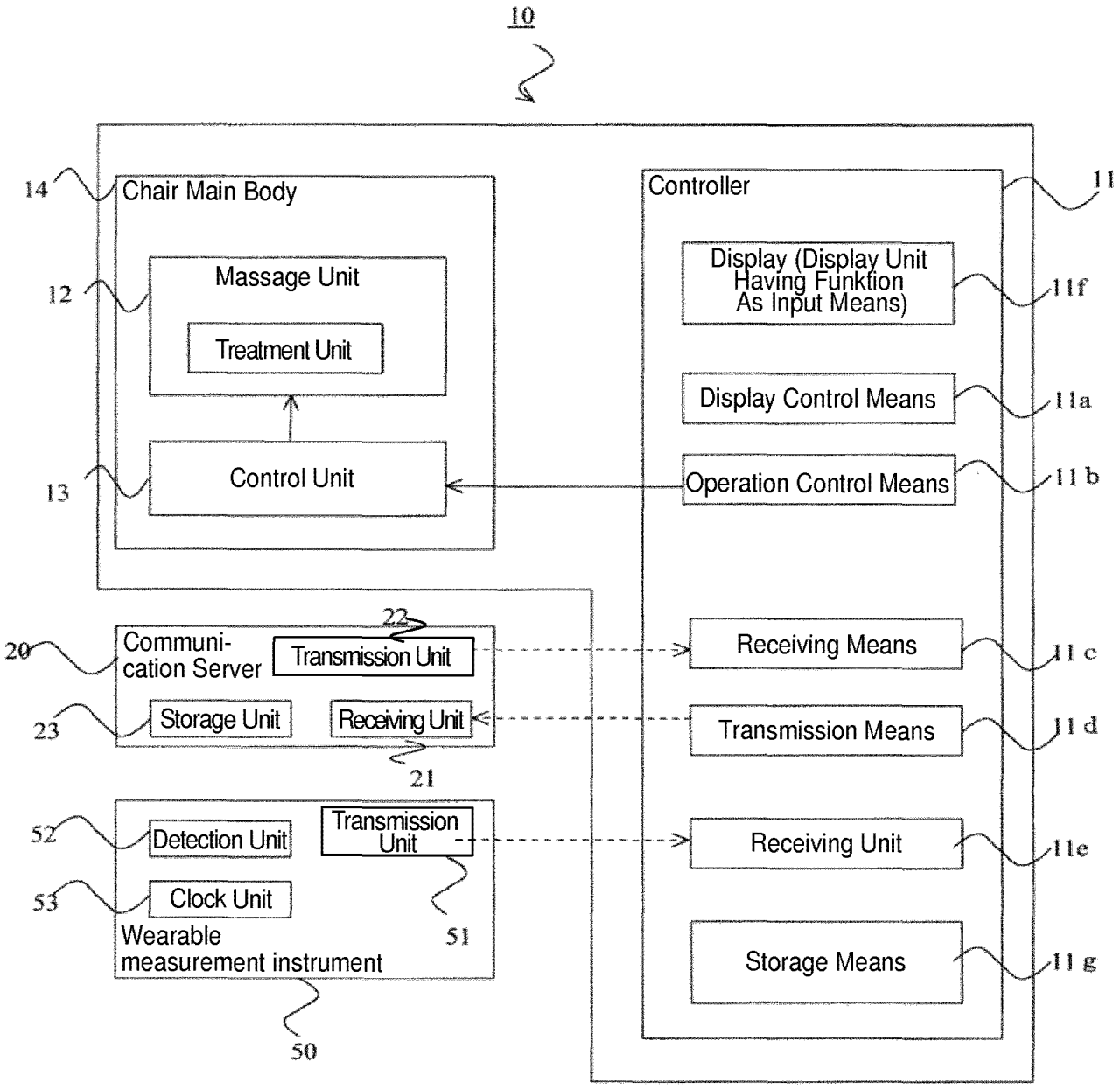

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FIG. 5

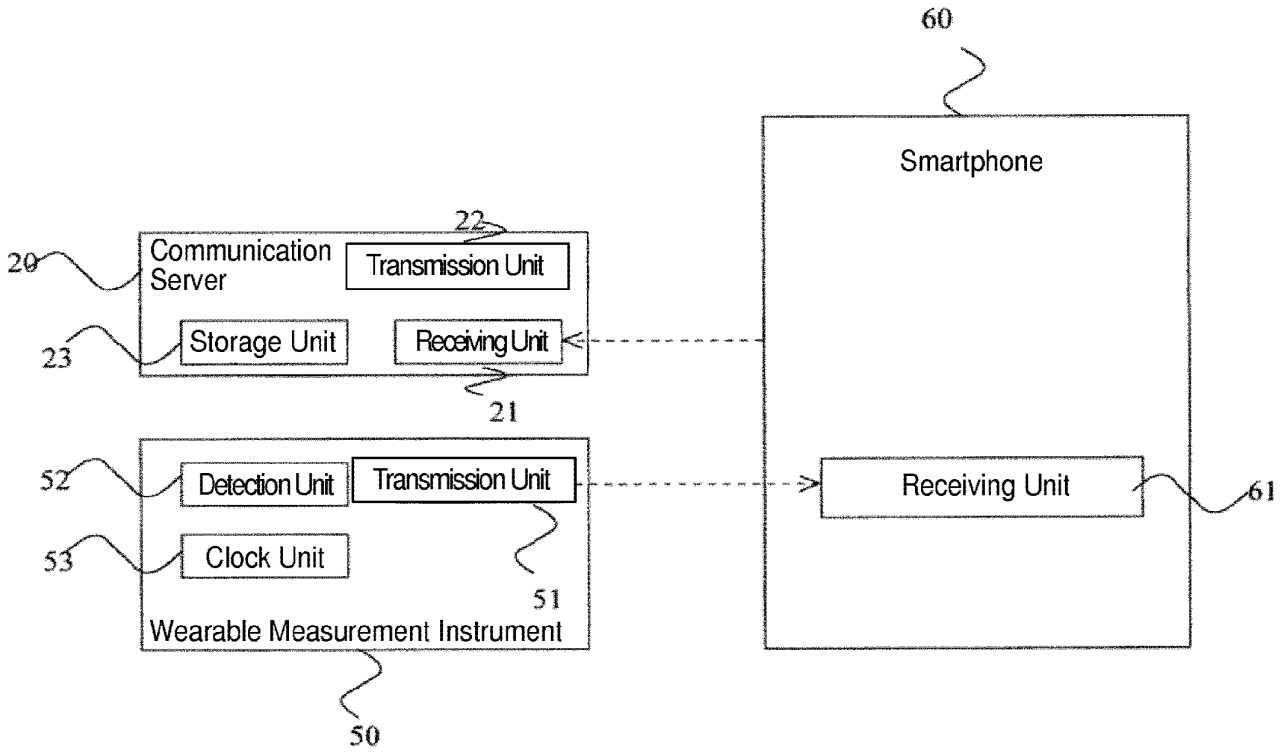

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FIG. 6

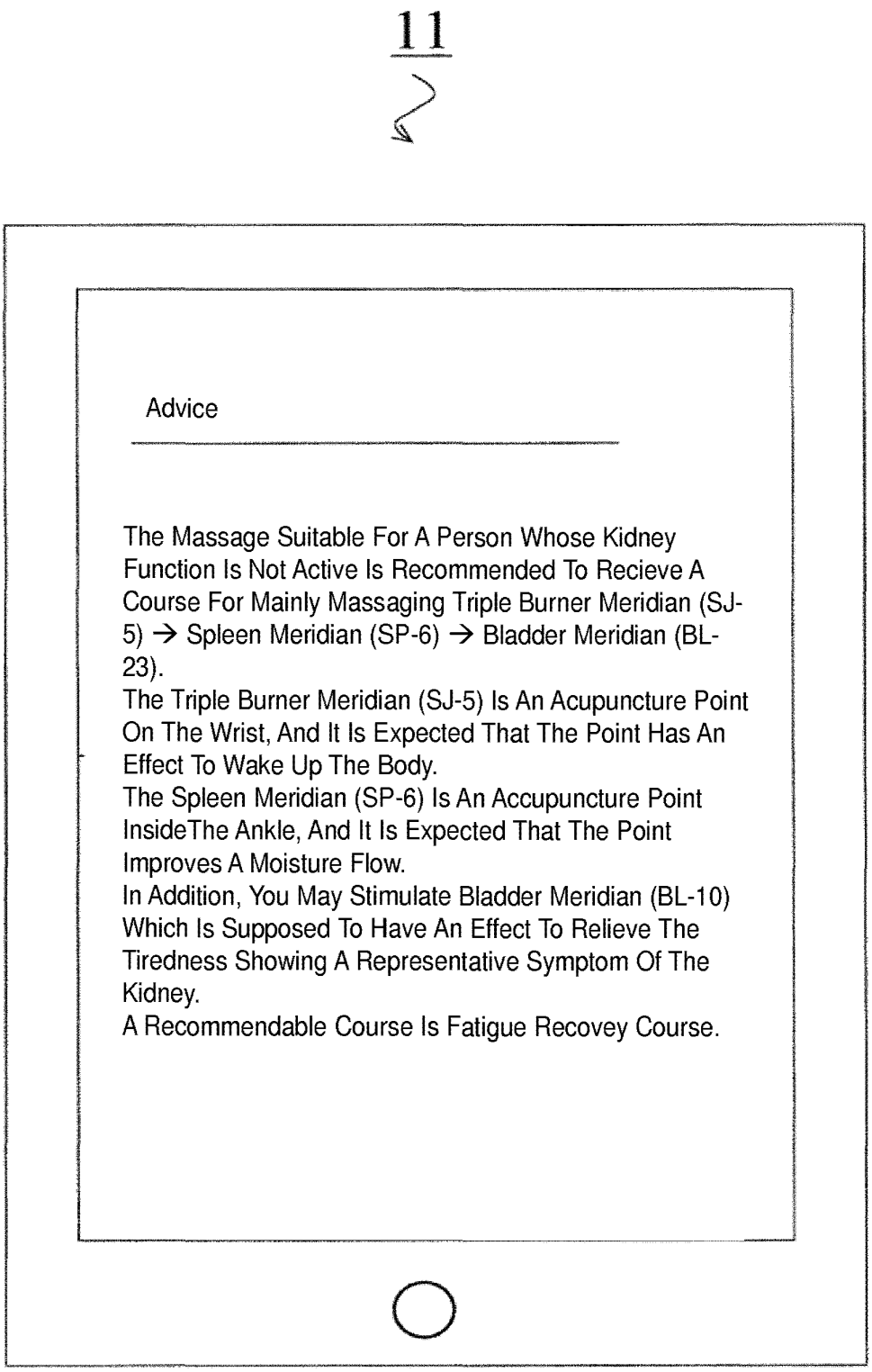

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FIG. 7

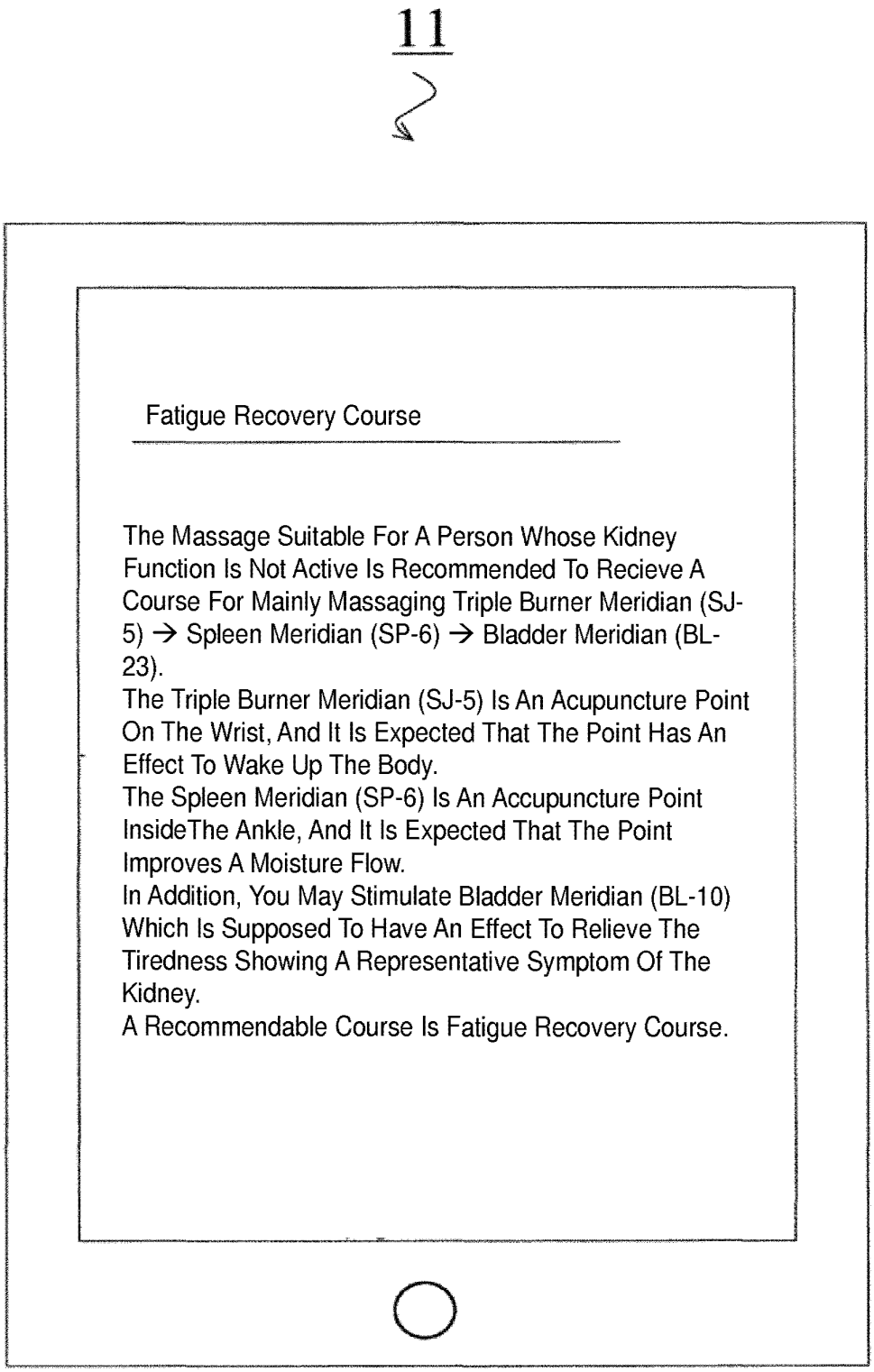

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FIG. 8

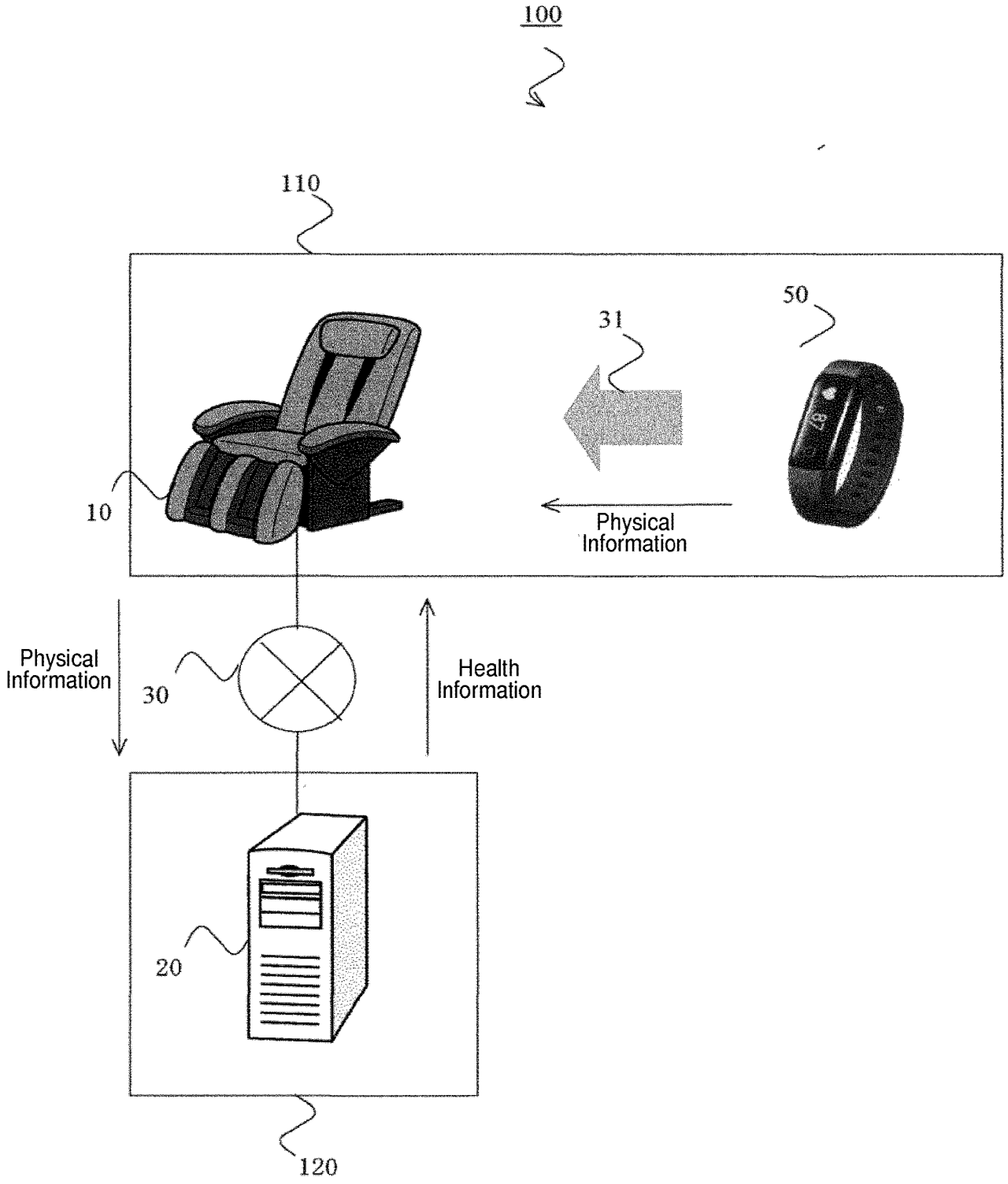

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FIG. 9

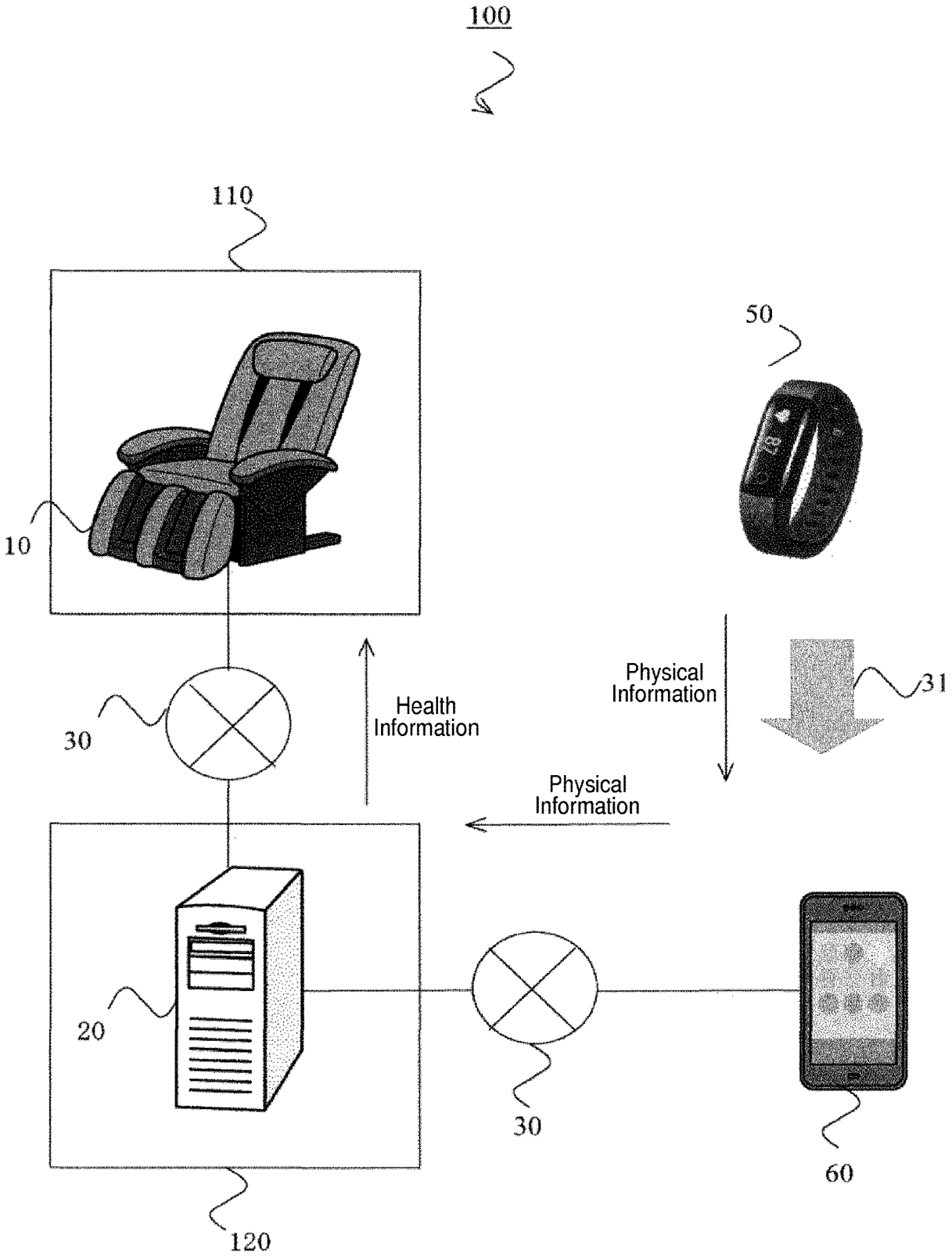

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FIG. 10

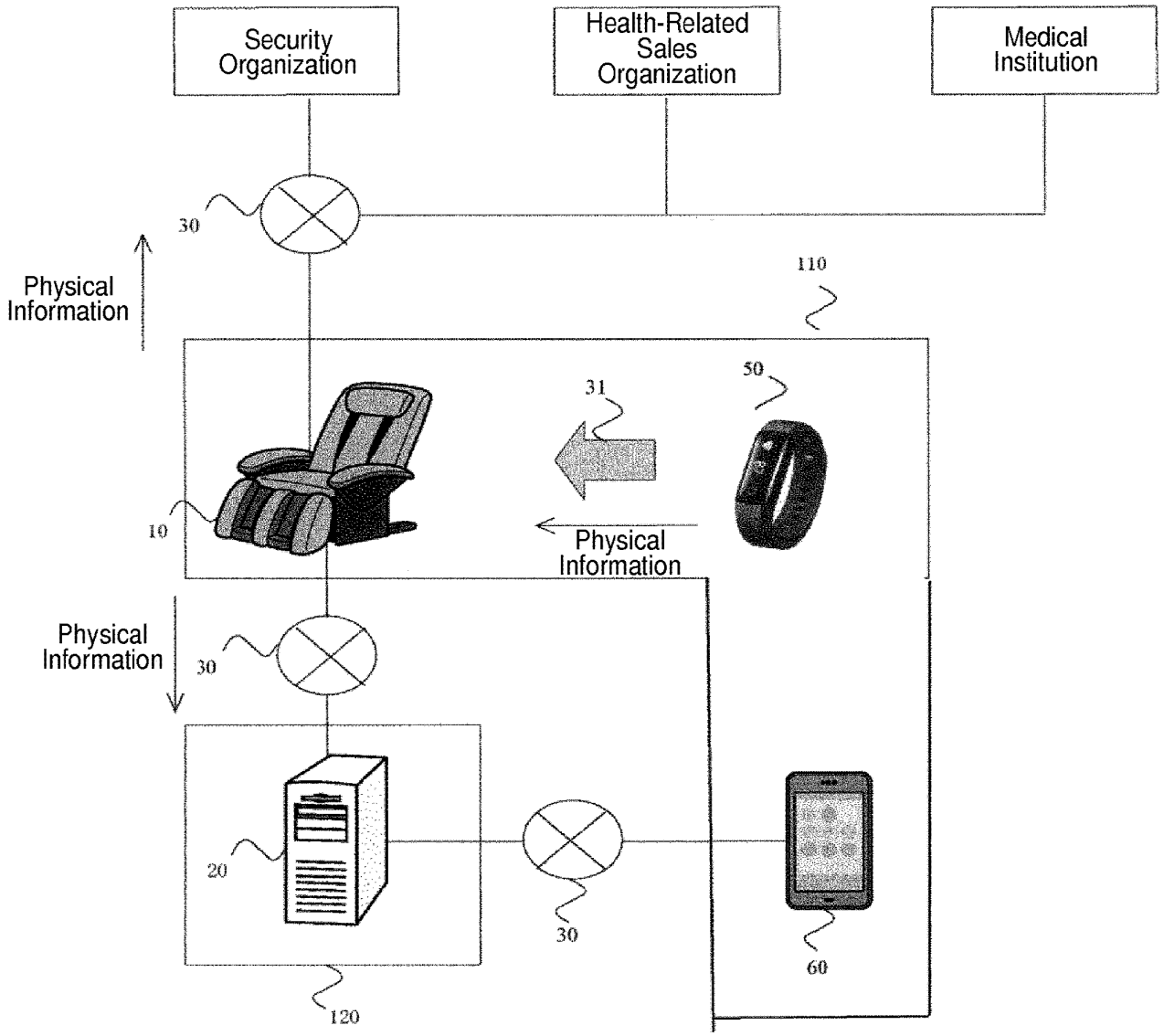

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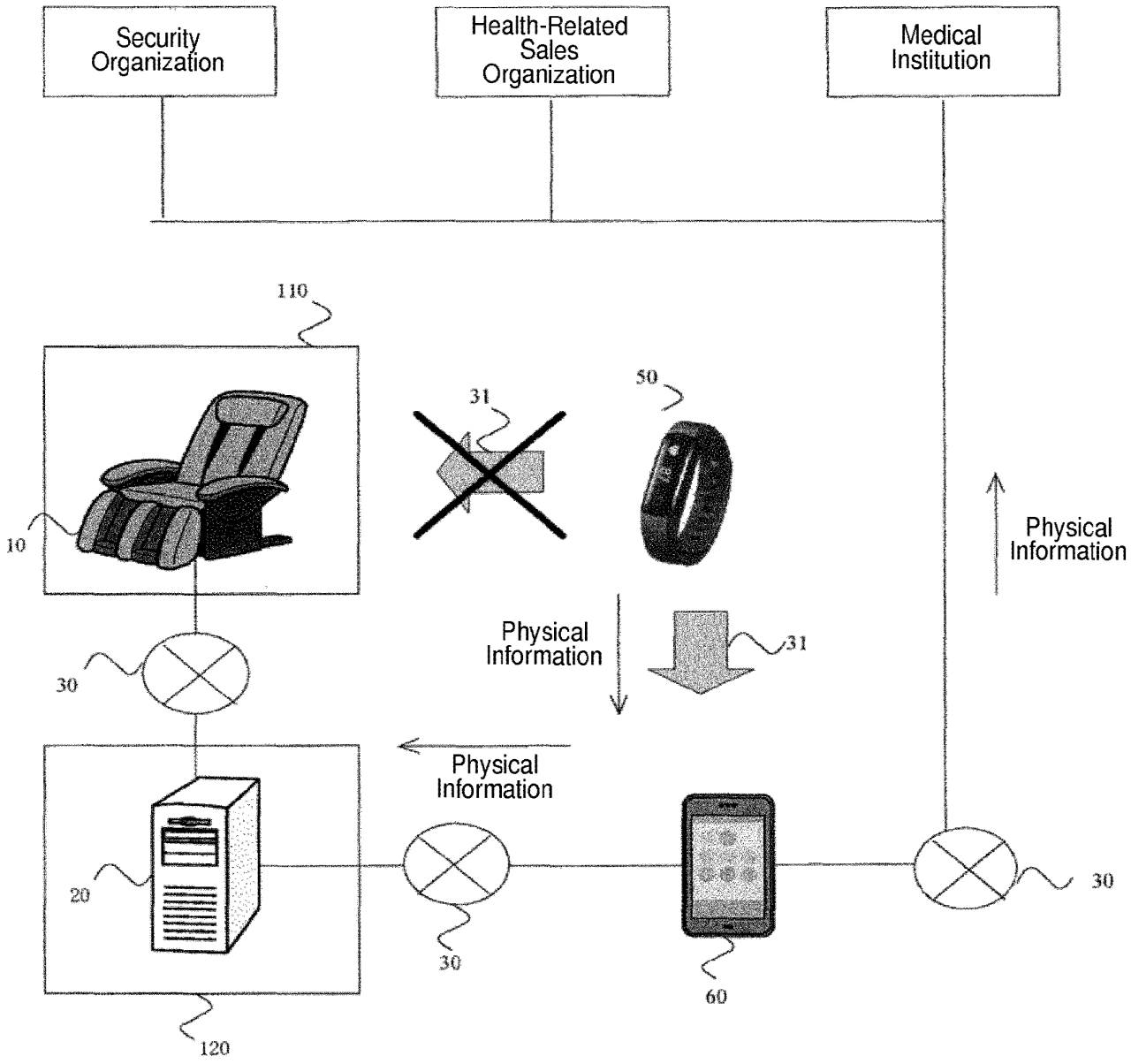
FIG. 11



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EUROPEAN SEARCH REPORT

Application Number
EP 18 18 5622

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/113723 A1 (UEYAMA KENJI [JP] ET AL) 26 May 2005 (2005-05-26) * summary; paragraphs [0165], [0227], [0235] - [0238], [0249], [0250] - [0251]; figures 2-5,12,14,21 * -----	1-13	INV. G16H20/30 G16H40/63 G16H40/67 A61H7/00
X	CN 105 853 136 A (BEIJING XIAOMI MOBILE SOFTWARE CO LTD) 17 August 2016 (2016-08-17) * abstract * & EP 3 235 484 A1 (BEIJING XIAOMI MOBILE SOFTWARE CO LTD [CN]) 25 October 2017 (2017-10-25) * summary; paragraphs [0004] - [0006], [0009], [0011], [0013], [0014], [0017], [0019]; figures 1-6,13 * -----	1-14	

TECHNICAL FIELDS SEARCHED (IPC)

G16H
G06F
A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 December 2018	Huber, Alexander

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 18 5622

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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11-12-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005113723 A1	26-05-2005	CN 1623527 A	08-06-2005
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		EP 3235484 A1	25-10-2017
		US 2017308046 A1	26-10-2017
		WO 2017181555 A1	26-10-2017

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 9192186 A **[0004]**
- JP 2000070373 A **[0004]**

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Espacenet

Bibliographic data: CN111759711 (A) — 2020-10-13

Massager pressure feedback and adjustment method, device and equipment

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Classification: - international: *A61H23/02; H02K7/06; H02K7/14*
- cooperative: A61H23/02 (CN); H02K7/06 (CN); H02K7/145 (CN)

Application number: CN202010745996 20200729
Global Dossier

Priority number (s): CN202010745996 20200729

Abstract of CN111759711 (A)

The invention discloses a massager pressure feedback and adjustment method, device and equipment. The massager pressure feedback and adjustment method, device and equipment are applied to a massager,wherein the massager is provided with a motor and a massage head; the motor is used for driving the massage head to reciprocate; the method comprises the following steps: when the massager operates ina selected state, obtaining the rotating speed of the motor as a first rotating speed when the massage head is not in contact with a human body; detecting the rotating speed of the motor as a secondrotating speed when the massage head is in contact with a human body; determining the real-time pressure borne by the human body according to the change of the second rotating speed relative to the first rotating speed; and displaying the real-time pressure in the state. The first rotating speed of the motor of the massager in the selected state is obtained, then the second rotating

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speed of the massager making contact with the human body in the same state is obtained, the pressure borne by the human body in the selected state is determined according to the first rotating speed and the secondrotating speed, and the pressure is displayed. A user can visually determine the current pressure through the display of the pressure, and the user experience is improved.

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DESCRIPTION CN111759711A

Massager pressure feedback, adjustment method, device and equipment

[0001]

technical field

[0002]

Embodiments of the present invention relate to massager technology, and in particular, to a massager pressure feedback and adjustment method, device, and device.

[0003]

Background technique

[0004]

The massager includes impact massage and squeezing massage, and the massage head of the massager is controlled to exert pressure on the position in contact with the human body, so as to realize the pressing massage on the human body.

The impact massage massager mainly produces high-frequency vibrations to the deep layers of the muscles to reduce local tissue tension, relieve pain, and promote blood circulation.

[0005]

When different people use the massager for massage, due to the different density of muscle tissue, the tolerance to impact pressure is different, and the required pressing force is different.

The adjustment of the pressing pressure of the massager in the prior art is mainly realized by adjusting the working gear of the massager, adjusting the current and working power of the motor inside the massager, and then changing the actual speed of the motor, and the user knows the current pressing pressure of the massager. The strength of the massager is mainly achieved by observing the selected working gear of the massager.

[0006]

In the massager in this way, the user needs to know the pressure intensity of the massager, which can only be obtained from the selected working position of the massager, but cannot directly know the actual pressure of the massager during use, so that the user can use the massager. When the massager performs massage, the specific pressing intensity cannot be accurately obtained, which makes the user experience of the massager poor.

[0007]

SUMMARY OF THE INVENTION

[0008]

The present invention provides a massager pressure feedback method, device and equipment, which are convenient for users to determine and adjust the current pressure intensity of the massager and bring better user experience.

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[0009]

In a first aspect, an embodiment of the present invention provides a massager pressure feedback method, which is applied to a massager, wherein the massager has a motor and a massage head, the motor is used to drive the massage head to reciprocate, and the method includes :

[0010]

When the massager is running in the selected state, the rotational speed of the motor when the massage head is not in contact with the human body is obtained as the first rotational speed;

[0011]

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

[0012]

Determine the real-time pressure that the human body bears in the state when the massage head is in contact with the human body according to the change of the second rotating speed relative to the first rotating speed;

[0013]

The real-time pressure in the state is displayed.

[0014]

Optionally, when the massager is running in a selected state, obtaining the rotational speed of the motor when the massage head is not in contact with the human body, as the first rotational speed, including:

[0015]

detecting a selected state in the massager, the state being used to distinguish the intensity of the reciprocating motion of the massage head;

[0016]

The rotation speed set corresponding to the state is queried as the first rotation speed, wherein the first rotation speed is positively correlated with the strength.

[0017]

Optionally, when the massager is running in a selected state, obtaining the rotational speed of the motor when the massage head is not in contact with the human body, as the first rotational speed, including:

[0018]

Get the rated power of the motor in the selected state;

[0019]

The rotational speed of the electric motor when operating at the rated power is determined as the first rotational speed.

[0020]

Optionally, the determining, according to the second rotational speed and the first rotational speed, the pressure that the human body bears in the state when the massage head is in contact with the human body, including:

[0021]

Setting a plurality of thresholds according to the first rotational speed, and dividing the rotational speed of the electric motor into a plurality of intervals based on the thresholds;

[0022]

When the massage head is in contact with the human body, the pressure that the human body bears in the state is classified according to the interval range;

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[0023]

The second rotational speed is compared with the interval range to determine the level of the pressure corresponding to the second rotational speed.

[0024]

Optionally, the threshold includes a first threshold and a second threshold, and the level includes a first level, a second level, and a third level, wherein the first threshold is smaller than the second threshold, and the first The pressure of the grade, the second grade, and the third grade increases step by step;

[0025]

The comparing the second rotational speed with the interval range to determine the level corresponding to the second rotational speed includes:

[0026]

If the second rotational speed is greater than the second threshold and less than or equal to the first rotational speed, the pressure is at the first level;

[0027]

If the second rotational speed is greater than the first threshold and less than or equal to the second threshold, the pressure is at the second level;

[0028]

If the second rotational speed is greater than 0 and less than or equal to the first threshold, the pressure is at the third level.

[0029]

In a second aspect, an embodiment of the present invention also provides a massager adjustment method, using the massager pressure feedback method described in the first aspect to obtain the real-time pressure of the massager, and the massager adjustment method includes:

[0030]

Detect the pressure level set in the selected state;

[0031]

Determine the reference pressure range according to the pressure level;

[0032]

Determine the interval range of the rotational speed of the motor of the massager under the pressure level according to the reference pressure range;

[0033]

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

[0034]

comparing the second rotational speed with the interval.

[0035]

If the second rotational speed falls within the interval, maintaining the input power of the electric motor unchanged;

[0036]

If the second rotational speed is smaller than the maximum value of the interval, the input power of the electric motor is reduced.

[0037]

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In a third aspect, an embodiment of the present invention also provides a massager adjustment method, using the massager pressure feedback method described in the first aspect to obtain the real-time pressure of the massager, and the massager adjustment method includes:

[0038]

Obtain the maximum allowable pressure set by the massager, where the maximum allowable pressure is the maximum pressure that the massager can provide in the selected state when the massage head is in contact with the human body.

[0039]

obtaining the third rotational speed corresponding to the maximum allowable pressure;

[0040]

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

[0041]

comparing the second rotational speed to the third rotational speed;

[0042]

If the second rotational speed is less than or equal to the third rotational speed, the input power of the electric motor is reduced to reduce the pressure on the human body.

[0043]

In a fourth aspect, an embodiment of the present invention further provides a device for feedback of pressure on the device, including:

[0044]

The rotational speed detection module is used to obtain the rotational speed of the motor when the massage head is not in contact with the human body when the massager is running in the selected state, as the first rotational speed;

[0045]

Or, for detecting the rotational speed of the motor when the massage head is in contact with the human body, as the second rotational speed;

[0046]

a pressure determination module, configured to determine, according to the second rotational speed and the first rotational speed, the pressure that the human body bears in the state when the massage head is in contact with the human body;

[0047]

A display module for displaying the pressure for the state.

[0048]

In a fifth aspect, an embodiment of the present invention further provides a device for adjusting the pressure of a massager, including using the massager pressure feedback device described in the fourth aspect to obtain the real-time pressure of the massager, and further including:

[0049]

The state detection module is used to detect the pressure level set in the selected state;

[0050]

a reference pressure range determination module, which determines a reference pressure range according to the pressure level;

[0051]

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an interval range detection module for determining the interval range of the rotational speed of the motor of the massager in the state according to the reference pressure range;

[0052]

a first comparison module, configured to compare the second rotational speed with the interval range;

[0053]

The first input power adjustment module is used to increase the input power of the motor when the second rotational speed is greater than the maximum value of the interval range; when the second rotational speed falls within the interval range, maintain the The input power of the electric motor remains unchanged; when the second rotational speed is less than the minimum value of the interval range, the input power of the electric motor is reduced.

[0054]

In a sixth aspect, an embodiment of the present invention further provides a massager pressure adjustment device, including using the massager pressure feedback device described in the fourth aspect to obtain the real-time pressure of the massager, and further including:

[0055]

The maximum allowable pressure acquisition module obtains the maximum allowable pressure set by the massager, which is the maximum allowable pressure set by the user when the massage head is in contact with the human body and the massager can be in the state, the maximum pressure provided;

[0056]

A third rotational speed obtaining module, configured to obtain a third rotational speed corresponding to the maximum allowable pressure;

[0057]

a second comparison module, configured to compare the second rotational speed with the third rotational speed;

[0058]

A second input power adjustment module, configured to reduce the input power of the electric motor when the second rotational speed is less than or equal to the third rotational speed, so as to reduce the magnitude of the pressure on the human body.

[0059]

In a seventh aspect, an embodiment of the present invention further provides a device, the device comprising:

[0060]

one or more processors;

[0061]

a storage device for storing one or more programs;

[0062]

When the one or more programs are executed by the one or more processors, the one or more processors implement the massager pressure feedback method as described in the first aspect, or, as in the second aspect, The massager adjustment method described in the third aspect.

[0063]

The present invention obtains the first rotational speed of the motor of the massager in a selected state when the massage head of the massager is not in contact with the human body, and obtains the second rotational speed when the massager is in contact with the human body in the same state, and then according to The first rotational speed and the second rotational speed determine the real-time pressure that the human body bears in this state, and display the real-time pressure in this state.

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For the acquisition of the speed of the motor and the determination of the pressure on the human body according to the comparison of the first speed and the second speed, the computing power involved is relatively low, and it can be integrated inside the massager to reduce the dependence on external circuits and external equipment. .

Since the load of the motor is inversely proportional to the rotational speed, the greater the load of the motor, the smaller the rotational speed, and the torque of the motor is inversely proportional to the rotational speed. When the strength increases, the load of the motor will also increase synchronously. At this time, the speed of the motor will decrease synchronously, and the torque of the motor will increase synchronously. The performance of the massager is that the massage head of the massager increases the massage force on the human body, and the human body bears The pressure of the massage head increases.

Therefore, in the present invention, the comparison between the second rotation speed and the first rotation speed can be used to determine the strength of the pressure pressed by the massager on the human body, and then the pressure is displayed on the massager for the selected state, so that the user can intuitively, through the pressure display, the current pressure of the massager on the human body is determined, which effectively improves the user experience.

[0064]

Description of drawings

[0065]

1 is a flowchart of a massager pressure feedback method in Embodiment 1 of the present invention;

[0066]

Fig. 2 is the flow chart of the massager pressure feedback method in the second embodiment of the present invention;

[0067]

Fig. 3 is the flow chart of the massager adjustment method in the third embodiment of the present invention;

[0068]

Fig. 4 is the flow chart of the massager adjustment method in the fourth embodiment of the present invention;

[0069]

Fig. 5 is the structure diagram of the massage adjustment device in the fifth embodiment of the present invention;

[0070]

Fig. 6 is the structure diagram of the massage adjustment device in the sixth embodiment of the present invention;

[0071]

Fig. 7 is the structure diagram of the massage adjustment device in the seventh embodiment of the present invention;

[0072]

FIG. 8 is a structural diagram of the massage adjusting device in the eighth embodiment of the present invention.

[0073]

Detailed ways

[0074]

The present invention will be further described in detail below in conjunction with the accompanying drawings and embodiments.

It should be understood that the specific embodiments described herein are only used to explain the present invention, but not to limit the present invention.

In addition, it should be noted that, for the convenience of description, the drawings only show some but not all structures related to the present invention.

[0075]

Example 1

[0076]

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1 is a flowchart of a massager pressure feedback method provided in Embodiment 1 of the present invention. This embodiment can be applied to a massager. The massager has a motor and a massage head, and the motor is used to drive the reciprocating motion of the massage head. It is performed by the massage adjustment device, which specifically includes the following steps:

[0077]

Step S110 , when the massager is running in the selected state, the rotational speed of the motor when the massage head is not in contact with the human body is obtained as the first rotational speed.

[0078]

In this embodiment, the selected state refers to the working gear selected by the user in the process of using the massager to massage.

When the massager works under the selected working gear, the input power of the motor of the massager remains constant.

[0079]

During the use of the massager, when the massage head of the massager is not in contact with the human body, the load of the motor of the massager is the smallest, and the speed of the motor is the highest at this time.

In this embodiment, the first rotation speed of the motor obtained when the massage head is not in contact with the human body is the rotation speed when the load of the motor of the massager is the minimum.

[0080]

In this embodiment, the first rotational speed can be obtained in various ways. For example, when the massager is manufactured, the rotational speed of the motor when the massager is in a specified gear position, when the massage head is not in contact with the human body, and the motor is measured, and stored. into the memory of the massager.

When using the massager to massage, the corresponding speed is obtained from the memory according to the selected working gear as the first speed

Alternatively, after the massager is started and the working gear is selected, the rotational speed of the electric motor is directly measured as the first rotational speed of the electric motor.

Alternatively, after the massager selects the working gear, the input power loaded on the motor of the massager is detected, and the motor speed under the state corresponding to the input power is read from the memory as the first speed.

In addition, other forms of rotational speed acquisition methods that meet the use requirements in the embodiments of the present invention may also be used, which will not be listed in detail here.

[0081]

Step S120, detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed.

[0082]

In this embodiment, when acquiring the second rotational speed, it is necessary to ensure that the massager is in the same state as when acquiring the first rotational speed, that is to say, it is in the same gear as when acquiring the first rotational speed, or is in the same state as the motor when acquiring the first rotational speed. The same state of the input power at the speed of rotation.

[0083]

When the massage head is in contact with the human body, the detection of the rotational speed of the motor can be various. For example, the current value of the motor during the working process can be obtained by detecting the current of the motor, and then the actual rotational speed of the motor can be obtained by conversion, as The second speed is used.

Alternatively, the rotational speed of the motor is measured with a tachometer.

In addition, other forms of rotational speed acquisition methods that meet the use requirements in the embodiments of the present invention may also be used, which will not be listed in detail here.

[0084]

Step S130, determining the real-time pressure that the human body bears in the selected state when the massage head is in contact with the human body according to the change of the second rotating speed relative to the first rotating speed,

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[0085]

The load of the motor is inversely proportional to the speed. The greater the load of the motor, the smaller the speed. The torque of the motor is inversely proportional to the speed.

In this embodiment, when the massage head of the massager is in contact with the human body, as the pressing force of the user increases, the contact pressure between the massage head and the human body increases, the load of the motor will also increase synchronously, and the speed of the motor will decrease synchronously at this time. .

The decrease in the speed of the motor causes the torque of the motor to increase synchronously, that is, the massage head of the massager increases the massage force on the human body, that is, the pressure on the human body from the massage head increases.

Therefore, in this embodiment, the real-time pressure from the massager that the human body bears in the selected state when the massage head is in contact with the human body can be determined by changing the second rotating speed relative to the first rotating speed.

[0086]

Step S140, displaying the real-time pressure in the selected state.

[0087]

In this embodiment, the state mentioned in step S140 refers to the selected state in step S110, that is, the working gear selected by the user when using the massager to massage.

That is to say, the pressure displayed in step S140 is the pressure of the massager in the same state as the first rotational speed obtained in step S110.

The pressure can be displayed in various ways. Exemplarily, a plurality of indicator lights are provided on the massager. When the pressure increases, the indicator lights are turned on in sequence; or different indicator lights are turned on for different pressures.

Alternatively, a display screen is provided on the massager for displaying the pressure that the massager currently presses on the human body.

In addition, other forms of display modes that meet the usage requirements in the embodiments of the present invention may also be used, which will not be listed in detail here.

[0088]

The massage head of the massager acts on the human body, and the reaction force of the human body to the massage head will increase the load of the motor of the massager, causing the speed of the motor to decrease and the torque to increase, thereby increasing the pressure of the massage head on the human body.

Therefore, in this embodiment, the pressure on the human body when the massage head is in contact with the human body can be determined by comparing the second rotational speed of the motor during massage with the first rotational speed when the massage head is not in contact with the human body.

[0089]

In the technical solution of this embodiment, when the massage head of the massager is not in contact with the human body, the first rotational speed of the motor of the massager in the selected state is obtained, and the second rotation speed of the massager when the massager is in contact with the human body is obtained in the same state. The rotation speed is finally determined according to the first rotation speed and the second rotation speed to determine the real-time pressure that the human body bears in the selected state, and the real-time pressure in the state is displayed.

For the acquisition of the speed of the motor and the determination of the pressure on the human body according to the comparison of the first speed and the second speed, the computing power involved is relatively low, and it can be integrated inside the massager to reduce the dependence on external circuits and external equipment. .

Since the load of the motor is inversely proportional to the rotational speed, the greater the load of the motor, the smaller the rotational speed, and the torque of the motor is inversely proportional to the rotational speed. When the strength increases, the load of the motor will also increase synchronously. At this time, the speed of the motor will decrease synchronously, and the torque of the motor will increase synchronously. The performance of the massager is that the massage head of the massager increases the massage force on the human body, and the human body bears The pressure of the massage head increases.

Therefore, in the present invention, the comparison between the second rotation speed and the first rotation speed can be used to determine the strength of the pressure pressed by the massager on the human body, and then the pressure is displayed on the massager for the selected state, so that the user can intuitively, through the pressure display, the current pressure of the massager on the human body is determined, which effectively improves the user experience.

[0090]

Embodiment 2

[0091]

2 is a flowchart of a massager pressure feedback method provided in Embodiment 2 of the present invention. This embodiment is embodied on the basis of the above-mentioned embodiment, and the method includes the following steps:

[0092]

Step S201 , detecting the selected state in the massager, which is used to distinguish the intensity of the reciprocating motion of the massage head.

[0093]

In this embodiment, the selected state refers to the working gear selected by the user in the process of using the massager to massage.

The massager is preset with a number of different states. In different states, the input power of the motor of the massager is different, thereby changing the torque of the motor of the massager, that is, changing the pressing strength of the massage head on the contact position with the human body.

Secondly, the intensity of the reciprocating motion of the massage head refers to that, under different states, the input power of the motor of the massager is different, and the rotational speed under the lowest load state when not in contact with the human body is different, thus causing the reciprocating motion of the massage head. The frequency is different, that is, the intensity of the reciprocating motion of the massage head is different.

[0094]

Step S202 , query the rotational speed set in the corresponding state as the first rotational speed, wherein the first rotational speed is positively correlated with the intensity.

[0095]

In this embodiment, by detecting the rotational speed of the motor of the massager in different states when the massager is not in contact with the human body, a relationship table between the rotational speed and the state is established and stored in the memory.

When using the massager for massage, the corresponding rotational speed is queried from the memory according to the state selected by the user and used as the first rotational speed.

[0096]

In this embodiment, the rotational speed of the motor of the massager is positively correlated with the input power of the motor.

Under the same conditions, the higher the input power, the higher the rotational speed of the motor, which is manifested in the higher frequency of reciprocating motion of the massage head on the massager, that is, the first rotational speed is positively correlated with the intensity.

[0097]

In other embodiments, the acquisition of the first rotational speed may also be implemented in other manners, for example, including:

[0098]

Step S201', obtaining the rated power of the motor in the selected state.

[0099]

The rated power of the motor is detected by setting a detection circuit in the body of the massager, and the power of the motor after the massager is powered on is obtained as the rated power of the massager.

[0100]

Step S202', determining the rotational speed of the motor when the motor runs at rated power as the first rotational speed.

[0101]

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In this embodiment, by detecting the rotational speed of the motor of the massager under different rated powers when the massager is not in contact with the human body, a relationship table between the rotational speed and the working power is established and stored in the memory.

When in use, the corresponding rotational speed is queried from the memory according to the detected rated power as the first rotational speed.

[0102]

Detect the rated power of the motor of the massager, and determine the first speed of the motor by the rated power of the massager, which can effectively avoid the decrease in the rated power caused by the decrease of the battery of the massager, which will affect the speed of the motor and cause the first speed of the motor. The problem of inaccurate determination of the rotational speed ensures the accuracy of the acquisition of the first rotational speed.

[0103]

In addition, in other embodiments, the rotation speed of the motor of the massager may be detected as the first rotation speed when the massager is started and before the massage head of the massager is not in contact with the human body.

[0104]

Same as the above-mentioned embodiment, when the massager is started, the rotating speed at which the massage head of the massager is not in contact with the human body is detected as the first rotating speed, which can effectively avoid the influence of the decrease in the working power caused by the decrease in battery power on the rotating speed of the motor of the massager, and ensure that The accuracy of the first speed.

[0105]

Step S203 , setting a plurality of thresholds according to the first rotational speed, and dividing the rotational speed of the electric motor into a plurality of intervals based on the thresholds.

[0106]

The acquisition of the threshold value may be obtained by offsetting the first rotational speed, in order to divide the rotational speed of the electric motor into a plurality of intervals corresponding to different rotational speed intervals and pressure levels respectively.

In addition, the threshold value may also be set by setting a plurality of coefficients, and by multiplying the set coefficient by the first rotational speed to obtain a plurality of threshold values, the rotational speed of the motor is divided into a plurality of continuous intervals.

[0107]

For example, the first speed is 1000r/min, and the first speed is offset to obtain 200r/min, 400r/min, 600r/min, 800r/min, then the corresponding interval range is 0-200r/min, 200-400r/ min, 400-600r/min, 600-800r/min, 800-1000r/min, the corresponding levels are: the fifth level corresponding to 0-200r/min, the fourth level corresponding to 200-400r/min, 400- The third level corresponding to 600r/min, the second level corresponding to 600-800r/min, and the first level corresponding to 800-1000r/min.

[0108]

Another example: the first speed is 1000r/min, and multiple coefficients of 0.2, 0.4, 0.6, and 0.8 are set, then the corresponding threshold value is the first speed multiplied by the coefficient, that is, 200r/min, 400r/min, 600r/min , 800r/min.

[0109]

It should be known that the division method here is only a specific example, and other division methods may also be selected in the implementation process.

[0110]

Step S204 , classifying the pressure corresponding to the interval range of the human body in the selected state when the massage head is in contact with the human body.

[0111]

When the massage head of the massager is in contact with the human body, the pressure exerted by the massage head on the human body is negatively correlated with the rotational speed of the motor of the massager.

That is, the closer the rotational speed of the motor is to the first rotational speed, the lower the pressure on the human body; the lower the rotational speed of the motor, the greater the pressure on the human body.

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Classifying the corresponding range of pressure on the human body can be simply understood as classifying the pressure on the human body according to the number of ranges.

[0112]

Step S205 , compare the second rotational speed with the interval range, and determine the pressure level corresponding to the second rotational speed.

[0113]

Step S206, displaying the real-time pressure in the selected state.

[0114]

Because in step S204, the range corresponding to the pressure on the human body is divided into multiple levels.

When the second rotational speed is compared with the interval range in step S205, the interval in which the second rotational speed falls and the corresponding pressure level can be intuitively obtained.

By dividing the pressure generated by the massager at the second rotational speed on the contact position with the human body according to the interval range, the pressure of the massage head of the massager on the contact position with the human body can be intuitively reflected, and the user can Adjust the pressure according to the displayed pressure level, so that the massager can work within the pressure range suitable for the user.

[0115]

In a specific embodiment, the second rotational speed is compared with the divided interval range to determine the pressure level corresponding to the second rotational speed, including:

[0116]

If the second rotational speed is greater than the second threshold and less than or equal to the first rotational speed, the pressure is at the first level;

[0117]

If the second rotational speed is greater than the first threshold and less than or equal to the second threshold, the pressure is at the second level;

[0118]

If the second rotational speed is greater than 0 and less than or equal to the first threshold, the pressure is at the third level.

[0119]

Here, just as an example, the threshold value includes a first threshold value and a second threshold value, and the level includes a first level, a second level and a third level, wherein the first threshold value is smaller than the second threshold value, the first level, the second level , The pressure of the third level increases step by step.

In other embodiments, more thresholds may be set, the first rotational speed is divided into more intervals, and the pressure level is divided into more and more detailed levels.

[0120]

In this embodiment, by detecting the selected working gear and determining the first rotational speed in the corresponding working gear, the process of obtaining the first rotational speed can be simplified and the amount of calculation can be reduced.

The first rotational speed and the detected second rotational speed of the massager in the same working gear are used to determine the pressure of the massager to massage the human body under the current working gear, which can improve the accuracy of the pressure feedback and assist the user to better Confirm the current pressing pressure of the massager, and further adjust the pressing pressure of the massager to suit the different needs of users.

By detecting the working power of the massager, and then determining the first rotation speed according to the working power, it can effectively avoid the problem of the motor input power drop of the massager caused by the decrease of electricity from affecting the judgment of the first rotation speed and ensure the acquisition of the first rotation speed. It ensures the accuracy and reliability of the pressure determined according to the second rotation speed and the first rotation speed, and assists the user to precisely control the pressing pressure of the massager.

The pressing pressure of the massager is divided into different levels according to the first rotation speed, and the corresponding status display is performed for the pressure of different levels, which is convenient for the user to directly

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determine the pressing pressure of the massager through the status display, and avoids relying on the user's senses to judge the massage. The specific pressure of the massager ensures the reliability of the massager.

[0121]

Embodiment 3

[0122]

3 is a flow chart of a massager adjustment method provided in Embodiment 3 of the present invention. This embodiment is further applied on the basis of the above-mentioned embodiment, and the method includes the following steps:

[0123]

In this embodiment, the massager pressure feedback method provided in Embodiment 1 or Embodiment 2 is used to obtain the real-time pressure of the massager. The massager adjustment method described in this embodiment includes:

[0124]

Step S301, detecting the pressure level set in the selected state.

[0125]

In this embodiment, the selected state refers to the working gear selected by the user in the process of using the massager to massage, and the set pressure level refers to the selected working gear according to the embodiment For different pressure levels divided by the division method in step S203 and step S204 in step 2, the user can select the desired pressure level, ie, set the pressure level, in the process of using the massager to massage.

When the massager works under the selected working gear, the electric motor of the massager has a rated input power

[0126]

Step S302, determining a reference pressure range according to the pressure level.

[0127]

In this embodiment, the reference pressure range refers to the range of the massage intensity with which the massager massages the human body corresponding to the pressure level, that is, the size range of the massage intensity corresponding to the pressure level.

For details, please refer to the division of pressure levels in steps S203 to S205 in the second solution. In other words, the reference pressure range described in this embodiment can also be divided in steps S203 to S205 in the second embodiment. The pressure level, according to the pressure level to determine the reference pressure range of the massager.

[0128]

Step S303: Determine the interval range of the rotational speed of the motor of the massager under the selected pressure level according to the reference pressure range.

[0129]

Further, the reference pressure range may correspond to the pressure level in step S205 in the second embodiment, that is, different pressure levels are used to represent the pressure interval range of different massagers for massaging the human body.

[0130]

In this embodiment, during the actual use of the massager, the user can set the pressure level of the output pressure of the massager. After the massager detects the selected pressure level, the corresponding pressure level obtained in step S302 relationship, the size range of the rotation speed corresponding to the selected pressure level can be determined.

[0131]

In this embodiment, the interval range of the rotational speed refers to the size range of the rotational speed determined according to the current pressure level of the massager.

Specifically, reference may be made to the plurality of interval ranges that the first rotational speed is divided into by thresholds in step S203 of the second embodiment, which correspond to the pressure level of the massager on the human body, that is, the selected pressure in this embodiment, corresponding to the level.

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Here, the corresponding relationship between the reference pressure range and the rotational speed range can be obtained through the selected pressure level.

[0132]

Step S304, detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed.

[0133]

In this embodiment, the second rotational speed is the real-time rotational speed of the motor of the massager under the current working condition.

When obtaining the second speed, it is necessary to ensure that the massager is in the same state as when obtaining the first speed, that is to say, it is in the same gear as when obtaining the first speed, or the input power of the motor is the same when obtaining the first speed. working position.

[0134]

When the massage head is in contact with the human body, the rotational speed of the motor is detected by using a tachometer to measure the rotational speed of the motor.

In addition, other forms of rotational speed acquisition methods that meet the use requirements in the embodiments of the present invention may also be used, such as using an encoder to directly monitor or control the frequency of an input voltage through an inverter to indirectly calculate and obtain the rotational speed, which will not be listed in detail here. .

[0135]

Further, after step S304, the second rotational speed can also be compared with the first rotational speed in the selected state, and when it is detected that the second rotational speed is smaller than the first rotational speed, it goes to step S305 to compare with the interval range, so as to it is ensured that the adjustment of the massage pressure of the massager is carried out after the massager acts on the human body, so as to avoid performing step S305 to continuously adjust the rotational speed of the massager when the massager is not in contact with the human body. A large amount of adjustment work is brought about by the interval range corresponding to a given pressure level.

And avoid the large change of the pressure in contact with the human body caused by the large change of the rotating speed of the massager after the massager is in contact with the human body, and improve the comfort when using the massager for massage.

In addition, when the massager is not in contact with the human body, the rotation speed of the motor of the massager should be equal to the first rotation speed in the selected state, that is to say, it is detected that the rotation speed of the massager should be equal to the first rotation speed.

Therefore, when the second rotational speed is equal to the first rotational speed, the massager is not in contact with the human body, and the massage pressure of the massager does not need to be adjusted at this time.

[0136]

Step S305, compare the second rotational speed with the interval range.

[0137]

If the second rotational speed is greater than the interval range, step S306 is performed;

[0138]

If the second rotational speed falls within the interval range, step S306 is executed.

[0139]

If the second rotational speed is smaller than the interval range, step S307 is executed.

[0140]

Step S306, maintaining the input power of the motor unchanged.

[0141]

Step S307, reducing the input power of the motor.

[0142]

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Further, in this embodiment, the rated input power of the motor may be reduced by the ratio of the second rotational speed to the lowest value of the interval range as the current input power of the motor.

[0143]

In other embodiments, it may be detected for the first time that the second rotational speed falls within the interval range and then proceed to step S305 to adjust the rotational speed of the motor of the massager, so as to adjust the massage pressure of the massager.

In addition, a rotational speed threshold can also be set, and when it is detected that the second rotational speed of the motor of the massager is greater than the rotational speed threshold, the process proceeds to step S305 to compare the second rotational speed with the interval range, and then determine the further steps to be executed, and finally realize the The adjustment and maintenance of the massage intensity of the massager.

[0144]

In this embodiment, comparing the second rotational speed with the interval range refers to judging whether the second rotational speed is in the interval range of the rotational speed corresponding to the selected pressure level, that is, ensuring that the rotational speed of the massager in actual operation is within the selected pressure level. Within the range of the corresponding rotational speed under the pressure level, ensure that the pressure exerted by the massager on the human body during use conforms to the pressure level corresponding to the pressure level selected by the user, and ensures that the user is using the massage provided by this embodiment. The comfort of the massager with the massager adjustment method.

[0145]

By matching the selected pressure level with the reference pressure range, the interval range of the rotational speed corresponding to the selected pressure level is obtained, that is, the range of the second rotational speed corresponding to the currently selected pressure level is obtained. The power makes the second speed of the motor fall within the selected range, which can ensure the pressure of the massager on the human body during the working process, realize the maintenance of the pressure of the massage, and avoid the need for the user to maintain the pressure on the massager. The pressing force controls the pressure that the massager presses on the human body.

[0146]

Embodiment 4

[0147]

4 is a flowchart of a massager adjustment method provided in Embodiment 4 of the present invention. This embodiment is further applied on the basis of the above-mentioned embodiment, and the method includes the following steps:

[0148]

Step S401, obtaining the maximum allowable pressure set by the massager, and the maximum allowable pressure is the maximum pressure that the massager can provide in the selected state when the massage head is in contact with the human body;

[0149]

The maximum allowable pressure can be set when the massager leaves the factory. The maximum allowable pressure is the maximum pressure that the massager can provide when the massage head is in contact with the human body and the massager is in the state. The load corresponding to the maximum allowable pressure should be less than or equal to the motor. the rated load to avoid overloading the motor.

[0150]

Step S402, obtaining the third rotational speed corresponding to the maximum allowable pressure;

[0151]

The third rotational speed can be obtained by pressing the massager on the human body, so that the pressing pressure of the massage head on the human body reaches the maximum allowable pressure, and the rotational speed of the motor at this time is detected as the third rotational speed.

[0152]

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Step S403, detecting the rotational speed of the motor when the massage head is in contact with the human body, as the second rotational speed;

[0153]

When the massage head is in contact with the human body, the detection of the rotational speed of the motor may be various. For example, the rotational speed of the motor may be measured by using a tachometer.

In addition, other forms of rotational speed acquisition methods that meet the use requirements in the embodiments of the present invention may also be used, which will not be listed in detail here.

[0154]

Step S404, comparing the second rotational speed with the third rotational speed;

[0155]

If the second rotational speed is less than or equal to the third rotational speed, step S405 is performed;

[0156]

Step S405, reducing the input power of the motor to reduce the pressure on the human body.

[0157]

Further, when the second rotational speed is restored to be greater than the third rotational speed, the input power of the electric motor is restored.

[0158]

By comparing the second rotational speed of the motor of the massager in actual use with the set third rotational speed, and reducing the working power of the motor when the second rotational speed is greater than the third rotational speed, the pressure of the massager can be prevented from exceeding the human body. The maximum pressure that can be tolerated to avoid muscle damage to the human body and ensure the safety of users when using the massager for massage

[0159]

Embodiment 5

[0160]

5 is a structural diagram of a massage pressure feedback device according to Embodiment 5 of the present invention. The device can execute the massage pressure feedback method described in the above-mentioned embodiments. Specifically, the device includes:

[0161]

The first rotational speed detection module 501 is used to obtain the rotational speed of the motor when the massage head is not in contact with the human body when the massager is running in a selected state, as the first rotational speed, or for detecting when the massage head is in contact with the human body , the speed of the motor, as the second speed.

[0162]

The pressure determination module 502 is configured to determine, according to the second rotational speed and the first rotational speed, the pressure that the human body bears under the state when the massage head is in contact with the human body.

[0163]

The display module 503 is used to display the pressure for the state.

[0164]

The working gear detection unit is used for detecting the working gear selected in the massager, and the working gear is used to indicate the intensity of the reciprocating motion of the massage head.

[0165]

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The rotational speed query unit is used for querying the rotational speed set corresponding to the working gear as the first rotational speed, wherein the first rotational speed is positively correlated with the intensity.

[0166]

The working power detection unit is used to detect the working power loaded on the motor as the working power.

[0167]

The rotational speed determination unit is used for determining the rotational speed of the electric motor when it runs under the working power, as the first rotational speed.

[0168]

The threshold value setting unit is configured to set a plurality of threshold values according to the first rotational speed, and divide the first rotational speed into a plurality of intervals.

[0169]

The grading unit is used for grading the corresponding interval range of the pressure that the human body bears under the state when the massage head is in contact with the human body.

[0170]

The first comparison unit is configured to compare the second rotational speed with the interval range, and determine the pressure level corresponding to the second rotational speed.

[0171]

The selected level detection unit is used to detect the level to which the selected pressure in the massager belongs.

[0172]

The interval determination unit is used to determine the interval range according to the level.

[0173]

a second comparison unit, configured to compare the second rotational speed with the interval range, if the second rotational speed is less than the interval range, reduce the working power of the motor; if the second rotational speed falls within the interval range, maintain the working power of the motor unchanged; If the second rotational speed is greater than the interval range, the working power of the motor is maintained.

[0174]

A pressure acquisition unit is set for acquiring the maximum allowable pressure set by the massager. The maximum allowable pressure is the maximum pressure that the massager can provide when the massage head is in contact with the human body and the massager is in a state.

[0175]

The third rotational speed obtaining unit is configured to obtain the third rotational speed corresponding to the maximum allowable pressure.

[0176]

The third comparison unit is configured to compare the second rotational speed with the third rotational speed, and if the second rotational speed is less than or equal to the third rotational speed, reduce the working power of the motor to reduce the pressure on the human body.

[0177]

The massage pressure feedback device provided by the embodiment of the present invention can execute the massage pressure feedback method provided by any embodiment of the present invention, and has functional modules and beneficial effects corresponding to the execution method.

[0178]

Embodiment 6

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[0179]

6 is a structural diagram of a massager pressure regulating device according to Embodiment 6 of the present invention. The device can perform the damage detection method of the above-mentioned embodiment. Specifically, the device includes:

[0180]

The state detection module 601 is used to detect the pressure level set in the selected state;

[0181]

The reference pressure range determination module 602 determines the reference pressure range according to the pressure level;

[0182]

The interval range detection module 603 is used to determine the interval range of the rotational speed of the motor of the massager in the state according to the reference pressure range;

[0183]

The second rotational speed detection module 604 is used to detect the rotational speed of the motor when the massage head is in contact with the human body, as the second rotational speed;

[0184]

a first comparison module 605, configured to compare the second rotational speed with the interval range;

[0185]

The first input power adjustment module 606 is used to maintain the input power of the motor when the second rotational speed is greater than the maximum value of the interval range; when the second rotational speed falls within the interval range, maintain the input power of the motor unchanged; When the rotation speed is less than the minimum value of the interval range, reduce the input power of the motor.

[0186]

The massager pressure regulating device provided by the embodiment of the present invention can execute the massager pressure regulating method provided by any embodiment of the present invention, and has corresponding functional modules and beneficial effects for executing the method.

[0187]

Embodiment 7

[0188]

7 is a structural diagram of a pressure regulating device for a massager provided in Embodiment 7 of the present invention. The device can perform the damage detection method of the above-mentioned embodiment. Specifically, the device includes:

[0189]

The maximum allowable pressure acquisition module 701 obtains the maximum allowable pressure set by the massager, and the maximum allowable pressure is the maximum pressure that the massager can provide when the massager head is in contact with the human body set by the user;

[0190]

A third rotational speed obtaining module 702, configured to obtain a third rotational speed corresponding to the maximum allowable pressure;

[0191]

The third rotational speed detection module 703 is used to detect the rotational speed of the motor when the massage head is in contact with the human body, as the second rotational speed;

[0192]

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a second comparison module 704, configured to compare the second rotational speed with the third rotational speed;

[0193]

The second input power adjustment module 705 is configured to reduce the input power of the motor when the second rotational speed is less than or equal to the third rotational speed, so as to reduce the pressure on the human body.

[0194]

The massager pressure regulating device provided by the embodiment of the present invention can execute the massager pressure regulating method provided by any embodiment of the present invention, and has corresponding functional modules and beneficial effects for executing the method.

[0195]

Embodiment 8

[0196]

FIG. 8 is a structural diagram of a device provided in Embodiment 8 of the present invention. As shown in FIG. 8 , the device includes a processor 810, a memory 820, an input device 830, and an output device 840; the number of processors 410 in the device may be one or more Multiple, one processor 810 is taken as an example in FIG. 4; the processor 810, the memory 820, the input device 830 and the output device 840 in the device/terminal/server can be connected by a bus or in other ways, and in FIG. 8, it is connected by a bus For example.

[0197]

As a computer-readable storage medium, the memory 810 can be used to store software programs, computer-executable programs, and modules, such as program instructions/modules corresponding to the massager pressure feedback method in the embodiment of the present invention (for example, in the massage pressure feedback device). The first rotation speed acquisition module 501, the second rotation speed acquisition module 502, the pressure determination module 503, the display module 504, or the state detection module 601, the reference pressure range determination module 602, the interval range detection module 603, the first Two rotation speed detection module 604, first comparison module 605, first input power adjustment module 606, maximum allowable pressure acquisition module 701, third rotation speed acquisition module 702, second rotation speed acquisition module 703, second comparison module 704, second input power adjustment module 705).

The processor 810 executes various functional applications and data processing of the device by running the software programs, instructions and modules stored in the memory 820, ie, implements the massager pressure feedback method described above.

[0198]

The memory may mainly include a stored program area and a stored data area, wherein the stored program area may store an operating system and an application program required for at least one function; the stored data area may store data created according to the use of the terminal, and the like.

Additionally, the memory may include high speed random access memory, and may also include nonvolatile memory, such as at least one magnetic disk storage device, flash memory device, or other nonvolatile solid state storage device.

In some examples, the memory may further include memory located remotely from the processor, the remote memory being connectable to the device through a network.

Examples of such networks include, but are not limited to, the Internet, an intranet, a local area network, a mobile communication network, and combinations thereof.

[0199]

The input device 830 may be used to receive the collected first rotational speed and second rotational speed.

An output device 840 may be used to display pressure information.

[0200]

In addition, it should be noted that the first rotational speed detection module 501, the second rotational speed detection module 604 and the third rotational speed detection module 703 in the fifth embodiment to the eighth embodiment may be the same rotational speed detection module, and the different labels are only for convenience understanding of different implementations.

[0201]

Embodiment 9

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[0202]

The ninth embodiment of the present invention also provides a storage medium containing computer-executable instructions, on which a computer program is stored, and when the program is executed by a processor, a massager pressure feedback method is implemented, and the method includes:

[0203]

When the massager is running in the selected state, the rotational speed of the motor when the massage head is not in contact with the human body is obtained as the first rotational speed;

[0204]

Detect the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

[0205]

According to the second rotating speed and the first rotating speed, determine the pressure that the human body bears under the state when the massage head is in contact with the human body;

[0206]

Displays pressure for status.

[0207]

Of course, a storage medium containing computer-executable instructions provided by an embodiment of the present invention, the computer program of which is not limited to the above-mentioned method operations, and can also execute the massager pressure feedback method or massage provided by any embodiment of the present invention. Relevant operations in the method of adjusting the pressure of the device.

[0208]

From the above description of the embodiments, those skilled in the art can clearly understand that the present invention can be realized by software and necessary general-purpose hardware, and of course can also be realized by hardware, but in many cases the former is a better embodiment .

Based on such understanding, the technical solutions of the present invention can be embodied in the form of software products in essence or the parts that make contributions to the prior art, and the computer software products can be stored in a computer-readable storage medium, such as a floppy disk of a computer , read-only memory (Read-Only Memory, ROM), random access memory (Random Access Memory, RAM), flash memory (FLASH), hard disk or CD, etc., including several instructions to make a computer device (which can be a personal computer, A server, or a network device, etc.) executes the methods described in the various embodiments of the present invention.

[0209]

It is worth noting that in the above embodiments of the massage adjustment device, the units and modules included are only divided according to functional logic, but are not limited to the above division, as long as the corresponding functions can be realized; The specific names of the functional units are only for the convenience of distinguishing from each other, and are not used to limit the protection scope of the present invention

[0210]

Note that the above are only preferred embodiments of the present invention and applied technical principles.

Those skilled in the art will understand that the present invention is not limited to the specific embodiments described herein, and various obvious changes, readjustments and substitutions can be made by those skilled in the art without departing from the protection scope of the present invention.

Therefore, although the present invention has been described in detail through the above embodiments, the present invention is not limited to the above embodiments, and can also include more other equivalent embodiments without departing from the concept of the present invention. The scope is determined by the scope of the appended claims.

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CLAIMS CN111759711A

1.

A massager pressure feedback method, characterized in that, when applied to a massager, the massager has a motor and a massage head, and the motor is used to drive the massage head to reciprocate, and the method includes:

When the massager is running in the selected state, the rotational speed of the motor when the massage head is not in contact with the human body is obtained as the first rotational speed;

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

Determine the real-time pressure that the human body bears in the state when the massage head is in contact with the human body according to the change of the second rotating speed relative to the first rotating speed;

The real-time pressure in the state is displayed.

2.

The massager pressure feedback method according to claim 1, wherein when the massager is running in a selected state, the rotation speed of the motor when the massage head is not in contact with the human body is obtained, As the first speed, including:

detecting a selected state in the massager, the state being used to distinguish the intensity of the reciprocating motion of the massage head;

The rotation speed set corresponding to the state is queried as the first rotation speed, wherein the first rotation speed is positively correlated with the strength.

3.

The massager pressure feedback method according to claim 1, wherein when the massager is running in a selected state, the rotation speed of the motor when the massage head is not in contact with the human body is obtained, As the first speed, including:

Get the rated power of the motor in the selected state;

The rotational speed of the electric motor when operating at the rated power is determined as the first rotational speed.

4.

The massager pressure feedback method according to claim 1, characterized in that, when the massage head is in contact with the human body according to the second rotation speed and the first rotation speed, the human body is in the state stress, including:

Setting a plurality of thresholds according to the first rotational speed, and dividing the rotational speed of the electric motor into a plurality of intervals based on the thresholds;

When the massage head is in contact with the human body, the pressure that the human body bears in the state is classified according to the interval range;

The second rotational speed is compared with the interval range, and the level of the pressure corresponding to the second rotational speed is determined.

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5.

The massager pressure feedback method according to claim 4, wherein the threshold value comprises a first threshold value and a second threshold value, and the level comprises a first level, a second level and a third level, wherein the first level A threshold value is smaller than the second threshold value, and the pressures of the first level, the second level, and the third level increase step by step;

The comparing the second rotational speed with the interval range to determine the level corresponding to the second rotational speed includes:

If the second rotational speed is greater than the second threshold and less than or equal to the first rotational speed, the pressure is at the first level;

If the second rotational speed is greater than the first threshold and less than or equal to the second threshold, the pressure is at the second level;

If the second rotational speed is greater than 0 and less than or equal to the first threshold, the pressure is at the third level.

6.

A massager adjustment method, characterized in that the massager pressure feedback method according to any one of claims 1-5 is used to obtain the real-time pressure of the massager, and the massager adjustment method comprises.

Detect the pressure level set in the selected state;

Determine the reference pressure range according to the pressure level;

Determine the interval range of the rotational speed of the motor of the massager under the pressure level according to the reference pressure range;

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

comparing the second rotational speed with the interval;

If the second rotational speed falls within the interval, maintaining the input power of the electric motor unchanged;

If the second rotational speed is smaller than the maximum value of the interval, the input power of the electric motor is reduced.

7.

A massager adjustment method, characterized in that the massager pressure feedback method according to any one of claims 1-5 is used to obtain the real-time pressure of the massager, and the massager adjustment method comprises.

Obtain the maximum allowable pressure set by the massager, which is the maximum pressure that the massager can provide in the selected state when the massage head set by the user is in contact with the human body;

obtaining the third rotational speed corresponding to the maximum allowable pressure;

Detecting the rotational speed of the motor when the massage head is in contact with the human body as the second rotational speed;

comparing the second rotational speed to the third rotational speed;

If the second rotational speed is less than or equal to the third rotational speed, the input power of the electric motor is reduced to reduce the pressure on the human body.

8.

A massager pressure feedback device, characterized in that it includes:

The rotational speed detection module is used to obtain the rotational speed of the motor when the massage head is not in contact with the human body when the massager is running in the selected state, as the first rotational speed;

Or, for detecting the rotational speed of the motor when the massage head is in contact with the human body, as the second rotational speed;

a pressure determination module, configured to determine, according to the second rotational speed and the first rotational speed, the pressure that the human body bears in the state when the massage head is in contact with the human body;

A display module for displaying the pressure for the state.

9.

A massager pressure regulating device, characterized in that it comprises using the massager pressure feedback device according to claim 8 to obtain the real-time pressure of the massager, further comprising:

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The state detection module is used to detect the pressure level set in the selected state;

a reference pressure range determination module, which determines a reference pressure range according to the pressure level;

an interval range detection module for determining the interval range of the rotational speed of the motor of the massager in the state according to the reference pressure range;

a first comparison module, configured to compare the second rotational speed with the interval range;

a first input power adjustment module, configured to maintain the input power of the motor unchanged when the second rotational speed falls within the interval range; when the second rotational speed is less than the minimum value of the interval range, Reduce the input power of the motor.

10.

A massager pressure regulating device, characterized in that it comprises using the massager pressure feedback device according to claim 8 to obtain the real-time pressure of the massager, further comprising:

The maximum allowable pressure acquisition module obtains the maximum allowable pressure set by the massager, which is the maximum allowable pressure set by the user when the massage head is in contact with the human body and the massager can be in the state. the maximum pressure provided;

A third rotational speed obtaining module, configured to obtain a third rotational speed corresponding to the maximum allowable pressure;

a second comparison module, configured to compare the second rotational speed with the third rotational speed;

A second input power adjustment module, configured to reduce the input power of the electric motor when the second rotational speed is less than or equal to the third rotational speed, so as to reduce the magnitude of the pressure on the human body.

11.

A device, characterized in that the device comprises:

one or more processors;

storage means for storing one or more programs,

When the one or more programs are executed by the one or more processors, the one or more processors implement the massager pressure feedback method of any one of claims 1-5, or, as The massager pressure feedback method according to any one of claims 6 or 7

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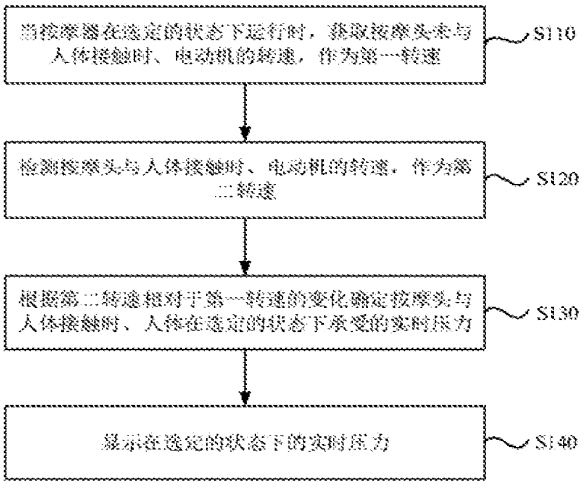
(54) 发明名称

按摩器压力反馈、调节方法、装置及设备

(57) 摘要

本发明公开了一种按摩器压力反馈、调节方法、装置及设备，应用于按摩器，按摩器具有电动机与按摩头，电动机用于驱动按摩头往复运动，方法包括：当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速；检测按摩头与人体接触时、电动机的转速，作为第二转速；根据第二转速相对于第一转速的变化确定人体承受的实时压力；显示在状态下的实时压力。通过获取按摩器在选定的状态下的电动机的第一转速，然后获取按摩器在相同状态下与人体接触时的第二转速，根据第一转速和第二转速确定人体在选定的状态下所承受的压力，并进行压力的显示，用户可直观的通过压力的显示确定目前的压力，改善了用户体验。



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1.一种按摩器压力反馈方法，其特征在于，应用于按摩器，所述按摩器具有电动机与按摩头，所述电动机用于驱动所述按摩头往复运动，所述方法包括：

当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速；

检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

根据所述第二转速相对于所述第一转速的变化确定所述按摩头与所述人体接触时、所述人体在所述状态下承受的实时压力；

显示在所述状态下的所述实时压力。

2.根据权利要求1所述的按摩器压力反馈方法，其特征在于，所述当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速，包括：

检测在所述按摩器中选定的状态，所述状态用于区分所述按摩头往复运动的强度；

查询对应所述状态设置的转速，作为第一转速，其中，所述第一转速与所述强度正相关。

3.根据权利要求1所述的按摩器压力反馈方法，其特征在于，所述当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速，包括：

获取在选定的状态下的所述电动机的额定功率；

确定所述电动机在所述额定功率下运行时的转速，作为第一转速。

4.根据权利要求1所述的按摩器压力反馈方法，其特征在于，所述根据所述第二转速与所述第一转速确定所述按摩头与所述人体接触时、所述人体在所述状态下承受的压力，包括：

根据所述第一转速设定多个阈值，基于所述阈值将所述电动机的转速划分为多个区间范围；

将所述按摩头与所述人体接触时、所述人体在所述状态下承受的压力对应所述区间范围进行等级划分；

将所述第二转速与所述区间范围进行比较，确定所述第二转速对应的所述压力的所述等级。

5.根据权利要求4所述的按摩器压力反馈方法，其特征在于，所述阈值包括第一阈值和第二阈值，所述等级包括第一等级、第二等级和第三等级，其中，所述第一阈值小于所述第二阈值，所述第一等级、所述第二等级、所述第三等级的压力逐级增加；

所述将所述第二转速与所述区间范围进行比较，确定所述第二转速对应的所述等级，包括：

若所述第二转速大于所述第二阈值，且小于等于所述第一转速，则所述压力为第一等级；

若所述第二转速大于所述第一阈值，且小于等于所述第二阈值，则所述压力为第二等级；

若所述第二转速大于0，且小于等于所述第一阈值，则所述压力为第三等级。

6.一种按摩器调节方法，其特征在于，采用权利要求1-5任一项所述的按摩器压力反馈

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方法获取所述按摩器的实时压力，所述按摩器调节方法包括：

检测在选定的状态下设定的压力等级；

根据所述压力等级确定参考压力范围；

根据所述参考压力范围确定所述按摩器的电动机在所述压力等级下的转速的区间范围；

检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

将所述第二转速与所述区间范围进行比较；

若所述第二转速落入所述区间范围内，则维持所述电动机的输入功率不变；

若所述第二转速小于所述区间范围的最大值，则降低所述电动机的输入功率。

7.一种按摩器调节方法，其特征在于，采用权利要求1-5任一项所述的按摩器压力反馈方法获取所述按摩器的实时压力，所述按摩器调节方法包括：

获取所述按摩器设定的最大允许压力，所述最大允许压力为用户设定的按摩头与人体接触时、所述按摩器在选定的状态下所能提供的最大的压力；

获取所述最大允许压力所对应的第三转速；

检测所述按摩头与人体接触时、电动机的转速，作为第二转速；

将所述第二转速与所述第三转速进行比较；

若所述第二转速小于或等于所述第三转速，则降低所述电动机的输入功率，以降低所述人体受到的压力的大小。

8.一种按摩器压力反馈装置，其特征在于，包括：

转速检测模块，用于当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速；

或，用于检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

压力确定模块，用于根据所述第二转速与所述第一转速确定所述按摩头与人体接触时、所述人体在所述状态下承受的压力；

显示模块，用于针对所述状态显示所述压力。

9.一种按摩器压力调节装置，其特征在于，包括采用权利要求8所述的按摩器压力反馈装置获取所述按摩器的实时压力，还包括：

状态检测模块，用于检测在选定的状态下设定的压力等级；

参考压力范围确定模块，根据所述压力等级确定参考压力范围；

区间范围检测模块，用于根据所述参考压力范围确定所述按摩器的电动机在所述状态下的转速的区间范围；

第一比较模块，用于将第二转速与所述区间范围进行比较；

第一输入功率调整模块，用于在所述第二转速落入所述区间范围内时，维持所述电动机的输入功率不变；在所述第二转速小于所述区间范围的最小值时，降低所述电动机的输入功率。

10.一种按摩器压力调节装置，其特征在于，包括采用权利要求8所述的按摩器压力反馈装置获取所述按摩器的实时压力，还包括：

最大允许压力获取模块，获取所述按摩器设定的最大允许压力，所述最大允许压力为用户设定的所述按摩头与所述人体接触时、所述按摩器在所述状态下所能提供的最大的压

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力；

第三转速获取模块，用于获取所述最大允许压力所对应的第三转速；

第二比较模块，用于将第二转速与所述第三转速进行比较；

第二输入功率调整模块，用于在所述第二转速小于或等于所述第三转速时，降低所述电动机的输入功率，以降低所述人体受到的压力的大小。

11.一种设备，其特征在于，所述设备包括：

一个或多个处理器；

存储装置，用于存储一个或多个程序，

当所述一个或多个程序被所述一个或多个处理器执行，使得所述一个或多个处理器实现如权利要求1-5中任一所述的按摩器压力反馈方法，或，如权利要求6或7中任一所述的按摩器压力反馈方法。

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按摩器压力反馈、调节方法、装置及设备

技术领域

[0001] 本发明实施例涉及按摩器技术，尤其涉及一种按摩器压力反馈、调节方法、装置及设备。

背景技术

[0002] 按摩器包括冲击式按摩和挤压式按摩，通过控制按摩器的按摩头对与人体接触的位置施加压力，从而实现对人体的按压按摩。冲击式按摩的按摩器，主要是通过产生高频的震动作用到肌肉深层，达到减少局部组织张力、缓解疼痛、促进血液循环等作用。

[0003] 不同的人使用按摩器进行按摩时，由于肌肉组织密度不同，对于冲击压力的耐受度不同，所需要的按压力度不同。现有技术中按摩器的按压压力调整，主要通过调整按摩器的工作档位，调整按摩器内部的电动机的电流、工作功率，进而改变电动机的实际转速实现，而用户获知按摩器当前的按压压力的强度主要通过观察按摩器的选定工作档位实现。

[0004] 这种方式下的按摩器，用户需要获知按摩器按压的压力强度，仅能够从按摩器选定工作档位获知，而并不能直接获知到按摩器在使用过程中的实际压力，使得用户在使用按摩器进行按摩时不能够准确的获取具体的按压强度，使得按摩器的用户体验不佳。

发明内容

[0005] 本发明提供一种按摩器压力反馈方法、装置及设备，便于用户确定和调节按摩器当前的压力强度，带来更好的用户体验。

[0006] 第一方面，本发明实施例提供了一种按摩器压力反馈方法，应用于按摩器，所述按摩器具有电动机与按摩头，所述电动机用于驱动所述按摩头往复运动，所述方法包括：

[0007] 当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速；

[0008] 检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

[0009] 根据所述第二转速相对于所述第一转速的变化确定所述按摩头与所述人体接触时、所述人体在所述状态下承受的实时压力；

[0010] 显示在所述状态下的所述实时压力。

[0011] 可选的，所述当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速，包括：

[0012] 检测在所述按摩器中选定的状态，所述状态用于区分所述按摩头往复运动的强度；

[0013] 查询对应所述状态设置的转速，作为第一转速，其中，所述第一转速与所述强度正相关。

[0014] 可选的，所述当所述按摩器在选定的状态下运行时，获取所述按摩头未与人体接触时、所述电动机的转速，作为第一转速，包括：

[0015] 获取在选定的状态下的所述电动机的额定功率；

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[0016] 确定所述电动机在所述额定功率下运行时的转速，作为第一转速。

[0017] 可选的，所述根据所述第二转速与所述第一转速确定所述按摩头与所述人体接触时、所述人体在所述状态下承受的压力，包括：

[0018] 根据所述第一转速设定多个阈值，基于所述阈值将所述电动机的转速划分为多个区间范围；

[0019] 将所述按摩头与所述人体接触时、所述人体在所述状态下承受的压力对应所述区间范围进行等级划分；

[0020] 将所述第二转速与所述区间范围进行比较，确定所述第二转速对应的所述压力的所述等级。

[0021] 可选的，所述阈值包括第一阈值和第二阈值，所述等级包括第一等级、第二等级和第三等级，其中，所述第一阈值小于所述第二阈值，所述第一等级、所述第二等级、所述第三等级的压力逐级增加；

[0022] 所述将所述第二转速与所述区间范围进行比较，确定所述第二转速对应的所述等级，包括：

[0023] 若所述第二转速大于所述第二阈值，且小于等于所述第一转速，则所述压力为第一等级；

[0024] 若所述第二转速大于所述第一阈值，且小于等于所述第二阈值，则所述压力为第二等级；

[0025] 若所述第二转速大于0，且小于等于所述第一阈值，则所述压力为第三等级。

[0026] 第二方面，本发明实施例还提供了一种按摩器调节方法，采用第一方面所述的按摩器压力反馈方法获取所述按摩器的实时压力，所述按摩器调节方法包括：

[0027] 检测在选定的状态下设定的压力等级；

[0028] 根据所述压力等级确定参考压力范围；

[0029] 根据所述参考压力范围确定所述按摩器的电动机在所述压力等级下的转速的区间范围；

[0030] 检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

[0031] 将所述第二转速与所述区间范围进行比较；

[0032] 若所述第二转速落入所述区间范围内，则维持所述电动机的输入功率不变；

[0033] 若所述第二转速小于所述区间范围的最大值，则降低所述电动机的输入功率。

[0034] 第三方面，本发明实施例还提供了一种按摩器调节方法，采用第一方面所述的按摩器压力反馈方法获取所述按摩器的实时压力，所述按摩器调节方法包括：

[0035] 获取所述按摩器设定的最大允许压力，所述最大允许压力为按摩头与人体接触时、所述按摩器在选定的状态下所能提供的最大的压力；

[0036] 获取所述最大允许压力所对应的第三转速；

[0037] 检测所述按摩头与人体接触时、电动机的转速，作为第二转速；

[0038] 将所述第二转速与所述第三转速进行比较；

[0039] 若所述第二转速小于或等于所述第三转速，则降低所述电动机的输入功率，以降低所述人体受到的压力的大小。

[0040] 第四方面，本发明实施例还提供了一种器压力反馈装置，包括：

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[0041] 转速检测模块，用于当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速；

[0042] 或，用于检测所述按摩头与人体接触时、所述电动机的转速，作为第二转速；

[0043] 压力确定模块，用于根据所述第二转速与所述第一转速确定所述按摩头与人体接触时、所述人体在所述状态下承受的压力；

[0044] 显示模块，用于针对所述状态显示所述压力。

[0045] 第五方面，本发明实施例还提供了一种按按摩器压力调节装置，包括采用第四方面所述的按摩器压力反馈装置获取所述按摩器的实时压力，还包括：

[0046] 状态检测模块，用于检测在选定的状态下设定的压力等级；

[0047] 参考压力范围确定模块，根据所述压力等级确定参考压力范围；

[0048] 区间范围检测模块，用于根据所述参考压力范围确定所述按摩器的电动机在所述状态下的转速的区间范围；

[0049] 第一比较模块，用于将第二转速与所述区间范围进行比较；

[0050] 第一输入功率调整模块，用于在所述第二转速大于所述区间范围的最大值时，增加所述电动机的输入功率；在所述第二转速落入所述区间范围内时，维持所述电动机的输入功率不变；在所述第二转速小于所述区间范围的最小值时，降低所述电动机的输入功率。

[0051] 第六方面，本发明实施例还提供了一种按摩器压力调节装置，包括采用第四方面所述的按摩器压力反馈装置获取所述按摩器的实时压力，还包括：

[0052] 最大允许压力获取模块，获取所述按摩器设定的最大允许压力，所述最大允许压力为用户设定的所述按摩头与所述人体接触时、所述按摩器在所述状态下所能提供的最大的压力；

[0053] 第三转速获取模块，用于获取所述最大允许压力所对应的第三转速；

[0054] 第二比较模块，用于将第二转速与所述第三转速进行比较；

[0055] 第二输入功率调整模块，用于在所述第二转速小于或等于所述第三转速时，降低所述电动机的输入功率，以降低所述人体受到的压力的大小。

[0056] 第七方面，本发明实施例还提供了一种设备，所述设备包括：

[0057] 一个或多个处理器；

[0058] 存储装置，用于存储一个或多个程序；

[0059] 当所述一个或多个程序被所述一个或多个处理器执行，使得所述一个或多个处理器实现如第一方面中所述的按摩器压力反馈方法，或，如第二方面、第三方面中所述的按摩器调节方法。

[0060] 本发明通过在按摩器的按摩头未与人体接触时，获取按摩器在选定的状态下的电动机的第一转速，并在相同状态下获取按摩器与人体接触时的第二转速，然后根据第一转速与第二转速确定人体在该状态下所承受的实时压力，并显示在该状态下的实时压力。对于电动机的转速获取，以及根据第一转速和第二转速比较确定人体所承受的压力，所涉及的算力较低，可集成在按摩器内部，以此减少对外部电路和对外部设备的依靠。由于电动机的负载与转速成反比关系，电动机的负载越大转速越小，且电动机的转矩与转速成反比关系，在本发明中，按摩器的按摩头与人体接触时，随着用户的按压力度增加，电动机的负载也将同步增加，此时电动机的转速同步下降，电动机的转矩同步增加，表现在按摩器上则是

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按摩器的按摩头对人体的按摩力度增加，人体所承受的来自按摩头的压力增加。因此，在本发明中可通过第二转速与第一转速的比较，确定按摩器对人体按压的压力的强弱对比，进而在按摩器上并针对选定的状态进行压力的显示，使得用户可直观的通过压力的显示确定目前按摩器对人体的压力强弱，有效的改善了用户体验。

附图说明

[0061] 图1为本发明实施例一中按摩器压力反馈方法的流程图；

[0062] 图2是本发明实施例二中按摩器压力反馈方法的流程图；

[0063] 图3是本发明实施例三中按摩器调节方法的流程图；

[0064] 图4是本发明实施例四中按摩器调节方法的流程图；

[0065] 图5是本发明实施例五中的按摩调节装置的结构图；

[0066] 图6是本发明实施例六中的按摩调节装置的结构图；

[0067] 图7是本发明实施例七中的按摩调节装置的结构图；

[0068] 图8是本发明实施例八中的按摩调节设备的结构图。

具体实施方式

[0069] 下面结合附图和实施例对本发明作进一步的详细说明。可以理解的是，此处所描述的具体实施例仅仅用于解释本发明，而非对本发明的限定。另外还需要说明的是，为了便于描述，附图中仅示出了与本发明相关的部分而非全部结构。

[0070] 实施例一

[0071] 图1为本发明实施例一提供的按摩器压力反馈方法的流程图，本实施例可适用于按摩器，按摩器具有电动机与按摩头，电动机用于驱动按摩头往复运动的情况，该方法可以由按摩调节装置来执行，具体包括如下步骤：

[0072] 步骤S110、当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速。

[0073] 在本实施例中，选定的状态指的是用户在使用按摩器进行按摩的过程中、选定的工作档位。按摩器工作在该选定的工作档位下工作时，按摩器的电动机输入功率保持恒定。

[0074] 在按摩器使用过程中，按摩器的按摩头未与人体接触时，按摩器的电动机的负载最小，此时电动机的转速最高。在本实施例中，在按摩头未与人体接触时获取的电动机的第一转速即按摩器的电动机的负载最小时的转速。

[0075] 在本实施例中，第一转速的获取方式可以是多种的，示例性的，在制作按摩器时测定按摩器在指定的档位下、按摩头未与人体接触时、电动机的转速，存储到按摩器的存储器中。在使用按摩器进行按摩时，根据选定的工作档位从存储器中获取对应的速度作为第一速度。又或者，在按摩器启动、并选定工作档位后，直接对电动机的转速进行测量，作为电动机的第一转速。还可以是，在按摩器选定工作档位后检测加载在按摩器的电动机上的输入功率，从存储器中读取对应输入功率状态下的电动机转速作为第一转速。另外，也可以是满足本发明实施例中使用需求的其他形式的转速获取方式，在此不做详尽列出。

[0076] 步骤S120、检测按摩头与人体接触时、电动机的转速，作为第二转速。

[0077] 在本实施例中，获取第二转速时，需保证按摩器处于与获取第一转速时相同的状

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态下，也就是说与获取第一转速时处于相同的档位，或者与电动机处于获取第一转速时的输入功率相同的状态。

[0078] 对于按摩头与人体接触时，电动机的转速检测可是多种的，示例性的，可通过对电动机的电流进行检测，获取电动机在工作过程中的电流值，然后通过换算得到电动机的实际转速，作为第二转速使用。又或者，利用转速计对电动机的转速进行测量。另外，也可以是满足本发明实施例中使用需求的其他形式的转速获取方式，在此不做详尽列出。

[0079] 步骤S130、根据第二转速相对于第一转速的变化确定按摩头与人体接触时、人体在选定的状态下承受的实时压力；

[0080] 电动机的负载与转速成反比关系，电动机的负载越大转速越小，电动机的转矩与转速成反比关系。在本实施例中，按摩器的按摩头与人体接触时，随着用户的按压力度增加，按摩头与人体的接触压力上升，电动机的负载也将同步增加，此时电动机的转速将同步的下降。而电动机的转速下降使得电动机的转矩同步增加，即按摩器的按摩头对人体的按摩力度增加，即人体所承受的来自按摩头的压力增加。因此，在本实施例中，可通过第二转速相对于第一转速变化确定按摩头与人体接触时，人体在选定的状态下所承受的来自按摩器的实时压力。

[0081] 步骤S140、显示在选定的状态下的实时压力。

[0082] 在本实施例中，步骤S140中所提到的状态指的是步骤S110中所说的选定的状态，即用户在使用按摩器进行按摩时所选定的工作档位。也就是说在步骤S140中所显示的压力，是按摩器在与步骤S110中获取第一转速相同的状态下的压力。压力的显示可以有多种方式，示例性的，在按摩器上设置有多个指示灯，压力递增时，指示灯依次亮起；或者针对不同的压力亮起不同的指示灯。又或者，在按摩器上设置有显示屏，用于显示按摩器当前对人体按压的压力。另外，也可以是满足本发明实施例中使用需求的其他形式的显示方式，在此不做详尽列出。

[0083] 按摩器的按摩头作用在人体上，人体对按摩头的反作用力将增加按摩器的电动机的负载，使得电动机的转速下降，扭矩增加，从而增加按摩头对人体的压力。因此，在本实施例中，可通过电动机在按摩时的第二转速与未与人体接触时的第一转速的比较确定按摩头与人体接触时、人体所承受的压力。

[0084] 本实施例的技术方案，在按摩器的按摩头未与人体接触时，获取按摩器在选定的状态下的电动机的第一转速，并在相同状态下获取按摩器与人体接触时的第二转速，最终根据第一转速和第二转速确定人体在选定的状态下所承受的实时压力，并显示在该状态下的实时压力。对于电动机的转速获取，以及根据第一转速和第二转速比较确定人体所承受的压力，所涉及的算力较低，可集成在按摩器内部，以此减少对外部电路和对外部设备的依靠。由于电动机的负载与转速成反比关系，电动机的负载越大转速越小，且电动机的转矩与转速成反比关系，在本发明中，按摩器的按摩头与人体接触时，随着用户的按压力度增加，电动机的负载也将同步增加，此时电动机的转速同步下降，电动机的转矩同步增加，表现在按摩器上则是按摩器的按摩头对人体的按摩力度增加，人体所承受的来自按摩头的压力增加。因此，在本发明中可通过第二转速与第一转速的比较，确定按摩器对人体按压的压力的强弱对比，进而在按摩器上并针对选定的状态进行压力的显示，使得用户可直观的通过压力的显示确定目前按摩器对人体的压力强弱，有效的改善了用户体验。

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[0085] 实施例二

[0086] 图2为本发明实施例二提供的一种按摩器压力反馈方法的流程图，本实施例是在上述实施例的基础上进行具体化，该方法包括如下步骤：

[0087] 步骤S201、检测在按摩器中选定的状态，该状态用于区分按摩头往复运动的强度。

[0088] 在本实施例中，选定的状态指的是用户在使用按摩器进行按摩的过程中、选定的工作档位。按摩器预设有多个不同的状态，处于不同的状态下，按摩器的电动机的输入功率不同，从而改变按摩器的电动机的转矩，即改变了按摩头对与人体接触位置的按压强度。其次，按摩头往复运动的强度指的是，在不同的状态下，按摩器的电动机的输入功率不同，在未与人体接触时的最低负载状态下的转速不同，从而造成的按摩头往复运动的频率不同，即按摩头往复运动的强度不同。

[0089] 步骤S202、查询对应状态设置的转速，作为第一转速，其中，第一转速与强度正相关。

[0090] 在本实施例中，通过在按摩器未与人体接触的状态下，检测在不同状态下的按摩器的电动机的转速，建立转速与状态的关系表，并存储在存储器中。在使用按摩器进行按摩时，根据用户选择的状态从存储器中查询对应的转速作为第一转速使用。

[0091] 在本实施例中，按摩器的电动机的转速与电动机的输入功率正相关。在同等条件下，输入功率越高，则电动机的转速越高，表现在按摩器上则是按摩头往复运动频率越高，即，第一转速与强度正相关。

[0092] 在其他实施例中，第一转速的获取还可以采用其他的方式实现，示例性的，包括：

[0093] 步骤S201′、获取在选定的状态下的电动机的额定功率。

[0094] 通过在按摩器的本体内设置检测电路对电动机的额定功率进行检测，获取按摩器接通电源后电动机的功率，作为按摩器的额定功率。

[0095] 步骤S202′、确定电动机在额定功率下运行时的转速，作为第一转速。

[0096] 在本实施例中，通过在按摩器未与人体接触的状态下，检测在不同额定功率下的按摩器的电动机的转速，建立转速与工作功率的关系表，并存储在存储器中。在使用时，根据检测到的额定功率从存储器中查询对应的转速作为第一转速。

[0097] 检测按摩器的电动机的额定功率，通过按摩器的额定功率确定电动机的第一转速，可有效的避免按摩器的电池的电量下降时带来的额定功率下降影响到电动机的转速，造成的第一转速的确定不准确的问题，保证第一转速的获取的准确性。

[0098] 此外，在其他实施例中，还可以在按摩器启动时，且按摩器的按摩头未与人体接触前，检测按摩器的电动机的转速，作为第一转速。

[0099] 与上述实施例相同，在按摩器启动时检测按摩器的按摩头未与人体接触的转速作为第一转速，可有效的避免电池电量下降引起的工作功率下降对按摩器的电动机的转速影响，保证第一转速的准确性。

[0100] 步骤S203、根据第一转速设定多个阈值，基于所述阈值将电动机的转速划分为多个区间范围。

[0101] 阈值的获取可以是通过对第一转速进行偏移获得，目的在于将电动机的转速划分为多个区间范围，分别对应不同的转速区间和压力等级。此外，阈值的设定还可以是设定多个系数，通过将设定的系数与第一转速相乘得到多个阈值，从而将电动机的转速划分为多

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个连续的区间范围。

[0102] 例如第一转速为1000r/min，对第一转速进行偏移，获得200r/min、400r/min、600r/min、800r/min，则对应的区间范围为0-200r/min、200-400r/min、400-600r/min、600-800r/min、800-1000r/min，对应的等级分别为：0-200r/min对应的第五等级，200-400r/min对应的第四等级，400-600r/min对应的第三等级，600-800r/min对应的第二等级，800-1000r/min对应的第一等级。

[0103] 又例如：第一转速为1000r/min，设定多个系数0.2、0.4、0.6、0.8，则对应的阈值则为第一转速乘以系数，即，200r/min、400r/min、600r/min、800r/min。

[0104] 需要知道的是，这里的划分方式仅是一个具体的示例，在实施过程中，还可以选择其他的划分方式。

[0105] 步骤S204、将按摩头与人体接触时、人体在选定的状态下承受的压力对应区间范围进行等级划分。

[0106] 按摩器的按摩头与人体接触时，按摩头作用在人体上的压力与按摩器的电动机的转速成负相关关系。即，电动机的转速越接近第一转速，人体受到的压力越小；电动机的转速越小，人体受到的压力越大。将人体承受的压力对应区间范围进行等级划分，可简单的理解为，将人体承受的压力按照区间范围的数量进行等级划分。

[0107] 步骤S205、将第二转速与区间范围进行比较，确定第二转速对应的压力的等级。

[0108] 步骤S206、显示在选定的状态下的实时压力。

[0109] 由于在步骤S204中将人体承受的压力对应区间范围划分为多个等级。在步骤S205中将第二转速与区间范围进行比较时，可直观的获知第二转速所落入的区间范围，以及所对应的压力的等级。通过将按摩器工作在第二转速时对与人体接触位置所产生的压力、按照区间范围进行等级划分，可实现直观的反应出按摩器的按摩头对与人体接触位置的压力的大小，用户可根据显示的压力的等级大小进行压力调整，从而使按摩器工作在适应用户自身的压力范围内。

[0110] 在一个具体的实施例中，将第二转速与划分的区间范围进行比较，确定第二转速对应的压力的等级，包括：

[0111] 若第二转速大于第二阈值，且小于等于第一转速，则压力为第一等级；

[0112] 若第二转速大于第一阈值，且小于等于第二阈值，则压力为第二等级；

[0113] 若第二转速大于0，且小于等于第一阈值，则压力为第三等级。

[0114] 在这里，仅是作为一个示例，阈值包括第一阈值和第二阈值，等级包括第一等级、第二等级和第三等级，其中，第一阈值小于第二阈值，第一等级、第二等级、第三等级的压力逐级增加。在其他实施例中，还可以设置更多的阈值，将第一转速划分为更多区间范围，将压力的等级划分为更多、更细致的等级。

[0115] 在本实施例中，通过检测选定的工作档位，确定对应工作档位下第一转速，可简化第一转速的获取流程，减少计算量。以该第一转速与检测到的按摩器在同一工作档位下的第二转速确定按摩器在当前工作档位下对人体按摩的压力，可提高压力的反馈的准确性，辅助用户更好的确认按摩器当前的按压压力，以及进一步的调整按摩器的按压压力，以适应用户的不同需求。通过对按摩器的工作功率检测，然后根据工作功率确定第一转速，可有效的避免电量下降时带来的按摩器的电动机输入功率下降问题影响到第一转速的判断，保

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证第一转速的获取的准确性和可靠性，进而保证根据第二转速和第一转速确定的压力的准确性，辅助用户精准的控制按摩器的按压压力。降按摩器的按压压力根据第一转速划分为不同的等级，并对不同的等级的压力进行相应的状态显示，可便于用户直接通过状态显示确定按摩器的按压压力，避免依靠用户的感官判断按摩器的具体压力大小，保证按摩器使用的可靠性。

[0116] 实施例三

[0117] 图3为本发明实施例三提供的一种按摩器调节方法的流程图，本实施例是在上述实施例的基础上进行进一步应用，该方法包括如下步骤：

[0118] 在本实施例中，采用实施例一或实施例二中所提供的按摩器压力反馈方法获取按摩器的实时压力，在本实施例所述的按摩器调节方法包括：

[0119] 步骤S301、检测在选定的状态下设定的压力等级。

[0120] 在本实施例中，选定的状态指的是用户在使用按摩器进行按摩的过程中、选定的工作档位，设定的压力等级指的是在选定的工作档位下按照实施例二中步骤S203、步骤S204中的划分方法划分出来的不同大小的压力级别，用户可在使用按摩器进行按摩的过程中选定所需的压力大小，即设定压力级别。按摩器工作在该选定的工作档位下工作时，按摩器的电动机具有额定的输入功率。

[0121] 步骤S302、根据压力等级确定参考压力范围。

[0122] 在本实施例中，参考压力范围指的是与压力等级对应的按摩器对人体进行按摩的按摩力度的范围，即代表压力等级所对应的按摩力度的大小范围。具体可参考实施例二方案中步骤S203至步骤S205中对于压力等级的划分，换句话说，在本实施例中所述的参考压力范围也可以是实施例二中步骤S203至步骤S205中划分的压力的等级，根据压力等级确定按摩器工作的参考压力范围。

[0123] 步骤S303、根据参考压力范围确定按摩器的电动机在选定的压力等级下的转速的区间范围。

[0124] 进一步的，该参考压力范围可以与实施例二中步骤S205中的压力的等级相对应，即采用不同的压力等级代表不同的按摩器对人体按摩的压力的区间范围。

[0125] 在本实施例中，在按摩器的实际的使用过程中，用户可以行设定按摩器的输出压力的压力等级，按摩器在检测到该选定的压力等级后，通过步骤S302中获得的对应关系，可以确定该选定的压力等级对应的转速的大小范围。

[0126] 在本实施例中，转速的区间范围指的是根据按摩器当前的压力等级所确定的转速所属的大小范围。具体的，可以参考实施例二步骤S203中利用阈值将第一转速划分为的多个区间范围，其与按摩器对人体的压力的等级相对应，也就是与本实施例中的选定的压力等级所对应。在这里可以通过选定的压力等级获取到参考压力范围与转速的区间范围的对应关系。

[0127] 步骤S304、检测按摩头与人体接触时、电动机的转速，作为第二转速。

[0128] 在本实施例中，第二转速为按摩器在当前工作条件下的电动机的实时转速。获取第二转速时，需保证按摩器处于与获取第一转速时相同的状态下，也就是说与获取第一转速时处于相同的档位，或者与电动机处于获取第一转速时的输入功率相同的工作档位。

[0129] 对于按摩头与人体接触时，电动机的转速检测利用转速计对电动机的转速进行测

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量。另外，也可以是满足本发明实施例中使用需求的其他形式的转速获取方式，比如采用编码器直接监测或通过变频器控制检测输入电压的频率来间接计算获得转速，在此不做详尽列出。

[0130] 进一步的，在步骤S304之后还可以将第二转速与在选定的状态下的第一转速进行对比，在检测到第二转速小于第一转速时进入到步骤S305中与区间范围进行对比，以保证对按摩器的按摩压力的调节是在按摩器作用在人体之后进行，避免在按摩器未与人体接触时即执行步骤S305对按摩器的转速不断进行调节，时按摩器的转速落入到选定的压力等级对应的区间范围所带来的大量调节工作。以及避免在按摩器与人体接触后按摩器的转速的大幅度变动所带来的与人体接触的压力的大幅度变化，提高使用按摩器进行按摩时的舒适性。此外，当按摩器未与人体接触时，按摩器的电动机的转速应该与选定的状态下的第一转速相等，也就是说检测到按摩器的转速应当与第一转速相等。因此，在第二转速等于第一转速时，按摩器未与人体接触，此时并不需要对按摩器的按摩压力进行调节。

[0131] 步骤S305、将第二转速与区间范围进行比较。

[0132] 若第二转速大于区间范围，则执行步骤S306；

[0133] 若第二转速落入区间范围，则执行步骤S306；

[0134] 若第二转速小于区间范围，则执行步骤S307。

[0135] 步骤S306、维持电动机的输入功率不变。

[0136] 步骤S307、降低电动机的输入功率。

[0137] 进一步的，在本实施例中可以以第二转速与区间范围的最低值的比例降低电机的额定输入功率以作为当前电机输入功率。

[0138] 在其他实施例中，还可以是第一次检测到第二转速落入区间范围后进入到步骤S305对按摩器的电动机的转速进行调节，以实现对按摩器的按摩压力调节。此外，还可以设定一转速阈值，当检测到按摩器的电动机的第二转速大于该转速阈值后进入到步骤S305将第二转速与区间范围进行比较，进而判断进一步执行的步骤，最终实现对按摩器的按摩力度的调整和维持。

[0139] 在本实施例中，将第二转速与区间范围进行比较指的是判断第二转速是否处于选定的压力等级对应的转速的区间范围，即保证按摩器在实际运行时的转速在选定的压力等级下对应的转速的区间范围内，保证按摩器在使用过程中对人体所施加的压力的大小符合用户所选定的压力等级对应的压力大小，保证用户在使用本实施例所提供的按摩器调节方法的按摩器进行按摩时的舒适性。

[0140] 通过将选定的压力等级与参考压力范围进行匹配，从而获得与选定的压力等级对应的转速的区间范围，即得到当前选定的压力等级对应的第二转速的范围，通过控制电动机的工作功率使电动机的第二转速落入在选定的区间范围内，即可保证按摩器在工作过程中对人体按压的压力，实现了按摩的压力的大小保持，避免需要用户通过保持对按摩器的按压力度控制按摩器对人体的按压的压力大小。

[0141] 实施例四

[0142] 图4为本发明实施例四提供的一种按摩器调节方法的流程图，本实施例是在上述实施例的基础上进行进一步应用，该方法包括如下步骤：

[0143] 步骤S401、获取按摩器设定的最大允许压力，最大允许压力为按摩头与人体接触

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时、按摩器在选定的状态下所能提供的最大的压力；

[0144] 最大允许压力可在按摩器出厂时进行设定，最大允许压力为按摩头与人体接触时、按摩器在状态下所能提供的最大的压力，最大允许压力对应的负载同时应满足小于或等于电动机的额定负载，避免电动机超负载运行。

[0145] 步骤S402、获取最大允许压力所对应的第三转速；

[0146] 第三转速的获取，可通过使按摩器按压在人体上，使按摩头对人体的按压的压力达到最大允许压力，检测此时电动机的转速作为第三转速。

[0147] 步骤S403、检测按摩头与人体接触时、电动机的转速，作为第二转速；

[0148] 对于按摩头与人体接触时，电动机的转速检测可是多种的，示例性的，可利用转速计对电动机的转速进行测量。另外，也可以是满足本发明实施例中使用需求的其他形式的转速获取方式，在此不做详尽列出。

[0149] 步骤S404、将第二转速与第三转速进行比较；

[0150] 若第二转速小于或等于第三转速，则执行步骤S405；

[0151] 步骤S405、降低电动机的输入功率，以降低人体承受的压力的大小。

[0152] 进一步的，当第二转速恢复大于第三转速时，则恢复电动机的输入功率。

[0153] 通过将按摩器在实际使用过程中的电动机的第二转速与设定的第三转速进行比较，当第二转速大于第三转速时降低电动机的工作功率，可避免按摩器按压的压力超过人体所能承受的最大压力，避免造成人体的肌肉损伤，保证用户使用按摩器进行按摩时的安全。

[0154] 实施例五

[0155] 图5为本发明实施例五提供的一种按摩压力反馈装置的结构图，该装置可以执行上述实施例所述的按摩压力反馈方法，具体的，该装置包括：

[0156] 第一转速检测模块501，用于当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速，或，用于检测按摩头与人体接触时、电动机的转速，作为第二转速。

[0157] 压力确定模块502，用于根据第二转速与第一转速确定按摩头与人体接触时、人体在状态下承受的压力。

[0158] 显示模块503，用于针对状态显示压力。

[0159] 工作档位检测单元，用于检测在按摩器中选定的工作档位，工作档位用于表示按摩头往复运动的强度。

[0160] 转速查询单元，用于查询对应工作档位设置的转速，作为第一转速，其中，第一转速与强度正相关。

[0161] 工作功率检测单元，用于检测加载于电动机的工作功率，作为工作功率。

[0162] 转速确定单元，用于确定电动机在工作功率下运行时的转速，作为第一转速。

[0163] 阈值设定单元，用于根据第一转速设定多个阈值，将第一转速划分为多个区间范围。

[0164] 等级划分单元，用于将按摩头与人体接触时、人体在状态下承受的压力对应区间范围进行等级划分。

[0165] 第一比较单元，用于将第二转速与区间范围进行比较，确定第二转速对应的压力

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的等级。

[0166] 选定等级检测单元，用于检测在按摩器中选定的压力所属的等级。

[0167] 区间确定单元，用于根据等级确定区间范围。

[0168] 第二比较单元，用于将第二转速与区间范围进行比较，若第二转速小于区间范围，则降低电动机的工作功率；若第二转速落入区间范围，则维持电动机的工作功率不变；若第二转速大于区间范围，则维持电动机的工作功率。

[0169] 设定压力获取单元，用于获取按摩器设定的最大允许压力，最大允许压力为按摩头与人体接触时、按摩器在状态下所能提供的最大的压力。

[0170] 第三转速获取单元，用于获取最大允许压力所对应的第三转速。

[0171] 第三比较单元，用于将第二转速与第三转速进行比较，若第二转速小于或等于第三转速，则降低电动机的工作功率，以降低人体承受的压力的大小。

[0172] 本发明实施例所提供的按摩压力反馈装置可执行本发明任意实施例所提供的按摩压力反馈方法，具备执行方法相应的功能模块和有益效果。

[0173] 实施例六

[0174] 图6为本发明实施例六提供的一种按摩器压力调节装置的结构图，该装置可以执行上述实施例的损伤检测方法，具体的，该装置包括：

[0175] 状态检测模块601，用于检测在选定的状态下设定的压力等级；

[0176] 参考压力范围确定模块602，根据压力等级确定参考压力范围；

[0177] 区间范围检测模块603，用于根据参考压力范围确定按摩器的电动机在状态下的转速的区间范围；

[0178] 第二转速检测模块604，用于检测按摩头与人体接触时、电动机的转速，作为第二转速；

[0179] 第一比较模块605，用于将第二转速与区间范围进行比较；

[0180] 第一输入功率调整模块606，用于在第二转速大于区间范围的最大值时，维持电动机的输入功率；在第二转速落入区间范围内时，维持电动机的输入功率不变；在第二转速小于区间范围的最小值时，降低电动机的输入功率。

[0181] 本发明实施例所提供的按摩器压力调节装置可执行本发明任意实施例所提供的按摩器压力调节方法，具备执行方法相应的功能模块和有益效果。

[0182] 实施例七

[0183] 图7为本发明实施例七提供的一种按摩器压力调节装置的结构图，该装置可以执行上述实施例的损伤检测方法，具体的，该装置包括：

[0184] 最大允许压力获取模块701，获取按摩器设定的最大允许压力，最大允许压力为用户设定的按摩头与人体接触时、按摩器在状态下所能提供的最大的压力；

[0185] 第三转速获取模块702，用于获取最大允许压力所对应的第三转速；

[0186] 第三转速检测模块703，用于检测按摩头与人体接触时、电动机的转速，作为第二转速；

[0187] 第二比较模块704，用于将第二转速与第三转速进行比较；

[0188] 第二输入功率调整模块705，用于在第二转速小于或等于第三转速时，降低电动机的输入功率，以降低人体受到的压力的大小。

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[0189] 本发明实施例所提供的按摩器压力调节装置可执行本发明任意实施例所提供的按摩器压力调节方法，具备执行方法相应的功能模块和有益效果。

[0190] 实施例八

[0191] 图8为本发明实施例八提供的设备的结构图，如图8所示，该设备包括处理器810、存储器820、输入装置830和输出装置840；设备中处理器410的数量可以是一个或多个，图4中以一个处理器810为例；设备/终端/服务器中的处理器810、存储器820、输入装置830和输出装置840可以通过总线或其他方式连接，图8中以通过总线连接为例。

[0192] 存储器810作为一种计算机可读存储介质，可用于存储软件程序、计算机可执行程序以及模块，如本发明实施例中的按摩器压力反馈方法对应的程序指令/模块(例如，按摩压力反馈装置中的第一转速获取模块501、第二转速获取模块502、压力确定模块503、显示模块504，或按摩器压力调节装置的状态检测模块601、参考压力范围确定模块602、区间范围检测模块603、第二转速检测模块604、第一比较模块605、第一输入功率调整模块606、最大允许压力获取模块701、第三转速获取模块702、第二转速获取模块703、第二比较模块704、第二输入功率调整模块705)。处理器810通过运行存储在存储器820中的软件程序、指令以及模块，从而执行设备的各种功能应用以及数据处理，即实现上述的按摩器压力反馈方法。

[0193] 存储器可主要包括存储程序区和存储数据区，其中，存储程序区可存储操作系统、至少一个功能所需的应用程序；存储数据区可存储根据终端的使用所创建的数据等。此外，存储器可以包括高速随机存取存储器，还可以包括非易失性存储器，例如至少一个磁盘存储器件、闪存器件、或其他非易失性固态存储器件。在一些实例中，存储器可进一步包括相对于处理器远程设置的存储器，这些远程存储器可以通过网络连接至设备。上述网络的实例包括但不限于互联网、企业内部网、局域网、移动通信网及其组合。

[0194] 输入装置830可用于接收采集的第一转速和第二转速。输出装置840可用于显示压力信息。

[0195] 此外，需要注意的是，实施例五至实施例八中的第一转速检测模块501、第二转速检测模块604及第三转速检测模块703可以是同一个转速检测模块，不同的标号仅为了便于不同实施方式的理解。

[0196] 实施例九

[0197] 本发明实施例九还提供一种包含计算机可执行指令的存储介质，其上存储有计算机程序，该程序被处理器执行时实现一种按摩器压力反馈方法，该方法包括：

[0198] 当按摩器在选定的状态下运行时，获取按摩头未与人体接触时、电动机的转速，作为第一转速；

[0199] 检测按摩头与人体接触时、电动机的转速，作为第二转速；

[0200] 根据第二转速与第一转速确定按摩头与人体接触时、人体在状态下承受的压力；

[0201] 针对状态显示压力。

[0202] 当然，本发明实施例所提供的一种包含计算机可执行指令的存储介质，其计算机程序不限于如上所述的方法操作，还可以执行本发明任意实施例所提供的按摩器压力反馈方法或按摩器压力调节方法中的相关操作。

[0203] 通过以上关于实施方式的描述，所属领域的技术人员可以清楚地了解到，本发明

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可借助软件及必需的通用硬件来实现，当然也可以通过硬件实现，但很多情况下前者是更佳的实施方式。基于这样的理解，本发明的技术方案本质上或者说对现有技术做出贡献的部分可以以软件产品的形式体现出来，该计算机软件产品可以存储在计算机可读存储介质中，如计算机的软盘、只读存储器(Read-Only Memory，ROM)、随机存取存储器(Random Access Memory，RAM)、闪存(FLASH)、硬盘或光盘等，包括若干指令用以使得一台计算机设备(可以是个人计算机，服务器，或者网络设备等)执行本发明各个实施例所述的方法。

[0204] 值得注意的是，上述按摩调节装置的实施例中，所包括的各个单元和模块只是按照功能逻辑进行划分的，但并不局限于上述的划分，只要能够实现相应的功能即可；另外，各功能单元的具体名称也只是为了便于相互区分，并不用于限制本发明的保护范围。

[0205] 注意，上述仅为本发明的较佳实施例及所运用技术原理。本领域技术人员会理解，本发明不限于这里所述的特定实施例，对本领域技术人员来说能够进行各种明显的变化、重新调整和替代而不会脱离本发明的保护范围。因此，虽然通过以上实施例对本发明进行了较为详细的说明，但是本发明不仅仅限于以上实施例，在不脱离本发明构思的情况下，还可以包括更多其他等效实施例，而本发明的范围由所附的权利要求范围决定。

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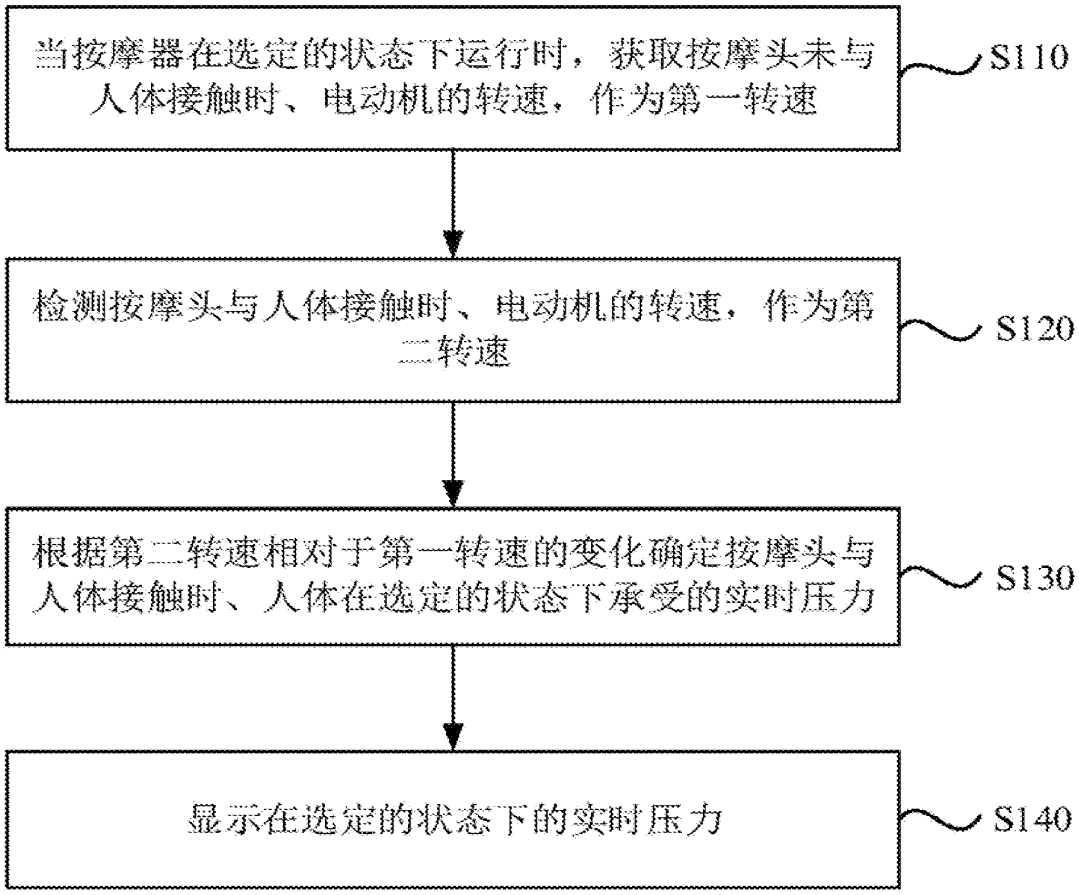

图1

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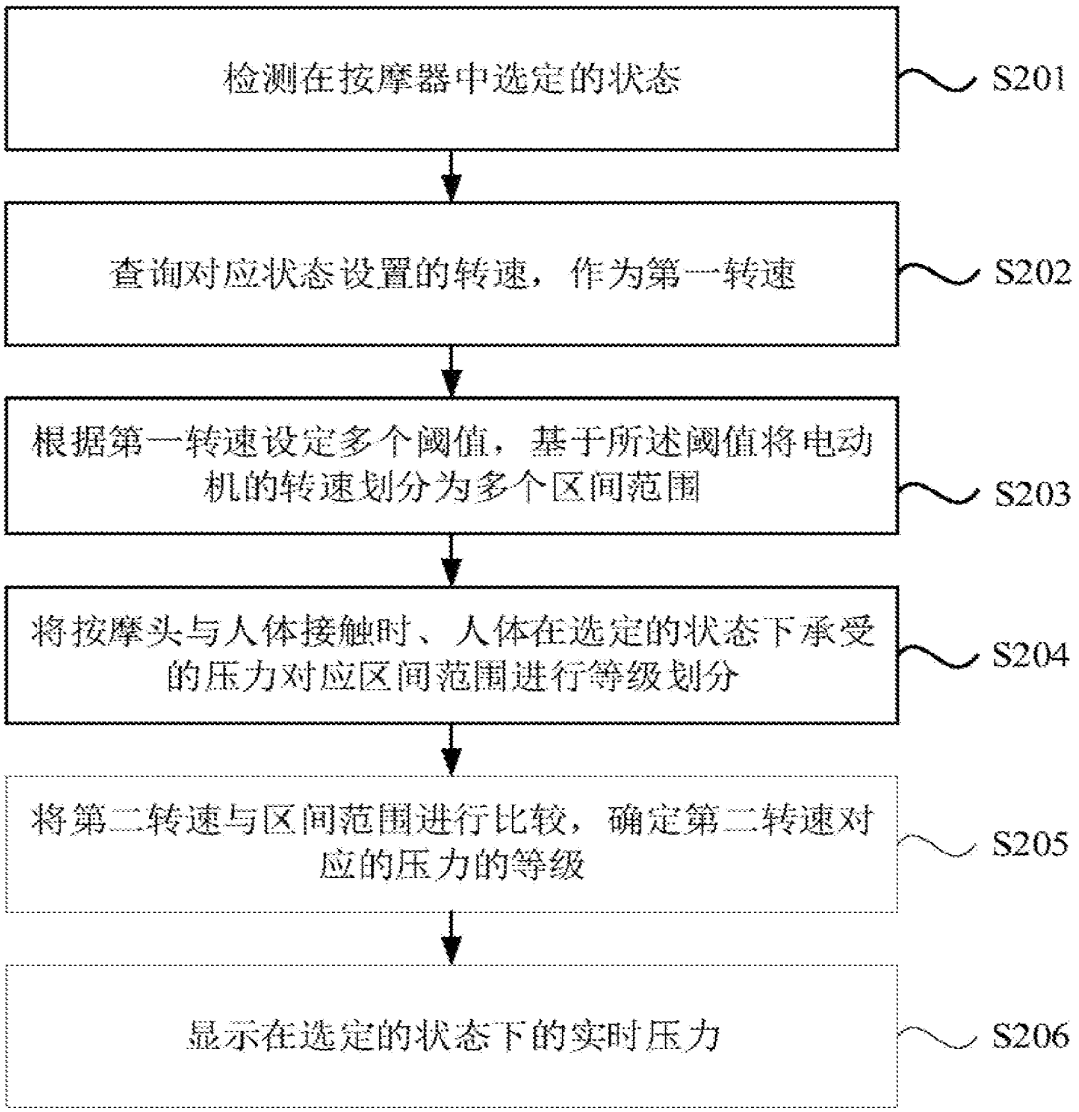

图2

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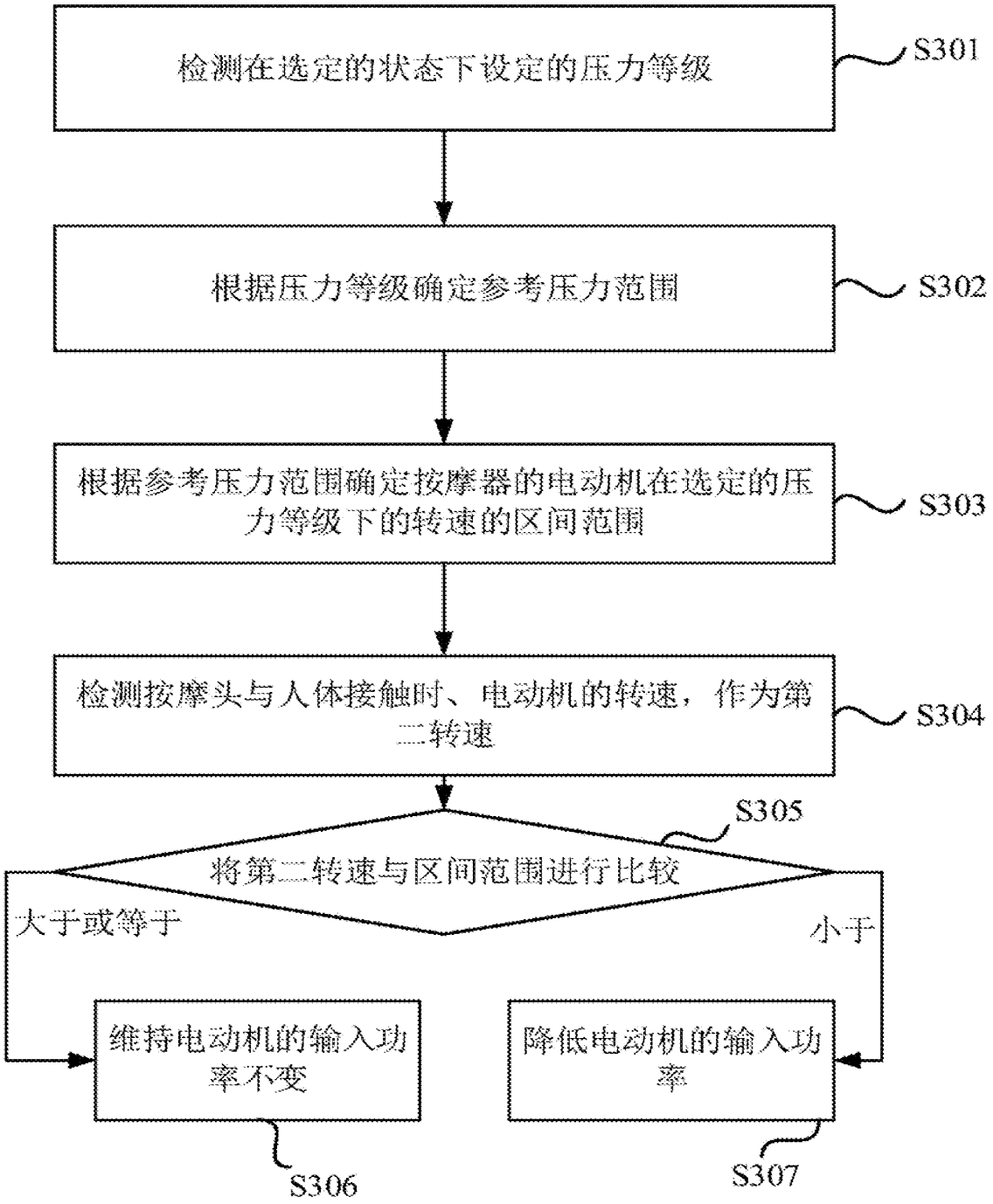

图3

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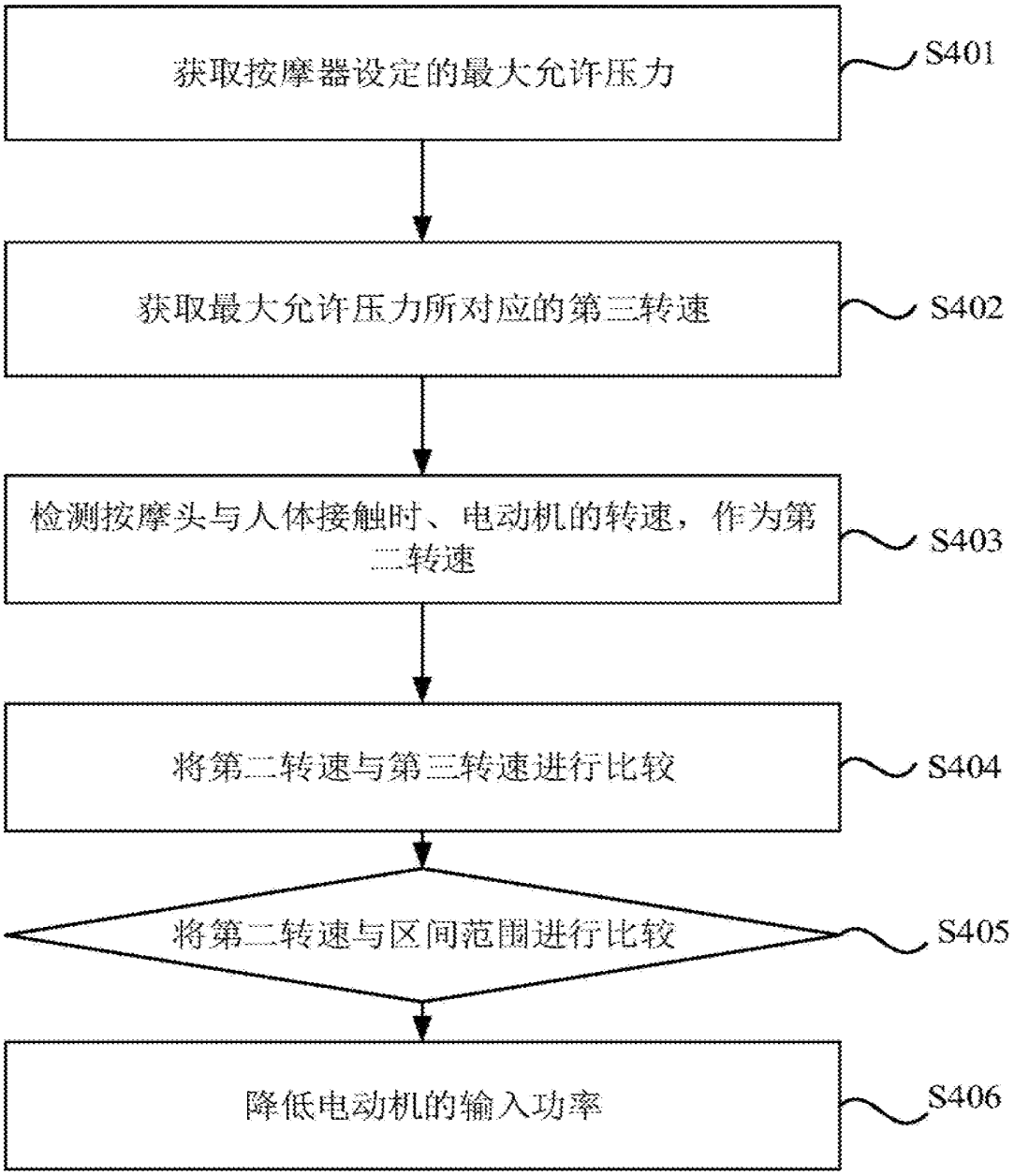

图4

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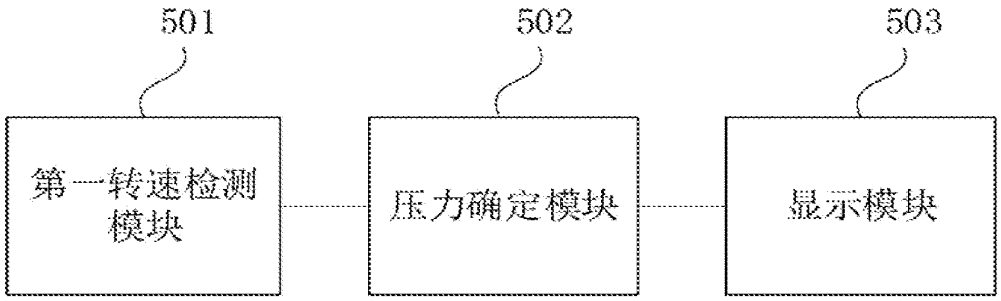

图5

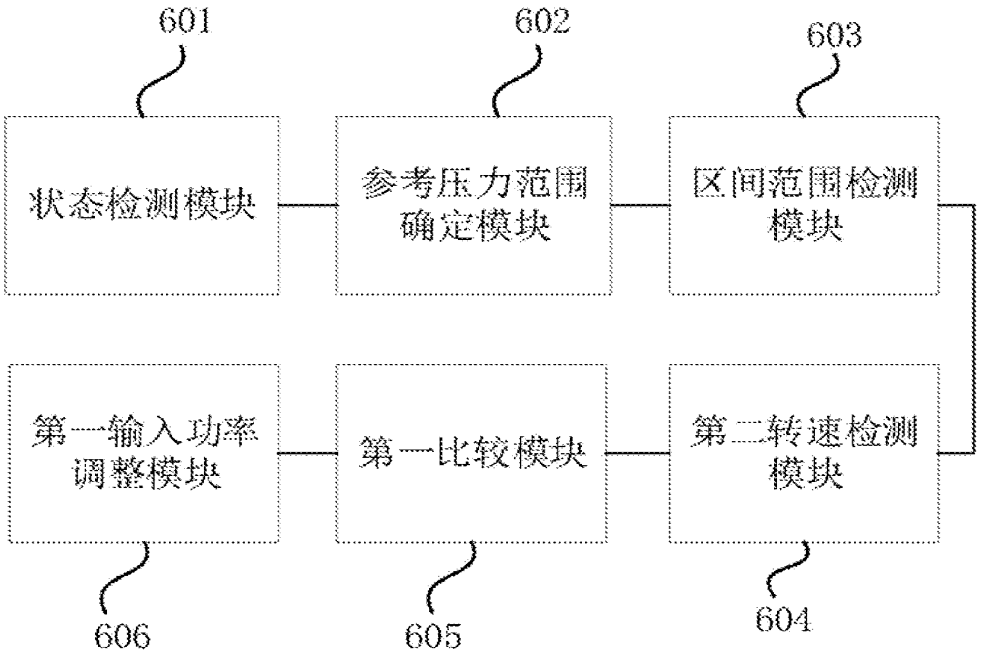

图6

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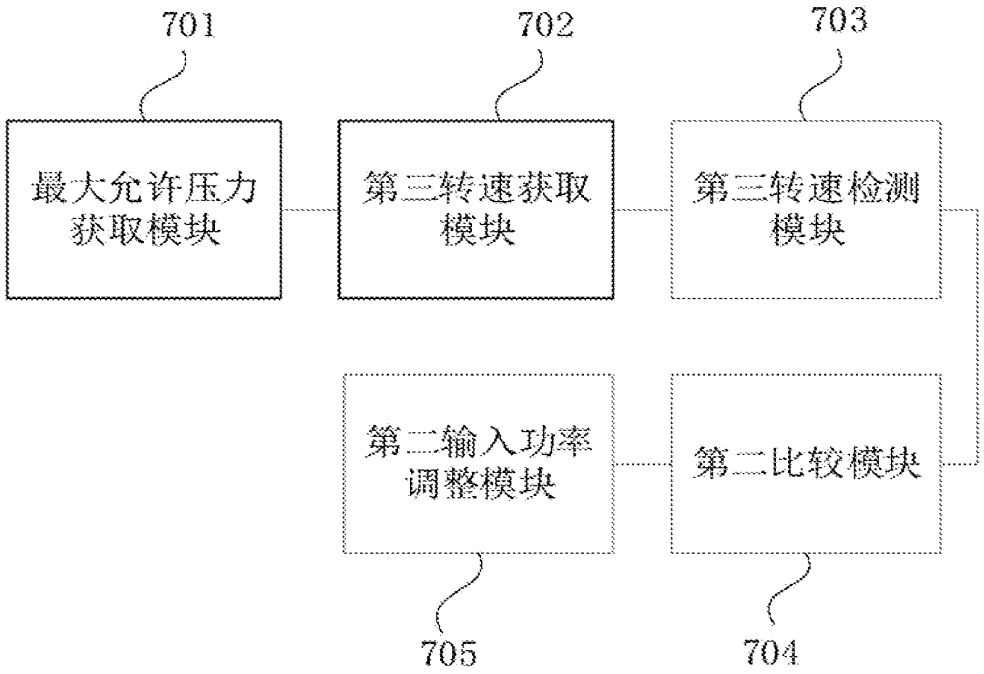

图7

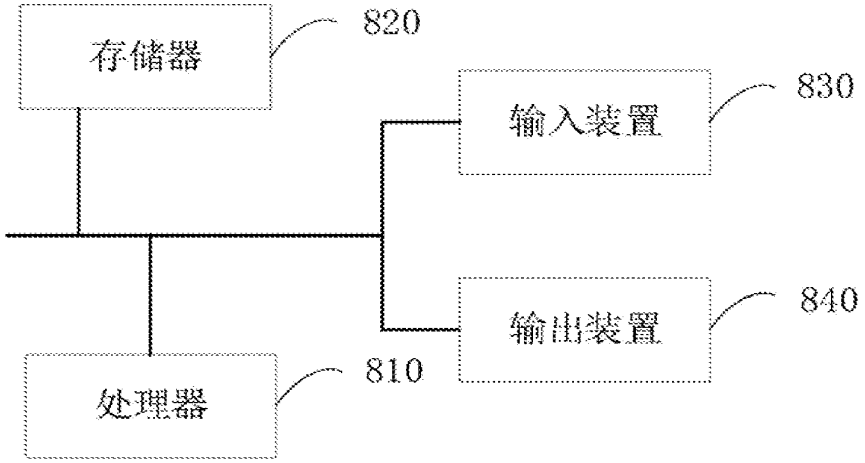

图8

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Espacenet

Bibliographic data: CN203395603 (U) — 2014-01-15

Electric torch and charging pedestal used for electric torch

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Applicant(s): LED LENSER CO LTD ± (LED LENSER CO., LTD)

Classification: **- international:** ***F21L4/00; F21V23/04; H02J7/00; H03K17/95; F21Y115/10***

- cooperative:

Application number: CN201320312850U 20130531

Priority number(s): CN201320312850U 20130531

Abstract of CN203395603 (U)

The utility model provides an improved electric torch and a charging pedestal used for the electric torch. The electric torch comprises a light source, a power supply comprising electric quantity grades, a shell which is extended along a main shaft and of which the main shaft is limited, and a switch located nearby a cylinder, wherein the switch is used to turn on or turn off the electric torch. The electric torch is characterized by also comprising an adjusting ring arranged round the shell, wherein the adjusting ring is rotated between at least two positions, the at least two positions are defined as different operation modes respectively, and the adjusting ring comprises a magnet and a hall effect sensor, and wherein the at least two positions of the adjusting ring are recognized by the positions of the magnet relative to the hall effect sensor. The utility model provides the electric torch compact structure which is suitable for LEDs.

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DESCRIPTION CN203395603U

A flashlight and a charging base for the flashlight

[0001]

Technical field

[0002]

The utility model relates to a flashlight and a charging system that provide lighting, and more particularly, to a flashlight and a charging base for multiple modes.

[0003]

Background technique

[0004]

Electric light sources can come in many forms, from residential or commercial lighting fixtures to handheld flashlights.

Traditional incandescent light bulbs have been replaced by more efficient fluorescent and compact fluorescent lamp (CFL) bulbs that use less energy while providing roughly similar light.

Although energy-saving lamps are more efficient than incandescent lamps of equivalent brightness, light-emitting diodes (LEDs) are more efficient at producing equal or greater light in certain compact structures.

[0005]

LEDs are initially more expensive than incandescent or CFL lamps and are not suitable for many applications.

Additionally, the low intensity and limited color options of LEDs limit their use.

Recent developments in the LED field have made LED light sources a common alternative or supplement to traditional light sources. Furthermore, LEDs can be packaged in smaller formats than incandescent or energy-saving lamps of equivalent brightness. Thanks to their small size and high efficiency, LEDs are now used in flashlights and other portable light sources.

[0006]

Because LEDs function differently than incandescent or CFL lamps, LEDs can provide functionality and utility that were previously unavailable in compact structures such as flashlights.

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Therefore, there is a need to develop the performance of LEDs in compact structures.

[0007]

Utility model content

[0008]

Based on the above background, exemplary embodiments of the present invention provide a flashlight and charging base system.

The flashlight of this exemplary embodiment may include a light source; a power source having a power level, a housing defining a main axis, the housing extending along the main axis; and an adjustment ring disposed around the housing, wherein the adjustment ring is disposed between at least two positions a rotation, wherein each of the at least two positions defines a different operating mode; and a switch located adjacent the barrel, wherein the switch is used to turn the flashlight on and off.

The flashlight of an exemplary embodiment may include a Hall effect sensor, and the adjustment ring may include a magnet, wherein at least two positions of the adjustment ring are identified by the position of the magnet relative to the Hall effect sensor. The operating modes include two or more, flash mode, bright mode, dim mode, and secondary light wavelength mode.

[0009]

Corresponding to some embodiments, the housing includes a barrel and a light source housing, wherein the light source housing includes a lens, and the light source housing is adjustable relative to the barrel along a main axis direction to focus the light beam emitted from the light source.

The barrel and the light source housing are adjustable relative to each other along the main axis. The barrel and the light source housing are rotatably combined. The rotation of the light source housing relative to the cylinder in the first rotation direction will increase the friction force used to resist the movement between the light source housing and the cylinder, and the light source housing rotates relative to the cylinder in a second rotation direction opposite to the first rotation direction. As it rotates, the friction resisting movement between the light source housing and barrel is reduced. The cylinder is configured to secure a first power supply, and the cylinder is interchangeable with a second cylinder configured to secure a second power supply, the second power supply being different from the first power supply. The adjustment ring can be configured to be removable from the housing.

[0010]

The flashlight according to some embodiments of the present invention may include a first sloped part and a second sloped part, wherein the first sloped part is fixed relative to the barrel, and the second sloped part is fixed relative to the light source housing.

The first ramp portion and the second ramp portion may cooperate with each other to increase friction between the barrel and the light source housing in response to rotation between the barrel and the light source housing in the first direction. The first ramp portion and the second ramp portion may cooperate to reduce friction between the barrel and the light source housing in response to friction between the barrel and the light source housing in a second direction opposite to the first direction. Turn.

[0011]

According to some embodiments of the present invention, the housing may include a power indicator ring disposed around the spindle.

When the power level of the power source exceeds the threshold power level, the power indicator ring emits a first color of light; and when the power level of the power source is lower than the threshold power level, the power indicator ring emits a second color of light. When the light source is on, the battery indicator ring lights up; when the light source is off, the battery indicator ring does not light up. The housing defines a base and a plurality of battery indicator lights disposed around the base. The plurality of charge indicators will illuminate in response to the power supply charge level.

[0012]

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The embodiment of the present invention also provides a charging base for the flashlight.

The charging base includes a base plate for mounting to a surface; a receiver pivotally secured to the base plate, the receiver being a base for placing a flashlight; and a bracket pivotally secured to the base plate. The bracket is used to place the barrel of the flashlight; and the charging adapter is placed in the receiver and combined with the base of the flashlight. The charging adapter is designed to be removable from the receiver so that it can be used independently of the receiver. The receiver is generally cup-shaped and includes an opening through which a base of the flashlight can be received within the cup; and wherein the receiver is biased to a position where the opening of the cup is oriented away from the base The direction of the board. The charging adapter may include a magnet, and the base of the flashlight may be attracted to the charging adapter's magnet.

[0013]

Embodiments of the present invention can provide a flashlight and charging base system, including a flashlight and a charging base.

The flashlight may include a light source, a power supply including a power level, a housing defining a main axis, the housing extending along the main axis; and an adjustment ring disposed about the housing, wherein the adjustment ring is configured to rotate between at least two positions, wherein the Each of the at least two positions defines a different operating mode; and a switch located adjacent the barrel, wherein the switch is configured to turn the flashlight on and off. The charging base may include a base plate mounted to the surface; a receiver pivotally secured to the base plate, the receiver being a base for placing the flashlight; and a bracket pivotally secured to the base plate, the cradle The rack is used to place the barrel of the flashlight and the charging adapter, which is placed in the receiver and combined with the base of the flashlight.

[0014]

Description of the drawings

[0015]

The present invention will now be described generally with reference to the accompanying drawings, which are not necessarily drawn to scale, in which:

[0016]

Figure 1 is a schematic diagram of a flashlight that can implement an embodiment of the present utility model;

[0017]

Figure 2 shows the flashlight of Figure 1 as viewed from the light source end;

[0018]

Figure 3 is a schematic diagram of a mechanism for increasing friction between the light source housing and the barrel of the flashlight in a high friction position according to an exemplary embodiment;

[0019]

Figure 4 is a schematic diagram of a mechanism for reducing friction between the light source housing and the barrel of the flashlight in a low friction position according to the embodiment of Figure 3;

[0020]

Figure 5 shows the flashlight of Figures 1 and 2 as seen from the light source end, with the light source housing, lens and bezel removed;

[0021]

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Figure 6 is a schematic diagram of a contactless switch used to change the way a flashlight operates according to an embodiment of the present invention;

[0022]

Figure 7 is a schematic diagram of the flashlight in Figure 1, with the base, power supply casing and switch part of the barrel separated;

[0023]

Figure 8 is a schematic diagram of the switch portion of the barrel in Figure 7, with the adjustment ring removed;

[0024]

Figure 9 is a schematic diagram of the switch portion of the barrel separated from the light source housing and the lens removed from the light source housing;

[0025]

Figure 10 shows a base of a flashlight according to an exemplary embodiment of the present invention;

[0026]

Figure 11 shows the charging port of the base of the flashlight according to an exemplary embodiment of the present invention;

[0027]

Figure 12 shows a flashlight and charging base system according to the present invention, a flashlight combined with a charging base; and

[0028]

Figure 13 shows a charging base according to an exemplary embodiment of the present invention.

[0029]

Detailed ways

[0030]

The invention will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown.

This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and to the knowledge in the art that these embodiments will be disclosed. The skilled person fully realizes the scope of the present invention.

Throughout the text, the same reference numbers refer to the same parts.

[0031]

Exemplary embodiments of the invention are often described or depicted in the form of a flashlight.

Nonetheless, it will be apparent that embodiments of the invention are extendable and applicable to a variety of forms, such as lighting, marine lighting, research or rescue lighting (e.g., floodlights, spotlights), and the like.

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Likewise, the disclosure herein merely provides an exemplary embodiment and is not limited thereto.

[0032]

Referring now to the embodiment in FIG. 1 , the embodiment of the present invention can be applied to a flashlight, such as a flashlight 100 with a housing 110 in FIG. 1 . The flashlight 100 includes a barrel 115 , a light source housing 120 and a base 130 .

The light source housing 120 may also include a rim 125 configured to secure the lens, as further described below.

In the illustrated embodiment, the flashlight 100 includes an adjustment ring 140 and a switch 150.

The illustrated embodiment depicts switch 150 located within elongated slot 142 in adjustment ring 140; however, in other embodiments, switch 150 and adjustment ring 140 may be separate.

[0033]

FIG. 2 shows the embodiment of FIG. 1 as viewed from the front of the light source housing 120 .

As shown in the figure, the bezel 125 can secure the lens 127 within the light source housing 120 .

The light source 129 in the illustrated embodiment is a high-power light emitting diode (LED), and the lens 127 in the illustrated embodiment includes a refractive lens capable of focusing light emitted from the LED based on the distance from the lens 127 to the light source 129 Light.

While the illustrated embodiment includes a high-power LED and a refractive lens 127 as the light source 129, other embodiments may include multiple types of light sources, such as multiple LEDs, one or more LEDs, and one or more incandescent light bulbs. combination, or any other light source inspired by embodiments of the invention.

Furthermore, lens 127 may be a refractive lens, focusing light from light source 129 as shown, or may be a generally planar lens that cannot focus light, allowing light to pass directly through the lens generally without refraction.

Embodiments with or without a refractive lens may include a reflector disposed within the light source housing 120 for reflecting light emitted from the light source 129 to the outside of the lens 127.

In such embodiments with a reflector (e.g., a parabolic cylindrical reflector), the reflector may be used to focus the light emitted from the light source 129.

[0034]

Adjust and get focus of light source

[0035]

Referring again to the embodiment shown in FIGS. 1 and 2 , the light source 129 may be fixedly disposed relative to the barrel 115 of the housing 110 , as further described in FIG. 9 .

In order to focus the light emitted from the light source, the light source housing 120 can be moved relative to the barrel 115 (and thus relative to the light source 129).

The movement of the light source housing 120 relative to the barrel 115 will cause the lens 127 to move relative to the light source 129, thereby changing the focal length (the distance from the light source 129 to the center of the lens 127).

Changing the focal length, in turn, changes the focus of the light emitted from the source, allowing the light band to adjust from a wide cone to a more focused beam.

[0036]

The movement of the light source housing 120 relative to the barrel 115 can be accomplished by sliding between the light source housing and the barrel.

By adjusting the focal length to the desired setting, the light source housing 120 can be locked relative to the barrel 115.

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Before the focus is "locked" to the desired setting, there is a first level of friction between the light source housing 120 and the barrel 115, which is sufficient to prevent the light source housing from loosening on the barrel, but allows the user to easily move the light source housing relative to the barrel. The body moves generally along the axis along which the barrel 115 extends to adjust the focus.

The friction force between the barrel 115 and the light source housing 120 increases in response to the rotation of the light source housing 120 relative to the barrel 115 in the first rotation direction (direction around the main axis of the barrel).

The increase in friction between the cylinder 115 and the light source housing 120 will block the movement between the cylinder 115 and the light source housing 120 along the main axis of the cylinder.

This increase in friction can be used to "lock" the focus.

Rotating the light source housing 120 relative to the cylinder 115 in a second rotation direction opposite to the first rotation direction is used to reduce the friction between the light source housing 120 and the cylinder 115, thereby reducing the friction between the light source housing 120 and the cylinder 115. Movement along the main axis of the barrel occurs relatively easily.

The term "locked" as used here does not require no relative movement between the barrel 115 and the light source housing 120, but defines a relationship between the light source housing 120 and the barrel 115 in which , it is generally more difficult to change the focal length than when the barrel 115 and light source housing 120 are "unlocked."

[0037]

The mechanism for increasing or reducing friction can be achieved by arranging friction elements around a part of the circumference of the cylinder which is accommodated within the light source housing.

The barrel 115 includes two opposing ramped portions arranged around the circumference of the barrel. For ease of illustration, Figure 3 shows opposing ramp-shaped portions (200, 210) that are horizontal or "spread" relative to their position around the circumference of barrel 115. The first ramp portion 200 is fixed relative to the barrel 115A, and the second ramp portion 210 provided on the barrel includes a key 215 that is received in the keyway 220 of the light source housing 120A. When key 215 engages keyway 220, second ramp portion 210 is fixed relative to light source housing 120A. Key 215 is configured to engage keyway 220 when light source housing 120 is mounted to barrel 115 .

[0038]

As described, in response to the relative rotation in the first direction (as shown in FIG. 3), the light source housing 120A moves in the direction of arrow 250 , the barrel 115A moves in the direction of arrow 260 , and the slopes of the sloped portions 200 and 210 mutually move. Match and combine to become thicker as shown in size "T".

The "thicker" pair of ramps are provided on the circumference around the barrel 115 to create greater friction between the light source housing 120 and the barrel 115 by creating pressure between the light source housing 120 and the barrel 115 interface. Conversely, in response to the rotation in the second direction, as shown in FIG. 4 , in which the light source housing 120A moves in the direction of arrow 230 and the barrel 115A moves in the direction of arrow 240 , the combined thickness of the ramp portions 200 and 210 decreases, as in the size Shown as "t" Therefore, the friction between the light source housing 120 and the barrel 115 is also reduced, and the barrel 115 is not locked relative to the light source housing 120, thereby allowing the focal length to be easily changed, as described above.

[0039]

Figure 5 shows the light source housing 120 with the bezel and lens removed for ease of understanding.

The housing 120 includes a keyway 220, and the barrel 115, which is fixed relative to the light source 129, includes a key 215. Two ramp-shaped portions are provided in grooves surrounding the barrel 115, not visible in Figure 5.

[0040]

Adjust operating mode

[0041]

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Referring again to FIG. 1 , housing 110 includes an adjustment ring 140 disposed about barrel 115 .

The adjustment ring is configured to rotate about the barrel between at least two different positions.

The adjustment ring may include a detent on the inner circumference of the ring for engaging a spring-biased protrusion, pin or ball. Since the adjustment ring 140 rotates around the barrel 115, the spring-biased protrusions will be accommodated in detents corresponding to different positions of the adjustment ring 140. In some embodiments, the detent and spring-biased protrusions may not be provided, so that the adjustment ring 140 can rotate around the barrel without actual identification to define different positions; however, the different positions of the adjustment ring 140 can also be determined by Other mechanisms may be used, for example, it may be up to the user to set these positions when implementing a particular mode through the flashlight 100 . Other embodiments defining different positions may be used, such as detents on the barrel and spring-biased protrusions on the adjustment ring, and/or aligned demarcation lines between the adjustment ring 140 and the barrel, etc.

[0042]

In an exemplary embodiment, each different position of the adjustment ring is provided with a locking position, and each different position of the adjustment ring corresponds to an operating mode of the flashlight.

For example, the light source 129 can operate in a bright mode and a dim mode, and it is also possible to set a mode of increasing brightness between the bright and dim modes. Each such brightness level may be an operating mode such that different positions of the adjustment ring correspond to operating modes corresponding to a specific brightness. Alternatively or additionally, the brightness can be adjusted virtually infinitely between the brightest level and the darkest level, with no substantial jamming between the two. Another mode of operation for the flashlight may include a flash mode in which the light source is set to flash periodically. In some exemplary embodiments, different wavelengths of light may be used in different modes of operation. For example, light source 129 may include visible, white light LEDs, ultraviolet (eg, 375 nanometer wavelength) LEDs, and infrared (eg, 10 micron wavelength) LEDs. Each different position of the adjustment ring may correspond to operation of one of the LEDs providing different wavelength selections.

[0043]

Since each different position of the adjustment ring can correspond to a specific operating mode, the position of the adjustment ring must be connected to the flashlight circuit to function properly in each operating mode.

Embodiments of the invention may include magnets disposed within the adjustment ring 140 . A Hall effect sensor is provided inside the housing for sensing the magnet provided on the adjustment ring 140 . Hall effect sensors, using voltage from a power supply (more on this below), generate a Hall voltage. This Hall voltage will change depending on the positional relationship between the magnet of the adjustment ring 140 and the Hall effect sensor. Based on the established, calibrated Hall voltage, the flashlight circuit can use this Hall voltage to determine which position the adjustment ring is in and cause the flashlight to operate in the corresponding operating mode.

[0044]

Figure 6 shows an exemplary embodiment of the contactless switch described above

In the embodiment shown, an adjustment ring 140 is disposed about the barrel 115. The adjustment ring 140 is rotatable about the barrel 115 in the direction of arrow 295 between five different positions shown in lines A, B, C, D and E. The magnet 280 on or within the adjustment ring 140 rotates with the adjustment ring relative to the barrel 115 and the Hall effect sensor 290 located in the barrel. At each position A, B, C, D, and E, the Hall voltage output from the Hall effect sensor is different depending on the proximity of the magnet 280 to the Hall effect sensor 290. Therefore, depending on the position of the adjustment ring 140, the operating mode of the flashlight can be changed.

[0045]

It is expected that the contactless switch described above to change the operating mode of the flashlight can be used as an internal component of the flashlight, such as a circuit, that can remain packaged within the barrel 115 and be less susceptible to environmental contaminants outside the barrel 115, etc. Impact.

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For example, the barrel 115 could be immersed in water and the use of magnets and Hall effect sensors would not negatively affect the functionality of the switch. This arrangement also allows for cleaning of the switch mechanism by removing the adjustment ring 140, as will be described in further detail below.

[0046]

Power switch assembly

[0047]

Exemplary embodiments of the present invention may be configured with a power switch that is separate from the adjustment ring 140 described above.

In the embodiment shown in FIG. 1 , the power switch 150 is disposed within the elongated groove of the adjustment ring 140 .

Depending on the position of the power switch 150 within the elongated slot of the adjustment ring, the power switch in this configuration provides the user with an intuitive method to determine the operating mode of the flashlight. The power switch 150 can be in a fixed position relative to the barrel 115, allowing the adjustment ring 140 to rotate relative to the power switch 150. According to the position of the power switch 150 in the extension slot 142, the user can intuitively know or remember the operating mode of the flashlight.

[0048]

Furthermore, according to the illustrated embodiment, the power switch 150 is disposed within the adjustment ring 140, so that the structural arrangement of the power switch and adjustment ring 140 mechanism for selecting the operating mode is more compact.

There is actually as much space within the body of the flashlight for multiple functions as there is for a separate power switch.

[0049]

The power switch can be used to turn the flashlight on and off, and the operating mode of the flashlight can be determined based on the position of the adjustment ring 140.

This structure allows the user to set the operating mode without turning on the flashlight. This structure is beneficial when the user switches to low brightness mode or infrared mode, for example, because the user does not want to cycle all the way from high brightness mode until they reach their desired mode. Therefore, one advantage of the present invention includes the ability to select the operating mode of the flashlight when the flashlight is turned off.

[0050]

Additionally or alternatively, the power switch 150 may be configured to cycle through all sub-modes of operation of the flashlight.

For example, in one embodiment where the different operating modes include different light source wavelengths, the power switch may cycle between brightness levels using the light source wavelength selected by adjustment ring 140. This embodiment allows multiplexing of operating modes between the adjustment ring 140 and the power switch 150, thereby enhancing the functionality of the flashlight without taking up any additional space on the flashlight housing for switches or buttons.

[0051]

Flashlight components

[0052]

Figure 7 shows an example of a partially disassembled flashlight according to an embodiment of the present invention.

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The flashlight housing of an exemplary embodiment may include a flashlight base 130, a power housing portion 310 of the barrel 115, a switch portion 320 of the barrel, and a light source housing 120.

The power supply housing portion 310 of the barrel 115 can accommodate a portable power supply for powering the flashlight. The power source may include, for example, one or more batteries. In an exemplary embodiment of the present invention, power supply housing portion 310 is interchangeable with an alternative power supply housing portion that may be configured, for example, to accommodate more or fewer batteries, or a different Type of battery (e.g., "C-size" battery vs. "D-size" battery). In an exemplary embodiment, the power supply housing 310 is configured to house two D-type batteries and is interchangeable with the power supply housing 310 housing three D-type batteries, which can Provides an additional 20 hours of light source operating power. Optionally, multiple power supply enclosures can be joined together to form additional power supply structures.

[0053]

The switch portion 320 of the barrel 115 and the base 130 are configured to be connected to the power supply housing 310 via a threaded connection.

For example, the male threads of base 130 are disposed within the internal female threads of power supply housing 310 . Similarly, the external male threads of the barrel's switch portion 320 are disposed within the corresponding internal female threads of the power supply housing 310. A gasket, such as a rubber gasket, is provided at the bottom of the male thread surrounding each base 130 and switch portion 320 so that the threads of the base 130 and switch portion 320 are fully combined with the power supply housing 310, thereby making the power supply housing substantially sealed and waterproof. , dustproof, anti-residue, etc.

[0054]

Figure 8 shows the exemplary embodiment of the flashlight 100 of Figures 1, 2, and 7 with the adjustment ring 140 removed, and demonstrates a mode of operation in which this assembly can be easily cleaned without contaminating or damaging the selector switch.

Further shown in Figure 8 is a spring-biased protrusion 144 that is provided to engage detents on the inner circumference of the adjustment ring 140, which detents define various positions of the adjustment ring 140.

[0055]

Figure 9 shows the exemplary embodiment of Figure 8, in which the switch portion 320 of the barrel 115 is removed from the light source housing 120, and the rim 125 (including the lens 127) is also removed from the light source housing 120.

The light source 129 is shown connected to the switch portion 320 of the barrel 115 along with the ramp portion 200 and the key 215 which engages with the keyway of the light source housing 120 to reduce accidental changes in focus as described above.

[0056]

FIG. 10 shows an enlarged schematic view of the base 130 in the embodiment of FIG. 7 .

Base 130 includes a threaded portion 135 that is received within power supply housing 310 and charge status indicator 133. The charge status indicator 133 of the illustrated embodiment is a translucent ring that extends around the base (about the main axis of the barrel 115) but does not protrude from the surface of the base. The battery status indicator 133 is configured to emit a first color of light when the power supply level is greater than a threshold, and to emit a second color of light when the power level is below the threshold. The battery status indicator 133 may also illuminate when the power supply is charging or when the flashlight is on (ie, when the light source is on).

[0057]

Figure 11 shows a schematic view of the base 130 of the flashlight 100 as seen from the bottom of the flashlight, opposite the light source 129.

The base 130 of the flashlight 100 may include a plurality of battery level indicator lights 350, which may be, for example, LED lights. The power level indicator LED light provides an indication of the power level of the power supply in the same manner as the power status indicator 133 in FIG. 10 . The plurality of power level indicator lights 350 provide a clearer visual indication of

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the power level than the power level indicator 133 in a more detailed manner. For example, the illustrated embodiment includes ten battery level indicator lights 350 . Each light corresponds to a power level. In one embodiment, each light corresponds to 10% of the maximum or full charge level of the power supply. When one light of the multiple power level indicator lights 350 lights up or glows, it indicates a 10% power level, and when four lights of the multiple power level indicator lights 350 light up, it indicates a 40% power level (the maximum value is 100% power level). grade).

[0058]

The plurality of power level indicator lights 350 can also indicate power levels in different colors.

For example, when the power level is lower than 100%, the lit power level indicator 350 emits red light. When all the power level indicator lights 350 are on, it means 100% power level, and the power level indicator light 350 emits green light. Optionally, after reaching a preset power level threshold, each power level indicator light 350 can all emit green light. For example, the preset power level threshold is 70%. After exceeding the threshold, the indicator lights 350 all emit green light. green light. Similarly, the power level indicator light 133 of Figure 10 can emit green light after exceeding a preset power level threshold (such as 70%). During power charging and/or during flashlight operation, for example, when the flashlight is turned on, the plurality of battery level indicators 350 may be illuminated.

[0059]

Depending on the operating mode of the flashlight, the battery level indicator 350 is optionally configured to display the time or percentage of battery life remaining.

For example, an exemplary embodiment's flashlight has a battery life of one hour when at full brightness. After thirty minutes, the battery level indicator 350 will display 50% of the flashlight's current operating mode or remaining battery life. When the same flashlight works in flash operation mode, the power used by the flash is much less than in full brightness operation mode. After thirty minutes of use in full brightness operating mode, the battery indicator will indicate 50% life. When switching to the flash operating mode, the battery indicator will show a higher percentage of life, such as 90%, since the flash operating mode consumes less power.

[0060]

Alternatively, the battery level indicator 350 may be configured to display battery life per unit time, such as in 15-minute increments.

With a full battery charge and full brightness operating mode, all battery indicator lights 350 cannot be illuminated because in that mode, a full charge can only provide one hour of battery life. Because of this, only four battery level indicators will light up. When the flashlight is operating in the lower brightness operating mode, when fully charged, the battery level indicators will all illuminate, indicating the remaining two and a half hours of operating time. In some operating modes, battery life will exceed the number of battery indicator lights. In such an embodiment, the battery indicator lights will all illuminate until the battery level drops below a point where the remaining battery life in this operating mode is less than two and a half hours.

[0061]

Figure 11 further illustrates charging port 360 of flashlight 100.

The charging port 360 may include two electrical connections (positive and negative or neutral), with a first electrical connection being centered on a second electrical connection that is a concentric ring surrounding the first electrical connection. The two electrical connections are separated by an insulating layer, such as plastic or other non-conductive material. One of the advantages of this arrangement of electrical connections is that the orientation of the charging adapter around the main axis of the barrel is not important, and the flashlight can be inserted into the charging base in any position as the main axis of the barrel is rotated (described further below) middle. Exemplary embodiments may further include a magnetized charging port 360 that will magnetically attract the charging adapter when the flashlight 100 is installed into the charging base. This structure facilitates establishing an electrical connection between the charging adapter and charging port 360. Alternatively, the charging adapter may become magnetized when the flashlight's charging port 360 includes a magnetically attractive material, such as ferrous metal. In either configuration, charging port 360 facilitates establishing a proper electrical connection with the charging adapter.

[0062]

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Charging base

[0063]

FIG. 12 shows an exemplary embodiment in which the flashlight 100 according to the above-described embodiment is mounted to the charging base 500.

Charging base 500 may include a receiver 510 for placing base 130 of flashlight 100.

The charging base 500 further includes a bracket 520 for placing the barrel 115 of the flashlight 100. The bracket 520 may include a strap 525 for securing the barrel 115 of the flashlight 100 into the bracket 520. The strap may be an adjustable strap to accommodate different sized flashlights and barrels, and/or the strap may be made of plastic material to accommodate different sized flashlights. The strap can be installed on and removed from the bracket 520 to make the flashlight 100 easier to install and remove from the charging base 500.

[0064]

As shown in Figure 12, receiver 510 is pivotally coupled to base plate 530 of charging base 500 via one or more receiver supports 540.

The receiver support 540 is mounted to the base plate 530 at one end and is pivotally coupled to the receiver 510 at the other end, for example, by a pin. Charging base 500 may further include a charging adapter 550 disposed within receiver 510. Charging adapter 550 is removably coupled to receiver 510 such that charger 550 can be used independently in charging base 500, as further described below.

[0065]

Figure 13 shows the charging base 500 of Figure 12 without a flashlight.

As shown, the strap 525 can be detached from the bracket 520 to remove the flashlight. The receiver 510 rotates about the receiver support 540 in the direction of arrow 512 so that the flashlight can be easily removed from the receiver 510. Charging adapter 550 is pivotally connected to receiver 510. Receiver 510 is generally cup-shaped with an opening in the cup-shaped receiver for receiving the base of the flashlight. A charging adapter 550 is provided at the bottom of the cup receiver 510 for coupling to the charging port 360 of the flashlight. The receiver 510 may be spring biased to a position in which the opening is generally oriented away from the base plate 530 . In order to secure the flashlight to the charging base 500, this structure allows the flashlight base 130 to be easily inserted into the receiver 510 before the flashlight (and receiver 510) is pivoted toward the bracket 520.

[0066]

The bracket 520 of the charging base 500 is pivotally mounted to the base plate 530 .

To accommodate flashlights of different sizes, bracket 520 is pivotable in the direction of arrow 527 . Furthermore, both the receiver 510 and the bracket 520 are adjustably positioned by the base plate 530 so that their positions along the base plate 530 can be adjusted

[0067]

For those skilled in the art, it is easy to think of various modifications and other implementations of the present utility model. The contents of the present utility model shown in the foregoing description and related drawings have beneficial technical inspiration.

Therefore, it is to be understood that the invention is not limited to the specific embodiments disclosed, but is intended to include various modifications and other embodiments claimed within the scope of the claims. Although specific terms are used herein, they are used in a generic and descriptive sense only and not as a limitation.

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CLAIMS CN203395603U

1.

A flashlight includes: a light source, including a power source with a power level; a housing defining a main axis, the housing extending along the main axis; and a switch located near the barrel, wherein the switch is used to turn the flashlight on and off; its characteristics The method further includes an adjustment ring arranged around the housing, wherein the adjustment ring rotates between at least two positions, each position of the at least two positions is defined as a different operating mode, and the adjustable The ring includes a magnet and a Hall effect sensor, and wherein at least two positions of the adjustment ring are identified by the position of the magnet relative to the Hall effect sensor.

2.

The flashlight of claim 1, wherein the operating modes include two or more flash modes, bright modes, secondary light wavelength modes, and dim modes.

3.

The flashlight according to claim 1, characterized in that: the housing includes a rotationally coupled barrel and a light source housing, the light source housing includes a lens, and the barrel and the light source housing are adjustable relative to each other along the main axis direction to focus. A beam of light emitted from a light source; where:

The rotation of the light source housing relative to the cylinder in the first rotation direction increases the friction force against movement between the light source housing and the cylinder; and the rotation of the light source housing in the second rotation direction opposite to the first rotation direction The rotation relative to the cylinder reduces the frictional force resisting the movement between the light source housing and the cylinder;

The barrel secures a first power source, and wherein the barrel and a second barrel are interchangeable, the second barrel being configured to hold a second power source different from the first power source.

4.

The flashlight of claim 3, further comprising: a first sloped portion and a second sloped portion, the first sloped portion being fixed relative to the barrel; and the second sloped portion being fixed relative to the light source housing Fixed; wherein the first ramp portion and the second ramp portion cooperate with each other to increase the friction between the barrel and the light source housing in response to the rotation of the barrel and the light source housing in the first direction; and the The first ramp portion and the second ramp portion cooperate with each other to reduce friction between the barrel and the light source housing in response to rotation of the barrel and the light source housing in a second direction opposite to the first direction.

5.

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The flashlight according to claim 1, characterized in that: the housing includes a power indicator ring arranged around the main axis, and when the power level of the power source exceeds the threshold power level, the power indicator ring emits light of the first color; and when When the power level of the power supply is lower than the threshold power level, the power indicator ring emits light of the second color; when the light source is turned on, the power indicator ring emits light; when the light source is turned off, the power indicator ring does not light up; and The housing defines a base, and a plurality of power indicator lights are disposed around the base, the plurality of power indicator lights emit light in response to the power level of the power supply, and the number of the illuminated power indicator lights changes in response to the flashlight operating mode. changes.

6.

A charging base for a flashlight, characterized by: compnsing a base plate mounted to a surface, a receiver pivotally fixed to the base plate, the receiver being used to place the base of the flashlight; a pivot a bracket rotationally fixed to the base plate for housing the barrel of the flashlight; and a charging adapter placed in the receiver and coupled to the base of the flashlight.

7.

The charging base according to claim 6, wherein the charging adapter is removable from the receiver so as to be used independently of the receiver.

8.

The charging base according to claim 6, wherein the receiver is generally cup-shaped and includes an opening, wherein the base of the flashlight is received in the cup body through the opening, and the receiver is biased Move to a position in which the opening of the cup faces away from the base plate.

9.

The charging base of claim 6, wherein the charging adapter includes a magnet, and wherein the base of the flashlight is attracted to the magnet of the charging adapter.

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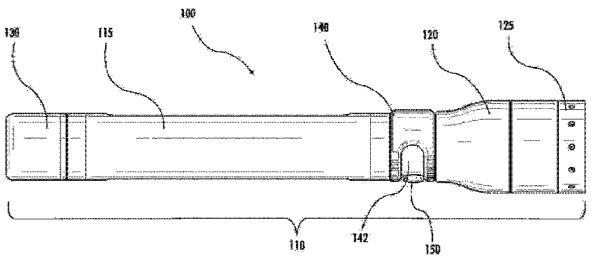
(54)实用新型名称

一种手电筒和用于手电筒的充电基座

(57)摘要

本实用新型提出了一种改进的手电筒和用于手电筒的充电基座。该手电筒包括：光源，包括电量等级的电源；限定了主轴的外壳，所述外壳沿所述主轴延伸；位于筒体附近的开关，其中，所述开关用于开启和关闭手电筒；其特征在于：还包括围绕外壳设置的调节环，其中，所述调节环在至少两个位置之间转动，所述至少两个位置的每个位置定义为一种不同的操作模式，及所述可调节环包括磁体和霍尔效应传感器，并且其中，所述调节环的至少两个位置由磁体相对于霍尔效应传感器的位置来识别。本实用新型提供了适用于LED使用的手电筒紧凑结构。



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1. 一种手电筒，包括：光源，包括电量等级的电源；限定了主轴的外壳，所述外壳沿所述主轴延伸；位于筒体附近的开关，其中，所述开关用于开启和关闭手电筒；其特征在于：还包括围绕外壳设置的调节环，其中，所述调节环在至少两个位置之间转动，所述至少两个位置的每个位置定义为一种不同的操作模式，及所述可调节环包括磁体和霍尔效应传感器，并且其中，所述调节环的至少两个位置由磁体相对于霍尔效应传感器的位置来识别。

2. 根据权利要求 1 所述的手电筒，其特征在于：所述操作模式包括两种或多种闪光模式、明亮模式、次级光波长模式、和昏暗模式。

3. 根据权利要求 1 所述的手电筒，其特征在于：所述外壳包括转动结合的筒体和光源外壳，光源外壳包括透镜，及筒体和光源外壳相对于彼此沿主轴方向是可调节的，以聚焦从光源发射出的光束；其中：

所述光源外壳在第一转动方向上相对于筒体的转动，增加了抵抗光源外壳和筒体之间运动的摩擦力；以及所述光源外壳在与第一转动方向相反的第二转动方向上相对于筒体的转动，减小了抵抗光源外壳和筒体之间运动的摩擦力；

所述筒体固定第一电源，并且其中所述筒体与第二筒体是可互相替换的，所述第二筒体设置为持有不同于第一电源的第二电源。

4. 根据权利要求 3 所述的手电筒，其特征在于：进一步包括第一斜坡形部分和第二斜坡形部分，所述第一斜坡形部分相对于筒体固定；并且第二斜坡形部分相对于光源外壳固定；其中，所述第一斜坡形部分和第二斜坡形部分相互配合，增加筒体和光源外壳之间的摩擦力，以响应筒体和光源外壳在第一方向上的转动；以及所述第一斜坡形部分和第二斜坡形部分相互配合，减小筒体和光源外壳之间的摩擦力，以响应筒体和光源外壳在与第一方向相反的第二方向上的转动。

5. 根据权利要求 1 所述的手电筒，其特征在于：所述外壳包括围绕主轴设置的电量指示环，当电源的电量等级超出阈值电量等级时，所述电量指示环发出第一颜色的灯光；并且当电源的电量等级低于阈值电量等级时，所述电量指示环发出第二颜色的灯光；当光源开启时，所述电量指示环发光；当光源关闭时，所述电量指示环不发光；及所述外壳限定了基座，并且多个电量指示灯围绕所述基座设置，多个电量指示灯发光，以响应电源的电量等级，且发光的电量指示灯的数量会改变，以响应手电筒操作模式的改变。

6. 一种用于手电筒的充电基座，其特征在于：包括设于安装至表面的基座板；枢轴转动固定至基座板的接收器，所述接收器用于放置手电筒的基座；枢轴转动固定至基座板的托架，所述托架用于放置手电筒的筒体；以及充电适配器，放置于接收器中并与手电筒的基座相结合。

7. 根据权利要求 6 所述的充电基座，其特征在于：充电适配器设为可从接收器中移除，以独立于接收器使用。

8. 根据权利要求 6 所述的充电基座，其特征在于：所述接收器大体呈杯形，包括一开口，其中，手电筒的基座通过所述开口容置于杯体内，并且所述接收器偏置至一个位置，在该位置处，所述杯体的开口朝向远离基座板的方向。

9. 根据权利要求 6 所述的充电基座，其特征在于：所述充电适配器包括磁体，并且其中手电筒的基座被吸引至充电适配器的磁体。

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一种手电筒和用于手电筒的充电基座

技术领域

[0001] 本实用新型的涉及一种提供照明的手电筒和充电系统，更特别地是，涉及一种用于多种模式的手电筒和充电基座。

背景技术

[0002] 从住宅或商用照明器具到手提式手电筒，电光源可以以多种形式存在。传统的白炽灯泡已经被更加高效的荧光灯泡和节能灯（CFL）泡所取代，以在耗费更少能源的同时能够提供大致相似的光亮。尽管节能灯比同等亮度的白炽灯高效，但发光二极管（LED）以特定紧凑的结构能更高效地产生同等或更强的光亮。

[0003] LED 最初比白炽灯或节能灯更贵，并且不适合于许多应用。此外，LED 的低强度和有限的颜色选择也限制了它们的使用。LED 领域最近的发展已使 LED 光源成为传统光源普遍的替代品或补充品。再者，LED 可以包装成比同等亮度的白炽灯或节能灯更小的形式。得益于 LED 体积小和高效能的特点，现在在手电筒和其他便携式光源中都应用了 LED。

[0004] 由于 LED 与白炽灯或节能灯作用的方式不同，LED 可提供的功能和效用之前在紧凑的结构中是不可用的如手电筒中。因此，需要开发 LED 在紧凑结构中的性能。

实用新型内容

[0005] 根据上述背景，本实用新型的示范性实施例提供了一种手电筒和充电基座系统。该示范性实施例的手电筒可包括光源；具有电量等级的电源；限定了主轴的外壳，该外壳沿该主轴延伸；围绕外壳设置的调节环，其中，调节环设为在至少两个位置之间转动，其中至少两个位置的每个位置限定一种不同的操作模式；以及位于筒体附近的开关，其中该开关用于开启和关闭手电筒。示范性实施例的手电筒可包括霍尔效应传感器，并且调节环可包括磁体，其中调节环的至少两个位置由磁体相对于霍尔效应传感器的位置来进行识别。操作模式包括两种或多种，闪光模式、明亮模式、昏暗模式、以及次级光波长模式。

[0006] 对应一些实施例，外壳包括筒体和光源外壳，其中，光源外壳包括透镜，并且光源外壳相对于筒体沿主轴方向是可调节，以聚焦从光源发射出的光束。筒体和光源外壳相对于彼此沿主轴方向是可调节的。筒体和光源外壳可转动地结合。光源外壳在第一转动方向相对于筒体的转动，将增加用来抵抗光源外壳和筒体之间运动的摩擦力，而光源外壳以与第一转动方向相反的第二转动方向相对于筒体转动时，将减少用来抵抗光源外壳和筒体之间运动的摩擦力。筒体设置为固定第一电源，并且该筒体与设置为固定第二电源的第二筒体是可互相替换的，该第二电源与第一电源不同。调节环可设为能从外壳中移除。

[0007] 依照本实用新型一些实施例的手电筒可包括第一斜坡形部分和第二斜坡形部分，其中，第一斜坡形部分相对于筒体固定，而第二斜坡形部分相对于光源外壳固定。第一斜坡形部分和第二斜坡形部分可相互配合，以增加筒体和光源外壳之间的摩擦力，以响应在第一方向上筒体和光源外壳之间的转动。第一斜坡形部分和第二斜坡形部分可相互配合，以减小筒体和光源外壳之间的摩擦力，以响应在与第一方向相反的第二方向上筒体和光源外

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壳之间的转动。

[0008] 依照本实用新型的一些实施例，该外壳可包括围绕主轴设置的电量指示环。当电源的电量等级超出阈值电量等级时，该电量指示环发出第一颜色的灯光；并且当电源的电量等级低于阈值电量等级时，该电量指示环发出第二颜色的灯光。当光源开启时，电量指示环发光；当光源关闭时，电量指示环不发光。该外壳定义了基座和多个围绕该基座设置的电量指示灯。该多个电量指示灯将发光作为对电源电量等级的响应。

[0009] 本实用新型的实施例还为手电筒提供了充电基座。该充电基座包括用于安装至表面的基座板；枢轴转动固定至基座板的接收器，该接收器用于放置手电筒的基座；枢轴转动固定至基座板的托架，该托架用于放置手电筒的筒体；以及充电适配器，放置于接收器中并与手电筒的基座相结合。该充电适配器设为可从接收器中移除，以便独立于接收器使用。接收器大体上呈杯形，包括一开口，其中，手电筒的基座可通过该开口容置于杯体内；其中该接收器偏置至一个位置，在该处，杯体的开口朝向远离基座板的方向。该充电适配器可包括磁体，而手电筒的基座可被吸引至充电适配器的磁体处。

[0010] 本实用新型的实施例可提供一种手电筒和充电基座系统，包括手电筒和充电基座。该手电筒可包括光源、包含电量等级的电源；限定了主轴的外壳，该外壳沿该主轴延伸；围绕该外壳设置的调节环，其中该调节环设为在至少两个位置之间转动，其中该至少两个位置的每个位置限定了一个不同的操作模式；以及位于筒体附近的开关，其中，该开关设为开启和关闭该手电筒。该充电基座可包括安装至表面的基座板；枢轴转动固定至基座板的接收器，该接收器用于放置手电筒的基座；枢轴转动固定至基座板的托架，该托架用于放置手电筒的筒体，以及充电适配器，放置于接收器中并与手电筒的基座相结合。

附图说明

[0011] 现参照附图，概括地描述本实用新型，这些附图未必按比例绘制，其中：

[0012] 图 1 是可实施本实用新型实施例的手电筒的示意图；

[0013] 图 2 示出了从光源端看到的图 1 中手电筒；

[0014] 图 3 是根据示范性实施例，处于高摩擦位置，增加手电筒的光源外壳和筒体之间摩擦的机构的示意图；

[0015] 图 4 是根据图 3 的实施例，处于低摩擦位置，减小手电筒的光源外壳和筒体之间摩擦的机构的示意图；

[0016] 图 5 示出了从光源端看到的图 1 和图 2 中的手电筒，移除了光源外壳、透镜和边圈；

[0017] 图 6 是根据本实用新型实施例用于改变手电筒操作的方式的无触点开关的示意图；

[0018] 图 7 是图 1 中手电图的示意图，拆分了基座、电源外壳和筒体的开关部分；

[0019] 图 8 是图 7 中筒体的开关部分的示意图，移除了调节环；

[0020] 图 9 是从光源外壳中分离的筒体的开关部分和从光源外壳中移除的透镜的示意图；

[0021] 图 10 示出了根据本实用新型示范性实施例的手电筒的基座；

[0022] 图 11 示出了根据本实用新型示范性实施例的手电筒的基座的充电端口；

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[0023] 图 12 示出了根据本实用新型的手电筒和充电基座系统，与充电基座相结合的手电筒；以及

[0024] 图 13 示出了根据本实用新型示范性实施例的充电基座。

具体实施方式

[0025] 本实用新型在下文中将参照附图进行更加全面的描述，在这些附图中示出了本实用新型优选的实施例。然而，本实用新型可以表现为多种不同的形式，且不应该被解释为局限于本文中所提出的实施例；相反，提供这些实施例使得本实用新型公开得彻底和完整，并且向本领域技术人员完整地表现本实用新型的范围。在全文中，相同的附图标记表示相同的部件。

[0026] 本实用新型的示范性实施例通常被描述或描绘体现为手电筒的形式。尽管如此，很明显，本实用新型的实施例可扩展并可应用至多种形式中，如照明灯、海事照明、研究或救援灯（例如，泛光灯、聚光灯）等等。同样地，本文公开的内容仅提供一个示范性实施例，而不局限于此。

[0027] 现参考图 1 中的实施例，本实用新型的实施例可应用于手电筒，如图 1 中带有外壳 110 的手电筒 100，该手电筒 100 包括筒体 115、光源外壳 120 和基座 130。光源外壳 120 还可包括边圈 125，该边圈 125 设置为固定透镜，下文中将进一步描述。在所示出的实施例中，该手电筒 100 包括调节环 140 和开关 150。示出的实施例描述了位于调节环 140 中的伸长槽 142 之内的开关 150；但在其他一些实施例中，开关 150 和调节环 140 可以是分开的。

[0028] 图 2 示出了从光源外壳 120 正面看到的图 1 中实施例。如图所示，边圈 125 可将透镜 127 固定于光源外壳 120 之内。所示出实施例中的光源 129 是大功率发光二极管（LED），以及所示出实施例中的透镜 127 包括折射透镜，其能够根据从透镜 127 到光源 129 的距离，聚焦从 LED 发射出的光。虽然所示出实施例包括作为光源 129 的大功率 LED 和折射透镜 127，但其他实施例可以包括多种类型的光源，例如多个 LED、一个或多个 LED 与和一个或多个白炽灯泡的组合、或能从本实用新型的实施例中受到启发的任何其他光源。再者，透镜 127 可以是折射透镜，如图所示聚焦来自光源 129 的光，或者也可以大体上是不能聚焦光线的平面透镜，而允许光线大体上未经折射直接穿过透镜。带有折射透镜或不带折射透镜的实施例都可包括设于光源外壳 120 之内的反射镜，用作将从光源 129 发射出的光线反射至透镜 127 外。在这种带有反射镜（例如，抛物柱面形反射镜）的实施例中，该反射镜可用于聚焦从光源 129 中发射出的光线。

[0029] 调整并获得光源的焦点

[0030] 再次参照图 1 和图 2 中所示的实施例，光源 129 可相对于外壳 110 的筒体 115 固定设置，这一点将在图 9 中进一步描述。为了聚焦从光源发射出的光线，光源外壳 120 可以相对于筒体 115（从而相对于光源 129）移动。光源外壳 120 相对于筒体 115 的移动，使将使透镜 127 相对于光源 129 移动，从而改变焦距（从光源 129 至透镜 127 中心的距离）。改变焦距，继而改变从光源发射出的光线的焦点，从而允许光带从宽的锥形调整为更聚焦的光束。

[0031] 光源外壳 120 相对于筒体 115 的运动可以通过光源外壳和筒体之间的滑动来完成。通过将焦距调整至理想设置，可以将光源外壳 120 相对于筒体 115 锁定。在将焦距“锁定”至理想设置之前，在光源外壳 120 和筒体 115 之间有第一级摩擦力，足以防止光源外壳

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在筒体上松动，但允许使用者轻松地将光源外壳相对于筒体大致沿筒体 115 延伸的轴线移动，以调整焦距。筒体 115 和光源外壳 120 之间的摩擦力会增加，以响应光源外壳 120 相对于筒体 115 在第一转动方向上（环绕筒体的主轴方向）的转动。筒体 115 和光源外壳 120 之间摩擦力的增加，将阻挡筒体 115 和光源外壳 120 之间沿筒体主轴方向的运动。这一摩擦力的增加可以用来“锁定”焦距。以与第一转动方向相反的第二转动方向，相对于筒体 115 转动光源外壳 120，用于减少光源外壳 120 和筒体 115 之间的摩擦力，从而使光源外壳 120 和筒体 115 之间沿筒体主轴方向的运动相对容易地进行。此处用到的术语“锁定”，并不要求筒体 115 和光源外壳 120 之间完全没有相对运动，而是限定了光源外壳 120 和筒体 115 之间的一种关系，在这种关系中，相比筒体 115 和光源外壳 120 “未锁定”时，大体上更难改变焦距。

[0032] 增加或减少摩擦力的机构，可以通过围绕筒体的一部分的圆周设置摩擦元件来实现，该筒体的一部分的圆周容置于光源外壳之内。筒体 115 包括两个相对的斜坡形部分，斜坡形部分围绕筒体的圆周设置。为便于阐述，图 3 示出了相对的斜坡形部分（200，210），相对于它们围绕筒体 115 的圆周的位置是水平的或“展开的”。第一斜坡形部分 200 相对于筒体 115A 是固定的，而设于筒体上的第二斜坡形部分 210 包括键 215，该键 215 容置于光源外壳 120A 的键槽 220 之内。当键 215 与键槽 220 结合时，第二斜坡形部分 210 相对于光源外壳 120A 固定。当光源外壳 120 安装至筒体 115 上时，键 215 被设置为与键槽 220 结合。

[0033] 如所述，为响应在第一方向（如图 3 所示）上的相对转动，光源壳体 120A 沿箭头 250 方向移动，筒体 115A 沿箭头 260 方向移动，斜坡形部分 200，210 的斜坡相互匹配并结合变得更厚，如尺寸“T”所示。该“更厚的”一对斜坡形部分设于围绕筒体 115 的圆周上，通过在光源外壳 120 和筒体 115 之间产生压力，在光源外壳 120 和筒体 115 之间产生更大的摩擦界面。反之，为响应第二方向上的转动，如图 4 所示，其中光源外壳 120A 沿箭头 230 方向移动，且筒体 115A 沿箭头 240 方向移动，斜坡形部分 200 和 210 的组合厚度减少，如尺寸“t”所示。因此，光源外壳 120 和筒体 115 之间的摩擦力也减小，筒体 115 相对于光源外壳 120 未锁定，从而使得焦距很容易被改变，如上所述。

[0034] 图 5 示出了光源壳体 120，为便于理解移除了边圈和透镜。外壳 120 包括键槽 220，而筒体 115，其相对于光源 129 固定，包括键 215。两个斜坡形部分设置在围绕筒体 115 的凹槽内，在图 5 中不可见。

[0035] 调整操作模式

[0036] 再次参照图 1，外壳 110 包括围绕筒体 115 设置的调节环 140。该调节环设置为可绕筒体在至少两个不同的位置之间转动。调节环可包括设于该环内圆周上的卡位，该卡位用于与弹簧偏置的突起、销或球结合。由于调节环 140 是围绕筒体 115 转动的，弹簧偏置的突起将容置在相应于调节环 140 的不同位置的卡位内。在一些实施例中，可以不设置卡位和弹簧偏置的突起，以使调节环 140 可围绕筒体转动，无需实际的标识来限定的不同位置；然而，调节环 140 的不同位置也可以通过其他机构来实现，例如，当通过手电筒 100 实现特定模式时，由使用者来决定设置这些位置。也可采用限定不同位置的其他实施例，例如筒体上的卡位和调节环上的弹簧偏置突起，和 / 或在调节环 140 和筒体之间对齐的分界线，等等。

[0037] 在示范性实施例中，其中调节环的每个不同的位置都设有卡位，该调节环的每个

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不同的位置对应一种手电筒的操作模式。例如，光源 129 能够在明亮模式和昏暗模式进行操作，并且也可能在明亮和昏暗模式二者之间设置亮度递增的模式。每个这种亮度等级都可以是一种操作模式，使得调节环的不同位置对应相应于特定亮度的操作模式。可替代地或附加地，亮度实质上可以在最亮等级和最暗等级之间无限调节，在这两者之间没有实质性的卡位。手电筒的另一种操作模式可以包括闪光模式，在该模式中，光源设置为周期性地闪光。在一些示范性实施例中，可在不同的操作模式中使用不同光的波长。例如，光源 129 可包括可见的、白光 LED、紫外线（例如，波长为 375 纳米）LED、以及红外线（例如，波长为 10 微米）LED。调节环的每个不同位置可对应于提供不同波长选择的 LED 中的一种的操作。

[0038] 由于调节环的每个不同位置可对应于一种特定的操作模式，调节环的位置必须与手电筒电路连通，以在每个操作模式下正常工作。本实用新型的实施例可以包括设置在调节环 140 之内的磁体。在外壳之内设有霍尔效应传感器用于感应设于调节环 140 上的磁体。霍尔效应传感器，利用来自电源的电压（下文中将进一步介绍），可产生霍尔电压。该霍尔电压将根据调节环 140 的磁体和霍尔效应传感器之间的位置关系而改变。基于已建立的、校准过的霍尔电压，手电筒的电路可以利用该霍尔电压来确定调节环处于哪个位置，并使手电筒在相应的操作模式下工作。

[0039] 图 6 示出了上文所述无触点开关的示范性实施例。在所示出的实施例中，调节环 140 围绕筒体 115 设置。该调节环 140 可围绕筒体 115 朝箭头 295 的方向，在线段 A、B、C、D 和 E 所示出的五个不同位置之间转动。调节环 140 之上或之内的磁体 280，随调节环，相对于筒体 115 和设于筒体内的霍尔效应传感器 290 而转动。在 A、B、C、D 和 E 每个位置，根据磁体 280 与霍尔效应传感器 290 的接近程度不同，从霍尔效应传感器输出的霍尔电压都是不同的。因此，根据调节环 140 的位置，可以改变手电筒的操作模式。

[0040] 期望上文所述的、改变手电筒操作模式的无触点开关可作为手电筒的内部元件，例如电路，可保持包装在筒体 115 之内，并且不容易受筒体 115 外部的环境污染物等等的影响。例如，筒体 115 可能被浸泡在水中，并且使用磁体和霍尔效应感应器不会对开关的功能构成负面影响。这种结构还可以通过移除调节环 140 来清洁开关机构，下文中将进一步详述。

[0041] 电源开关组件

[0042] 本实用新型的示范性实施例可以设置为带有电源开关，该电源开关与上文所述的调节环 140 是分开的。在图 1 所示出的实施例中，电源开关 150 设置在调节环 140 的伸长槽之内。根据调节环的伸长槽内电源开关 150 的位置，在该结构中的电源开关可为使用者提供一种直观的方法来确定手电筒的操作模式。电源开关 150 可相对于筒体 115 处于固定的位置，使调节环 140 相对于电源开关 150 转动。根据伸长槽 142 内电源开关 150 的位置，使用者可以直观地知道或记得手电筒的操作模式。

[0043] 再者，根据所示出的实施例，将电源开关 150 设置在调节环 140 之内，使得用于选择操作模式的电源开关和调节环 140 机构的结构安排更紧凑。在手电筒主体内完成多项功能的空间实际上与作为单独的电源开关的空间一样大。

[0044] 电源开关可用于开启和关闭手电筒，而手电筒的操作模式可根据调节环 140 的位置来确定。这种结构使得使用者无需开启手电筒就可设定操作模式。当使用者切换至低亮度模式或红外线模式时，例如，由于使用者不希望从高亮度模式全部循环直至达到他们理

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想的模式，这种结构是有益的。因此，本实用新型的一个优势包括当手电筒关闭时，可以选择手电筒的操作模式。

[0045] 可附加地或可替代地，电源开关 150 可设置为循环手电筒的所有子操作模式。例如，在一个实施例中，不同的操作模式包括不同的光源波长，电源开关可在采用调节环 140 已选择的光源波长的亮度等级之间循环。这种实施例允许调节环 140 和电源开关 150 之间的操作模式的多路复用，从而即使在手电筒外壳上不占用任何额外的空间用于开关或按钮，也能增强手电筒的功能性。

[0046] 手电筒组件

[0047] 图 7 示出了依照本实用新型的实施例，部分拆卸的手电筒的示例。示范性实施例的手电筒外壳可包括手电筒基座 130、筒体 115 的电源外壳部分 310、筒体的开关部分 320、和光源外壳 120。筒体 115 的电源外壳部分 310 可放置便携式电源，用于为手电筒供电。该电源可包括，例如，一节或多节电池。在本实用新型的示范性实施例中，电源外壳部分 310 与替换的电源外壳部分是可以互换的，该替换的电源外壳部分可设置为，例如可以容纳更多或更少的电池，或不同类型的电池（如，“C- 型”电池对“D- 型”电池）。在示范性实施例中，电源外壳 310 设置为装有两节 D- 型电池，可与装有三节 D- 型电池的电源外壳 310 互换，该装有三节 D- 型电池的电源外壳 310 能提供额外的 20 小时的光源工作电量。可选择地，将多个电源外壳联接在一起，可构成额外的电源结构。

[0048] 筒体 115 的开关部分 320 和基座 130 设置为通过螺纹连接连接至电源外壳 310。例如，基座 130 的阳螺纹设置在电源外壳 310 的内部阴螺纹之内。类似地，筒体的开关部分 320 的外部阳螺纹设置在相应的电源外壳 310 的内部阴螺纹之内。垫圈，例如，橡胶垫圈，设置于环绕每个基座 130 和开关部分 320 的阳螺纹的底部，使基座 130 和开关部分 320 的螺纹与电源外壳 310 完全结合，从而使电源外壳实质上密封防水、防尘、防残渣等。

[0049] 图 8 示出了图 1、2 和 7 中移除了调节环 140 的手电筒 100 的示范性实施例，并展示了可轻松地清洁该组件，而不会污染或损坏选择开关的操作模式。图 8 中进一步示出了弹簧偏置的突起 144，该突起设于与调节环 140 内圆周上的卡位接合，这些卡位限定了调节环 140 的不同位置。

[0050] 图 9 示出了图 8 中的示范性实施例，其中，筒体 115 的开关部分 320 从光源外壳 120 拆下，并且边圈 125（包括透镜 127）也从光源外壳 120 中拆下。所示的光源 129 与斜坡形部分 200 和键 215 一起连接至筒体 115 的开关部分 320，该键 215 与光源外壳 120 的键槽相结合，以减少上文所述的焦距的偶然改变。

[0051] 图 10 示出了图 7 实施例中基座 130 的放大示意图。基座 130 包括螺纹部分 135，该部分容置于电源外壳 310 和电量状态指示器 133 之内。所示实施例的电量状态指示器 133 是围绕基座（围绕筒体 115 的主轴）延伸的半透明环，但不会从基座的表面突出。该电量状态指示器 133 设为当电源电量等级大于阈值时，发出第一种颜色的光，并且当电源电量等级低于阈值时，发出第二种颜色的光。当电源正在充电或当手电筒开启（也就是，光源点亮时）时，该电量状态指示器 133 也可发光。

[0052] 图 11 示出了从手电筒的底部，与光源 129 相反的方向，看到的手电筒 100 的基座 130 的示意图。手电筒 100 的基座 130 可包括多个电量等级指示灯 350，这些指示灯可以是，例如 LED 灯。电量等级指示 LED 灯，以与图 10 中电量状态指示器 133 相同的方式，为电源的

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电量等级提供指示。该多个电量等级指示灯 350 以更加细化的方式比电量等级指示器 133 提供更清晰的电量等级可视化指示。例如，所示出实施例包括十个电量等级指示灯 350。每个灯对应一个电量等级。在一个实施例中，每个灯对应于电源的最大的或全部的电量等级的 10%。多个电量等级指示灯 350 的一个灯点亮或发光则表示 10% 的电量等级，而多个电量等级指示灯 350 的四个灯点亮则表示 40% 的电量等级（最大值为 100% 电量等级）。

[0053] 多个电量等级指示灯 350 也可以不同颜色来指示电量等级。例如，当电量等级低于 100% 时，点亮的电量等级指示灯 350 发出红色的光。当所有电量等级指示灯 350 都点亮时，表示 100% 电量等级，电量等级指示灯 350 发出绿色的光。可选择地，在达到预设的电量等级阈值之后，每个电量等级指示灯 350 都可以都发出绿色的光，例如预设的电量等级阀值为 70%，超过该阈值后，指示灯都发出绿色的光。类似地，图 10 的电量等级指示灯 133 在超过预设电量等级阈值（如 70%）后可以发出绿色的光。在电源充电期间和 / 或手电筒工作期间，例如，当手电筒开启时，多个电量等级指示灯 350 可以为点亮的。

[0054] 根据手电筒的操作模式，电量等级指示灯 350 可选择地设为显示电池寿命余下的时间或百分比。例如，在处于完全亮度时，示范性实施例的手电筒的电池寿命为一个小时。三十分钟之后，电量等级指示灯 350 将显示手电筒当前操作模式下 50% 的电量或剩余电池寿命。同一手电筒在闪光操作模式下工作时，闪光使用的电量远远小于完全亮度操作模式。在完全亮度操作模式下使用三十分钟之后，电量指示灯将指示 50% 寿命。当切换至闪光操作模式时，由于闪光操作模式消耗的电量更少，因此电量指示灯将显示更高百分比的寿命，例如 90%。

[0055] 可选择地，电量等级指示灯 350 可设为显示单位时间内的电池寿命，例如 15 分钟的增量。在具有充满的电池电量和完全亮度操作模式的基础上，所有的电量指示灯 350 不能都点亮，因为在那种模式时，充满的电量仅能提供一个小时的电池寿命。正因为如此，仅有四个电量等级指示灯将点亮。当手电筒在亮度更低的操作模式下工作时，完全充电后，电量等级指示灯将全部点亮，指示剩余两个半小时的工作时间。在一些操作模式下，电池寿命将超过电量指示灯的数目。在这种实施例中，电量指示灯将全部点亮直至电量低于某个点，在该点处在该操作模式下剩余电池寿命小于两个半小时。

[0056] 图 11 进一步示出了手电筒 100 的充电端口 360。该充电端口 360 可包括两个电连接（正极和负极或中性极），其中第一电连接设在第二电连接的中心，该第二电连接是围绕第一电连接的同心环。这两个电连接被一绝缘层分开，如塑料或其他非导电性材料。电连接的这种设置的优势之一是，围绕筒体主轴的充电适配器的方向并不重要，并且，手电筒可随着筒体主轴转动，以任何位置插入至充电基座（下文将进一步描述）中。示范性实施例可进一步包括磁化充电端口 360，当手电筒 100 安装至充电基座内时，该端口将通过磁力吸引充电适配器。这种结构易于在充电适配器和充电端口 360 之间建立电连接。可替代地，当手电筒的充电端口 360 包括磁性吸引材料，如黑色金属时，充电适配器会被磁化。在这两种结构的任意一种中，充电端口 360 易于与充电适配器建立恰当的电连接。

[0057] 充电基座

[0058] 图 12 示出了根据上述实施例中的手电筒 100 安装至充电基座 500 的示范性实施例。充电基座 500 可包括接收器 510，用于放置手电筒 100 的基座 130。充电基座 500 还进一步包括托架 520，用于放置手电筒 100 的筒体 115。托架 520 可包括束带 525，用于将手

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电筒 100 的筒体 115 固定至托架 520 中。该束带是可调节的束带，以适应不同尺寸的手电筒和筒体，和 / 或该束带可由塑料材料制成，以适应不同尺寸的手电筒。该束带可安装在托架 520 上以及从托架 520 中卸下，以使手电筒 100 更容易地安装至充电基座 500 以及从充电基座 500 上移除。

[0059] 如图 12 所示，接收器 510 通过一个或多个接收器支承物 540 枢轴转动地联接至充电基座 500 的基座板 530。该接收器支承物 540 一端被安装至基座板 530，另一端则，例如，通过销，枢轴转动地联接至接收器 510。充电基座 500 可进一步包括设置在接收器 510 之内的充电适配器 550。充电适配器 550 可移除地联接至接收器 510，使得充电器 550 可独立用于充电基座 500 中，下文将进一步描述。

[0060] 图 13 示出了不具有手电筒的图 12 中的充电基座 500。如图所示，束带 525 可从托架 520 中卸下，从而移除手电筒。接收器 510 沿箭头 512 方向以接收器支承物 540 为轴旋转，使手电筒可容易地从接收器 510 上移除。充电适配器 550 与接收器 510 枢轴连接。接收器 510 大体上呈杯形，具有杯形接收器的开口用于接收手电筒的基座。充电适配器 550 设置在杯形接收器 510 的底部，用于联接至手电筒的充电端口 360。该接收器 510 可弹簧偏置至一个位置，在该处，开口大体上朝着远离基座板 530 的方向。为了将手电筒固定至充电基座 500，这种结构可使手电筒（和接收器 510）朝托架 520 枢轴转动之前，手电筒的基座 130 易于插入至接收器 510 中。

[0061] 充电基座 500 的托架 520 可枢轴转动地安装至基座板 530。为了适应不同尺寸的手电筒，托架 520 沿着箭头 527 方向是可枢轴转动的。再者，接收器 510 和托架 520 都是通过基座板 530 可调节地放置，从而沿基座板 530 调节它们的位置。

[0062] 对于本领域技术人员而言，很容易想到本实用新型的多种修改和其他实施方式，本实用新型在前述说明书和相关的附图中所示出的内容具有有益的技术启示。因此，应当理解为，本实用新型不局限于所公开的特定实施例，还意图包括权利要求范围之内所请求保护的多种修改和其他实施方式。尽管本文中使用了一些特定术语，但它们是仅用于通用和描述性的意义，并且不构成限制。

Petitioner Therabody Ex-1004, 1735

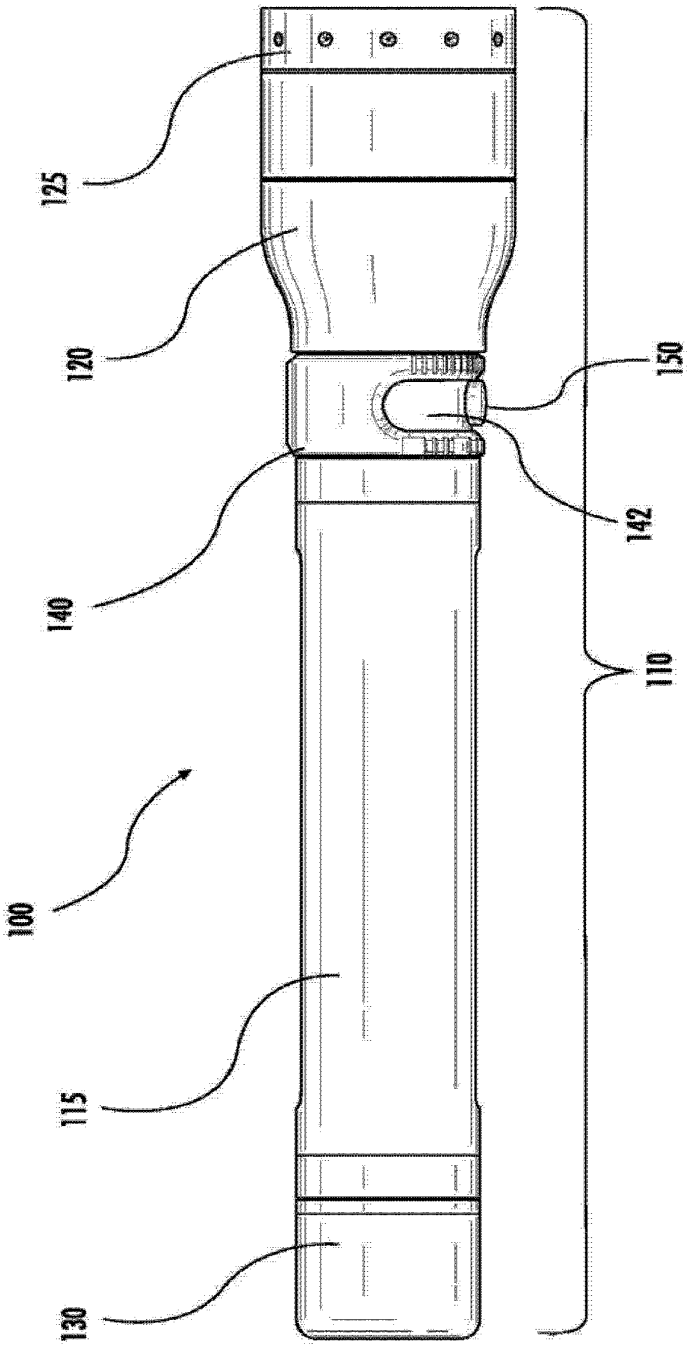

图 1

Petitioner Therabody Ex-1004, 1736

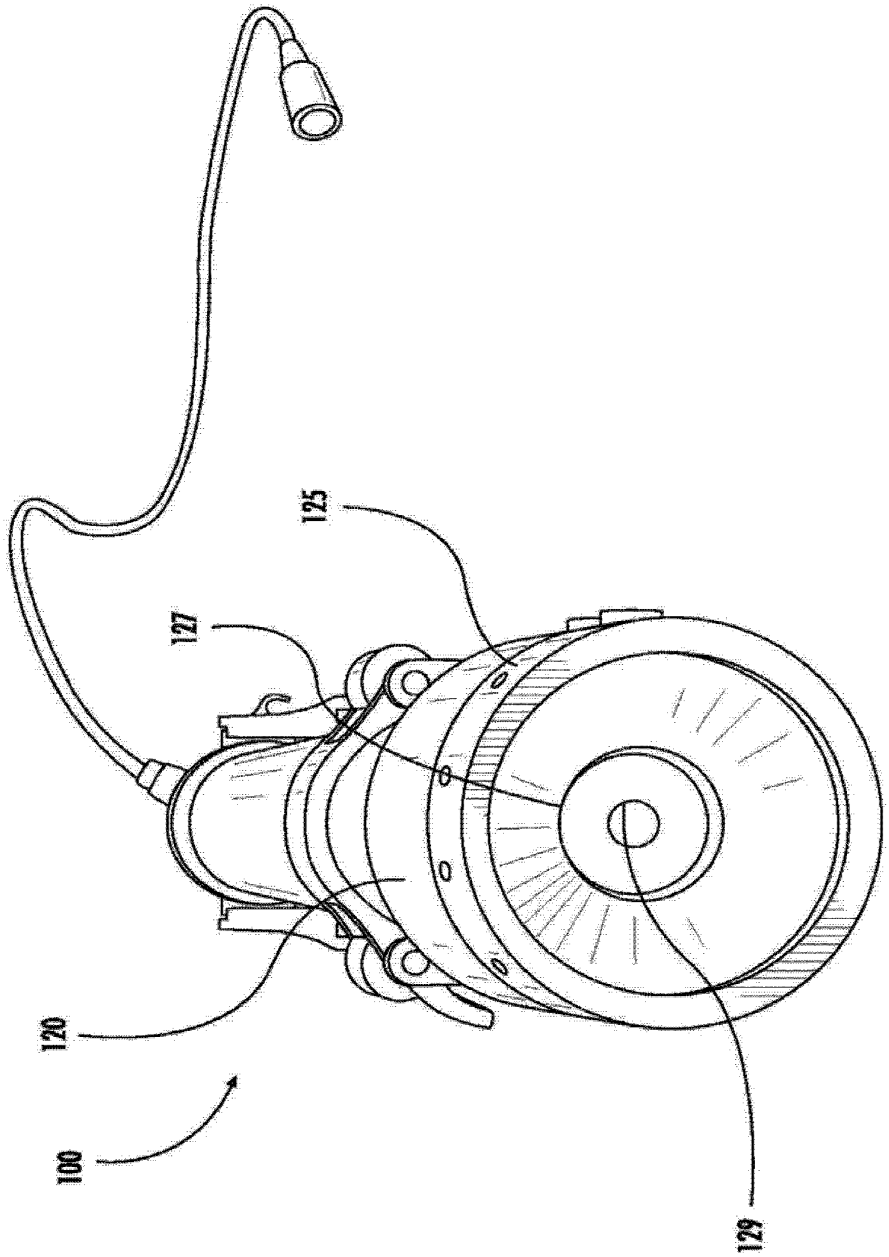

图 2

Petitioner Therabody Ex-1004, 1737

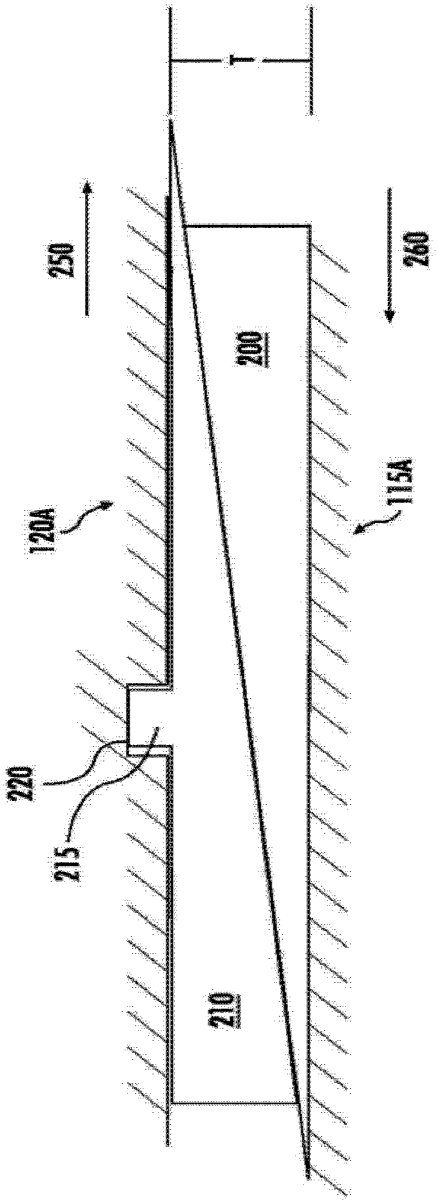

图 3

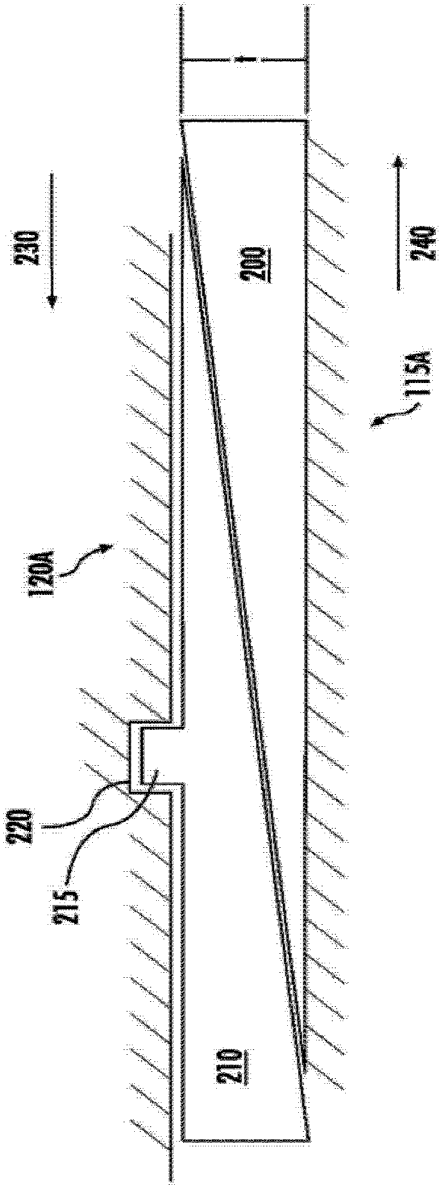

图 4

Petitioner Therabody Ex-1004, 1738

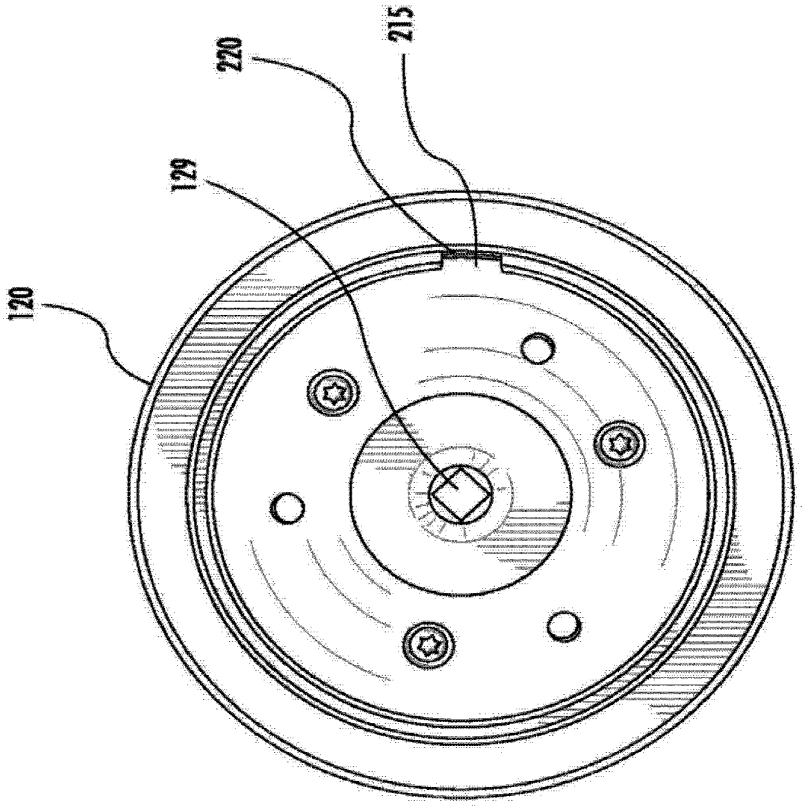

图 5

Petitioner Therabody Ex-1004, 1739

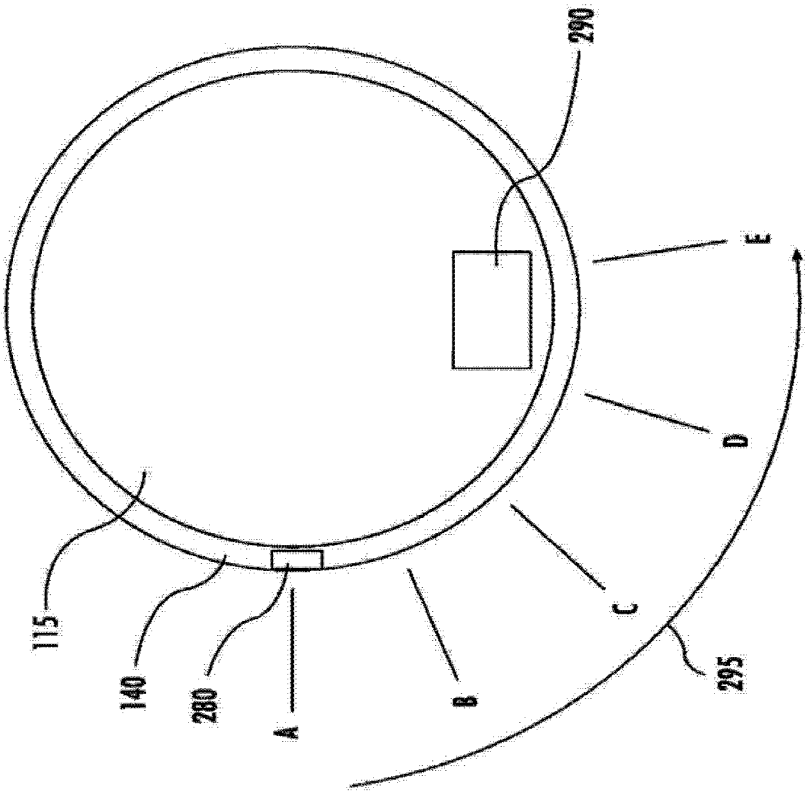

图 6

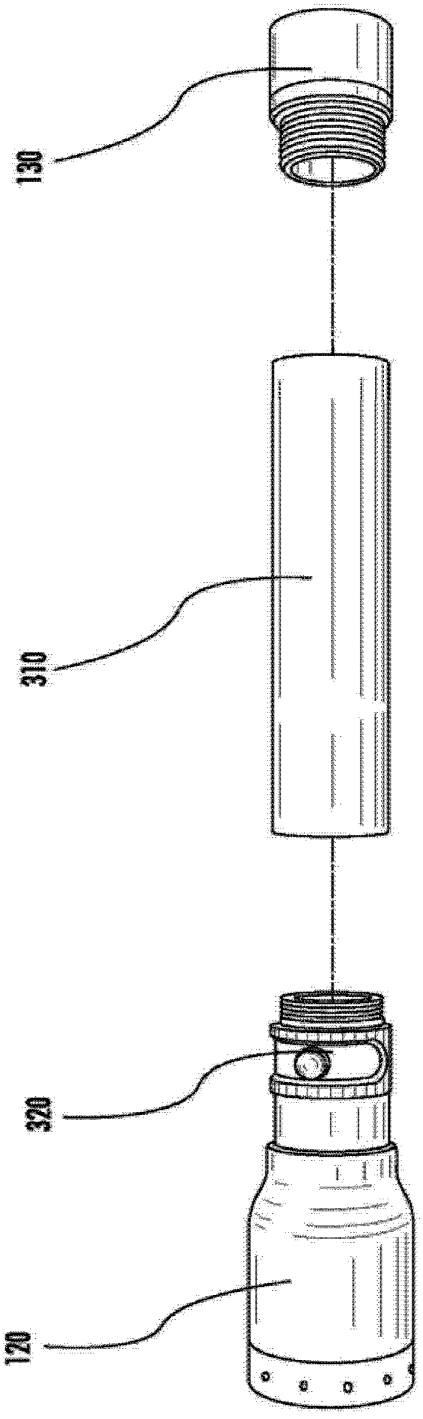

图 7

Petitioner Therabody Ex-1004, 1740

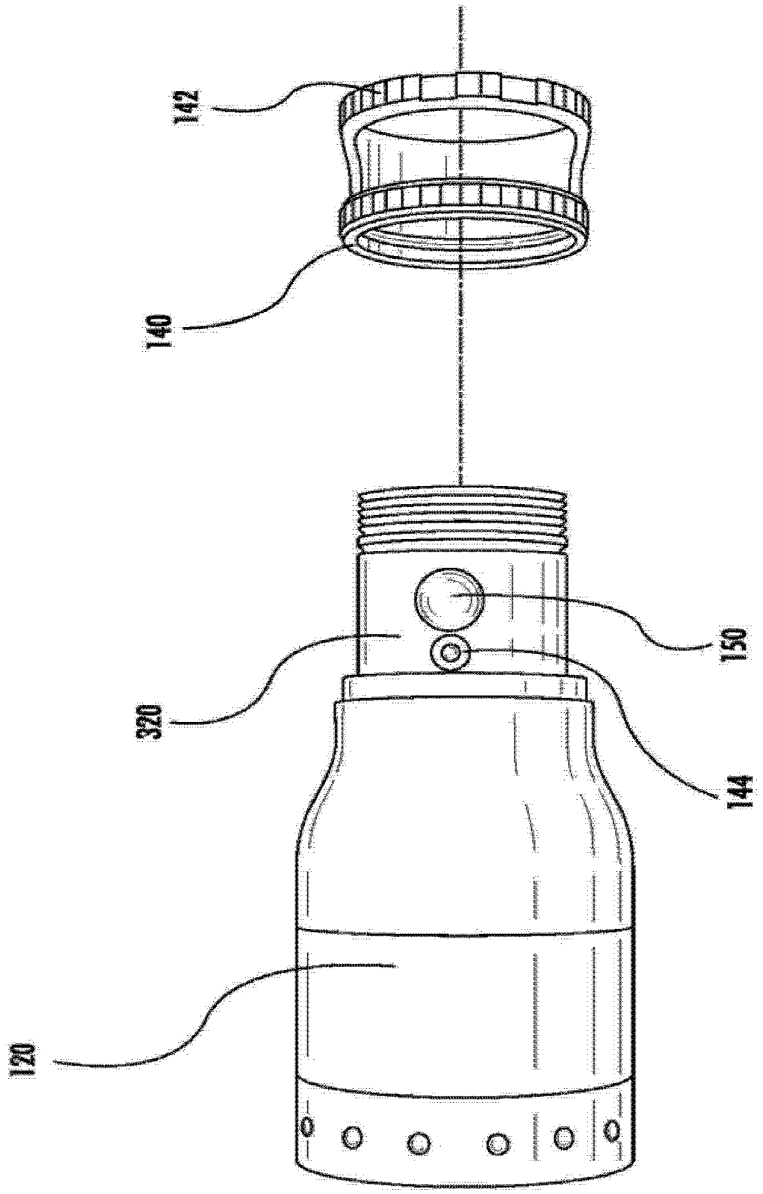

图 8

Petitioner Therabody Ex-1004, 1741

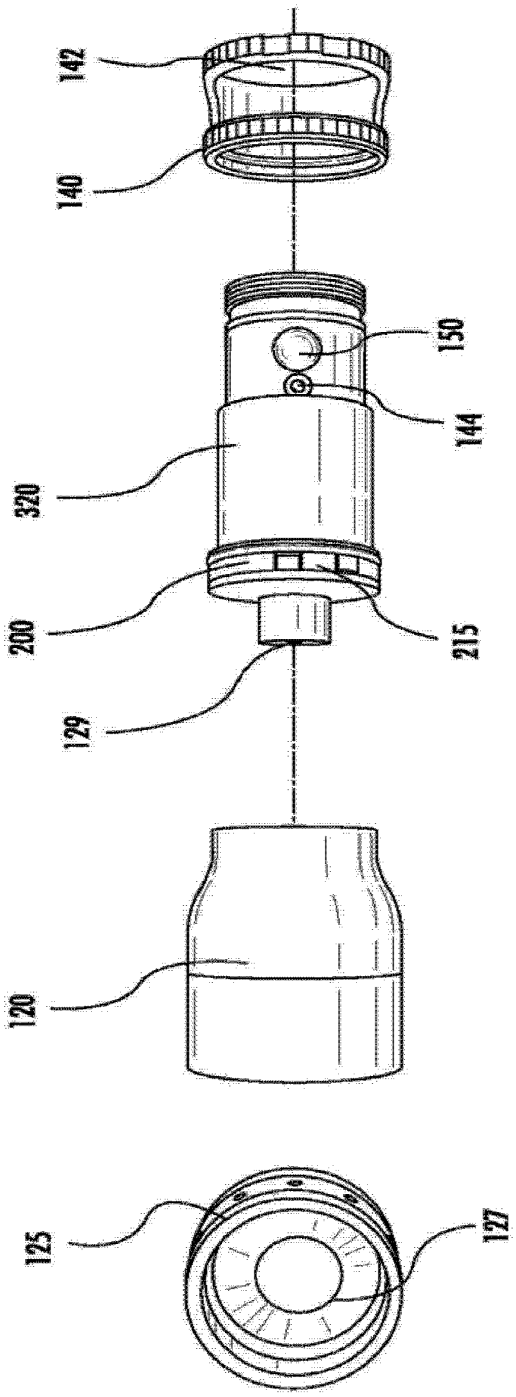

图 9

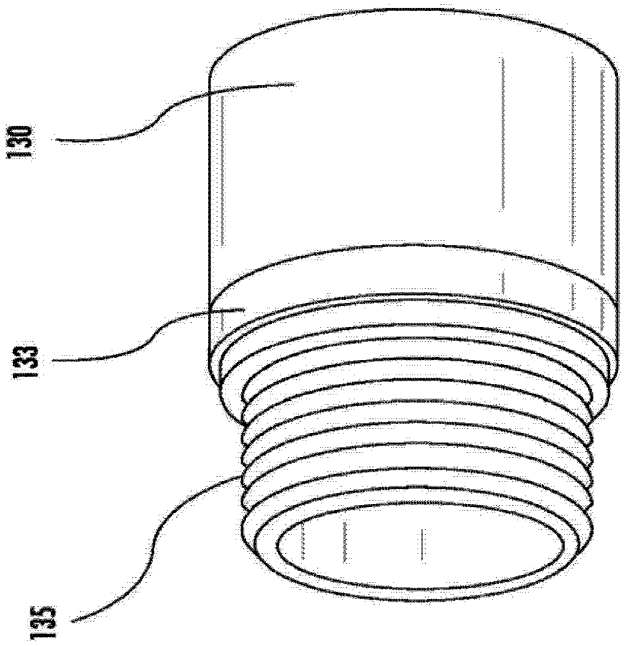

图 10

Petitioner Therabody Ex-1004, 1742

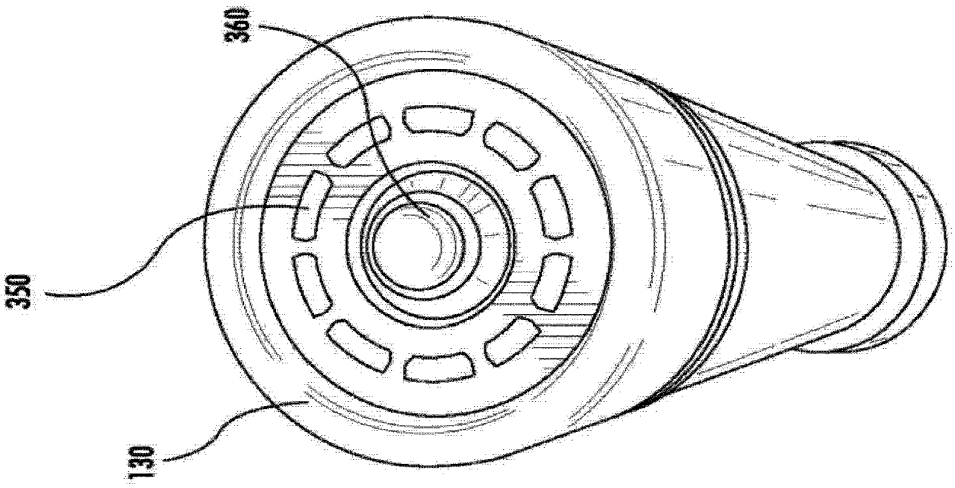

图 11

Petitioner Therabody Ex-1004, 1743

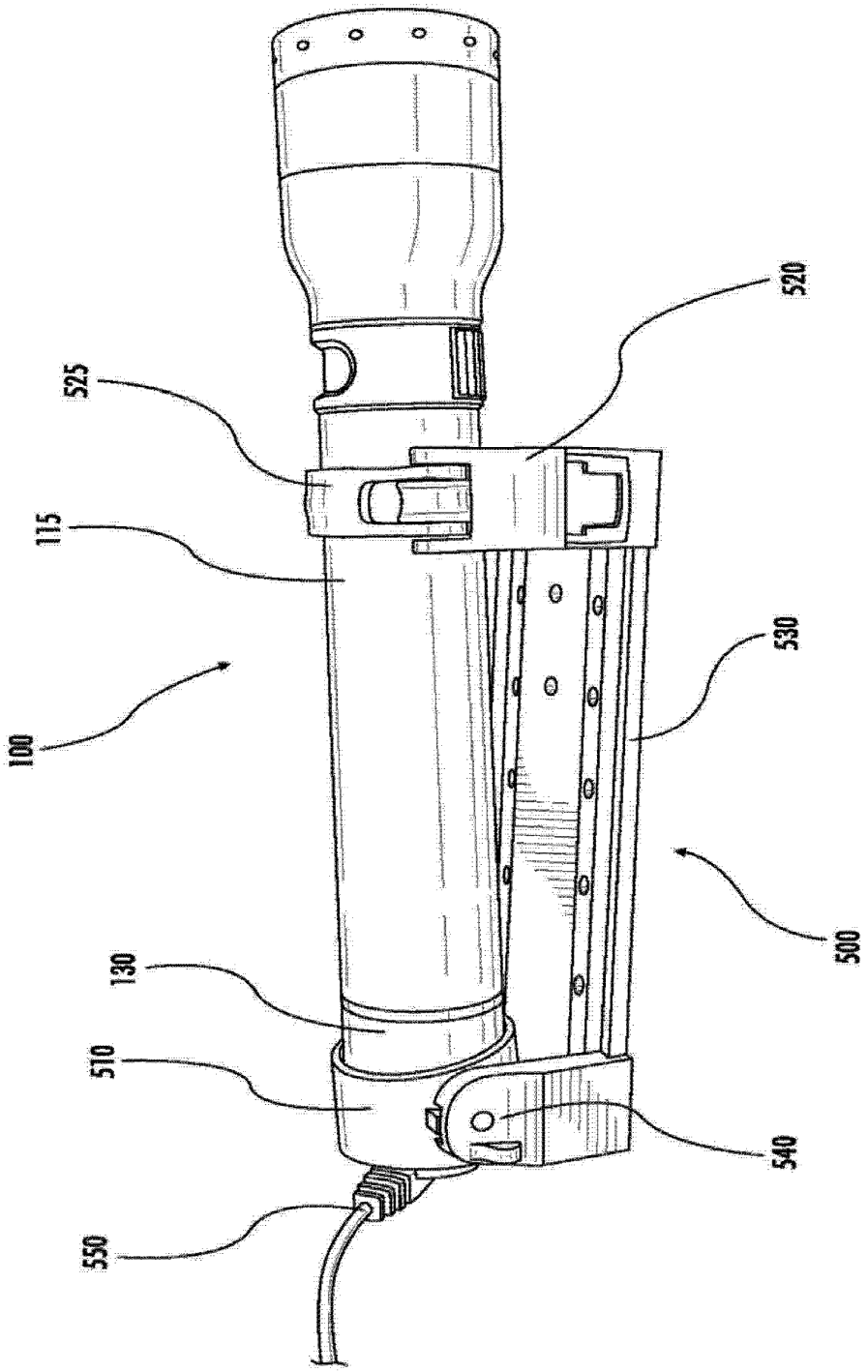

图 12

Petitioner Therabody Ex-1004, 1744

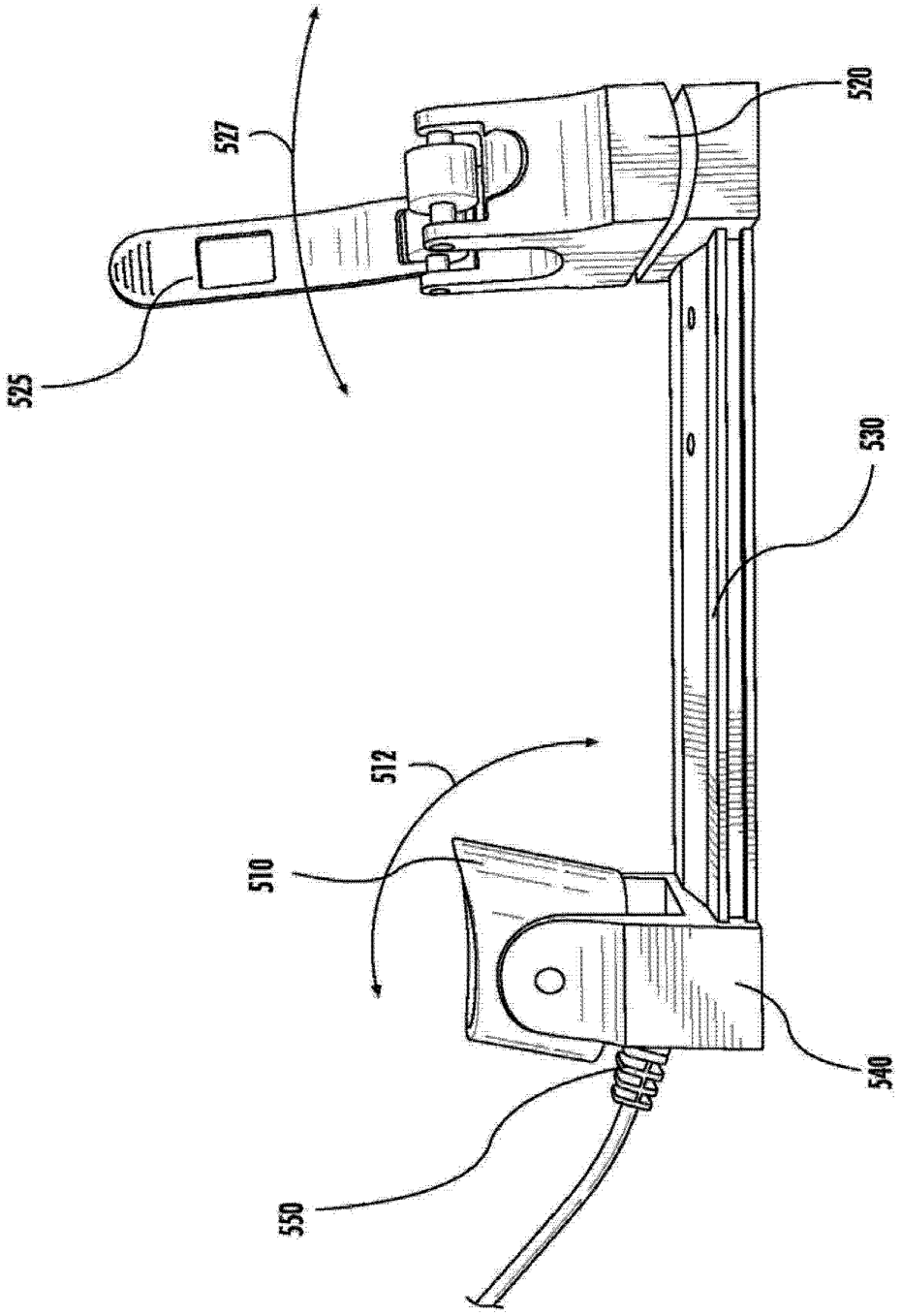

图 13

Petitioner Therabody Ex-1004, 1745

Espacenet

Bibliographic data: CN103398298 (A) — 2013-11-20

USB (universal serial bus) flashlight

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Classification: **- international:** ***F21L4/00; F21V23/06; F21V31/00; F21V33/00***
- cooperative:

Application number: CN201310305068 20130711 Global Dossier

Priority number (s): CN201310305068 20130711

Abstract of CN103398298 (A)

The invention discloses a USB (universal serial bus) flashlight comprising a head, a neck, a body and a tail and belongs to the technical field of lighting equipment. A power supply device is disposed in the body. The USB flashlight further comprises a battery display component electrically connected with the power supply device and a USB charge-discharge component. In addition to the lighting and input-charging functions in normal rechargeable flashlights, the USB flashlight has the functions of inputting and outputting power through a single USB and displaying the battery level anytime and can also be charged timely. In addition, the more importantly, the USB flashlight can be used for emergency charging of electronic equipment (cellphones, MP3 players, MP4 players and the like) when the equipment is out of power and has no access to charging.

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DESCRIPTION CN103398298A

USB flashlight

[0001]

Technical field

[0002]

The present invention belongs to the technical field of lighting equipment, and in particular relates to a USB flashlight with lighting function, power display and charging function for other electronic devices.

[0003]

Background technique

[0004]

A flashlight is a handheld electronic lighting tool.

A typical flashlight has a battery-powered bulb and focusing reflector, and has a handle-type housing for hand holding.

The flashlights currently on the market only have the single purpose of directional beam illumination at night or in dark places.

Current flashlights no longer use the original dry cell battery as a power source. Many of them have adopted storage batteries as the power source, which can be recycled. However, using storage batteries is not as convenient as dry batteries. If it runs out of power, dry battery flashlights only need to be replaced with new dry batteries and can be used immediately, but this cannot be achieved with storage batteries, so existing flashlights have a no-power display function. In addition, with the development of science and technology, there are more and more electronic devices, such as mobile phones, MP3s, MP4s, tablets, etc. We usually use these electronic devices more often. The most common situation we encounter is lack of power, but they are immediately available. There is no charging device available, so designing a flashlight with lighting function, power display and charging function for other electronic devices is currently needed.

[0005]

Contents of the invention

[0006]

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The technical problem to be solved by the present invention is to provide a USB flashlight with lighting function, power display and charging function for other electronic devices.

[0007]

The technical solution adopted by the present invention is: a USB flashlight, which includes a lamp holder, a lamp neck, a lamp body and a lamp tail. The lamp body is provided with a power supply device, and it also includes a power display component electrically connected to the power supply device. USB charging and discharging components.

[0008]

The USB charging and discharging component includes a printed circuit board with a USB interface.

[0009]

The power display component and the USB charging and discharging interface are both installed on the lamp neck. The light guide column of the power display component and the USB interface of the USB charging and discharging component are provided with a set of transparent rings outside the lamp neck.

[0010]

There are three light guide pillars.

[0011]

The transparent ring is screwed to the lamp neck.

[0012]

The light guide column and the USB interface are fixed by positioning parts, and the positioning parts are arranged on the outer surface of the lamp neck.

[0013]

The front and rear ends of the transparent ring are provided with sealing rings, the lamp neck is provided with a sealing groove at the front and rear ends of the transparent ring installation position, and the sealing rings are placed on the sealing grooves.

[0014]

The beneficial effects of the present invention are: Compared with the prior art, the advantage of the USB flashlight of the present invention is that in addition to the rechargeable flashlight having the lighting and input charging functions of a general flashlight, the present invention also greatly improves the input and output functions of the power supply using a single USB , and the power display function at any time, which can charge the flashlight in time.

At the same time, the more important point is that when our electronic devices (such as mobile phones, MP3, MP4, etc.) have no power and nowhere to charge, we can use this flashlight for emergency charging.

[0015]

Preferably, the power display component and the USB charging and discharging interface are installed on the lamp neck. The display screen of the power display component and the USB interface of the USB charging and discharging component are provided with a set of transparent rings outside the lamp neck.

The advantage is to ensure the sealing of the USB interface, and it is also convenient to observe the battery power at all times.

[0016]

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Preferably, the transparent ring is screwed to the lamp neck, which has the advantage of compact structure and reliability.

[0017]

Preferably, the front and rear ends of the transparent ring are provided with sealing rings, the lamp neck is provided with a sealing groove at the front and rear ends of the transparent ring installation position, and the sealing rings are placed on the sealing grooves.

The advantage is to improve the waterproof performance of the present invention.

[0018]

Description of the drawings

[0019]

Figure 1 is a schematic structural diagram of the present invention.

[0020]

Figure 2 is an exploded view of the present invention.

[0021]

In the picture, 1. Lamp head, 2. Lamp neck, 3. Lamp body, 4. Lamp tail, 5. Light guide column, 6. USB interface, 7. Transparent ring, 8. Positioning piece, 9. Printed circuit board.

[0022]

Detailed ways

[0023]

The following are preferred embodiments of the present invention, but they do not limit the scope of the present invention.

[0024]

Referring to Figures 1 and 2, a USB flashlight of the present invention includes a lamp head 1, a lamp neck 2, a lamp body 3 and a lamp tail 4. The lamp body 3 is provided with a power supply device, and it also includes a power supply device. The device is electrically connected to a power display component and a USB charging and discharging component.

[0025]

The USB charging and discharging component includes a printed circuit board 9 with a USB interface 6 .

The printed circuit board 9 is electrically connected to the power supply device.

Can charge other electronic devices.

[0026]

The power display component and USB charging and discharging interface are installed on the lamp neck 2. The light guide column 5 of the power display component and the USB interface 6 of the USB charging and discharging component are provided with a set of transparent rings 7 outside the lamp neck 2.

There are two main purposes of setting the transparent ring 7. The first is to improve the waterproof performance here, and the second is to facilitate the observation of the display content of the power display component.

[0027]

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There are three light guide pillars 5 .

Three full and two means the battery is fully charged. If there is only one charge left, charging should be considered. This can remind the user to charge as soon as possible.

[0028]

The transparent ring 7 is screwed to the lamp neck 2.

Adjust the transparent ring 7 to advance or retreat relative to the lamp neck 2 by rotating it clockwise or counterclockwise, so that the USB interface 6 can be exposed.

[0029]

The light guide column 5 and the USB interface 6 are fixed through the positioning member 8, and the positioning member 8 is provided on the outer surface of the lamp neck 2.

[0030]

The front and rear ends of the transparent ring 7 are provided with sealing rings. The lamp neck 2 is each provided with a sealing groove at the front and rear ends of the installation position of the transparent ring 7, and the sealing ring is placed on the sealing groove.

[0031]

The working principle of the present invention is: when the flashlight needs to be charged and discharged, the transparent ring 7 is rotated downward and close to the button on the lamp neck 2, so that the USB interface 6 is completely exposed for easy insertion of the USB plug, and at the same time the power display component works. The light guide posts 5 display the current capacity of the flashlight battery; after being fully charged, the three light guide posts 5 will all light up. Rotate the transparent ring 7 upward to the lamp head 1. The upper and lower sealing rings play a waterproof role. Turn on the flashlight switch button and the flashlight will light up. At the same time, the power display component starts to work. If the flashlight is turned off, the power display stops working after three seconds.

[0032]

In addition to the lighting and input charging functions of a general flashlight, the present invention also greatly improves the input and output functions of the power supply using a single USB, and the power display function at any time, so that the flashlight can be charged in a timely manner.

At the same time, the more important point is that when our electronic devices (such as mobile phones, MP3, MP4, etc.) have no power and nowhere to charge, we can use this flashlight for emergency charging.

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CLAIMS CN103398298A

1.

A USB flashlight, which includes a lamp head (1), a lamp neck (2), a lamp body (3) and a lamp tail (4). The lamp body (3) is equipped with a power supply device, and is characterized by: it also it includes a power display component and a USB charging and discharging component that are electrically connected to the power supply device.

2.

The USB flashlight according to claim 1, characterized in that: the USB charging and discharging assembly includes a printed circuit board (9) with a USB interface (6).

3.

The USB flashlight according to claim 2, characterized in that: the power display component and the USB charging and discharging interface are installed on the lamp neck (2), and the light guide column (5) of the power display component and the USB charging and discharging component are The USB interface (6) is provided with a set of transparent rings (7) outside the lamp neck (2).

4.

The USB flashlight according to claim 3, characterized in that there are three light guide columns (5).

5.

The USB flashlight according to claim 3, characterized in that the transparent ring (7) is screwed to the lamp neck (2).

6.

The USB flashlight according to claim 2, characterized in that: the light guide column (5) and the USB interface (6) are fixed by a positioning member (8), and the positioning member (8) is provided on the outer surface of the lamp neck (2) .

7.

The USB flashlight according to claim 2, characterized in that: the transparent ring (7) is provided with sealing rings at both front and rear ends, and the lamp neck (2) is provided with sealing rings at the front and rear ends of the transparent ring (7). There is a sealing groove, and the sealing ring is placed on the sealing groove.

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Petitioner Therabody Ex-1004, 1752

(19)中华人民共和国国家知识产权局

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F21V 23/06(2006.01)
F21V 31/00(2006.01)

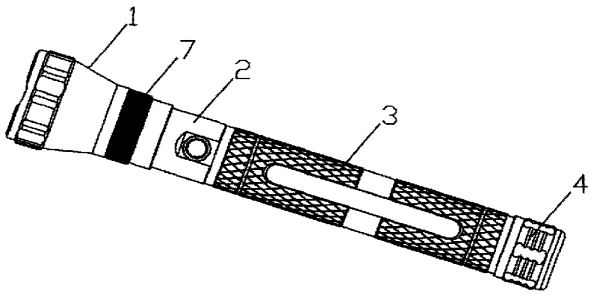
权利要求书1页 说明书2页 附图2页

(54)发明名称

USB手电筒

(57)摘要

本发明公开了一种USB手电筒，它包括灯头、灯颈、灯身和灯尾，所述的灯身内设有供电装置，它还包括与供电装置电连接的电量显示组件和USB充放电组件。本发明除充电手电筒具有一般电筒的照明，及输入充电功能外，还大大改进了用单个USB实现电源的输入输出功能，及随时的电量显示功能，能及时给手电筒充电。同时更重要一点是当我们的电子设备（如手机、MP3、MP4等）在没有电，又无处充电时，可以用此电筒应急充电的目的。本发明属于照明设备技术领域。



CN 103398298 A

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1. 一种 USB 手电筒，它包括灯头 (1)、灯颈 (2)、灯身 (3) 和灯尾 (4)，所述的灯身 (3) 内设有供电装置，其特征在于：它还包括与供电装置电连接的电量显示组件和 USB 充放电组件。

2. 根据权利要求 1 所述的 USB 手电筒，其特征在于：所述的 USB 充放电组件包括带有 USB 接口 (6) 的印制电路板 (9)。

3. 根据权利要求 2 所述的 USB 手电筒，其特征在于：所述的电量显示组件和 USB 充放电接口均安装在灯颈 (2) 上，电量显示组件的导光柱 (5) 和 USB 充放电组件的 USB 接口 (6) 外设有一套在灯颈 (2) 外的透明环 (7)。

4. 根据权利要求 3 所述的 USB 手电筒，其特征在于：所述的导光柱 (5) 为三个。

5. 根据权利要求 3 所述的 USB 手电筒，其特征在于：所述的透明环 (7) 与灯颈 (2) 螺接。

6. 根据权利要求 2 所述的 USB 手电筒，其特征在于：所述的导光柱 (5) 和 USB 接口 (6) 经定位件 (8) 固定，定位件 (8) 设在灯颈 (2) 外表面。

7. 根据权利要求 2 所述的 USB 手电筒，其特征在于：所述的透明环 (7) 前后两端均设有密封圈，灯颈 (2) 在透明环 (7) 安装位置的前后两端各设有一个密封槽，密封圈套在密封槽上。

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USB 手电筒

技术领域

[0001] 本发明属于照明设备技术领域，尤其是涉及一种具备照明功能、带有电量显示又具备给其他电子设备充电功能的 USB 手电筒。

背景技术

[0002] 手电筒是一种手持式电子照明工具。一个典型的手电筒有一个经由电池供电的灯泡和聚焦反射镜，并有供手持用的手把式外壳。现有市场上的手电筒，仅仅具备在夜间或黑暗场所定向光束照明的单一用途。目前的手电筒不再沿用当初的干电池作为电源，很多都已经采用蓄电池来作为供电用电源，可以实现循环使用。但是使用蓄电池却没有干电池那么方便，如果没电了，干电池手电筒只需要更换新的干电池即可在第一时间使用，而蓄电池却无法实现，所以现有的手电筒存在无电量显示功能。此外，跟随科技的发展，电子设备也越来越多，例如手机、MP3、MP4、平板电脑等，这些电子设备平时我们应用较多，碰到最多的情况就是缺电，却又在第一时间找不到充电设备，所以设计一款具备照明功能、带有电量显示又具备给其他电子设备充电功能的手电筒是目前所需的。

发明内容

[0003] 本发明所要解决的技术问题是：提供一种具备照明功能、带有电量显示又具备给其他电子设备充电功能的 USB 手电筒。

[0004] 本发明所采取的技术方案是：一种 USB 手电筒，它包括灯头、灯颈、灯身和灯尾，所述的灯身内设有供电装置，它还包括与供电装置电连接的电量显示组件和 USB 充放电组件。

[0005] 所述的 USB 充放电组件包括带有 USB 接口的印制电路板。

[0006] 所述的电量显示组件和 USB 充放电接口均安装在灯颈上，电量显示组件的导光柱和 USB 充放电组件的 USB 接口外设有一套在灯颈外的透明环。

[0007] 所述的导光柱为三个。

[0008] 所述的透明环与灯颈螺接。

[0009] 所述的导光柱和 USB 接口经定位件固定，定位件设在灯颈外表面。

[0010] 所述的透明环前后两端均设有密封圈，灯颈在透明环安装位置的前后两端各设有一个密封槽，密封圈套在密封槽上。

[0011] 本发明的有益效果是：本发明 USB 手电筒，相比现有技术优点在于：本发明除充电手电筒具有一般电筒的照明，及输入充电功能外，还大大改进了用单个 USB 实现电源的输入输出功能，及随时的电量显示功能，能及时给手电筒充电。同时更重要一点是当我们的电子设备（如手机、MP3、MP4 等）在没有电，又无处充电时，可以用此电筒应急充电的目的。

[0012] 作为优选，所述的电量显示组件和 USB 充放电接口均安装在灯颈上，电量显示组件的显示屏和 USB 充放电组件的 USB 接口外设有一套在灯颈外的透明环。优点是保证 USB 接口处的密封性，同时也便于时刻观察蓄电池电量。

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[0013] 作为优选，所述的透明环与灯颈螺接，优点是结构紧凑、可靠。

[0014] 作为优选，所述的透明环前后两端均设有密封圈，灯颈在透明环安装位置的前后两端各设有一个密封槽，密封圈套在密封槽上。优点是提高本发明的防水性能。

附图说明

[0015] 图 1 为本发明结构示意图。

[0016] 图 2 为本发明爆炸图。

[0017] 图中，1、灯头，2、灯颈，3、灯身，4、灯尾，5、导光柱，6、USB 接口，7、透明环，8、定位件，9、印制电路板。

具体实施方式

[0018] 以下为本发明较佳实施例，但并不因此而限定本发明的保护范围。

[0019] 参照图 1、图 2 所示，本发明一种 USB 手电筒，它包括灯头 1、灯颈 2、灯身 3 和灯尾 4，所述的灯身 3 内设有供电装置，它还包括与供电装置电连接的电量显示组件和 USB 充放电组件。

[0020] 所述的 USB 充放电组件包括带有 USB 接口 6 的印制电路板 9。印制电路板 9 与供电装置电连接。可以给其他电子设备充电。

[0021] 所述的电量显示组件和 USB 充放电接口均安装在灯颈 2 上，电量显示组件的导光柱 5 和 USB 充放电组件的 USB 接口 6 外设有一套在灯颈 2 外的透明环 7。设置透明环 7 的主要目的有两个，第一个是提高此处的防水性能，第二个是便于观察电量显示组件显示内容。

[0022] 所述的导光柱 5 为三个。三个全两代表电已经充满，如果只剩下一个量，就要考虑充电了，能够在第一时间提醒使用者充电。

[0023] 所述的透明环 7 与灯颈 2 螺接。通过顺时针或逆时针旋转来调节透明环 7 相对于灯颈 2 前进或者后退，便于将 USB 接口 6 露出来。

[0024] 所述的导光柱 5 和 USB 接口 6 经定位件 8 固定，定位件 8 设在灯颈 2 外表面。

[0025] 所述的透明环 7 前后两端均设有密封圈，灯颈 2 在透明环 7 安装位置的前后两端各设有一个密封槽，密封圈套在密封槽上。

[0026] 本发明的工作原理是：在手电筒需要充放电时，把透明环 7 旋转向下接近灯颈 2 上的按钮处，这样就完全露出 USB 接口 6，以便于插入 USB 插头，同时电量显示组件工作，导光柱 5 显示目前电筒电池的容量；充满电后，三个导光柱 5 显示全亮，把透明环 7 旋转向上到灯头 1，上下两密封圈起到防水作用，起动手电筒开关按钮，手电筒亮，同时电量显示组件开始工作，如果关上电筒三秒钟后电量显示停止工作。

[0027] 本发明除充电手电筒具有一般电筒的照明，及输入充电功能外，还大大改进了用单个 USB 实现电源的输入输出功能，及随时的电量显示功能，能及时给手电筒充电。同时更重要一点是当我们的电子设备（如手机、MP3、MP4 等）在没有电，又无处充电时，可以用此电筒应急充电的目的。

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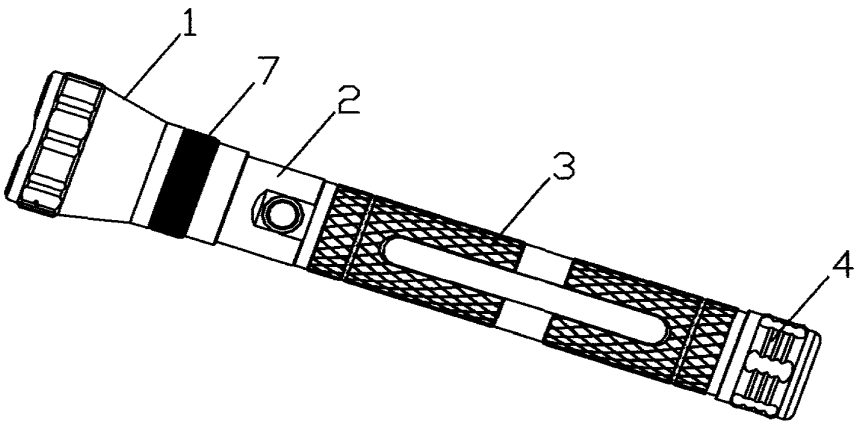

图 1

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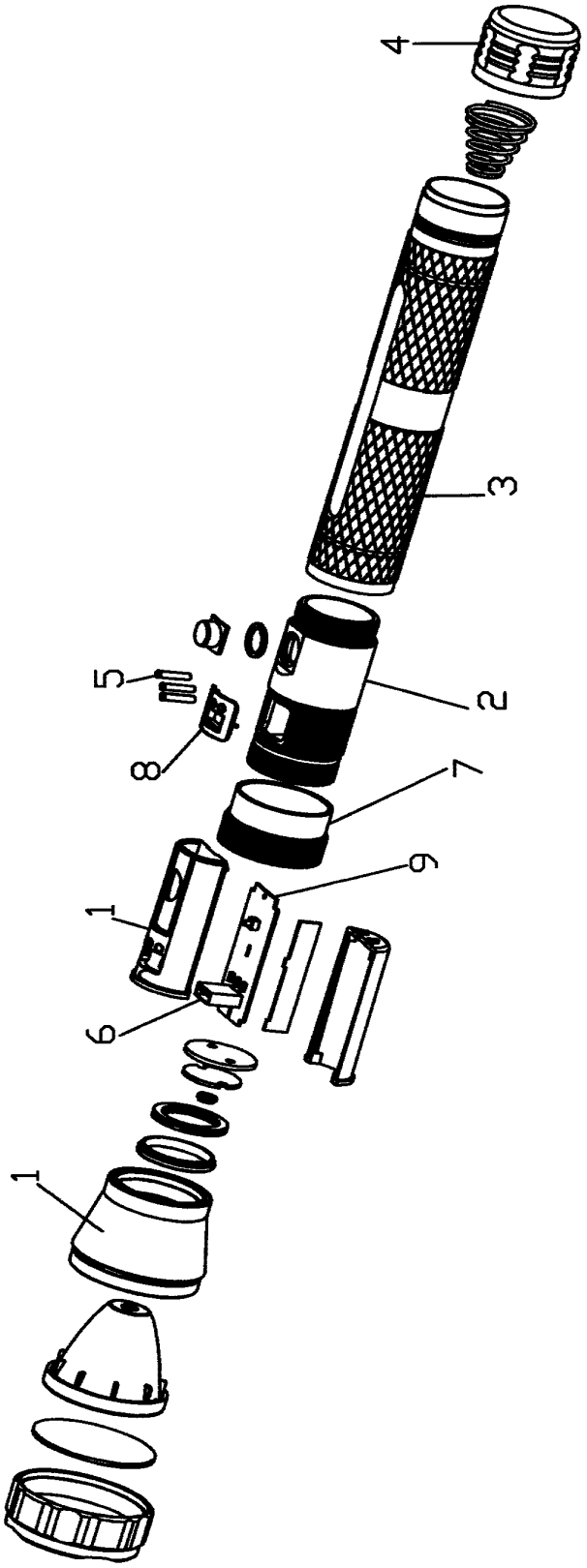
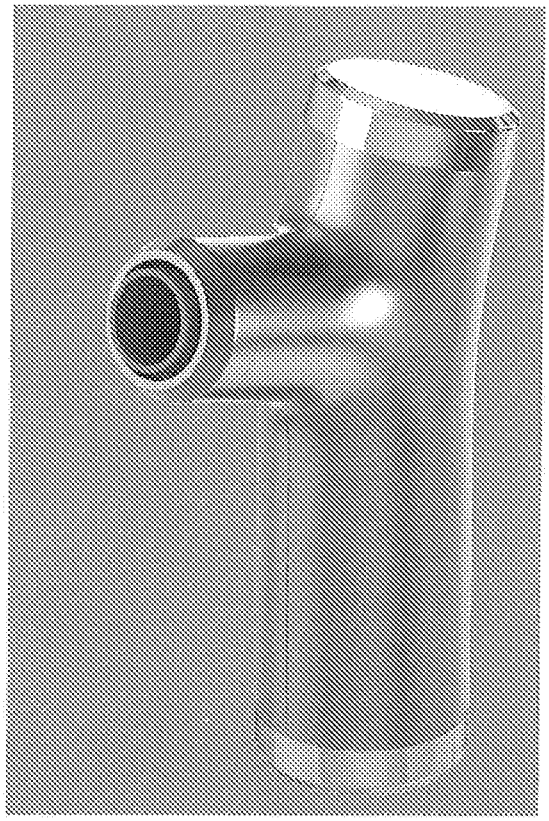


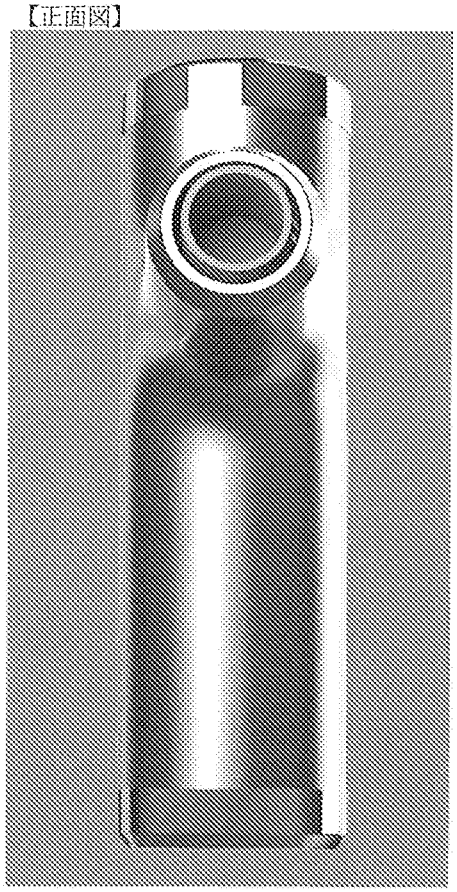
图 2

Petitioner Therabody Ex-1004, 1758

（１９）【発行国・地域】日本国特許庁（ＪＰ）
（４５）【発行日】令和３年４月１９日（２０２１．４．１９）
（１２）【公報種別】意匠公報（Ｓ）
（１１）【登録番号】意匠登録第１６８３４０９号（Ｄ１６８３４０９）
（２４）【登録日】令和３年３月２９日（２０２１．３．２９）
（５４）【意匠に係る物品】筋膜マッサージ器具本体
（５２）【意匠分類】Ｊ７－１６０
（５１）【国際意匠分類】Ｌｏｃ（１２）Ｃｌ．２８－０３
【Ｄターム】Ｊ７－１６０ＡＡ
（２１）【出願番号】意願２０２０－１５６７７（Ｄ２０２０－１５６７７）
（２２）【出願日】令和２年７月２９日（２０２０．７．２９）
（３１）【優先権主張番号】２０２０３０３３９５９２．６
（３２）【優先日】令和２年６月２９日（２０２０．６．２９）
（３３）【優先権主張国・地域又は機関】中国（ＣＮ）
（７２）【創作者】
【氏名】張宏
【住所又は居所】中華人民共和国広東省深▲せん▼市龍岡区宝龍街道同心社区同心路７０号同路工業区▲ちゃん▼房Ｂ１棟Ｂ１（１）棟一層至五層
（７３）【意匠権者】
【識別番号】５２０２８１８３７
【氏名又は名称】深▲せん▼市東吉聯電子有限公司
【住所又は居所】中華人民共和国広東省深▲せん▼市龍岡区宝龍街道同心社区同心路７０号同路工業区▲ちゃん▼房Ｂ１棟Ｂ１（１）棟一層至五層
（７４）【代理人】
【識別番号】１０００８８０６３
【弁理士】
【氏名又は名称】坪内　康治
【審査官】石坂　陽子
（５５）【意匠に係る物品の説明】本物品は、マッサージヘッドを取り付けることにより、筋膜のマッサージを行える筋膜マッサージ器具本体である。
【図面】
【斜視図】



【正面図】



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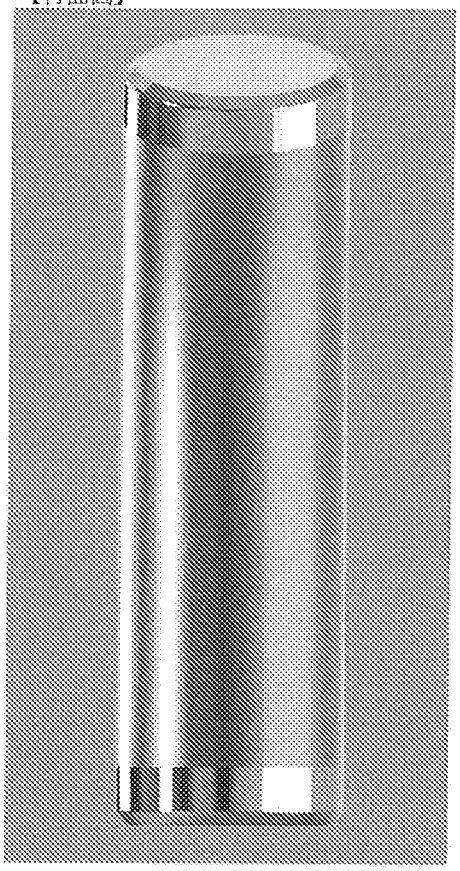
【背面図】



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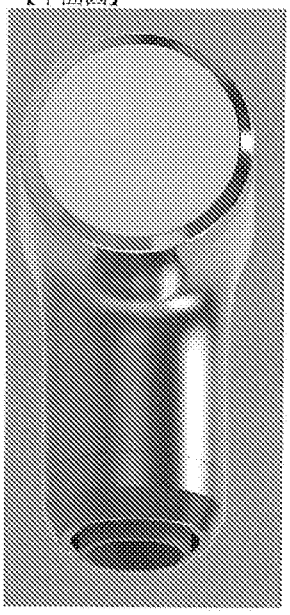

【底面図】

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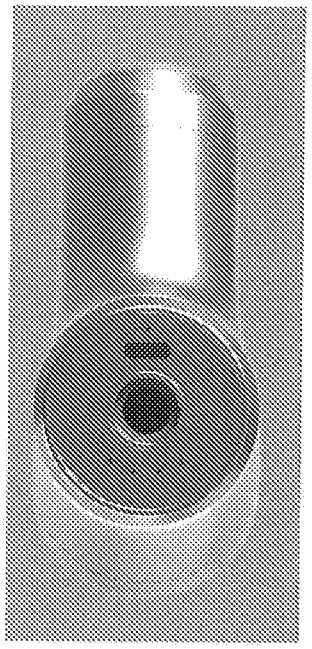

【右側面図】

【左側面図】

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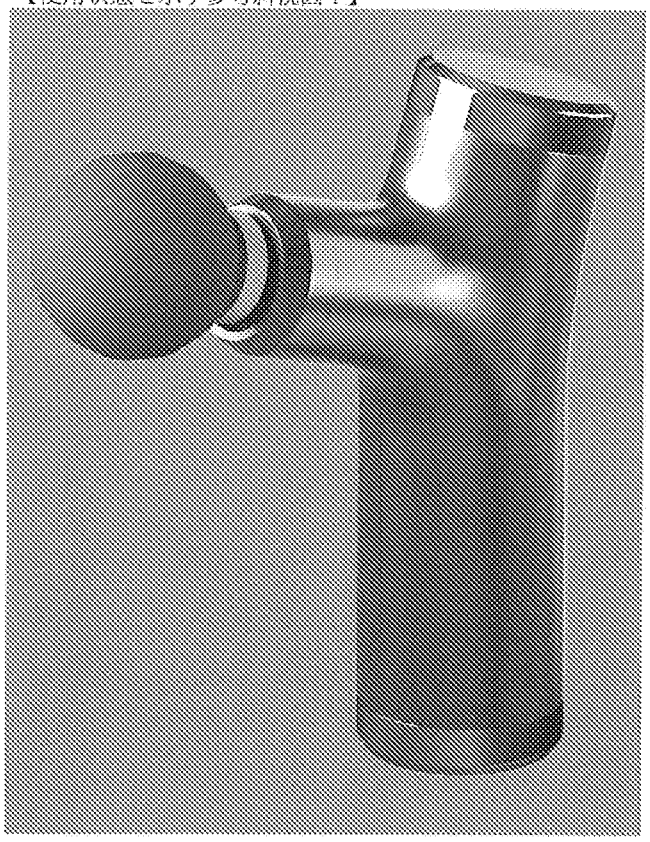
【使用状態を示す参考斜視図１】



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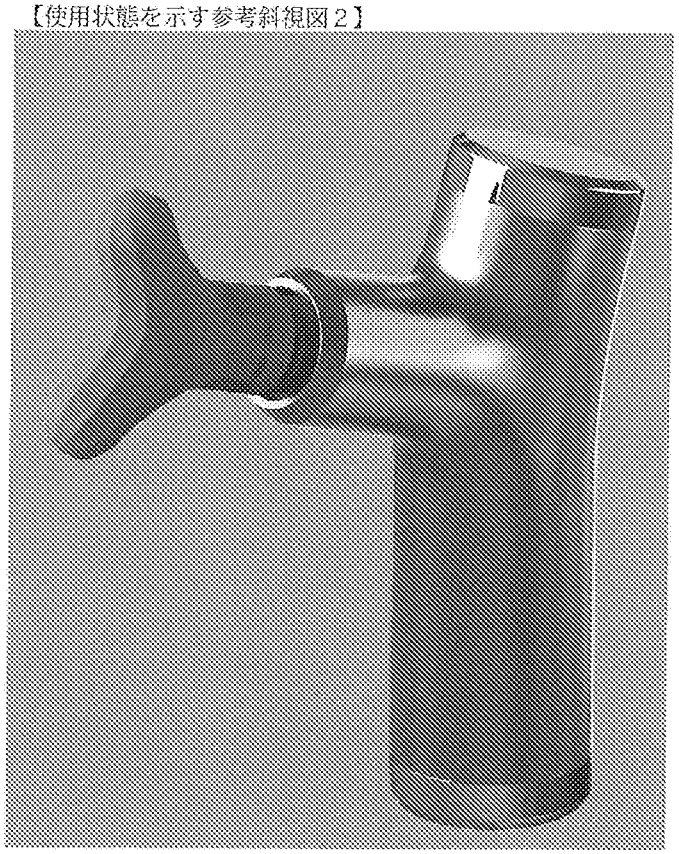
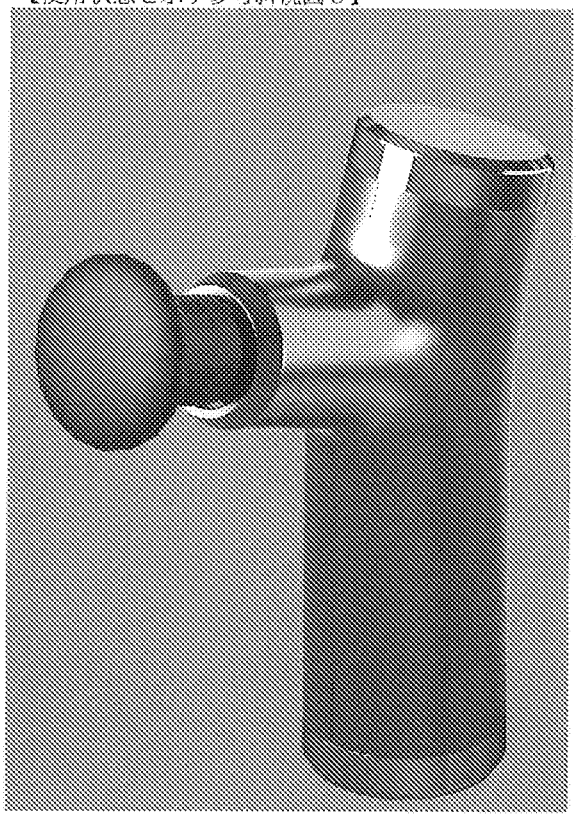
【使用状態を示す参考斜視図２】



【使用状態を示す参考斜視図３】



【使用状態を示す参考斜視図４】

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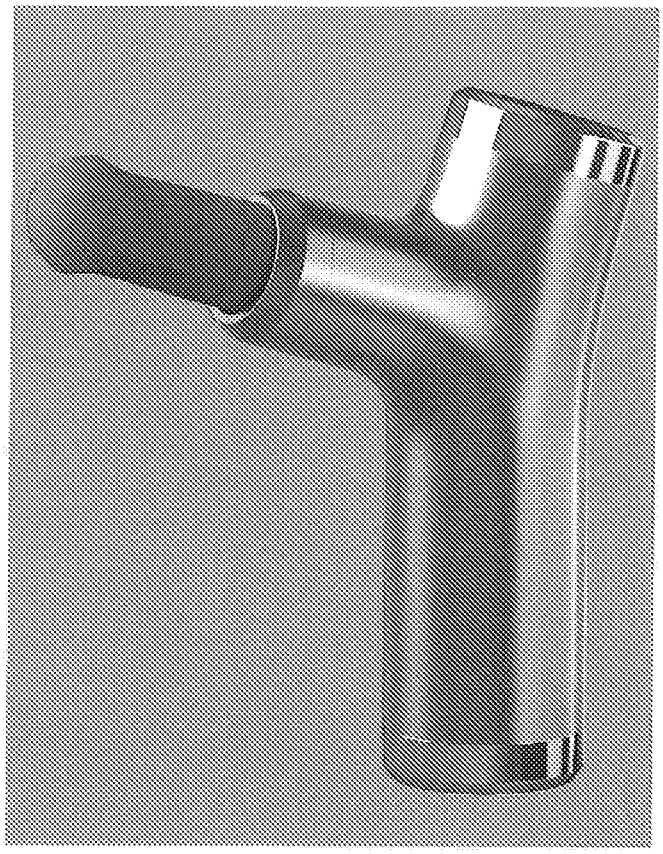

（５６）【参考文献】意登１６４１２３１　米国特許商標公報、（２０２０－９－８）、Ｄ８９５８２９、（特許庁意匠課公知資料番号ＲＨ０２３２３８３６）

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JP, 1683409, S

Details References URL Mistranslation

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Design gazette

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As the original gazette has English description of those untranslated items here, please click "Image" button and confirm the correct information in the original gazette.

(19)[Publication country/region]Japan Patent Office (JP)
(45)[Publication date]Reiwa 3(2021) April 19 (2021.4.19)
(12)[Kind of official gazette]Design Gazette (S)
(11)[Registration number]D1683409
(24)[Registration date]Reiwa 3(2021) March 29 (2021.3.29)
(54)[Article to the design]The main part of a fascia massager implement
(52)[Japanese design classification]J7-160
(51)[International design classification]Loc(12)Cl.28-03
[D-term]J7-160AA

Petitioner Therabody Ex-1004, 1766

(21)[Application number]D2020-15677

(22)[Filing date]Reiwa 2(2020) July 29 (2020.7.29)

(31)[Application number of the priority]202030339592.6

(32)[Priority date]Reiwa 2(2020) June 29 (2020.6.29)

(33)[Priority claim country/region or organization]CN

(72)[Creator]

[Full name]**

(73)[Owner of a design right]

[Identification number]520281837

[Name]* ▲ plug ▼ **** electronic, Inc.

(74)[Representative]

[Identification number]100088063

[Patent attorney]

[Name]TSUBOUCHI, Yasuji

[Examiner]ISHIZAKA, Yoko

(55)[Description of article to the design]This article is a main part of a fascia massager implement which can massage a fascia by attaching a massaging head.

[Drawings]

[Perspective view]

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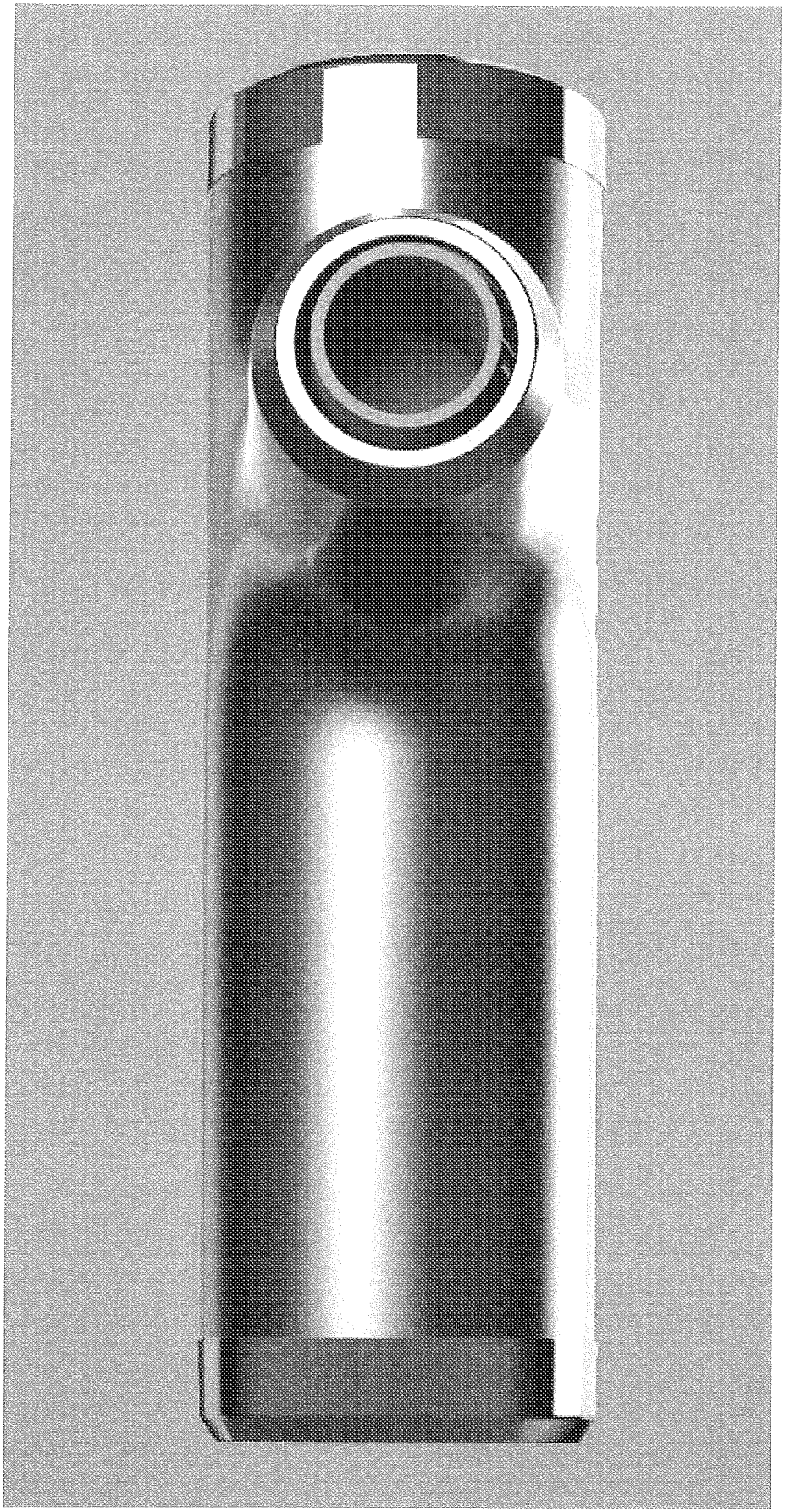
[Front view]

Petitioner Therabody Ex-1004, 1768



[Rear view]

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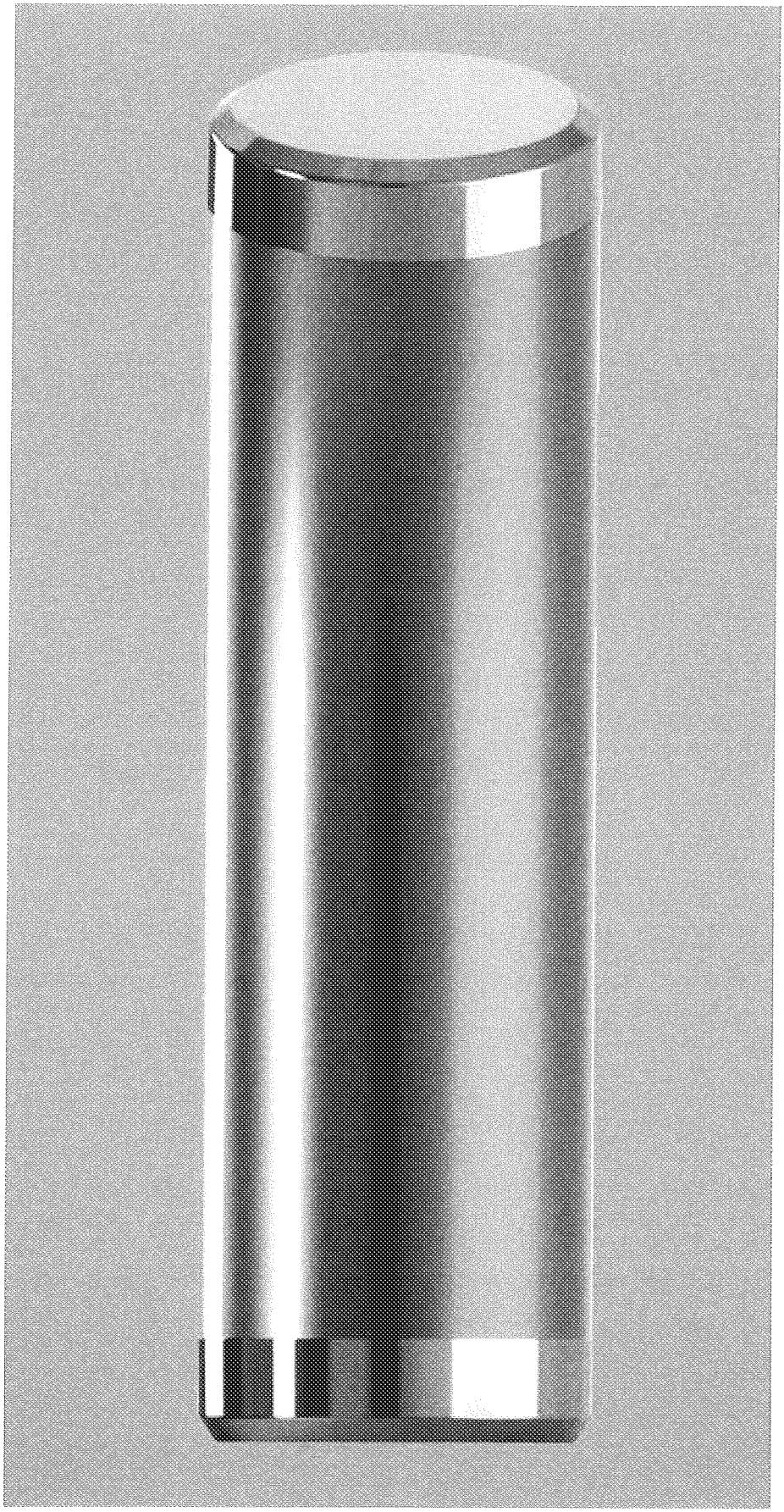

[Top view]

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[Bottom view]

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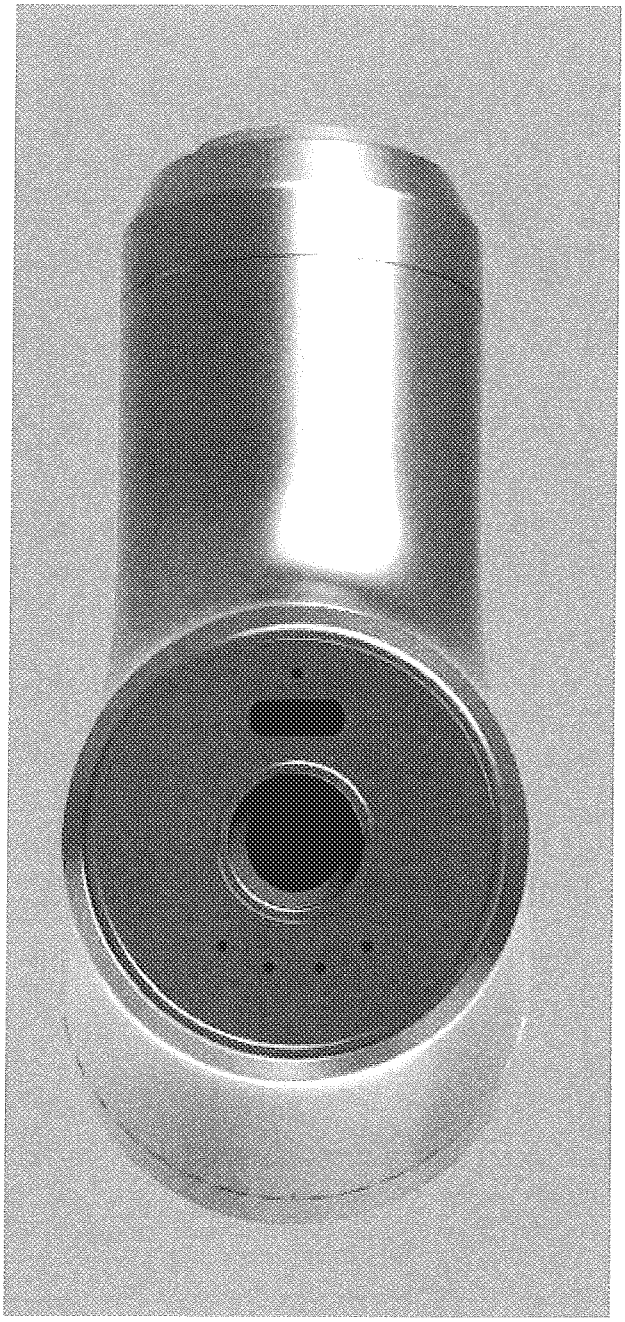

[Right side view]

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[Left side view]

Petitioner Therabody Ex-1004, 1773

[The reference perspective view 1 showing a busy condition]

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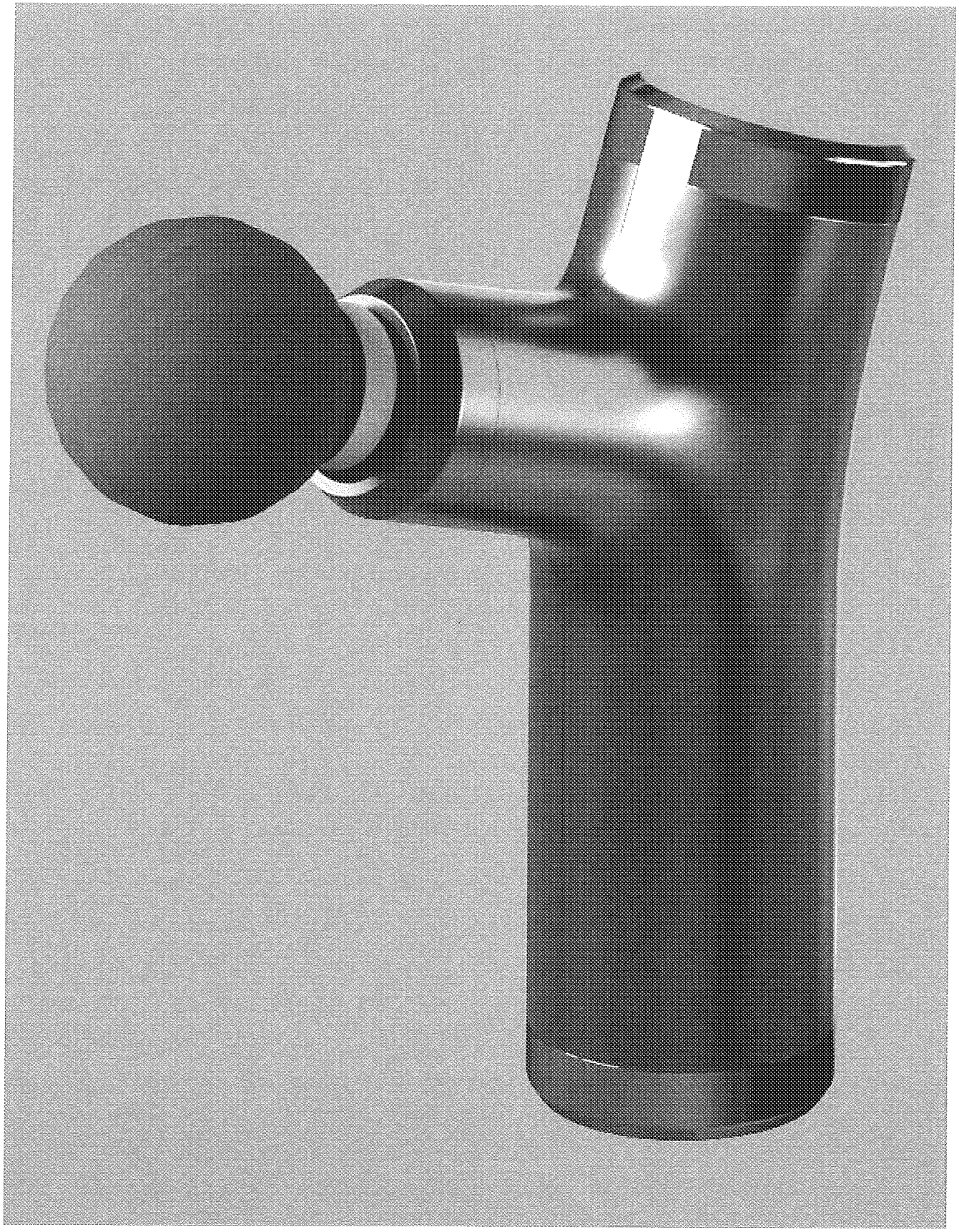
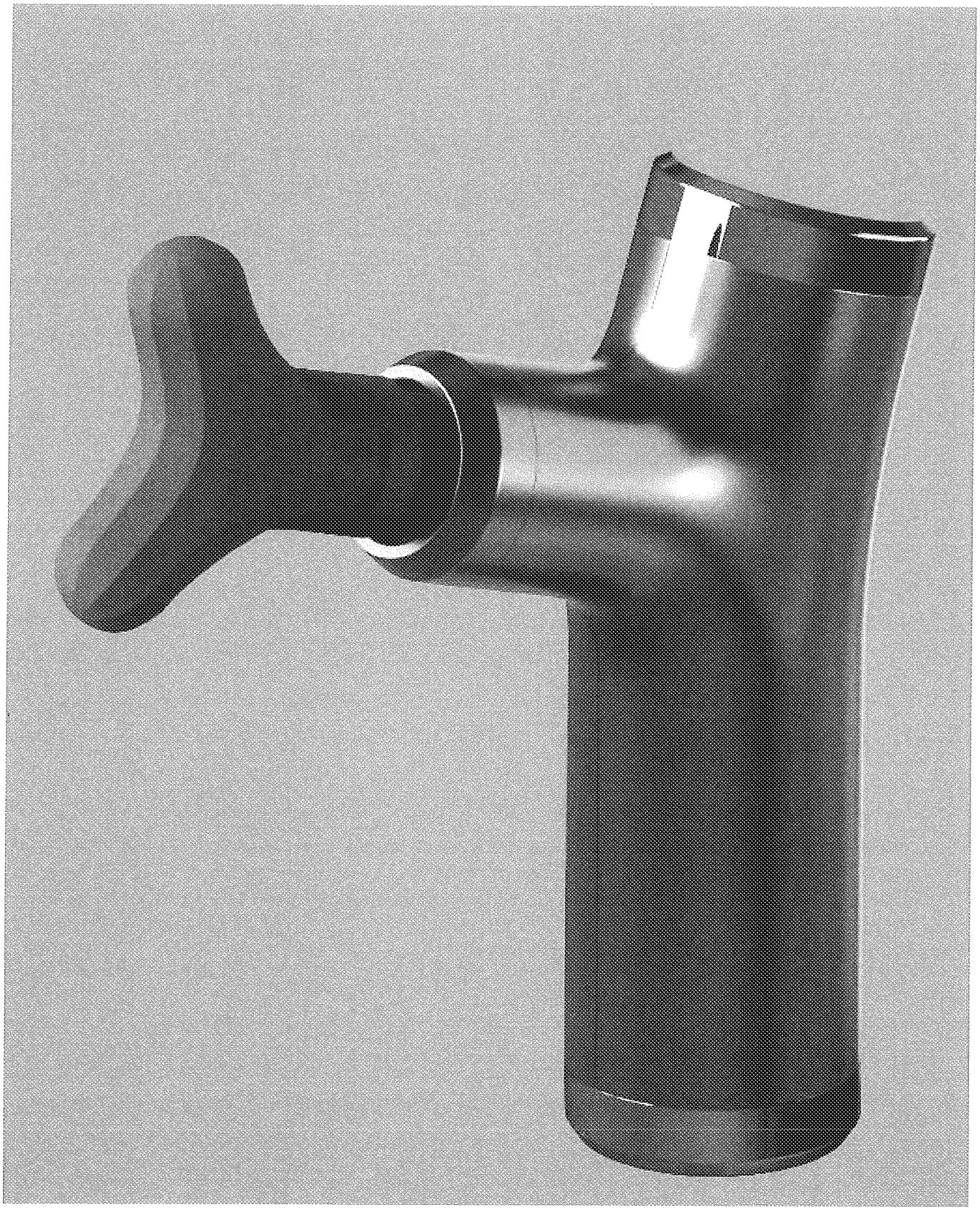


[The reference perspective view 2 showing a busy condition]

Petitioner Therabody Ex-1004, 1775



[The reference perspective view 3 showing a busy condition]

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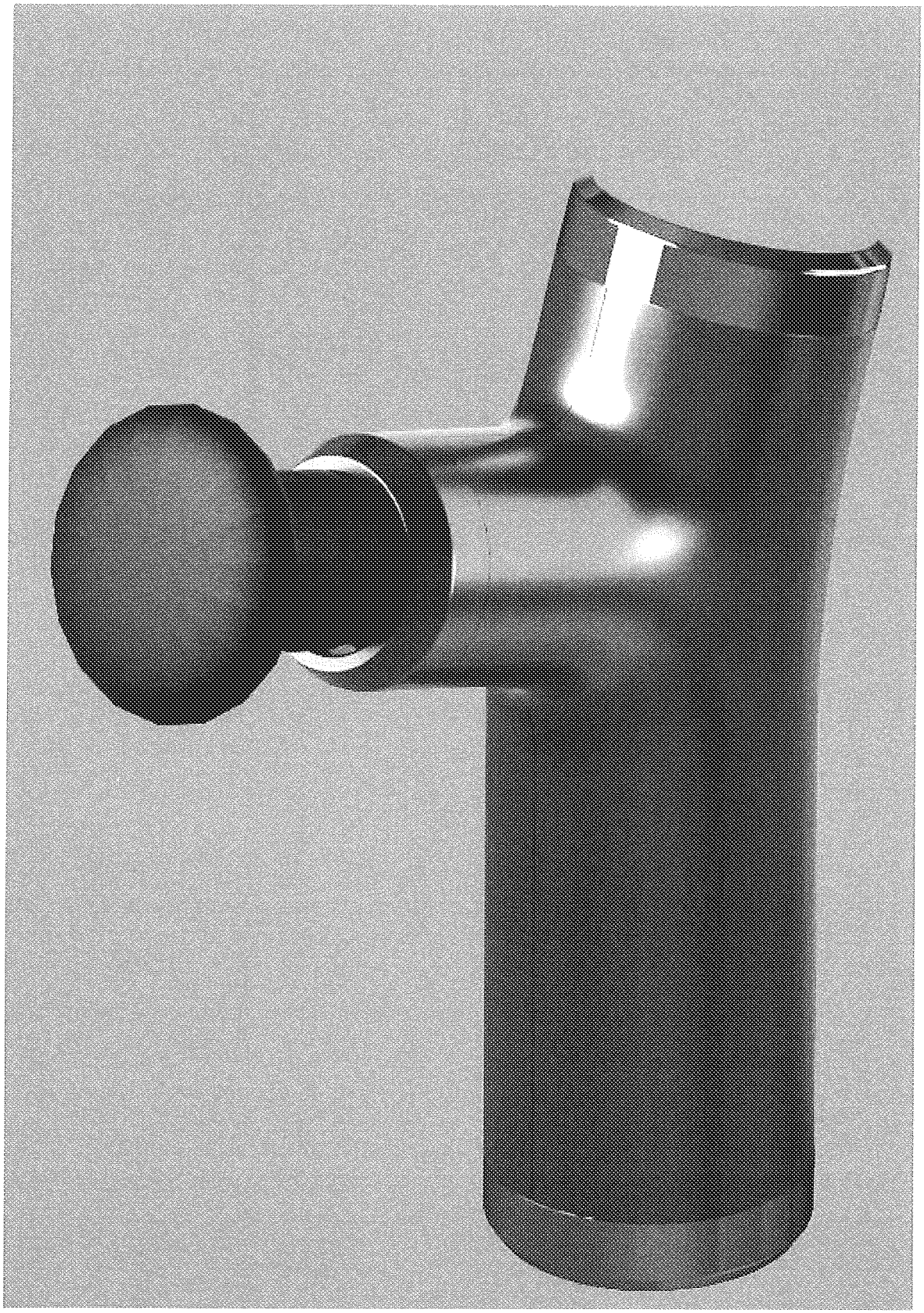

[The reference perspective view 4 showing a busy condition]

Petitioner Therabody Ex-1004, 1777

(56)[Reference]Design registration No. 1641231 An United States patent trademark gazette, (2020-9-8), D895829 (Patent Office design division JPO-Design-Division's-publicly-known-design-document-No. RH02323836),

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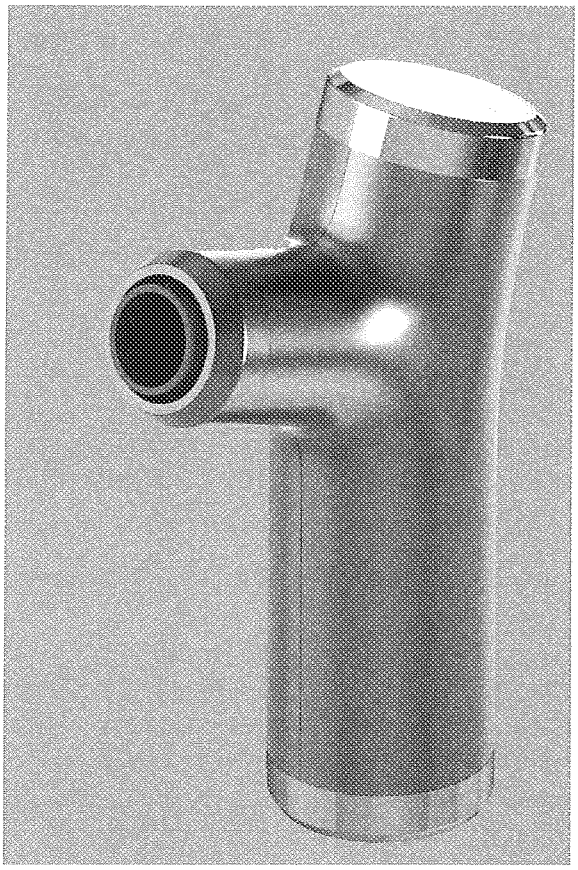
Drawings Close

[Perspective view] | [Front view] | [Rear view] | [Top view] | [Bottom view] | [Right side view] | [Left side view] | [The reference perspective view 1 showing a busy condition] | [The reference perspective view 2 showing a busy condition] | [The reference perspective view 3 showing a busy condition] | ...

Enlarge and Rotate



[Perspective view]

1 of 1 Display

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Espacenet

Bibliographic data: CN210301676 (U) — 2020-04-14

Handheld electric massage gun

Inventor(s): LI DOUYUN ± (李斗云)

Applicant(s): SHENZHEN JIUYIDA ELECTRONICS CO LTD ± (深圳市玖易达电子有限公司)

Classification: **- international:** *A61H23/02*
- cooperative:

Application number: CN201920103404U 20190122

Priority number(s): CN201920103404U 20190122

Abstract of CN210301676 (U)

The utility model discloses a handheld electric massage gun. The utility model belongs to a massage device, wherein the main shell upper cover and the main shell lower cover are fixedly connected. Theleft sides of the main shell upper cover and the main shell lower cover are fixedly connected with a front cover; the right sides of the main shell upper cover and the main shell lower cover are fixedly connected with a rear cover; a battery pack outer shell is fixedly connected to the lower portion of the main shell lower cover. A battery pack is movably clamped in the battery pack shell, a motor is fixedly connected to the inner top of an upper cover of the main shell through a motor base and electrically connected with the battery pack through a switch button on the rear cover, the outputend of the motor is rotationally connected with a connecting rod through an eccentric wheel, and a linear bearing is fixedly connected to the inner side of the front cover through a damping rubber ring. The damping device is simple in structure and convenient to use, noise generated in the moving process of the piston can be lowered through the damping rubber ring and the linear bearing, noise generated in the moving process of the motor can be lowered through the damping pad, noise generated in the working process of the device is effectively lowered through double measures, and the effect ofquiet operation is achieved.

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DESCRIPTION CN210301676U

A handheld electric massage gun

[0001]

Technical field

[0002]

The utility model relates to a massage gun, specifically a handheld electric massage gun.

[0003]

Background technique

[0004]

Massage is based on the theory of viscera and meridians of traditional Chinese medicine, combined with the anatomy and pathological diagnosis of Western medicine, and uses techniques to act on specific parts of the human body surface to regulate the body's physiological and pathological conditions and achieve the purpose of physical therapy. Say, it is a physical therapy method.

From the perspective of massage treatment, it can be divided into health massage, sports massage and medical massage.

[0005]

Products currently on the market to relax muscles and relieve fatigue are mainly massage chairs and handheld massagers.

The main working method of the massage chair is to squeeze the muscles, and the main working method of the handheld massager is to squeeze and vibrate at low frequency.

It has a soothing effect, but the massage chair is large and not suitable for ordinary families. The handheld massager makes a lot of noise when working.

For this reason, those skilled in the art have proposed a handheld electric massage gun to solve the problems raised in the above background.

[0006]

Utility model content

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[0007]

The purpose of this utility model is to provide a handheld electric massage gun to solve the problems raised in the above background technology.

[0008]

In order to achieve the above purpose, the present utility model provides the following technical solutions:

[0009]

A handheld electric massage gun, including a main shell upper cover and a main shell lower cover that are fixedly connected. The main shell upper cover and the main shell lower cover are fixedly connected with a front cover on the left side, and the main shell upper cover and the main shell lower cover are on the right side. There is a back cover fixedly connected, a battery pack shell is fixedly connected below the lower cover of the main shell, and a battery pack is movablely connected in the battery pack shell. A motor is fixedly connected to the top of the upper cover of the main shell through a motor base, and the motor passes through the back cover. The switch button is electrically connected to the battery pack. The motor output end is connected to a connecting rod through an eccentric wheel. A linear bearing is fixedly connected to the inner side of the front cover through a shock-absorbing rubber ring. The inner side of the linear bearing is slidingly connected to the connecting rod to rotate. The connected piston and the outer end of the linear bearing are slidingly connected with a massage head fixedly connected to the piston.

[0010]

As a further solution of the present invention: a shock absorbing pad is fixedly connected between the motor base and the main housing upper cover.

[0011]

As a further solution of the present invention, a battery pack removal button for removing the battery pack is also included.

[0012]

As a further solution of the present invention: the inner bottom of the battery pack casing is connected to a battery pack casing back cover through a charging control board, and a battery pack sticker is attached to the outside of the battery pack casing back cover.

[0013]

As a further solution of the present invention, it also includes a control panel fixed on the inside of the back cover.

[0014]

As a further solution of the present invention: the connecting rod and the piston are made of alloy

[0015]

As a further solution of the present invention: the linear bearing is made of plastic material.

[0016]

Compared with the existing technology, the beneficial effects of this utility model are: the utility model has a simple structure and is easy to use. It can reduce the noise during the piston movement through the installation of shock-absorbing rubber rings and linear bearings, and can reduce the noise of the motor through the installation of shock-absorbing pads. The dual measures effectively reduce the noise generated during the movement and achieve quiet operation, which is worthy of promotion.

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[0017]

Description of drawings

[0018]

Figure 1 is a schematic structural diagram of a handheld electric massage gun;

[0019]

Figure 2 is a schematic cross-sectional structural diagram of a handheld electric massage gun;

[0020]

Figure 3 is a schematic top view of the half-section structure of Figure 2;

[0021]

Figure 4 is a schematic diagram of the half-section structure of Figure 2 viewed from above;

[0022]

Figure 5 is a schematic diagram of the left half-section structure of Figure 2;

[0023]

Figure 6 is a schematic diagram of the right half-section structure of Figure 2.

[0024]

In the picture: 1-main shell upper cover, 2-main shell lower cover, 3-motor, 4-motor seat, 5-eccentric wheel, 6-connecting rod, 7-front cover, 8-linear bearing, 9-piston, 10-massage head, 11-battery pack shell, 12-battery pack, 13-battery pack removal button, 14-charging control board, 15-back cover, 16-switch button, 17-control board.

[0025]

Detailed ways

[0026]

The technical solution of this patent will be further described in detail below in conjunction with specific implementation modes.

[0027]

Embodiment 1: Please refer to Figure 1-6. A handheld electric massage gun includes a main shell upper cover 1 and a main shell lower cover 2 that are fixedly connected. The main shell upper cover 1 and the main shell lower cover 2 are fixedly connected on the left side. There is a front cover 7, a rear cover 15 is fixedly connected to the right side of the main case upper cover 1 and the main case lower cover 2, a battery pack shell 11 is fixedly connected below the main shell lower cover 2, and the battery pack shell 11 is movable and snap-fitted with a Battery pack 12. The battery pack 12 uses a 18650 lithium battery pack. The inner top of the upper cover 1 of the main case is fixedly connected to the motor 3 through the motor base 4. The motor 3 uses an outer rotor brushless motor. The noise of the motor 3 is small when working. 3 is electrically connected to the battery pack 12 through the switch button 16 on the back cover 15. The switch button 16 controls whether the battery pack 12 supplies power to the motor 3 to make the motor 3 work. The output end of the motor 3 is connected to the eccentric wheel 5 through rotation. Connecting rod 6, the inner side of the front cover 7 is fixedly connected with a linear bearing 8 through a shock-absorbing rubber ring. The linear bearing 8 is fixed through a shock-absorbing rubber ring. It can effectively reduce noise during the left and right movement of the piston 9 and the massage head 10. The linear bearing The inner side of 8 is slidingly

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connected to a piston 9 that is rotatably connected to the connecting rod 6. The outer end of the linear bearing 8 is slidingly connected to a massage head 10 that is fixedly connected to the piston 9. The massage head 10 can be set in a variety of different structures, so that it can be replaced. It has different hammering massage effects.

[0028]

A battery pack removal button 13 for removing the battery pack 12 is also included.

[0029]

The inner bottom of the battery pack casing 11 is connected to the battery pack casing back cover through the charging control board 14, and a battery pack sticker is attached to the outside of the battery pack casing back cover.

[0030]

It also includes a control panel 17 fixed on the inside of the back cover 15 .

[0031]

The connecting rod 6 and the piston 9 are made of alloy.

[0032]

The linear bearing 8 is made of plastic material.

[0033]

Embodiment 2: This embodiment is a further improvement of the previous embodiment: a shock absorbing pad is fixedly connected between the motor base 4 and the main housing upper cover 1 .

Adding a shock-absorbing pad between the motor base 3 and the main housing upper cover 1 can reduce the noise of the motor 3 during operation, further reduce the noise of the device, and achieve quiet operation.

[0034]

It is worth mentioning that this application aims to achieve the effect of quiet operation through the settings of shock-absorbing rubber rings and shock-absorbing pads, controls the charging of the battery pack 12 through the charging control board 14, controls the normal operation of the motor 3 through the control board 17, and The mechanism of the eccentric wheel 5 and the connecting rod 6 driving the piston 9 to reciprocate left and right, and the removal of the battery pack 12 through the battery pack removal button 13 are all applications of the existing technology and need not be repeated here.

[0035]

Further explanation: This patent uses a 24V external rotor brushless motor with low power consumption and high strength. Through the rotation of the eccentric wheel 5, it drives the connecting rod 6 with two ball bearings to push the piston 9 to make a reciprocating motion of 10mm stroke.

The piston 9 drives the massage head 10 to impact the human muscle surface at high frequency.

The impact vibration frequency is adjustable in multiple gears from 900 times to 5000 times.

To adapt to various user requirements for strength and impact frequency.

The power supply is provided by a battery pack 12 consisting of 6 18650 lithium batteries connected in series.

Easy to use and carry.

The battery pack 12 is controlled by an intelligent balanced charging protection board to enable balanced charging of each battery, resulting in short charging time and long battery life.

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The battery pack 12 is charged by a 28V1A power adapter, and the product can be used alone or while charging.

The outer rotor brushless motor 3 is driven by a PWM motor control board and has the advantages of low power consumption, silence and power saving.

[0036]

It is obvious to those skilled in the art that the present invention is not limited to the details of the above exemplary embodiments, and the present invention can be implemented in other specific forms without departing from the spirit or basic characteristics of the present invention.

Therefore, from any point of view, the embodiments should be regarded as exemplary and non-restrictive. The scope of the present invention is defined by the appended claims rather than the above description, and it is therefore intended that all claims falling within the rights All changes within the meaning and scope of the required equivalent elements are included in the present invention.

Any reference signs in the claims shall not be construed as limiting the claim in question.

[0037]

In addition, it should be understood that although this specification is described in terms of implementations, not each implementation only contains an independent technical solution. This description of the specification is only for the sake of clarity, and those skilled in the art should take the specification as a whole. , the technical solutions in each embodiment can also be appropriately combined to form other implementations that can be understood by those skilled in the art.

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CLAIMS CN210301676U

1.

A handheld electric massage gun, including a main shell upper cover (1) and a main shell lower cover (2) that are fixedly connected. A front cover is fixedly connected to the left side of the main shell upper cover (1) and the main shell lower cover (2). (7), a back cover (15) is fixedly connected to the right side of the main case upper cover (1) and the main case lower cover (2), and a battery pack shell (11) is fixedly connected below the main case lower cover (2). The battery pack (12) is movably connected in the battery pack casing (11), and the top of the main case upper cover (1) is fixedly connected to the motor (3) through the motor base (4). The motor (3) passes through the back cover (15) The switch button (16) on the top is electrically connected to the battery pack (12), and the output end of the motor (3) is connected to a connecting rod (6) through an eccentric wheel (5). It is characterized in that the front cover (7)) is fixedly connected to the inner side of the linear bearing (8) through a shock-absorbing rubber ring. The inner side of the linear bearing (8) is slidingly connected to a piston (9) that is rotatably connected to the connecting rod (6). The outer end of the linear bearing (8) is slidingly connected to the connecting rod (6). The piston (9) is fixedly connected to the massage head (10).

2.

The handheld electric massage gun according to claim 1, characterized in that a shock-absorbing pad is fixedly connected between the motor base (4) and the main housing upper cover (1).

3.

The handheld electric massage gun according to claim 1, further comprising a battery pack removal button (13) for removing the battery pack (12).

4.

The handheld electric massage gun according to claim 1, characterized in that the inner bottom of the battery pack casing (11) is connected to the battery pack casing back cover through the charging control board (14), and the battery pack casing back cover is attached to the outside. There is a battery pack sticker.

5.

The handheld electric massage gun according to claim 1, further comprising a control panel (17) fixed on the inside of the back cover (15).

6.

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The handheld electric massage gun according to any one of claims 1 to 5, characterized in that the connecting rod (6) and the piston (9) are made of alloy.

7.

The handheld electric massage gun according to claim 6, characterized in that the linear bearing (8) is made of plastic material.

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(12)实用新型专利

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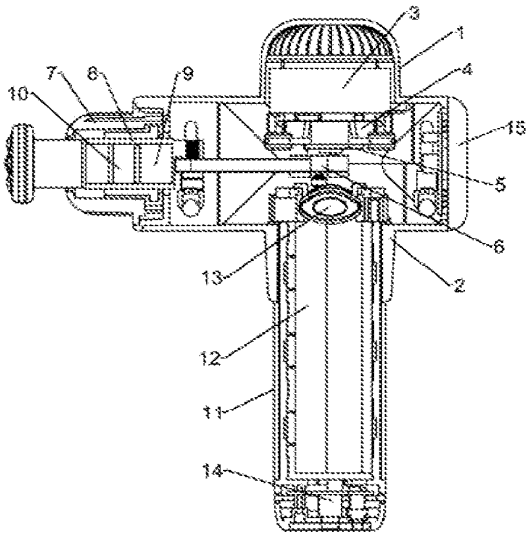
权利要求书1页 说明书3页 附图4页

(54)实用新型名称

一种手持式电动按摩枪

(57)摘要

本实用新型公开了一种手持式电动按摩枪，属于一种按摩装置，包括固定连接的主壳上盖和主壳下盖，主壳上盖与主壳下盖左侧固定连接有前盖，主壳上盖与主壳下盖右侧固定连接有后盖，所述主壳下盖下方固定连接有电池组外壳，电池组外壳内活动卡接有电池组，主壳上盖内顶部通过马达座固定连接有马达，马达通过后盖上的开关按钮与电池组电性连接，所述马达输出端通过偏心轮转动连接有连杆，所述前盖内侧通过减震胶圈固定连接有直线轴承。本实用新型结构简单，使用方便，通过减震胶圈与直线轴承设置能够降低活塞运动过程的噪音，通过减震垫的设置能够降低马达运动过程产生的噪音，双重措施有效降低了装置工作时的噪音，达到安静作业的效果。



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1.一种手持式电动按摩枪，包括固定连接的主壳上盖(1)和主壳下盖(2)，主壳上盖(1)与主壳下盖(2)左侧固定连接有前盖(7)，主壳上盖(1)与主壳下盖(2)右侧固定连接有后盖(15)，所述主壳下盖(2)下方固定连接有电池组外壳(11)，电池组外壳(11)内活动卡接有电池组(12)，主壳上盖(1)内顶部通过马达座(4)固定连接有马达(3)，马达(3)通过后盖(15)上的开关按钮(16)与电池组(12)电性连接，所述马达(3)输出端通过偏心轮(5)转动连接有连杆(6)，其特征在于，所述前盖(7)内侧通过减震胶圈固定连接有直线轴承(8)，直线轴承(8)内侧滑动连接有与连杆(6)转动连接的活塞(9)，直线轴承(8)外端滑动连接有与活塞(9)固定连接的按摩头(10)。

2.根据权利要求1所述的手持式电动按摩枪，其特征在于，所述马达座(4)与主壳上盖(1)之间固定连接有减震垫。

3.根据权利要求1所述的手持式电动按摩枪，其特征在于，还包括用于取下电池组(12)的电池组拆卸按钮(13)。

4.根据权利要求1所述的手持式电动按摩枪，其特征在于，所述电池组外壳(11)内底部通过充电控制板(14)连接有电池组外壳后盖，电池组外壳后盖外贴合有电池组贴纸。

5.根据权利要求1所述的手持式电动按摩枪，其特征在于，还包括固定于后盖(15)内侧的控制板(17)。

6.根据权利要求1-5任一所述的手持式电动按摩枪，其特征在于，所述连杆(6)与活塞(9)为合金材质。

7.根据权利要求6所述的手持式电动按摩枪，其特征在于，所述直线轴承(8)为塑料材质。

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一种手持式电动按摩枪

技术领域

[0001] 本实用新型涉及一种按摩枪，具体是一种手持式电动按摩枪。

背景技术

[0002] 按摩是以中医的脏腑、经络学说为理论基础，并结合西医的解剖和病理诊断，而用手法作用于人体体表的特定部位以调节机体生理、病理状况，达到理疗目的的方法，从性质上来说，它是一种物理的治疗方法。从按摩的治疗上，可分为保健按摩、运动按摩和医疗按摩。

[0003] 目前市场上放松肌肉缓解疲劳的产品主要是按摩椅和手持式按摩器。按摩椅的主要工作方式是挤压肌肉，手持按摩器的工作方式主要也是挤压，低频率震动。有舒缓的效果，但是按摩椅体积较大不适合普通家庭使用，手持式按摩器在工作时噪音较大。为此本领域技术人员提出了一种手持式电动按摩枪，以解决上述背景中提出的问题。

实用新型内容

[0004] 本实用新型的目的在于提供一种手持式电动按摩枪，以解决上述背景技术中提出的问题。

[0005] 为实现上述目的，本实用新型提供如下技术方案：

[0006] 一种手持式电动按摩枪，包括固定连接的主壳上盖和主壳下盖，主壳上盖与主壳下盖左侧固定连接有前盖，主壳上盖与主壳下盖右侧固定连接有后盖，所述主壳下盖下方固定连接有电池组外壳，电池组外壳内活动卡接有电池组，主壳上盖内顶部通过马达座固定连接有马达，马达通过后盖上的开关按钮与电池组电性连接，所述马达输出端通过偏心轮转动连接有连杆，所述前盖内侧通过减震胶圈固定连接有直线轴承，直线轴承内侧滑动连接有与连杆转动连接的活塞，直线轴承外端滑动连接有与活塞固定连接的按摩头。

[0007] 作为本实用新型进一步的方案：所述马达座与主壳上盖之间固定连接有减震垫。

[0008] 作为本实用新型再进一步的方案：还包括用于取下电池组的电池组拆卸按钮。

[0009] 作为本实用新型再进一步的方案：所述电池组外壳内底部通过充电控制板连接有电池组外壳后盖，电池组外壳后盖外贴合有电池组贴纸。

[0010] 作为本实用新型再进一步的方案：还包括固定于后盖内侧的控制板。

[0011] 作为本实用新型再进一步的方案：所述连杆与活塞为合金材质。

[0012] 作为本实用新型再进一步的方案：所述直线轴承为塑料材质。

[0013] 与现有技术相比，本实用新型的有益效果是：本实用新型结构简单，使用方便，通过减震胶圈与直线轴承设置能够降低活塞运动过程的噪音，通过减震垫的设置能够降低马达运动过程产生的噪音，双重措施有效降低了装置工作时的噪音，达到安静作业的效果，值得推广。

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附图说明

[0014] 图1为一种手持式电动按摩枪的结构示意图；

[0015] 图2为一种手持式电动按摩枪的剖视结构示意图；

[0016] 图3为图2的俯视半剖结构示意图；

[0017] 图4为图2的仰视半剖结构示意图；

[0018] 图5为图2的左视半剖结构示意图；

[0019] 图6为图2的右视半剖结构示意图。

[0020] 图中：1-主壳上盖、2-主壳下盖、3-马达、4-马达座、5-偏心轮、6-连杆、7-前盖、8-直线轴承、9-活塞、10-按摩头、11-电池组外壳、12-电池组、13-电池组拆卸按钮、14-充电控制板、15-后盖、16-开关按钮、17-控制板。

具体实施方式

[0021] 下面结合具体实施方式对本专利的技术方案作进一步详细地说明。

[0022] 实施例一：请参阅图1-6，一种手持式电动按摩枪，包括固定连接的主壳上盖1和主壳下盖2，主壳上盖1与主壳下盖2左侧固定连接有前盖7，主壳上盖1与主壳下盖2右侧固定连接有后盖15，所述主壳下盖2下方固定连接有电池组外壳11，电池组外壳11内活动卡接有电池组12，电池组12采用18650锂电池组，主壳上盖1内顶部通过马达座4固定连接有马达3，马达3采用外转子无刷马达，该马达3工作时的噪音较小，马达3通过后盖15上的开关按钮16与电池组12电性连接，通过开关按钮16控制电池组12是否给马达3供电，使马达3工作，所述马达3输出端通过偏心轮5转动连接有连杆6，所述前盖7内侧通过减震胶圈固定连接有直线轴承8，直线轴承8通过减震胶圈固定，在活塞9及按摩头10左右运动过程中能够有效降低噪音，直线轴承8内侧滑动连接有与连杆6转动连接的活塞9，直线轴承8外端滑动连接有与活塞9固定连接的按摩头10，按摩头10可以设置为多种不同的结构，从而实现可更换，起到不同的锤击按摩效果。

[0023] 还包括用于取下电池组12的电池组拆卸按钮13。

[0024] 所述电池组外壳11内底部通过充电控制板14连接有电池组外壳后盖，电池组外壳后盖外贴合有电池组贴纸。

[0025] 还包括固定于后盖15内侧的控制板17。

[0026] 所述连杆6与活塞9为合金材质。

[0027] 所述直线轴承8为塑料材质。

[0028] 实施例二：本实施例作为上一实施例进一步的改进：所述马达座4与主壳上盖1之间固定连接有减震垫。在马达座3与主壳上盖1之间添加减震垫能够降低马达3工作时的噪音，进一步降低装置的噪音，达到安静作业的效果。

[0029] 值得说明的是，本申请旨在通过减震胶圈及减震垫的设置达到安静作业的效果，通过充电控制板14控制电池组12的充电，通过控制板17控制马达3的正常工作，通过偏心轮5、连杆6带动活塞9左右往复运动的机构，以及通过电池组拆卸按钮13拆卸电池组12均为现有技术的应用，在此无需赘述。

[0030] 进一步说明：本专利使用24V功耗小力量大的外转子无刷马达，通过偏心轮5的转动，带动带两个滚珠轴承的连杆6来推动活塞9做10mm行程的往复运动。活塞9带动按摩头10

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高频率冲击人体肌肉表面。冲击振动频率从900次至5000次多个挡位可调。以适应各种用户对力度和冲击频率的要求。电源由6节串联的18650锂电池组成的电池组12供电。方便使用，携带。电池组12由智能平衡充电保护板控制，使每个电池均衡充电，充电时间短，电池寿命长。电池组12由28V1A电源适配器充电，产品可以单独使用，也可以边充电边使用。外转子无刷马达3由PWM马达控制板驱动，具有功耗小、静音、省电的优点。

[0031] 对于本领域技术人员而言，显然本实用新型不限于上述示范性实施例的细节，而且在不背离本实用新型的精神或基本特征的情况下，能够以其他的具体形式实现本实用新型。因此，无论从哪一点来看，均应将实施例看作是示范性的，而且是非限制性的，本实用新型的范围由所附权利要求而不是上述说明限定，因此旨在将落在权利要求的等同要件的含义和范围内的所有变化囊括在本实用新型内。不应将权利要求中的任何附图标记视为限制所涉及的权利要求。

[0032] 此外，应当理解，虽然本说明书按照实施方式加以描述，但并非每个实施方式仅包含一个独立的技术方案，说明书的这种叙述方式仅仅是为清楚起见，本领域技术人员应当将说明书作为一个整体，各实施例中的技术方案也可以经适当组合，形成本领域技术人员可以理解的其他实施方式。

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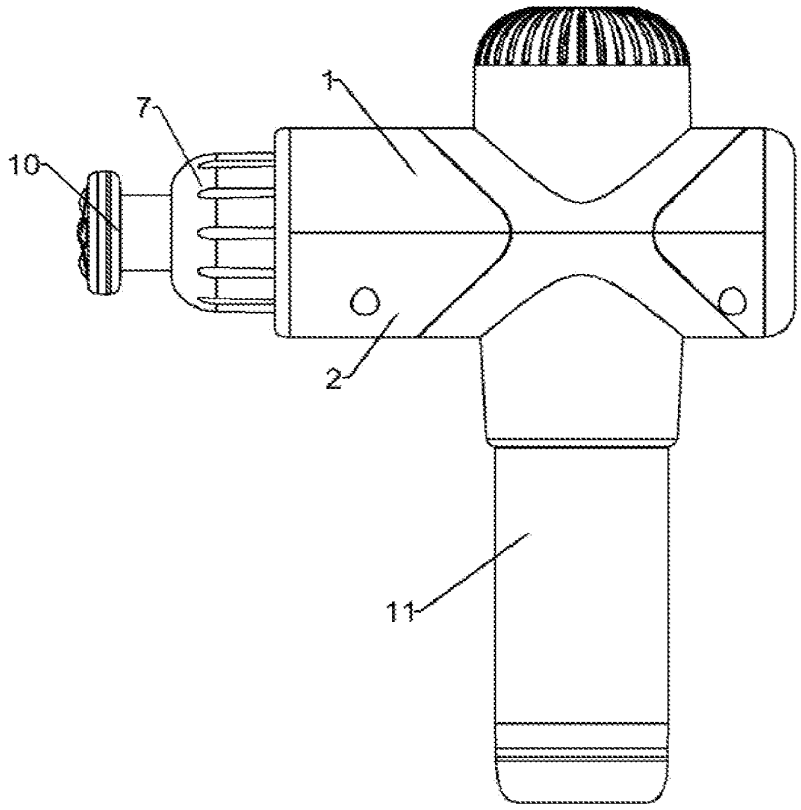

图1

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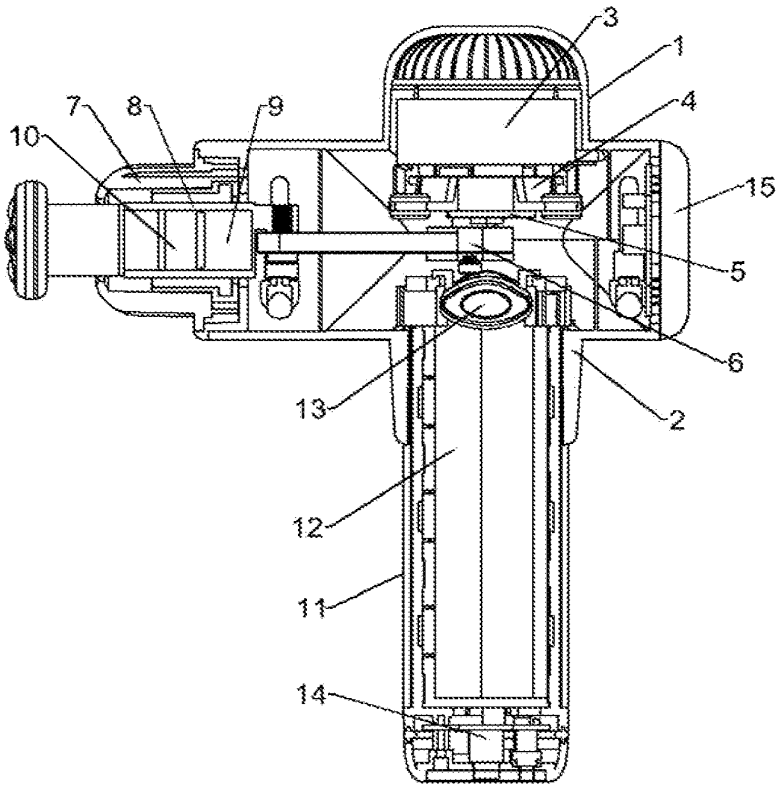

图2

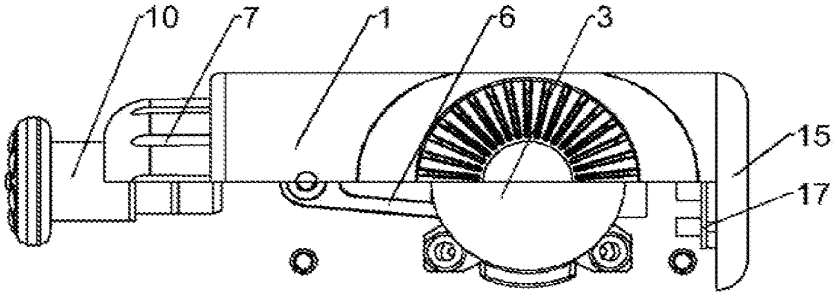

图3

Petitioner Therabody Ex-1004, 1794

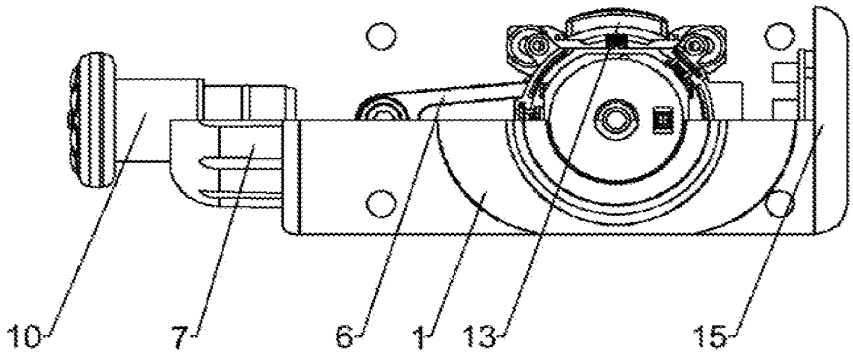

图4

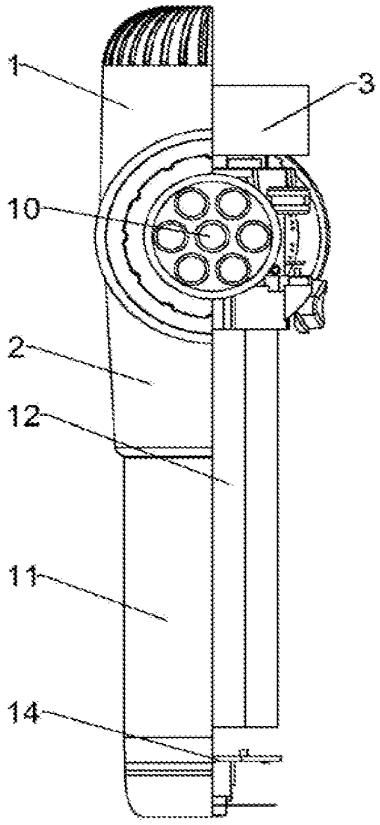

图5

Petitioner Therabody Ex-1004, 1795

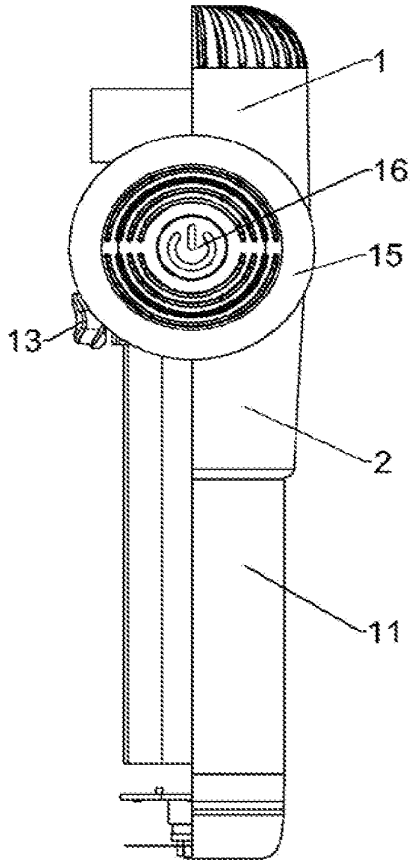

图6

Petitioner Therabody Ex-1004, 1796

Espacenet

Bibliographic data: WO2012177028 (A2) — 2012-12-27

PUMP-TYPE MASSAGE CONTAINER HAVING VIBRATION MEANS

Inventor(s): HWANG CHENGHWAN [KR]; PARK WOORAM [KR]; KIM JUNOH [KR]; KIM YEEHWA [KR]; YUN EUNSOOK [KR]; JEONG HEAWON [KR]; KIM YUSEOB [KR] ± (HWANG, CHENGHWAN, ; PARK, WOORAM, ; KIM, JUNOH, ; KIM, YEEHWA, ; YUN, EUNSOOK, ; JEONG, HEAWON, ; KIM, YUSEOB)

Applicant(s): AMOREPACIFIC CORP [KR]; HWANG CHENGHWAN [KR]; PARK WOORAM [KR]; KIM JUNOH [KR]; KIM YEEHWA [KR]; YUN EUNSOOK [KR]; JEONG HEAWON [KR]; KIM YUSEOB [KR] ± (AMOREPACIFIC CORPORATION, ; HWANG, CHENGHWAN, ; PARK, WOORAM, ; KIM, JUNOH, ; KIM, YEEHWA, ; YUN, EUNSOOK, ; JEONG, HEAWON, ; KIM, YUSEOB)

Classification: - international: ***A45D34/04; A45D40/18; A45D40/26; A61H23/02; B65D47/34***

- cooperative: **A45D34/04 (KR); A45D34/041 (EP, US); A45D40/18 (EP, KR); A45D40/26 (KR); A61H15/0085 (EP); A61H23/02 (EP, KR);** A45D2034/005 (EP); A45D2200/056 (EP); A45D2200/207 (EP); A61H2015/0064 (EP); A61H2201/105 (EP); B05B11/0038 (EP, US); B05B11/1004 (EP); B05B11/1023 (EP); B05B11/1052 (EP)

Application number: WO2012KR04822 20120619 Global Dossier

Priority number(s): KR20110005727U 20110623

Also published as: WO2012177028 (A3) WO2012177028 (A9) CN203789387 (U) HK1195194 (A2) JP2014529301 (A) more

Abstract of WO2012177028 (A2)

The present invention relates to a pump-type massage container having a vibration means. According to the present invention, the invention comprises: a pump container having a pump unit which is combined with the upper part of an accommodation container having cosmetic contents accommodated therein; a container body in which

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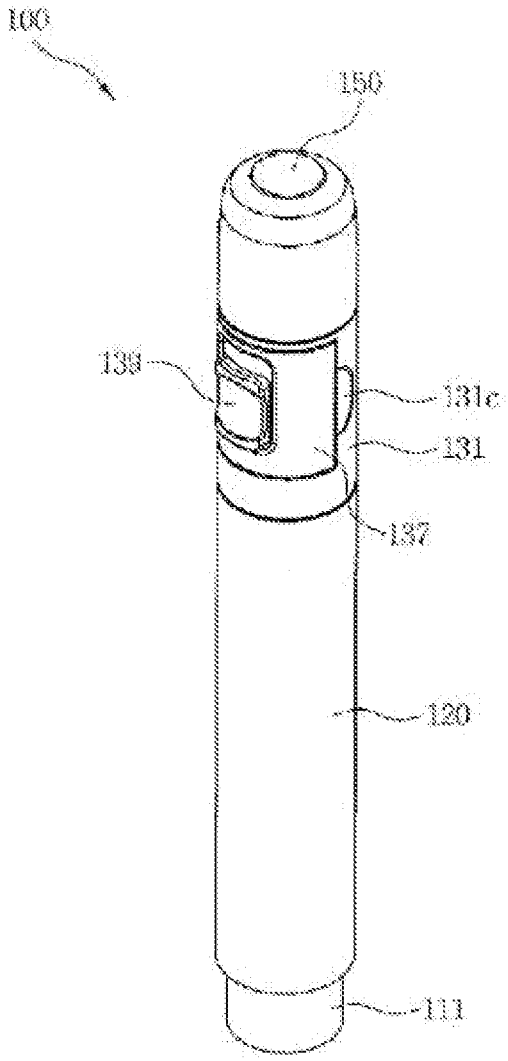
said pump container is detachably positioned; a housing which is combined with the upper part of said container body, has a nozzle for forming a moving passage of the cosmetic contents, has an embedded vibration means operated by on/off operations of a switch; a massage unit which is inserted and combined with the inside of an upper end of said housing, and has a massage ball positioned in a gap between a combined lower cap and upper cap; and a cover which is detachably positioned on the outside of the upper end of said housing, and protects said massage unit. Thus, a user is able to easily and conveniently change the cosmetic contents accommodated in the pump container and a battery provided in the vibration means, whereby the pump-type massage container having the vibration means can be used semi permanently.

[Fig. 1]



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(12) 특허협력조약에 의하여 공개된 국제출원

(19) 세계지식재산권기구
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(26) 공개언어: 한국어

(30) 우선권정보:
20-2011-0005727 2011 년 6 월 23 일 (23.06.2011) KR

(71) 출원인 (US 을(를) 제외한 모든 지정국에 대하여): **주식회사 아모레퍼시픽 (AMOREPACIFIC CORPORATION)** [KR/KR]; 서울시 용산구 한강로 2 가 181, 140-777 Seoul (KR).

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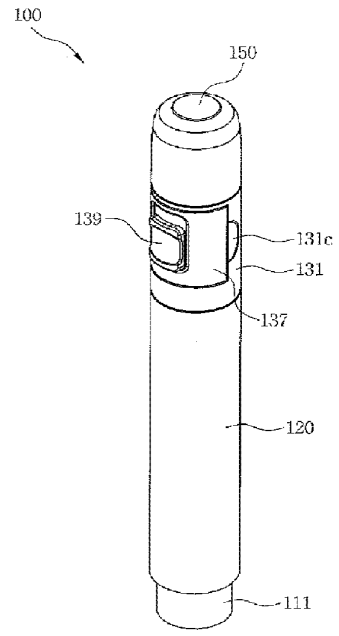
(81) 지정국 (별도의 표시가 없는 한, 가능한 모든 종류의 국내 권리의 보호를 위하여): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK,

[다음 쪽 계속]

(54) **Title**: PUMP-TYPE MASSAGE CONTAINER HAVING VIBRATION MEANS

(54) **발명의 명칭** : 진동수단이 구비된 펌프형 마사지 용기

[Fig. 1]



(57) **Abstract**: The present invention relates to a pump-type massage container having a vibration means. According to the present invention, the invention comprises: a pump container having a pump unit which is combined with the upper part of an accommodation container having cosmetic contents accommodated therein; a container body in which said pump container is detachably positioned; a housing which is combined with the upper part of said container body, has a nozzle for forming a moving passage of the cosmetic contents, has an embedded vibration means operated by on/off operations of a switch; a massage unit which is inserted and combined with the inside of an upper end of said housing, and has a massage ball positioned in a gap between a combined lower cap and upper cap; and a cover which is detachably positioned on the outside of the upper end of said housing, and protects said massage unit. Thus, a user is able to easily and conveniently change the cosmetic contents accommodated in the pump container and a battery provided in the vibration means, whereby the pump-type massage container having the vibration means can be used semi permanently.

(57) **요약서**: 본 고안은 진동수단이 구비된 펌프형 마사지 용기에 관한 것이다. 이러한 본 고안에 의하면, 화장품 내용물이 수납된 수납용기의 상부에 펌프유닛이 결합된 펌프용기;

[다음 쪽 계속]

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MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **지정국** (별도의 표시가 없는 한, 가능한 모든 종류의 역내 권리의 보호를 위하여): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), 유라시아 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 유럽 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

공개:

— 국제조사보고서 없이 공개하며 보고서 접수 후 이를 별도 공개함 (규칙 48.2(g))

상기 펌프용기가 내부에 착탈가능하게 구비되는 용기본체; 상기 용기본체의 상부에 결합되고, 화장품 내용물의 이동로를 형성하는 노즐과, 스위치의 온/오프(on/off)에 의해 작동되는 진동수단이 내재된 하우징; 상기 하우징의 상단 내부에 끼워져 결합되고, 하부캡과 상부캡이 결합된 사이에 마사지볼이 구비된 마사지부; 및 상기 하우징의 상단 외부에 착탈가능하게 구비되어 상기 마사지부를 보호하는 뚜껑; 을 포함하여 구성됨으로써, 사용자는 펌프용기에 수납된 화장품 내용물과 진동수단에 구비된 배터리를 쉽고 편리하게 교체할 수 있어 진동수단이 구비된 펌프형 마사지 용기를 반영구적으로 사용할 수 있다.

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명세서

발명의 명칭: 진동수단이 구비된 펌프형 마사지 용기

기술분야

[1] 본 고안은 진동수단이 구비된 펌프형 마사지 용기에 관한 것으로, 더욱 상세하게는, 용기본체의 내부에 착탈가능한 펌프용기를 구비하고, 용기본체의 상부에 결합되는 하우징의 내부에 착탈가능한 진동수단을 구비함으로써, 펌프용기와 진동수단의 교체를 쉽고 편리하게 할 수 있도록 한 진동수단이 구비된 펌프형 마사지 용기에 관한 것이다.

배경기술

[2] 일반적으로, 진동수단을 갖는 마사지 용기는 화장품 내용물이 수용되는 튜브형 용기와 진동을 발생시키는 진동수단과, 마사지할 수 있는 마사지부가 일체로 구비되어 이루어진다.

[3] 이러한, 마사지 용기는 사용자가 튜브형 용기 내부에 수용된 화장품 내용물을 사용하고자 하는 부위에 토출시킨 후 화장품 내용물을 마사지부를 이용하여 피부에 스며들게 마사지하는 것이다.

[4] 상기 마사지 용기에 의하면 진동수단을 작동시켜 진동수단에 발생하는 진동을 통하여 마사지기능을 수행하게 할 수도 있다.

[5] 상기와 같은 종래의 진동수단을 갖는 마사지 용기는 내부에 수용된 화장품 내용물을 토출시키기 위하여 튜브형 용기를 짜내어 토출시켜야 하는 번거로움이 있었다.

[6] 또한, 종래의 마사지 용기는 튜브형 용기와, 진동수단과, 마사지부가 일체로 구비되어 구성되기 때문에 화장품 내용물을 다 쓰고 난 후에는 별도로 화장품 내용물만 다시 구매할 수 없어 기존의 마사지 용기를 버리고 새로 구입해야하는 단점이 있었다.

[7] 그리고, 종래의 마사지 용기 내부에 구비된 진동수단은 배터리에 의해 전원을 공급받아 작동되기 때문에 배터리를 모두 소진하였을 때 배터리를 교체해야 하는데 진동수단으로부터 배터리를 쉽게 분리할 수 없어 배터리의 교체가 어려운 단점이 있었다.

발명의 상세한 설명

기술적 과제

[8] 본 고안은 상기의 문제점을 해결하기 위하여 안출된 것으로, 용기본체의 내부에 착탈가능한 펌프용기를 구비하고, 용기본체의 상부에 결합되는 하우징의 내부에 착탈가능한 진동수단을 구비함으로써, 펌프용기와 진동수단의 교체를 쉽고 편리하게 할 수 있도록 한 진동수단이 구비된 펌프형 마사지 용기를 제공하는데 그 목적이 있다.

과제 해결 수단

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[9] 상기한 목적은, 화장품 내용물이 수납된 수납용기의 상부에 펌프유닛이 결합된 펌프용기; 상기 펌프용기가 내부에 착탈가능하게 구비되는 용기본체; 상기 용기본체의 상부에 결합되고, 화장품 내용물의 이동로를 형성하는 노즐과, 스위치의 온/오프(on/off)에 의해 작동되는 진동수단이 내재된 하우징; 상기 하우징의 상단 내부에 끼워져 결합되고, 하부캡과 상부캡이 결합된 사이에 마사지볼이 구비된 마사지부; 및 상기 하우징의 상단 외부에 착탈가능하게 구비되어 상기 마사지부를 보호하는 뚜껑; 을 포함하는 진동수단이 구비된 펌프형 마사지 용기에 의해 달성된다.

[10] 상기 수납용기의 상단에 결합된 상기 펌프유닛의 타측으로 누름버튼이 형성되고, 하부 외측으로 누름방지돌기가 형성된 것을 특징으로 한다.

[11] 상기 수납용기의 누름방지돌기를 상기 용기본체의 하부 내측에 형성된 누름방지수단에 내재하고, 상기 누름버튼의 회동여부에 따라 누름조작되어 상기 펌프유닛의 작동을 제어하게 되는 것을 특징으로 한다.

[12] 상기 용기본체의 상부에 결합되며, 내부에 빈공간을 형성하고 일측이 개방된 수용홈을 갖는 몸체; 상기 몸체의 내부에 구비되고, 화장품 내용물이 이동하는 이동로가 형성된 노즐; 상기 몸체의 수용홈을 통해 상기 몸체의 내부에 착탈가능하게 구비되고, 상기 몸체의 내부에 구비된 상태에서 외부로 노출된 스위치의 조작에 의해 작동되어 진동을 발생시키는 진동수단; 상기 몸체의 수용홈에 착탈가능하게 끼워지고, 중앙에 상기 스위치가 결합되는 스위치부가 형성된 마감판; 및 상기 마감판의 스위치부에 끼워져 상기 진동수단을 작동시키는 스위치; 를 포함하여 구성되는 것을 특징으로 한다.

발명의 효과

[13] 따라서, 본 고안의 진동수단이 구비된 펌프형 마사지 용기에 의하면, 용기본체의 내부에 착탈가능한 펌프용기를 구비하고, 용기본체의 상부에 결합되는 하우징의 내부에 착탈가능한 진동수단을 구비함으로써, 펌프용기와 진동수단의 교체를 쉽고 편리하게 할 수 있는 이점이 있다.

[14] 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기에 수납된 화장품 내용물을 모두 소진하였을 때 펌프용기만을 교체하여 사용함으로써, 진동수단이 구비된 펌프형 마사지 용기를 반영구적으로 사용할 수 있기 때문에 비용절감의 효과뿐만 아니라 사용상 편리한 이점이 있다.

[15] 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기는 마사지 용기 내부에 구비된 진동수단의 모터에 전원을 공급하는 배터리가 모두 소진하였을 때 배터리만을 교체하여 사용함으로써, 진동수단이 구비된 펌프형 마사지 용기를 반영구적으로 사용할 수 있기 때문에 비용절감의 효과뿐만 아니라 사용상 편리한 이점이 있다.

도면의 간단한 설명

[16] 도1은 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기를 도시한 사시도.

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[17] 도2는 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기를 분해하여 도시한 분해사시도.

[18] 도3은 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기의 단면을 도시한 단면도.

발명의 실시를 위한 최선의 형태

[19] 본 명세서 및 청구범위에 사용된 용어나 단어는 통상적이거나 사전적인 의미로 한정해서 해석되어서는 아니되며, 고안자는 자신의 고안을 가장 최선의 방법으로 설명하기 위해 용어의 개념을 적절하게 정의할 수 있다는 원칙에 입각하여 본 고안의 기술적 사상에 부합하는 의미와 개념으로 해석되어야만 한다.

[20]

[21] 이하, 첨부된 도면을 참조하여 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기(100)를 설명하면 다음과 같다.

[22]

[23] 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기(100)는 화장품 내용물이 수납된 수납용기(111)의 상부에 펌프유닛(113)이 결합된 펌프용기(110)와, 펌프용기(110)가 착탈가능하게 내재 되는 용기본체(120)와, 용기본체(120)의 상부에 결합되고, 내부에 노즐(133)과 진동수단(135)이 내재된 하우징(130)과, 하우징(130)의 상부에 결합되어 마사지를 수행하는 마사지부(140)와 마사지부(140)의 상부에 구비되는 뚜껑(150)을 포함하여 구성된다.

[24] 펌프용기(110)는, 도2 내지 도3에 도시된 바와 같이, 화장품 내용물이 수납되는 수납용기(111)와, 화장품 내용물을 토출시키는 펌프유닛(113)의 결합으로 이루어진다.

[25] 수납용기(111)의 상부에는 펌프유닛(113)이 결합되는 개구부(111a)가 형성되고, 개구부(111a) 타측으로 누름버튼(111b)이 형성된다. 수납용기(111)의 하부 외측에는 용기본체(120)에 형성된 누름방지수단(120c)에 구비되는 누름방지돌기(111c)가 돌출형성된다. 수납용기(111)의 내부에는 화장품 내용물을 진공압에 의해 밀어 올려주는 승강피스톤(112)이 구비된다.

[26] 펌프유닛(113)은 수납용기(111)의 개구부(111a) 외주연에 결합하는 펌프헤드(113a)와, 펌프헤드(113a)의 하부에 결합된 펌프실린더(113b)와, 펌프실린더(113b) 내부에 설치되고 화장품 내용물이 이동하는 이송로(113c-1)가 형성된 작동피스톤(113c)과, 작동피스톤(113c)의 외측으로 설치되고 가압피스톤(113e)에 의해 이송로(113c-1)를 개폐하는 역할을 수행하는 밀폐피스톤(113d)과, 작동피스톤(113c)과 밀폐피스톤(113d)에 외력을 가하는 가압피스톤(113e)과, 펌프헤드(113a)와 가압피스톤(113d) 사이에 구비되고 가압에 의해 눌려진 가압피스톤(113d)을 원위치로 복원시켜주는 역할을

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수행하는 스프링(113f)과, 펌프실린더(113b) 내측 하부에 설치되어 화장품 내용물이 펌프실린더(113b) 내부로만 이동할 수 있도록 하는 역할을 수행하는 체크벨브(113g)로 이루어진다.

[27] 상기와 같은 본 고안에 따른 진동수단이 구비된 화장품용기(100)의 구성요소 중 화장품 내용물을 토출시키는 펌프용기(110)의 작동을 아래와 같이 구체적으로 설명한다.

[28] 먼저, 누름버튼(111b)에 외력을 가하면 누름버튼(111b)과 연계된 가압피스톤(113e)이 가압피스톤(113e)에 결합된 작동피스톤(113c)과 밀폐피스톤(113d)을 이동시켜 밀폐피스톤(113d)에 의해 폐쇄되었던 이송로(113c-1)를 개방하게 된다.

[29] 이때, 작동피스톤(113c)과 밀폐피스톤(113d)이 이동되면서 펌프실린더(113b)의 내부공간이 협소해짐에 따라 압력이 증가하여 펌프실린더(113b) 내부에 수납된 화장품 내용물이 이송로(113c-1)를 통해 외부로 토출된다.

[30] 그리고, 누름버튼(111b)에 가한 외력을 해제하면, 펌프헤드(113a)와 가압피스톤(113e) 사이에서 압축되었던 스프링(113f)의 탄성복원력에 의해 가압피스톤(113e)이 상승되면서 가압피스톤(113e)에 결합된 작동피스톤(113c)과 밀폐피스톤(113d)이 상부로 이동되면서 개방되었던 이송로(113c-1)가 밀폐피스톤(113d)에 의해 폐쇄된다.

[31] 이때, 작동피스톤(113c)과 밀폐피스톤(113d)이 상부로 이동되면서 펌프실린더(113b)의 내부공간이 넓어짐에 따라 진공압이 발생하여 수납용기(111)에 수용된 화장품 내용물이 체크벨브(113g)를 통해 펌프실린더(113b) 내부로 다시 이송되는 것이다.

[32] 용기본체(120)는, 도1 내지 도3에 도시된 바와 같이, 펌프용기(110)가 착탈가능하게 끼워질 수 있도록 하단이 펌프용기(110)의 외각 둘레만큼의 직경으로 함몰형성된다. 용기본체(120)에는 상부에 형성된 결합부(120a) 내측 평면 중앙에 화장품 내용물이 이동하는 구멍(120b)이 관통형성되고, 하부 내측면에 수납용기(111)에 형성된 누름방지돌기(111c)가 구비되는 누름방지수단(120c)이 형성된다.

[33] 상기와 같은 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기(100)에 의하면, 용기본체(120)에 형성된 누름방지수단에(120c)에 누름방지돌기(111c)가 구비됨으로써, 누름버튼(111b)의 회동여부에 따라 누름조작되어 펌프유닛(113)을 작동시키거나 누름조작을 방지하여 펌프유닛(113)의 작동을 중지시키게 되는 것이다.

[34] 하우징(130)은, 도1 내지 도3에 도시된 바와 같이, 용기본체(120)에 형성된 결합부(120a) 외측으로 하단이 끼워져 결합되는 몸체(131)와, 용기본체(120)의 결합부(120a) 내측으로 끼워지고, 몸체(131)의 내부에 내재 되는 노즐(133)과, 몸체(131)의 내부에 착탈가능하게 구비되는 진동수단(135)과, 진동수단(135)의 이탈을 방지하는 마감판(137)과, 마감판(137)의 중앙에 설치되어

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진동수단(135)을 조작하는 스위치(139)로 이루어진다.

[35] 몸체(131)는 내부가 상,하로 관통형성된 빈공간을 형성하고, 일측면이 개방된 수용홈(131a)이 형성된다. 몸체(131)에 형성된 수용홈(131a)의 내측면에는 마감판(137)에 형성된 결합돌기(137b)가 끼워지는 결합홈(131b)이 형성되고, 외측면에는 마감판(137)을 분리할 수 있는 요홈(131c)이 형성된다.

[36] 노즐(133)은 하부가 용기본체(120)의 결합부(120a) 내측으로 끼워져 결합된 상태로 몸체(131)의 내부에 내재된다. 노즐(133)의 내부에는 화장품 내용물이 이동하는 이동로(133a)가 관통형성된다.

[37] 진동수단(135)은 회전운동을 발생시키는 모터(135b)와, 모터(135b)의 회전에 의해 회전운동을 하는 회전체(135)와, 모터(135b)에 전원을 공급하는 배터리(135c)와, 모터(135b)와 배터리(135c)를 연결하는 연결부재(135d)로 이루어진다. 진동수단(135)은 몸체(131)에 형성된 수용홈(131a)을 통해 몸체(131)의 내부에 착탈가능하게 구비되고, 스위치(139)의 조작에 따라 변형되는 연결부재(135d)를 통해 모터(135b)와 배터리(135c)를 연결시켜 회전체(135a)가 회전운동을 하게 함으로써 진동을 발생시킨다.

[38] 마감판(137)의 외측면 중앙에는 스위치(139)가 끼워져 상,하로 조작가능한 스위치부(137a)가 관통형성된다. 마감판(137)의 내측면에는 몸체(131)의 수용홈(131a)에 형성된 결합홈(131b)에 끼워지는 결합돌기(137b)가 형성된다. 마감판(137)은 내측면에 형성된 결합돌기(137b)가 몸체(131)의 수용홈(131a)에 형성된 결합홈(131b)에 착탈가능하게 끼워진다.

[39] 스위치(139)의 내측면에는 마감판(137)의 스위치부(137a)에 관통되게 끼워져 연결부재(135d)를 변형시키는 돌기(139a)가 돌출형성된다.

[40] 마사지부(140)는, 도2 내지 도3에 도시된 바와 같이, 하우징(130)의 상부 내측에 끼워져 결합되고, 외체를 형성하는 상부캡(141)과, 상부캡(141)의 하부에 결합되는 하부캡(143)과, 상부캡(141)과 하부캡(143) 사이에 구비되는 마사지볼(145)로 이루어진다.

[41] 상부캡(141)은 하부캡(143)의 상부에 끼워져 결합되고, 상부 중앙에 마사지볼(145)이 외부로 노출되면서도 상부캡(141)을 이탈하지 않도록 일정간격만큼의 둘레를 갖는 노출공(141a)이 관통형성된다.

[42] 하부캡(143)은 상부가 상부캡(141)의 내부로 끼워져 결합되고, 하부가 하우징(130)의 상부 내측으로 끼워져 결합된다. 하부캡(143)의 상단부에 형성된 함몰부(143a) 일측면에는 화장품 내용물이 토출되는 토출공(143b)이 관통형성되고, 하부캡(143)의 하단부에 노즐(133)의 상부가 끼워지는 끼움홈(143c)이 형성되되, 끼움홈(143c)은 토출공(143b)이 관통형성된 동심축선에 형성된다.

[43] 뚜껑(150)은, 도1 내지 도3에 도시된 바와 같이, 마사지부(140)를 외부로부터 보호하기 위해 하우징(130)의 상부 외측으로 착탈가능하게 구비된다.

[44]

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[45] 한편, 상기와 같은 구성을 갖는 본 고안에 따른 진동수단이 구비된 펌프형 마사지 용기(100)를 사용하는 과정을 설명하면 다음과 같다.

[46] 먼저, 마사지부(140)를 보호하는 뚜껑(150)을 벗겨낸 후 펌프용기(110)에 수납된 화장품 내용물을 하부캡(143)에 형성된 토출공(143c)을 통하여 함몰부(143a)로 토출시킨다.

[47] 이 과정에서, 토출된 화장품 내용물은 마사지부(140)에 구비된 마사지볼(145)에 묻게 된다.

[48] 그리고, 상기 마사지볼(145)에 묻은 화장품 내용물을 사용자가 원하는 부위에 접촉하여 골고루 마사지하는 것이다.

[49] 아울러, 마사지 용기(100)에 구비된 진동수단(135)을 스위치(139)의 조작에 의해 작동시킨 후 사용함으로써 마사지효과를 극대화하는 것이다.

[50] [부호의 설명]

[51] 100 : 마사지 용기 110 : 펌프용기

[52] 111 : 수납용기 111a : 개구부

[53] 111b : 누름버튼 111c : 누름방지돌기

[54] 112 : 승강피스톤 113 : 펌프유닛

[55] 120 : 용기본체 120a : 결합부

[56] 120b : 구멍 120c : 누름방지수단

[57] 131 : 몸체 131a : 수용홈

[58] 131b : 결합홈 131c : 요홈

[59] 133 : 노즐 133a : 이동로

[60] 135 : 진동수단 135a : 회전체

[61] 135b : 모터 135c : 베터리

[62] 135d : 연결부재 137 : 마감판

[63] 137a : 스위치부 137b : 결합돌기

[64] 139 : 스위치 139a : 돌기

[65] 140 : 마사지부 141 : 상부캡

[66] 141a : 노출공 143 : 하부캡

[67] 143a : 함몰부 143b : 토출공

[68] 143c : 끼움홈 145 : 마사지볼

[69] 150 : 뚜껑

Petitioner Therabody Ex-1004, 1806

청구범위

[청구항 1] 화장품 내용물이 수납된 수납용기의 상부에 펌프유닛이 결합된 펌프용기;
상기 펌프용기가 내부에 착탈가능하게 구비되는 용기본체;
상기 용기본체의 상부에 결합되고, 화장품 내용물의 이동로를 형성하는 노즐과, 스위치의 온/오프(on/off)에 의해 작동되는 진동수단이 내재된 하우징;
상기 하우징의 상단 내부에 끼워져 결합되고, 하부캡과 상부캡이 결합된 사이에 마사지볼이 구비된 마사지부; 및
상기 하우징의 상단 외부에 착탈가능하게 구비되어 상기 마사지부를 보호하는 뚜껑; 을 포함하는 진동수단이 구비된 펌프형 마사지 용기.

[청구항 2] 제1항에 있어서,
상기 수납용기의 상단에 결합된 상기 펌프유닛의 타측으로 누름버튼이 형성되고, 하부 외측으로 누름방지돌기가 형성된 것을 특징으로 하는 진동수단이 구비된 펌프형 마사지 용기.

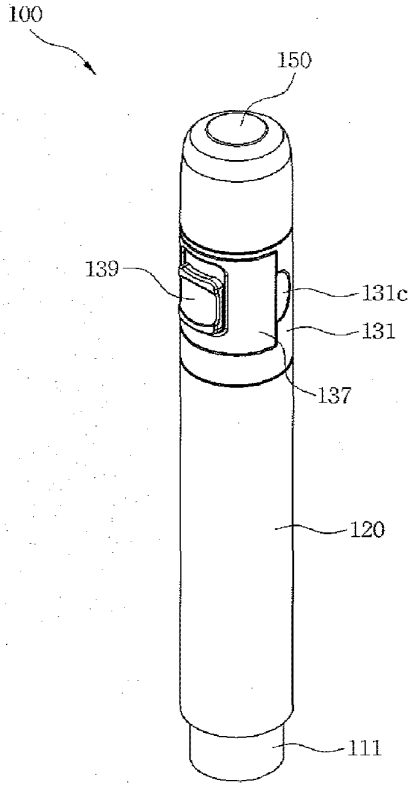
[청구항 3] 제1항 또는 제2항에 있어서,
상기 수납용기의 누름방지돌기를 상기 용기본체의 하부 내측에 형성된 누름방지수단에 내재하고, 상기 누름버튼의 회동여부에 따라 누름조작되어 상기 펌프유닛의 작동을 제어하게 되는 것을 특징으로 하는 진동수단이 구비된 펌프형 마사지 용기.

[청구항 4] 제1항에 있어서,
상기 하우징은,
상기 용기본체의 상부에 결합되며, 내부에 빈공간을 형성하고 일측이 개방된 수용홈을 갖는 몸체;
상기 몸체의 내부에 구비되고, 화장품 내용물이 이동하는 이동로가 형성된 노즐;
상기 몸체의 수용홈을 통해 상기 몸체의 내부에 착탈가능하게 구비되고, 상기 몸체의 내부에 구비된 상태에서 외부로 노출된 스위치의 조작에 의해 작동되어 진동을 발생시키는 진동수단;
상기 몸체의 수용홈에 착탈가능하게 끼워지고, 중앙에 상기 스위치가 결합되는 스위치부가 형성된 마감판; 및
상기 마감판의 스위치부에 끼워져 상기 진동수단을 작동시키는 스위치; 를 포함하여 구성되는 것을 특징으로 하는 진동수단이 구비된 펌프형 마사지 용기.

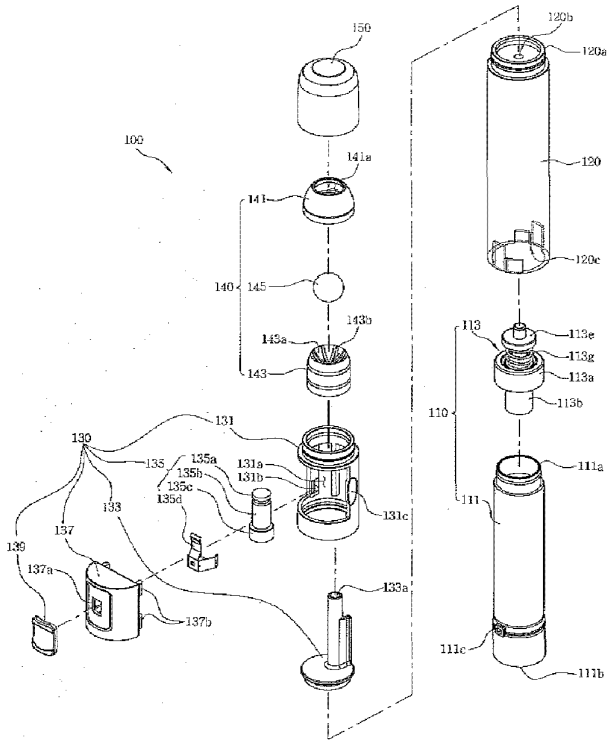
Petitioner Therabody Ex-1004, 1807

WO 2012/177028 PCT/KR2012/004822

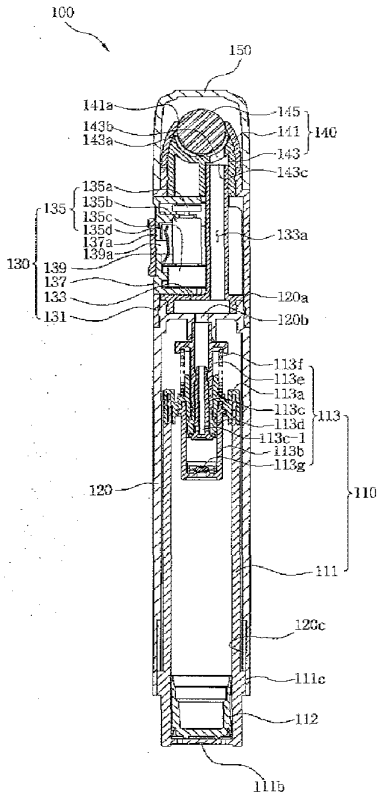
[Fig. 1]



[Fig. 2]



[Fig. 3]



Petitioner Therabody Ex-1004, 1809

Espacenet

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Medical equipment of dispensing of paediatrics intravenous route

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Classification: **- international:** *A61J1/22*
- cooperative:

Application number: CN20162168867U 20160921

Priority number (s): CN20162168867U 20160921

Abstract of CN206381389 (U)

The utility model discloses a medical equipment of dispensing of paediatrics intravenous route, including montant and base, the montant top is equipped with the adapter sleeve, and the adapter sleeve is connected with the cup, and cup central authorities are equipped with the through -hole, are equipped with the graduated bottle on the cup, is connected with the glass pipe under the graduated bottle, and the glass pipe passes the through -hole, glass pipe lower part ring cover has piston push rod, and the bottom surface is fixed with micro air cylinder under the cup, and micro air cylinder connects piston push rod's upper end, piston push rod sets up in the cylinder, and it is fixed that the cylinder passes through the collet chuck, and collet chuck one end is equipped with the 2nd fastening bolt, and the collet chuck other end passes through the connecting rod and connects on the adapter sleeve, the syringe needle is joined in marriage the liquid bottle and is placed in the recess of revolving stage in inserting and joining in marriage the liquid bottle, and the revolving stage below is connected with the pivot, and the pivot is connected with the 2nd sector gear, and the meshing of the 2nd sector gear has a sector gear, and a sector gear is connected with the motor shaft of motor, the utility model discloses the convenient quick accurate paediatrics patient that gives dispenses.

Petitioner Therabody Ex-1004, 1810

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DESCRIPTION CN206381389U

Pediatric intravenous injection medical dispensing equipment

[0001]

Technical field

[0002]

The utility model relates to the field of medical equipment, specifically to a pediatric intravenous injection medical dispensing equipment.

[0003]

Background technique

[0004]

Intravenous infusion is a widely used therapeutic method in clinical practice. According to various statistics, 90% of inpatients in hospitals, 40% of outpatients in hospitals, and 70% of patients in community clinics in China use intravenous infusion, which shows its wide application.

When medical staff prepare intravenous medications for pediatric patients, they have different types of preparations. The amounts of various drugs are prone to errors, which is time-consuming and can easily delay the patient's medication and affect the condition of the pediatric patient.

[0005]

Utility model content

[0006]

The technical problem to be solved by this utility model is to provide a pediatric intravenous injection medical dispensing equipment, which can conveniently, quickly and accurately dispense medication to pediatric patients.

[0007]

The utility model adopts the following technical solutions to achieve the purpose of the invention:

[0008]

Petitioner Therabody Ex-1004, 1811

A pediatric intravenous injection medical dispensing equipment, including a vertical rod and a base, characterized in that: a fastening sleeve is provided above the vertical rod, and the fastening sleeve is fixed on the vertical rod through a first fastening bolt. The fastening sleeve is connected to a cup holder, a through hole is provided in the center of the cup holder, a graduated bottle is provided on the cup holder, a glass tube is connected under the graduated bottle, and the glass tube passes through the through hole. The lower part of the glass tube is surrounded by a piston push rod, and a micro cylinder is fixed on the lower surface of the cup holder. The piston rod of the micro cylinder is connected to the upper end of the piston push rod, and the lower end of the piston push rod is arranged in the syringe. , the syringe is fixed by a collet, one end of the collet is provided with a second fastening bolt, the other end of the collet is connected to the fastening sleeve through a connecting rod, and a needle is connected below the syringe, The needle is inserted into the liquid preparation bottle, and the liquid preparation bottle is placed in the groove of the rotating table. A rotating shaft is connected below the rotating table, and a second sector gear is connected to the rotating shaft. The second sector gear meshes with There is a first sector gear, the first sector gear is connected with the motor shaft of the motor, and the motor is fixed on the base.

[0009]

As a further limitation of this technical solution, a rubber layer is provided in the groove.

[0010]

As a further limitation of this technical solution, the rotating shaft is fixed on the base through a bearing.

[0011]

Compared with the existing technology, the advantages and positive effects of this utility model are: the graduated bottle can accurately control the dosage of various drugs, ensure the accuracy of drug configuration, and ensure the effect of drug use; the fastening sleeve can be adjusted by adjusting the fastening bolts Move on the vertical rod to adjust the positions of the syringe, needle and graduated bottle; the medicine flows into the syringe through the glass tube, and the micro cylinder works to drive the piston push rod to move up and down, quickly pushing the medicine into the dispensing bottle; after the medicine configuration is completed , remove the needle from the dispensing bottle, and the motor works to rotate the rotating table, driving the dispensing bottle to rotate, so that the drugs in the dispensing bottle are evenly dispersed, and the intravenous medication is quickly and accurately configured; the groove on the rotating table is aligned with the dispensing bottle Playing a fixed role, the rubber layer provided in the groove increases the friction between the liquid mixing bottle and the groove, ensuring stability during rotation.

[0012]

Description of the drawings

[0013]

Figure 1 is a schematic diagram of the overall structure of the utility model.

[0014]

Figure 2 is a schematic structural diagram of the fastening sleeve of the present invention.

[0015]

Figure 3 is a schematic structural diagram of the second fastening sleeve of the present invention.

[0016]

In the picture: 1. Graduated bottle, 2. Cup holder, 3. Valve, 4. Glass tube, 5. Piston push rod, 6. Syringe, 7. Second fastening bolt, 8. Collet, 9. Needle, 10. Liquid dispensing bottle, 11. Rotary table, 12. Motor, 13. Motor shaft, 14. First sector gear, 15.

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Bearing, 16. Rotating shaft, 17. Second sector gear, 18. Base, 19. Groove , 19A, rubber layer, 20, vertical rod, 21, connecting rod, 22, first fastening bolt, 23, fastening sleeve, 24, micro cylinder, 25, through hole.

[0017]

Detailed ways

[0018]

A specific embodiment of the present utility model will be described in detail below with reference to the accompanying drawings, but it should be understood that the protection scope of the present utility model is not limited by the specific embodiment.

[0019]

As shown in Figures 1 to 3, the utility model is a pediatric intravenous injection medical dispensing equipment, including a vertical rod 20 and a base 18. A fastening sleeve 23 is provided above the vertical rod 20, and the fastening sleeve 23 passes through the third A fastening bolt 22 is fixed on the vertical rod 20. The fastening sleeve 23 is connected to a cup holder 2. A through hole 25 is provided in the center of the cup holder 2. A graduated bottle 1 is provided on the cup holder 2. A glass tube 4 is connected to the bottom of the graduated bottle 1, and the glass tube 4 passes through the through hole 25. A piston push rod 5 is ringed at the bottom of the glass tube 4, and a micro cylinder is fixed on the bottom surface of the cup holder 2. 24. The piston rod of the micro-cylinder 24 is connected to the upper end of the piston push rod 5. The lower end of the piston push rod 5 is arranged in the syringe 6. The syringe 6 is fixed by a collet 8. The collet 8 One end is provided with a second fastening bolt 7, the other end of the collet 8 is connected to the fastening sleeve 23 through a connecting rod 21, and a needle 9 is connected below the syringe 6, and the needle 9 is inserted into the liquid dispensing In the bottle 10, the liquid preparation bottle 10 is placed in the groove 19 of the rotating table 11. A rotating shaft 16 is connected below the rotating table 11. The rotating shaft 16 is connected to a second sector gear 17. The second sector gear 17 is meshed with a first sector gear 14, and the first sector gear 14 is connected to the motor shaft 13 of the motor 12, and the motor 12 is fixed on the base 18.

[0020]

The groove 19 is provided with a rubber layer 19A.

[0021]

The rotating shaft 16 is fixed on the base 18 through a bearing 15 .

[0022]

The working process of the utility model is: first, adjust the positions of the cup holder 2 and the collet 8 through the first fastening bolt 22 and the fastening sleeve 23, then insert the needle 9 into the liquid dispensing bottle 10, and put the liquid dispensing bottle 10 into the There is a rubber layer 19A in the groove 19 of the rotary table 11. The syringe 6 is fixed through the second fastening bolt 7 and the collet 8. Add the medicine to be configured into the graduated bottle 1, and pass the scale The scale on the bottle 1 accurately ensures the dosage of each medicine. By controlling the valve 3, the medicine flows into the syringe 6 through the glass tube 4. The piston push rod 5 ringed outside the glass tube 4 moves the needle driven by the micro cylinder 24. The medicine in the cylinder 6 is pushed into the liquid preparation bottle 10 through the needle 9, and then the fastening sleeve 22 is adjusted upward to remove the needle 9 from the liquid preparation bottle. The micro cylinder 24 drives the piston push rod 5 to return to the graduated bottle 1. For the next configured medicine, repeat the above process. After the medicine configuration is completed, move the needle 9 out of the dispensing bottle 10 by adjusting the first fastening bolt 22 and the fastening sleeve 23. The motor 12 works, and the motor shaft 13 drives the first The sector gear 14 rotates, and the second sector gear 17 meshing with the first sector gear 14 drives the rotating shaft 16 to rotate around the bearing 15, causing the rotating table 11 to rotate, driving the liquid preparation bottle 10 to rotate, so that the medicine in the liquid preparation bottle 10 is evenly dispersed , achieving rapid and accurate configuration of intravenous medication.

[0023]

Petitioner Therabody Ex-1004, 1813

What is disclosed above is only a specific embodiment of the present utility model. However, the present utility model is not limited thereto. Any changes that those skilled in the art can think of should fall within the protection scope of the present utility model.

Petitioner Therabody Ex-1004, 1814

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CLAIMS CN206381389U

1.

A pediatric intravenous injection medical dispensing equipment, including a vertical rod and a base, characterized in that: a fastening sleeve is provided above the vertical rod, and the fastening sleeve is fixed on the vertical rod through a first fastening bolt. The fastening sleeve is connected to a cup holder, a through hole is provided in the center of the cup holder, a graduated bottle is provided on the cup holder, a glass tube is connected under the graduated bottle, and the glass tube passes through the through hole. The lower part of the glass tube is surrounded by a piston push rod, and a micro cylinder is fixed on the lower surface of the cup holder. The piston rod of the micro cylinder is connected to the upper end of the piston push rod, and the lower end of the piston push rod is arranged in the syringe. , the syringe is fixed by a collet, one end of the collet is provided with a second fastening bolt, the other end of the collet is connected to the fastening sleeve through a connecting rod, and a needle is connected below the syringe, The needle is inserted into the liquid preparation bottle, and the liquid preparation bottle is placed in the groove of the rotating table. A rotating shaft is connected below the rotating table, and a second sector gear is connected to the rotating shaft. The second sector gear meshes with There is a first sector gear, the first sector gear is connected with the motor shaft of the motor, and the motor is fixed on the base.

2.

The pediatric intravenous injection medical dispensing equipment according to claim 1, characterized in that: a rubber layer is provided in the groove.

3.

The pediatric intravenous injection medical dispensing equipment according to claim 1, wherein the rotating shaft is fixed on the base through a bearing.

Petitioner Therabody Ex-1004, 1815

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(12)实用新型专利

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A61J 1/22(2006.01)

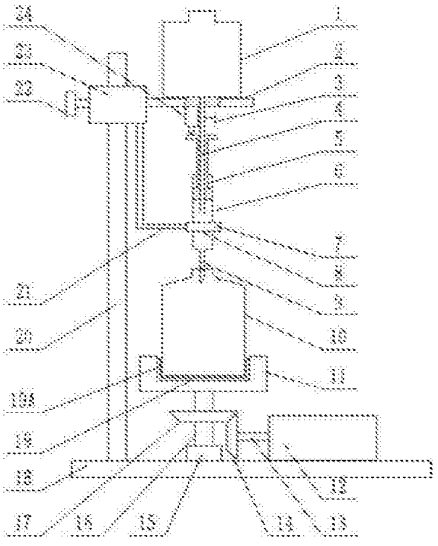
权利要求书1页 说明书2页 附图2页

(54)实用新型名称

一种儿科静脉注射医用配药设备

(57)摘要

本实用新型公开一种儿科静脉注射医用配药设备，包括竖杆和底座，竖杆上方设有紧固套，紧固套连接有杯座，杯座中央设有通孔，杯座上设有刻度瓶，刻度瓶下连接有玻璃管，玻璃管穿过所述通孔，玻璃管下部环套有活塞推杆，杯座下底面固定有微型气缸，微型气缸连接所述活塞推杆的上端，活塞推杆设置在针筒内，针筒通过筒夹固定，筒夹一端设有第二紧固螺栓，筒夹另一端通过连杆连接在所述紧固套上，针头插入到配液瓶中，配液瓶放置在旋转台的凹槽内，旋转台下方连接有转轴，转轴连接有第二扇形齿轮，第二扇形齿轮啮合有第一扇形齿轮，第一扇形齿轮连接有电机的电机轴，本实用新型方便快速准确的给儿科患者进行配药。



CN 206381389 U

Petitioner Therabody Ex-1004, 1816

1.一种儿科静脉注射医用配药设备，包括竖杆和底座，其特征是：所述竖杆上方设有紧固套，所述紧固套通过第一紧固螺栓固定在所述竖杆上，所述紧固套连接有杯座，所述杯座中央设有通孔，所述杯座上设有刻度瓶，所述刻度瓶下连接有玻璃管，所述玻璃管穿过所述通孔，所述玻璃管下部环套有活塞推杆，所述杯座下底面固定有微型气缸，所述微型气缸的活塞杆连接所述活塞推杆的上端，所述活塞推杆下端设置在针筒内，所述针筒通过筒夹固定，所述筒夹一端设有第二紧固螺栓，所述筒夹另一端通过连杆连接在所述紧固套上，所述针筒下方连接有针头，所述针头插入到配液瓶中，所述配液瓶放置在旋转台的凹槽内，所述旋转台下方连接有转轴，所述转轴连接有第二扇形齿轮，所述第二扇形齿轮啮合有第一扇形齿轮，所述第一扇形齿轮连接有电机的电机轴，所述电机固定在所述底座上。

2.根据权利要求1所述的儿科静脉注射医用配药设备，其特征是：所述凹槽内设有橡胶层。

3.根据权利要求1所述的儿科静脉注射医用配药设备，其特征是：所述转轴通过轴承固定在所述底座上。

Petitioner Therabody Ex-1004, 1817

一种儿科静脉注射医用配药设备

技术领域

[0001] 本实用新型涉及医疗设备领域，具体地讲，涉及一种儿科静脉注射医用配药设备。

背景技术

[0002] 静脉输液是临床广泛采用的治疗用药方法，据多方面资料统计，我国医院住院患者的90％，医院门诊患者的40％，社区诊所患者的70％，都采用了静脉输液，可见应用之广泛。而医护人员在给儿科患者进行静脉用药配置时，配置的种类不一，各种药品的量容易出现误差，耗费时间，容易耽误患者用药，影响儿科患者的病情。

实用新型内容

[0003] 本实用新型要解决的技术问题是提供一种儿科静脉注射医用配药设备，方便快速准确的给儿科患者进行配药。

[0004] 本实用新型采用如下技术方案实现发明目的：

[0005] 一种儿科静脉注射医用配药设备，包括竖杆和底座，其特征是：所述竖杆上方设有紧固套，所述紧固套通过第一紧固螺栓固定在所述竖杆上，所述紧固套连接有杯座，所述杯座中央设有通孔，所述杯座上设有刻度瓶，所述刻度瓶下连接有玻璃管，所述玻璃管穿过所述通孔，所述玻璃管下部环套有活塞推杆，所述杯座下底面固定有微型气缸，所述微型气缸的活塞杆连接所述活塞推杆的上端，所述活塞推杆下端设置在针筒内，所述针筒通过筒夹固定，所述筒夹一端设有第二紧固螺栓，所述筒夹另一端通过连杆连接在所述紧固套上，所述针筒下方连接有针头，所述针头插入到配液瓶中，所述配液瓶放置在旋转台的凹槽内，所述旋转台下方连接有转轴，所述转轴连接有第二扇形齿轮，所述第二扇形齿轮啮合有第一扇形齿轮，所述第一扇形齿轮连接有电机的电机轴，所述电机固定在所述底座上。

[0006] 作为本技术方案的进一步限定，所述凹槽内设有橡胶层。

[0007] 作为本技术方案的进一步限定，所述转轴通过轴承固定在所述底座上。

[0008] 现有技术相比，本实用新型的优点和积极效果是：刻度瓶可以准确控制各种不同药品的用量，保证药品配置的准确性，保证用药的效果；通过调整紧固螺栓可以使紧固套在竖杆上移动，调整针筒、针头和刻度瓶的位置；药品经玻璃管流入针筒，微型气缸工作，带动活塞推杆上下运动，快速将药品推入配液瓶内；药品配置完成后，将针头从配液瓶移出，电机工作，使旋转台转动，带动配液瓶转动，使配液瓶内的药品均匀分散，实现快速准确配置静脉用药；旋转台上的凹槽对配液瓶起到固定的作用，凹槽内设置的橡胶层增大了配液瓶与凹槽的摩擦力，保证了在旋转过程中的稳定。

附图说明

[0009] 图1为本实用新型的整体结构示意图。

[0010] 图2为本实用新型的紧固套部位的结构示意图。

[0011] 图3为本实用新型的第二紧固套部位的结构示意图。

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[0012] 图中：1、刻度瓶，2、杯座，3、阀门，4、玻璃管，5、活塞推杆，6、针筒，7、第二紧固螺栓，8、筒夹，9、针头，10、配液瓶，11、旋转台，12、电机，13、电机轴，14、第一扇形齿轮，15、轴承，16、转轴，17、第二扇形齿轮，18、底座，19、凹槽，19A、橡胶层，20、竖杆，21、连杆，22、第一紧固螺栓，23、紧固套，24、微型气缸，25、通孔。

具体实施方式

[0013] 下面结合附图，对本实用新型的一个具体实施方式进行详细描述，但应当理解本实用新型的保护范围并不受具体实施方式的限制。

[0014] 如图1-图3所示，本实用新型一种儿科静脉注射医用配药设备，包括竖杆20和底座18，所述竖杆20上方设有紧固套23，所述紧固套23通过第一紧固螺栓22固定在所述竖杆20上，所述紧固套23连接有杯座2，所述杯座2中央设有通孔25，所述杯座2上设有刻度瓶1，所述刻度瓶1下连接有玻璃管4，所述玻璃管4穿过所述通孔25，所述玻璃管4下部环套有活塞推杆5，所述杯座2下底面固定有微型气缸24，所述微型气缸24的活塞杆连接所述活塞推杆5的上端，所述活塞推杆5下端设置在针筒6内，所述针筒6通过筒夹8固定，所述筒夹8一端设有第二紧固螺栓7，所述筒夹8另一端通过连杆21连接在所述紧固套23上，所述针筒6下方连接有针头9，所述针头9插入到配液瓶10中，所述配液瓶10放置在旋转台11的凹槽19内，所述旋转台11下方连接有转轴16，所述转轴16连接有第二扇形齿轮17，所述第二扇形齿轮17啮合有第一扇形齿轮14，所述第一扇形齿轮14连接有电机12的电机轴13，所述电机12固定在所述底座18上。

[0015] 所述凹槽19内设有橡胶层19A。

[0016] 所述转轴16通过轴承15固定在所述底座18上。

[0017] 本实用新型的工作流程为：首先，通过第一紧固螺栓22和紧固套23调整杯座2和筒夹8的位置，然后将针头9插入配液瓶10内，配液瓶10放到旋转台11的凹槽19中，凹槽19中设有橡胶层19A，通过第二紧固螺栓7和筒夹8将针筒6固定好，将需要配置的药品加入刻度瓶1中，通过刻度瓶1上的刻度准确保证每种药品的用量，通过控制阀门3，使药品经玻璃管4流入针筒6，环套在玻璃管4外的活塞推杆5在微型气缸24的带动下将针筒6内的药品通过针头9推入配液瓶10内，然后向上调整紧固套22将针头9从配液瓶中移出，微型气缸24带动活塞推杆5回位，向刻度瓶1内加入下一种配置的药品，重复上述流程，待药品配置完成后，通过调整第一紧固螺栓22和紧固套23将针头9从配液瓶10移出，电机12工作，电机轴13带动第一扇形齿轮14转动，与第一扇形齿轮14啮合的第二扇形齿轮17带动转轴16绕着轴承15转动，使旋转台11转动，带动配液瓶10转动，使配液瓶10内的药品均匀分散，实现快速准确配置静脉用药。

[0018] 以上公开的仅为本实用新型的一个具体实施例，但是，本实用新型并非局限于此，任何本领域的技术人员能思之的变化都应落入本实用新型的保护范围。

Petitioner Therabody Ex-1004, 1819

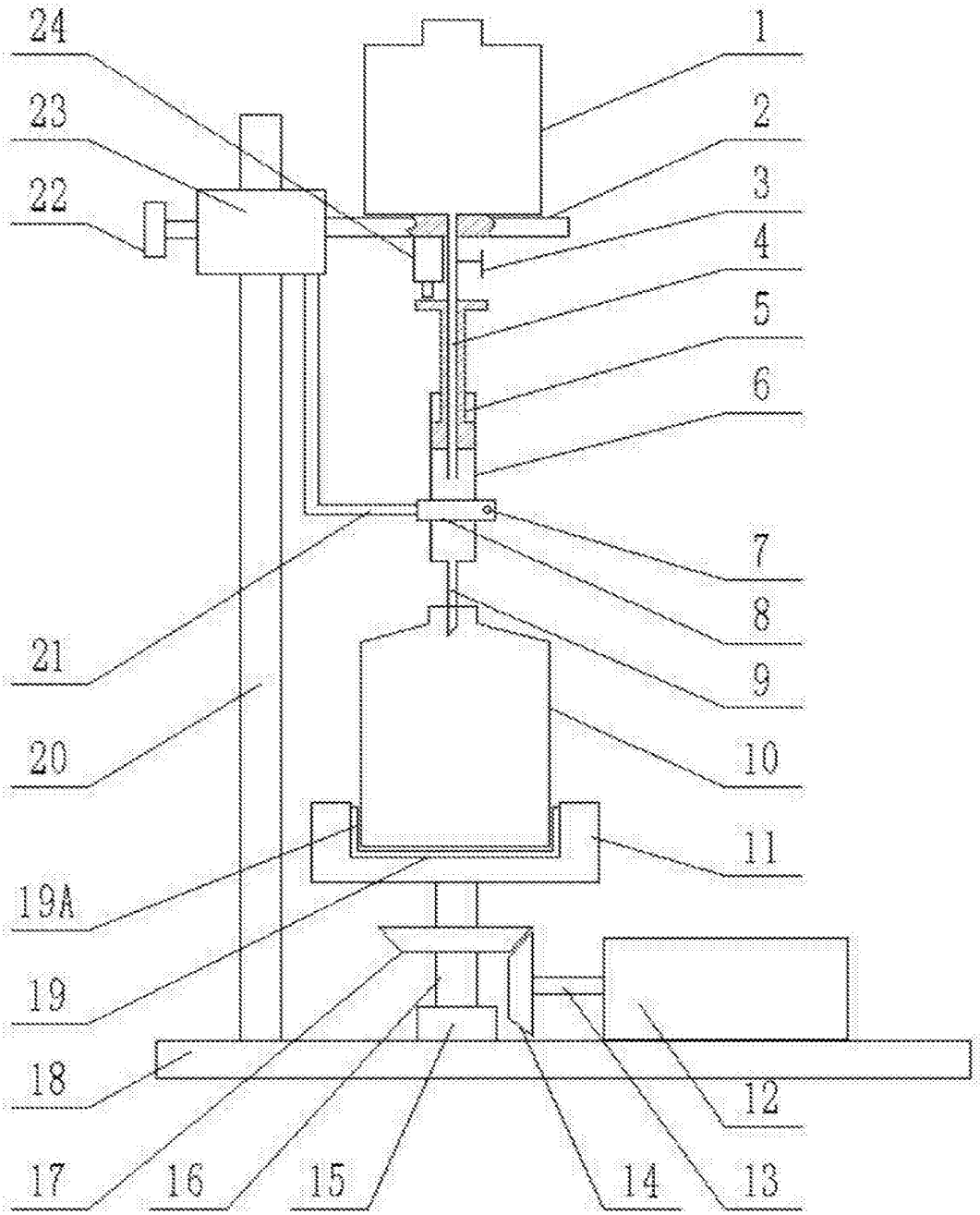

图1

Petitioner Therabody Ex-1004, 1820

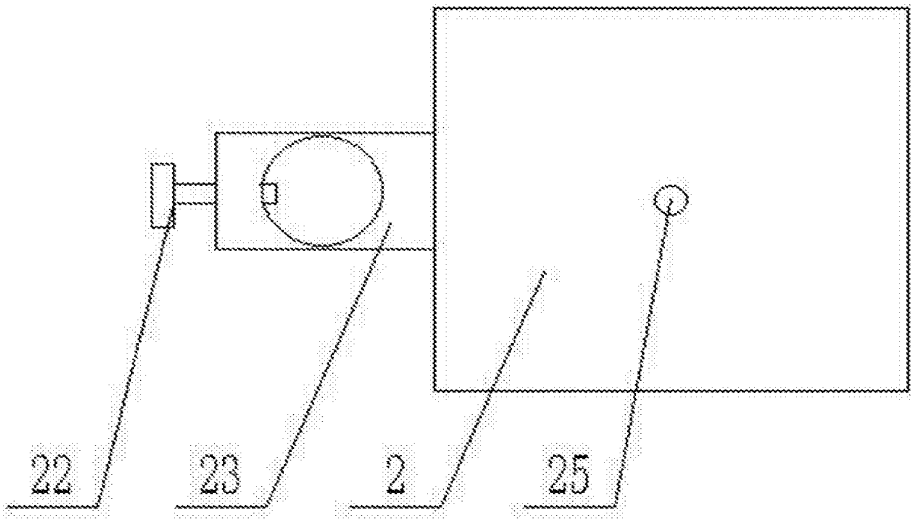

图2

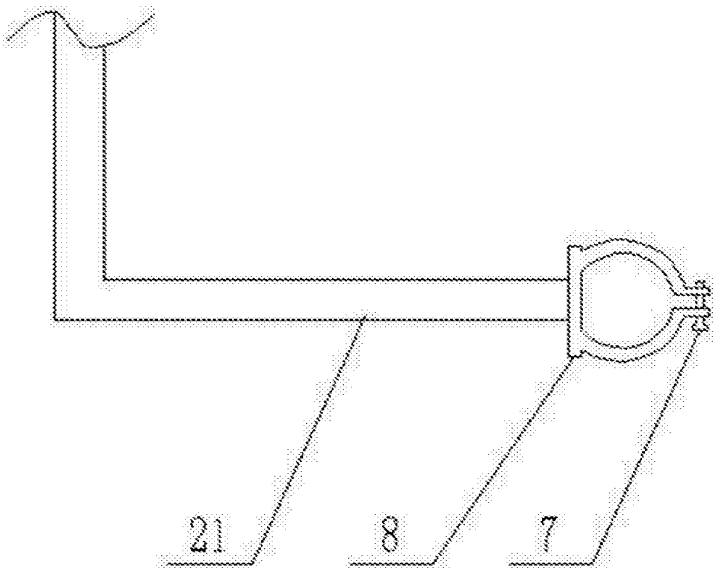

图3

Petitioner Therabody Ex-1004, 1821

Espacenet

Bibliographic data: CA188553 (A) — 1919-02-04

INVOICE RETAINER

Inventor(s): HOAG DAVID EDGAR [CA] +
(HOAG, DAVID EDGAR)

Applicant(s): HOAG DAVID EDGAR [CA] +
(HOAG, DAVID EDGAR)

Classification: **- international:**
- cooperative:

Application number: CAD188553 19180920

Priority number (s): CAT188553 19180920

Abstract not available for CA188553 (A)

Petitioner Therabody Ex-1004, 1822

(19) Office de la propriété intellectuelle du Canada
Un organisme d'Industrie Canada
Canadian Intellectual Property Office
An Agency of Industry Canada

(11) Publication number: **CA 188553**
(13) Document type: **A**
(43) Publication date: **04.02.1919**
(51) Int. Cl:

(12)

(21) Application number: **188553D**
(22) Date of filing: **20.09.1918**
(30) Priority:

(71) Applicant: **HOAG DAVID EDGAR (CA)**
(72) Inventor: **HOAG DAVID EDGAR (CA)**

(54) **INVOICE RETAINER**
(54) **PORTE-FACTURE**

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provided with slits 4 and 5 forming side flaps 6 and 7 and a supplemental flap 8. When the flaps 6 and 7 are folded inwardly in the manner shown in Fig. 2 the label assumes a generally I-shape form.

The flaps 6, 7 and 8 are provided on their inner faces with mucilage or other adhesive material to enable of the label being attached to the parcel.

8 indicates a pocket which is secured to the under face of the label and into which the invoice is inserted.

When the parcel is done up in the shipping room the label is attached to the parcel by means of the flap 8, the flaps 6 and 7 being rolled inwardly as shown in Fig. 2 indicating that the invoice has not been inserted. The parcel is then sent from the shipping room to the office and the invoice inserted, the flaps 6 and 7 being then folded outwardly and fixed to the face of the parcel together with the end portion 10 thereby closing the retainer and holding the invoice securely between the label. By this means it will be readily seen that there is absolutely no danger of the invoice being lost or of it being torn from the parcel during transmission.

The common practice now is to secure the invoice by string or other suitable means to the parcel and it is often torn off and lost. By this means the invoice is absolutely held and cannot be tampered with in any way without disfiguring the label until the parcel reaches its destination.

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W H A T I C L A I M I S :

1. An invoice container comprising a label adapted to be secured around its edges to the parcel, and a pocket secured to the central portion of the inner face of the label.

2. An invoice container comprising a label provided in proximity to one end with a pair of cross slits extending inwardly in opposite directions thereby forming side flaps and an end flap adapted to be secured to the face of the package, and a pocket secured to the central portion of the inner face of the label between the flaps.

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188553

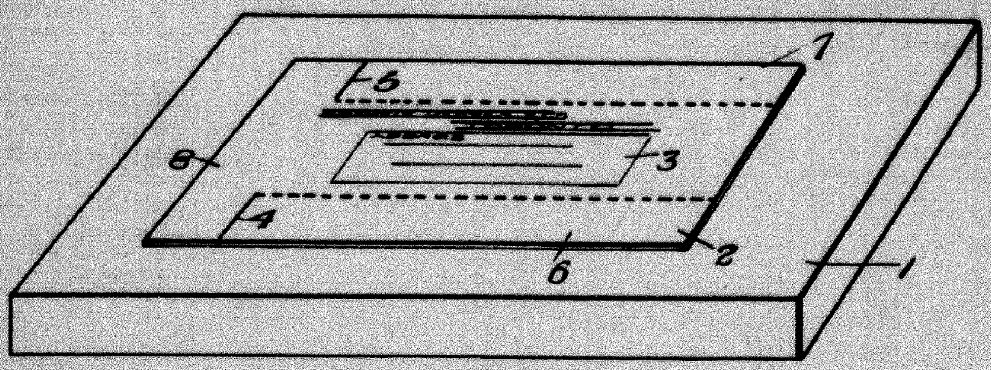

Fig. 1.

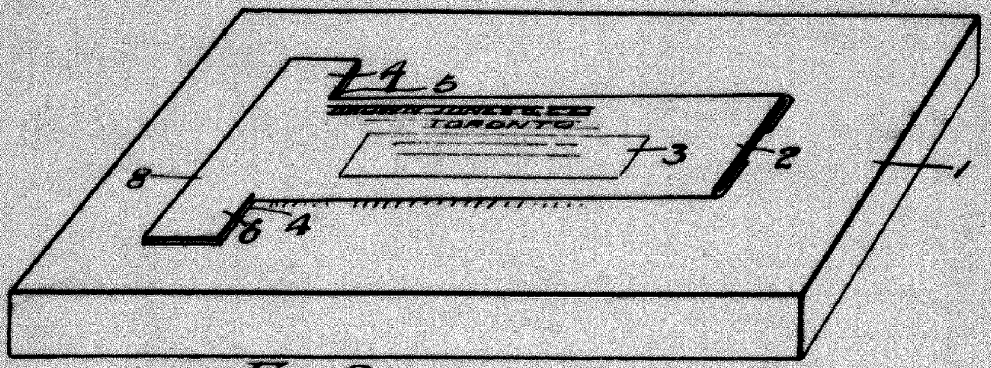

Fig. 2

Fig. 3.

Witnesses.
H. H. Glass
M. Egan

Certified to be the Drawings referred to in the specifications hereunto annexed.
TORONTO Aug 29 1918

Inventor.
D. E. HOAG
By Fetherstonhaugh & Co.
Attorneys.

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Espacenet

Bibliographic data: TWD202371 (S) — 2020-01-21

肌肉按摩棒（一）

Inventor(s): HU DASHUAI ± (HU, DASHUAI)

Applicant(s): 大陸商東莞市西芹電器有限&#0x5 [CN]; DONGGUAN XIQIN ELECTRICAL APPLIANCE CO LTD [CN] ± (大陸商東莞市西芹電器有限公司, ; DONGGUAN XIQIN ELECTRICAL APPLIANCE CO., LTD)

Classification: **- international:**
- cooperative:

Application number: TW20190302323F 20190419

Priority number (s): CN201830588878F 20181022

Also published as: JP1641231 (S) USD895829 (S)

Abstract of TWD202371 (S)

【物品用途】;本設計物品，係一肌肉按摩棒的外觀設計。;【設計說明】;如使用狀態參考圖，前端設置按摩頭，於底部向下設具成為握把供人手握持，該握把內部設有一馬達，驅動按摩頭做前後運動，達成對人體各個部位進行震動按摩，其整體外觀呈現簡明之立體美感。

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D202371

(19)中華民國智慧財產局

(12)設計說明書公告本 **(11)證書號數：TW D202371 S**

(45)公告日： 中華民國 109 (2020) 年 01 月 21 日

(21)申請案號：108302323 (22)申請日： 中華民國 108 (2019) 年 04 月 19 日

(51)LOC.(11)Cl.：28-03

(30)優先權：2018/10/22 中國大陸 201830588878.0

(71)申請人：大陸商東莞市西芹電器有限公司 (中國大陸) DONGGUAN XIQIN ELECTRICAL APPLIANCE CO., LTD. (CN)
中國大陸

(72)設計人：胡大帥 HU, DASHUAI (CN)

(74)代理人：林弘明

(56)參考文獻：

JP D1469617 JP D1469618

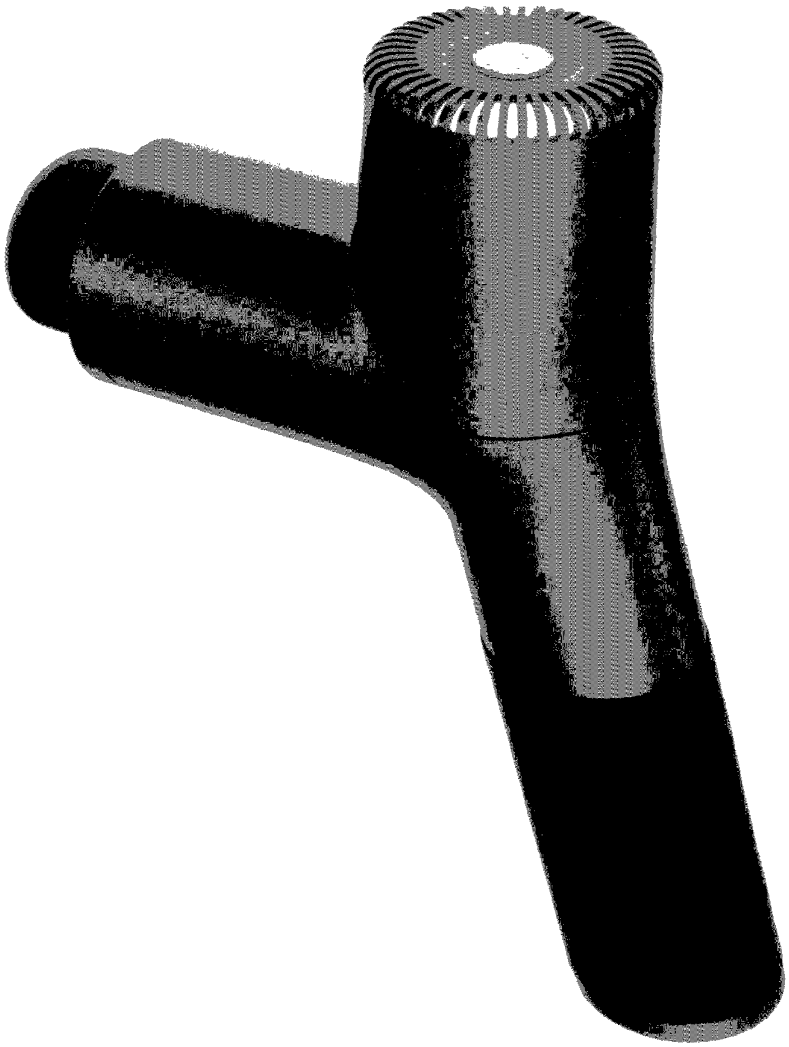
審查人員：陳慧媛

圖式數：11 共 12 頁

(54)名稱

肌肉按摩棒（一）

代表圖：



立體圖(代表圖)

D202371

設計專利說明書 公告本

（本說明書格式、順序，請勿任意更動，※記號部分請勿填寫）

【設計名稱】（中文/英文）

肌肉按摩棒(一)

【物品用途】

【0001】 本設計物品，係一肌肉按摩棒的外觀設計。

【設計說明】

【0002】 如使用狀態參考圖，前端設置按摩頭，於底部向下設具成為握把供人手握持，該握把內部設有一馬達，驅動按摩頭做前後運動，達成對人體各個部位進行震動按摩，其整體外觀呈現簡明之立體美感。

Petitioner Therabody Ex-1004, 1831

Espacenet

Bibliographic data: WO2020227225 (A1)

— 2020-11-12

PORTABLE PERCUSSIVE MASSAGE DEVICE

Inventor(s): WERSLAND JASON [US]; NAZARIAN BENJAMIN [US]; SOLANA JAIME [US]; MERINO EDUARDO [US] ± (WERSLAND, Jason, ; NAZARIAN, Benjamin, ; SOLANA, Jaime, ; MERINO, Eduardo)

Applicant(s): THERAGUN INC [US] ± (THERAGUN, INC)

Classification: - international: ***A61B17/34; A61H23/00; A61M25/04; A61M25/10; A61M29/02; A61M3/02***

- cooperative: **A61H1/00 (EP); A61H23/006 (EP); A61H23/0254 (EP);** A61H2201/0153 (EP); A61H2201/0157 (EP); A61H2201/1215 (EP); A61H2201/149 (EP); A61H2201/1685 (EP); A61H2201/5025 (EP)

Application number: WO2020US31339 20200504
Global Dossier

Priority number(s): US201929708815F 20191009 ; US201962844424P 20190507 ; US201962899098P 20190911 ; US202016824328 20200319

Abstract of WO2020227225 (A1)

A percussive massage device that includes a housing that defines a housing interior, a battery, a motor positioned in the housing, a switch for activating the motor, and a reciprocating shaft operatively connected

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to the motor and configured to reciprocate in response to activation of the motor. The reciprocating shaft includes a distal end that defines a reciprocation axis. The housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis. The motor is positioned in the first side portion and the battery is positioned in the second side portion.

Petitioner Therabody Ex-1004, 1833

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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62/844,424	07 May 2019 (07.05.2019)	US
62/899,098	11 September 2019 (11.09.2019)	US
29/708,815	09 October 2019 (09.10.2019)	US
16/824,328	19 March 2020 (19.03.2020)	US

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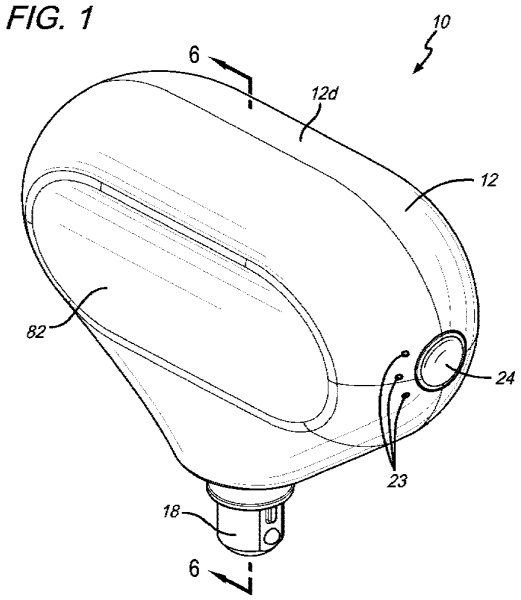
(72) Inventors: **WERSLAND, Jason**; 9420 Wilshire Blvd., Fourth Floor, Beverly Hills, CA 90212 (US). **NAZARIAN, Benjamin**; 9420 Wilshire Blvd., Fourth Floor, Beverly Hills, CA 90212 (US). **SOLANA, Jaime, Sanchez**; 9420 Wilshire Blvd., Fourht Floor, Beverly Hills, CA 90212 (US). **MERINO, Eduardo**; 9420 Wilshire Blvd., Fourth Floor, Beverly Hills, CA 90212 (US).

(74) Agent: **SWAIN, Brennan, C.** et al.; Jeffer Mangels Butler & Mitchell LLP, 1900 Avenue of the Stars, 7th Floor, Los Angeles, CA 90067 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

(54) Title: PORTABLE PERCUSSIVE MASSAGE DEVICE



(57) Abstract: A percussive massage device that includes a housing that defines a housing interior, a battery, a motor positioned in the housing, a switch for activating the motor, and a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor. The reciprocating shaft includes a distal end that defines a reciprocation axis. The housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis. The motor is positioned in the first side portion and the battery is positioned in the second side portion.

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[Continued on next page]

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TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

Petitioner Therabody Ex-1004, 1835

PORTABLE PERCUSSIVE MASSAGE DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. Patent Application No. 29/708,815, filed October 9, 2019 and also claims priority to U.S. Provisional Patent Application No. 62/899,098, filed September 11, 2019, and U.S. Provisional Patent Application No. 62/844,424, filed May 7, 2019, the entireties of which are incorporated by reference herein.

FIELD OF THE INVENTION

[0002] The present invention relates generally to a percussive massage device, and more particularly to a portable percussive massage device.

BACKGROUND OF THE INVENTION

[0003] Percussive massage devices have become increasingly popular in recent years. However, they often can be bulky and difficult to transport in a gym bag or the like.

SUMMARY OF THE PREFERRED EMBODIMENTS

[0004] In accordance with a first aspect of the present invention there is provided a percussive massage device that includes a housing that defines a housing interior, a battery, a motor positioned in the housing, a switch for activating the motor, and a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor. In a preferred embodiment, the reciprocating shaft includes a distal end that defines a reciprocation axis. The housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis. The motor is positioned in the first side portion and the battery is positioned in the second side portion. Preferably, the first side portion and second side portion are generally symmetrical. In a preferred embodiment, the housing defines a housing axis, and the reciprocation axis and the housing axis are co-axial. In a preferred

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embodiment, the motor includes a rotatable motor shaft that defines a motor axis that is perpendicular to the reciprocation axis and extends through the battery.

[0005] In a preferred embodiment, the percussive massage device includes a motor mount bracket that includes a middle member having first and second opposite sides. The motor is positioned on the first side of the middle member and the reciprocating shaft is positioned on the second side of the middle member. Preferably, the middle member includes a shaft opening defined therein and the motors rotatable motor shaft extends from the first side of the middle member, through the shaft opening and to the second side of the middle member. The reciprocating shaft is operatively connected to the motor shaft. In a preferred embodiment, the housing includes first and second housing halves. The motor mount bracket is secured to both of the first and second housing halves. Preferably, the motor mount bracket is secured to the first housing half via an interference fit and to the second housing half via threaded fasteners. In a preferred embodiment, the interference fit includes one of a tubular member and a securing post disposed on the housing and the other of the tubular member and the securing post disposed on the motor mount bracket, and the securing post is received in the tubular member.

[0006] In a preferred embodiment, the percussive massage device also includes a bush assembly through which the reciprocating shaft reciprocates. The bush assembly includes first and second dampening halves on opposite sides thereof that are positioned between the bush assembly and the housing. Preferably, the first and second dampening halves include securing protrusions extending outwardly therefrom that are received in securing opening defined in the housing.

[0007] In accordance with another aspect of the present invention there is provided a percussive massage device that includes a housing that defines a housing interior and a housing axis, a battery, a motor positioned in the housing, a switch for activating the

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motor, and a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor. The motor includes a rotatable motor shaft that defines a motor axis that is perpendicular to the reciprocation axis and extends through the battery. The reciprocating shaft includes a distal end that defines a reciprocation axis. The housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis. The motor is positioned in the first side portion and the battery is positioned in the second side portion. The first side portion and second side portion are generally symmetrical and the reciprocation axis and the housing axis are co-axial.

[0008] In accordance with another aspect of the present invention there is provided a method of using a percussive massage device that includes a housing that defines a housing interior, a battery, a motor positioned in the housing, a switch for activating the motor, and a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor. The reciprocating shaft includes a distal end that defines a reciprocation axis. The method includes grasping the housing with a first hand having a palm, positioning the first hand such that the reciprocation axis extends through the palm, and massaging a first body part with a massage attachment removably connected to the distal end of the reciprocating shaft.

[0009] In a preferred embodiment, the housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis and the motor is positioned in the first side portion and the battery is positioned in the second side portion.

[0010] In a preferred embodiment, the present invention is a percussive massage device that is more compact than many others taught in the prior art. In a preferred embodiment, the device includes a brushless motor that includes the necessary torque in a relatively small

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space. In a preferred embodiment, the device is shaped to ergonomically fit into a user's palm and the structure of the device is such that when the device is held in a user's hand, the user is placing generally linear force from their palm through the housing and to the massage member. Preferably, the outer housing tapers from the top toward the opening through which the reciprocal shaft extends.

[0011] In a preferred embodiment, the device includes a motor mount that includes threaded fasteners that connect to one side of the housing. The device includes a bush through which the shaft runs and a bush holder in which the bush resides. In a preferred embodiment, the device is small enough to fit in a ski jacket or a purse. Due to the symmetrical nature of the device, the weight distribution and compactness makes the device easy to use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a perspective view of a portable percussive massage device in accordance with a preferred embodiment of the present invention;

[0013] FIG. 2 is a front elevational view of the percussive massage device with one housing half removed;

[0014] FIG. 3 is an exploded perspective view of the percussive massage device;

[0015] FIG. 4 is an exploded perspective view of the percussive massage device from the opposite side of FIG. 3;

[0016] FIG. 5 is an exploded perspective view of a percussive massage device with a unitary motor mount bracket and bush holding structure;

[0017] FIG. 6 is a cross-sectional side elevation taken along line 6--6 of FIG. 1;

[0018] FIG. 7 is a side elevational view of the percussive massage device being grasped by a user; and

[0019] FIG. 8 is a rear elevational view of the percussive massage device being grasped by a user.

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[0020]

[0021]

[0022]

[0023] Like numerals refer to like parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] The following description and drawings are illustrative and are not to be construed as limiting. Numerous specific details are described to provide a thorough understanding of the disclosure. However, in certain instances, well-known or conventional details are not described in order to avoid obscuring the description. References to one or an embodiment in the present disclosure can be, but not necessarily are references to the same embodiment; and, such references mean at least one of the embodiments.

[0025] Reference in this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the-disclosure. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Moreover, various features are described which may be exhibited by some embodiments and not by others. Similarly, various requirements are described which may be requirements for some embodiments but not other embodiments.

[0026] The terms used in this specification generally have their ordinary meanings in the art, within the context of the disclosure, and in the specific context where each term is used. Certain terms that are used to describe the disclosure are discussed below, or elsewhere in the specification, to provide additional guidance to the practitioner regarding the description of the disclosure. For convenience, certain terms may be highlighted, for

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example using italics and/or quotation marks: The use of highlighting has no influence on the scope and meaning of a term; the scope and meaning of a term is the same, in the same context, whether or not it is highlighted.

[0027] It will be appreciated that the same thing can be said in more than one way. Consequently, alternative language and synonyms may be used for any one or more of the terms discussed herein. No special significance is to be placed upon whether or not a term is elaborated or discussed herein. Synonyms for certain terms are provided. A recital of one or more synonyms does not exclude the use of other synonyms. The use of examples anywhere in this specification including examples of any terms discussed herein is illustrative only, and is not intended to further limit the scope and meaning of the disclosure or of any exemplified term. Likewise, the disclosure is not limited to various embodiments given in this specification.

[0028] Without intent to further limit the scope of the disclosure, examples of instruments, apparatus, methods and their related results according to the embodiments of the present disclosure are given below. Note that titles or subtitles may be used in the examples for convenience of a reader, which in no way should limit the scope of the disclosure. Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure pertains. In the case of conflict, the present document, including definitions, will control.

[0029] It will be appreciated that terms such as "front," "back," “top,” “bottom,” "side," "short," "long," "up," "down," "aft," "forward," "inboard," "outboard" and "below" used herein are merely for ease of description and refer to the orientation of the components as shown in the figures. It should be understood that any orientation of the components described herein is within the scope of the present invention.

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[0030] Referring now to the drawings, wherein the showings are for purposes of illustrating the present invention and not for purposes of limiting the same, FIGS. 1-___ show embodiments of a portable percussive massage device 10 in accordance with a preferred embodiment of the present invention.

[0031] As shown in FIGS. 1-2, in a preferred embodiment, the percussive massage device 10 generally includes a housing 12 that defines a housing interior 14, a reciprocating shaft 16 and an attachment member 18 (secured on the distal end 16a of the reciprocating shaft 16) for securing a massage member or attachment thereto. In a preferred embodiment, the device includes one of the attachment members 18 disclosed in U.S. Patent No. 10,557,490 (the '490 patent), the entirety of which is incorporated herein by reference. The attachment member 18 is used to attach a treatment member or massage attachment 19 (see FIG. 8). The male attachment member 18 shown in the drawings is similar to the embodiment shown in FIGS. 11-13 in the '490 patent. However, the embodiments shown in any of FIGS. 1-10 in the '490 patent or any other system for connecting a massage attachment to a percussive massage device can also be used. For example, in another embodiment, the reciprocating shaft 16 can include a female attachment member that mates with a male attachment member on the massage attachment 19.

[0032] As shown in FIG. 2, the device 10 also includes a battery or batteries 20 (or other electrical source, such as an AC plug), a motor 22 positioned in the housing, and a switch 24 for activating the motor. In a preferred embodiment, the motor 22 is a brushless direct current (BLDC) motor. The motor 22 and is configured to vary the speed (i.e., rotational motion) that may be converted to reciprocal motion, as described below. In other embodiments, the motor is a brushed DC motor, a brushed AC motor, or a brushless AC motor. One of ordinary skill in the art would understand that choosing a brushless or brushed motor, or direct current or alternating current, may vary depending on the

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application and intended size, battery power, and use. The battery 20 is positioned in a battery recess 20a defined in the housing 12 and is electrically connected or communicated with the PCB 21, which controls the operation of the device 10. In a preferred embodiment, the switch 24 is a push button whose operation is controlled to turn the device on and off, change speeds, change modes, etc. The housing 12 can also include lights 23 that show status, such as on/off or which speed or mode the device is set to. A long push of the button 24 can turn the device on or off and short pushes of the button 24 can changes speeds or modes. The PCB 21 and associated controller are communicated with the motor 22. It will be appreciated that wiring is not shown in the drawings.

[0033] As shown in FIGS. 2-4, in a preferred embodiment, the percussive massage device 10 includes a motor mount bracket 26 positioned in the housing interior 14. Preferably, the motor mount bracket 26 includes a middle member 28 having first and second opposite sides 28a and 28b. The motor 22 is positioned on the first side 28a and the reciprocating shaft 16 is positioned on the second side 28b of the middle member 28. The middle member 28 includes a shaft opening 30 defined therein. The motor 22 includes a rotatable motor shaft 32 extending therefrom that extends from the first side 28a of the middle member 28, through the shaft opening 30 and to the second side 28b of the middle member 28. Preferably, the motor 22 is secured to the motor mount bracket 26 via threaded fasteners. However, other attachments, such as welding, gluing, rivets, bolts and the like are within the scope of the present invention.

[0034] In a preferred embodiment, the motor mount bracket 26 includes flanges 44 extending from the middle member 28. The flanges 44 partially define a motor space 46 where at least a portion of the motor 22 is housed. The middle member 28 also includes a plurality of feet 48 extending therefrom that include tubular members 49 and securing openings 50 defined therein. Dampening rings 51 and dampening washers are also

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included. All dampening components herein are made of rubber, silicone or the like and are provided to prevent plastic to plastic or plastic to metal contact and to reduce noise and vibration.

[0035] As shown in FIGS. 3-4, dampening rings 51 are received in tubular members 49 on a first side of feet 48 and dampening washers 52 are positioned on the second side of the feet 58. Threaded fasteners 53 or the like extend through the dampening rings 51, tubular members 49, securing openings 50, dampening washers 52 and are received in threaded female securing members 58 on the inner surface of the second housing half 12b to secure the motor mount bracket 26 within the housing interior 14. Securing posts 55 (see FIG. 3) are received in the tubular members 49 and extend into tubular rings 51 to secure the motor mount 26 to the first housing half 12a. The securing posts 55 provide an interference fit with the tubular members 49 to secure the motor mount bracket 26 to the first housing half 12a. In a preferred embodiment, the securing posts 55 are tapered from the top or free end thereof (or include tapered flanges) to provide the interference fit with the tubular members. A dampening member 57 is positioned between the motor mount 26 and the second housing half 12b to prevent direct contact of the motor mount 26 against the second housing half 12b.

[0036] In a preferred embodiment, the rotation of the motor shaft 32 is converted to reciprocating motion of the reciprocating shaft 16 via a linkage assembly (or push rod assembly) 34 that includes a push rod 36 that is pivotably connected to the reciprocating shaft 16 (see pivot pin 37) and an offset member 38 that includes a counterweight 40. An offset shaft 42 extending from the offset member 38 is operatively connected (e.g., pivotably connected) to the push rod 36. It will be appreciated that the axis of the offset shaft 42 is offset from the axis of rotation of the motor shaft 32. In a preferred embodiment, the push rod 36 (or at least a majority thereof), offset member 38 and

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counterweight 40 are all positioned on the first side 14a of the housing interior 14 (i.e., on the same side of the housing interior as the motor.

[0037] As shown in FIGS. 3-4, the reciprocating shaft 16 extends through and reciprocates within a bush assembly 60, that generally includes a bush 62, dampening bush cover 64, washer 73 and bush holding structure 66. Bush 62 is received in the central opening 64a of dampening bush cover 64, which is received in the central opening 66a of bush holding structure 66. The reciprocating shaft 16 extends through the central opening of bush 64. Dampening screw guides 70 and dampening halves 72 (which preferably have a curved shape) help damp the reciprocation of the reciprocating shaft 60 through the bush assembly 60. To connect the bush assembly 60 to the housing 12, threaded fasteners are extended through openings in the dampening screw guides, through openings in wings 68 extending from the bush holding structure 66 and into female securing members 71 (see FIG. 4). Dampening halves 72 are positioned between the bush assembly 60 and the housing halves 12a and 12b. Securing protrusions 74 extending from the dampening halves 72 extend into securing openings 76 defined in the housing halves 12a and 12b.

[0038] FIG. 5 shows another embodiment, where the motor mount 26 and bush holding structure 66 are part of a unitary mounting structure 80. The remaining components are the same or similar to the embodiment discussed herein where the motor mount 26 and bush holding structure 66 are separate pieces.

[0039] As shown in FIGS. 2 and 6, in a preferred embodiment, the reciprocating shaft 16 includes a distal end that defines a reciprocation axis A1. The housing defines a housing axis A2. In a preferred embodiment, the reciprocation axis A1 and the housing axis A2 are co-axial. As shown in FIG. 2, the housing 12 includes a first side portion 25 and a second side portion 27 that cooperate to define the housing interior 14 and are defined on opposite sides of the reciprocation axis A1. Preferably, the motor 22 is positioned in the first side

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portion 25 and the battery 20 is positioned in the second side portion 27. Preferably, the motor and entire drive train, prior to the reciprocating shaft 16 (with respect to the drive train), is positioned in the first side portion 25 (i.e., on the first side of the reciprocation axis A1) and the battery 20, PCB 21 and associated electronic components (other than all wires) and the switch 24 are all located in the second side portion 27 (i.e., on the second side of the reciprocation axis A1). As shown in FIG. 2, the motor shaft 32 defines a motor axis A3. In a preferred embodiment, the motor axis A3 is perpendicular to the reciprocation axis A1 and extends through the battery 20. The motor axis A3 can also be co-axial with the switch 24.

[0040] In use, a user grasps the device by placing their hand, and, in particular, their palm against the top 12d of the housing (as shown in FIGS. 7 and 8) at a position wherein the reciprocation axis A1 extends through their palm. This allows the user to provide a push force in line with the reciprocation axis A1. The user can then use the device to massage one or more body parts with the removably attached massage attachment and to change attachments as desired. The device can be gripped differently if desired. It will be appreciated that the device can be paired

[0041] As shown in FIGS. 7 and 8, the device 500 is preferably shaped to ergonomically fit into a user's palm. Preferably, the outer surface 12c of the housing 12 tapers (front, back, left side and right side) from the top toward the opening 84 through which the reciprocal shaft 16 extends. In another embodiment, the reciprocal shaft 16 may be completely retained within the housing 12 and does not extend through opening 84. In this embodiment, the reciprocal shaft 16 includes a female attachment member on the distal end thereof and the massage attachment 19 includes a male attachment member that extends through opening 84 and mates with the reciprocal shaft 16.

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[0042] In a preferred embodiment, the housing 12 includes finger recesses 82 on opposite sides where a user can place their fingers on one side and thumb on the other side, as shown in FIGS. 7 and 8. In a preferred embodiment, the percussive massage device 10 and housing 12 are generally symmetrical both left and right (as shown in FIG. 2 and 8) and front and back (as shown in FIG. 6 and 7). As shown in FIG. 2, due to the button 24 and the opening 24a therefor and the charging port 83, the device is not completely symmetrical left to right. This meets the definition of "generally symmetrical." Similar openings and additions fall within the definition of generally symmetrical.

[0043] Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense, as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to." As used herein, the terms "connected," "coupled," or any variant thereof, means any connection or coupling, either direct or indirect, between two or more elements; the coupling of connection between the elements can be physical, logical, or a combination thereof. Additionally, the words "herein," "above," "below," and words of similar import, when used in this application, shall refer to this application as a whole and not to any particular portions of this application. Where the context permits, words in the above Detailed Description of the Preferred Embodiments using the singular or plural number may also include the plural or singular number respectively. The word "or" in reference to a list of two or more items, covers all of the following interpretations of the word: any of the items in the list, all of the items in the list, and any combination of the items in the list.

[0044] The above-detailed description of embodiments of the disclosure is not intended to be exhaustive or to limit the teachings to the precise form disclosed above. While specific embodiments of and examples for the disclosure are described above for illustrative

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purposes, various equivalent modifications are possible within the scope of the disclosure, as those skilled in the relevant art will recognize. Further, any specific numbers or dimensions noted herein are only examples: alternative implementations may employ differing values, measurements, dimensions or ranges.

[0045] The teachings of the disclosure provided herein can be applied to other systems, not necessarily the system described above. The elements and acts of the various embodiments described above can be combined to provide further embodiments. Any measurements described or used herein are merely exemplary and not a limitation on the present invention. Other measurements can be used. Further, any specific materials noted herein are only examples: alternative implementations may employ differing materials.

[0046] Any patents and applications and other references noted above, including any that may be listed in accompanying filing papers, are incorporated herein by reference in their entirety. Aspects of the disclosure can be modified, if necessary, to employ the systems, functions, and concepts of the various references described above to provide yet further embodiments of the disclosure.

[0047] These and other changes can be made to the disclosure in light of the above Detailed Description of the Preferred Embodiments. While the above description describes certain embodiments of the disclosure, and describes the best mode contemplated, no matter how detailed the above appears in text, the teachings can be practiced in many ways. Details of the system may vary considerably in its implementation details, while still being encompassed by the subject matter disclosed herein. As noted above, particular terminology used when describing certain features or aspects of the disclosure should not be taken to imply that the terminology is being redefined herein to be restricted to any specific characteristics, features or aspects of the disclosure with which that terminology is associated. In general, the terms used in the following claims should not be construed to

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limit the disclosures to the specific embodiments disclosed in the specification unless the above Detailed Description of the Preferred Embodiments section explicitly defines such terms. Accordingly, the actual scope of the disclosure encompasses not only the disclosed embodiments, but also all equivalent ways of practicing or implementing the disclosure under the claims.

[0048] Accordingly, although exemplary embodiments of the invention have been shown and described, it is to be understood that all the terms used herein are descriptive rather than limiting, and that many changes, modifications, and substitutions may be made by one having ordinary skill in the art without departing from the spirit and scope of the invention.

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CLAIMS

What is claimed is:

1. A percussive massage device comprising:
a housing that defines a housing interior,
a battery,
a motor positioned in the housing,
a switch for activating the motor, and
a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor.

2. The percussive massage device of claim 1 wherein the reciprocating shaft includes a distal end that defines a reciprocation axis, wherein the housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis, wherein the motor is positioned in the first side portion and the battery is positioned in the second side portion.

3. The percussive massage device of claim 2 wherein the first side portion and second side portion are generally symmetrical.

4. The percussive massage device of claim 3 wherein the housing defines a housing axis, and wherein the reciprocation axis and the housing axis are co-axial.

5. The percussive massage device of claim 2 wherein the motor includes a rotatable motor shaft that defines a motor axis, wherein the motor axis is perpendicular to the reciprocation axis and extends through the battery.

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6. The percussive massage device of claim 1 further comprising a motor mount bracket that includes a middle member having first and second opposite sides, wherein the motor is positioned on the first side of the middle member and the reciprocating shaft is positioned on the second side of the middle member.

7. The percussive massage device of claim 6 wherein the middle member includes a shaft opening defined therein, wherein the motor includes a rotatable motor shaft extending therefrom that extends from the first side of the middle member, through the shaft opening and to the second side of the middle member, wherein the reciprocating shaft is operatively connected to the motor shaft.

8. The percussive massage device of claim 7 wherein the housing includes first and second housing halves, wherein the motor mount bracket is secured to both of the first and second housing halves.

9. The percussive massage device of claim 8 wherein the motor mount bracket is secured to the first housing half via an interference fit and to the second housing half via threaded fasteners.

10. The percussive massage device of claim 9 wherein the interference fit comprises one of a tubular member and a securing post disposed on the housing and the other of the tubular member and the securing post disposed on the motor mount bracket, and wherein the securing post is received in the tubular member.

11. The percussive massage device of claim 1 further comprising a bush assembly through which the reciprocating shaft reciprocates, wherein the bush assembly includes first and second dampening halves on opposite sides thereof that are positioned between the bush assembly and the housing.

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12. The percussive massage device of claim 11 wherein the first and second dampening halves include securing protrusions extending outwardly therefrom that are received in securing opening defined in the housing.

13. A percussive massage device comprising:

a housing that defines a housing interior and a housing axis,

a battery,

a motor positioned in the housing, wherein the motor includes a rotatable motor shaft that defines a motor axis, and wherein the motor axis is perpendicular to the reciprocation axis and extends through the battery,

a switch for activating the motor, and

a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor, wherein the reciprocating shaft includes a distal end that defines a reciprocation axis, wherein the housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis, wherein the motor is positioned in the first side portion and the battery is positioned in the second side portion, wherein the first side portion and second side portion are generally symmetrical, and wherein the reciprocation axis and the housing axis are co-axial.

14. The percussive massage device of claim 13 further comprising a motor mount bracket that includes a middle member having first and second opposite sides, wherein the motor is positioned on the first side of the middle member and the reciprocating shaft is positioned on the second side of the middle member, wherein the middle member includes a shaft opening defined therein, wherein the motor shaft extend extends from the first side of the middle member, through the shaft opening and to the second side of the middle member, wherein the reciprocating shaft is operatively connected to the motor shaft.

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15. The percussive massage device of claim 14 wherein the housing includes first and second housing halves, wherein the motor mount bracket is secured to both of the first and second housing halves, wherein the motor mount bracket is secured to the first housing half via an interference fit and to the second housing half via threaded fasteners, wherein the interference fit comprises one of a tubular member and a securing post disposed on the housing and the other of the tubular member and the securing post disposed on the motor mount bracket, and wherein the securing post is received in the tubular member.

16. The percussive massage device of claim 15 further comprising a bush assembly through which the reciprocating shaft reciprocates, wherein the bush assembly includes first and second dampening halves on opposite sides thereof that are positioned between the bush assembly and the housing, wherein the first and second dampening halves include securing protrusions extending outwardly therefrom that are received in securing opening defined in the housing.

17. A method of using a percussive massage device that includes a housing that defines a housing interior, a battery, a motor positioned in the housing, a switch for activating the motor, and a reciprocating shaft operatively connected to the motor and configured to reciprocate in response to activation of the motor, wherein the method comprises the steps of:

grasping the housing with a first hand having a palm, wherein the reciprocating shaft includes a distal end that defines a reciprocation axis,

positioning the first hand such that the reciprocation axis extends through the palm, and

massaging a first body part with a massage attachment removably connected to the distal end of the reciprocating shaft.

18. The method of claim 17 wherein the housing includes a first side portion and a second side portion that cooperate to define the housing interior and are defined on opposite sides of the reciprocation axis, wherein the motor is positioned in the first side portion and the battery is positioned in the second side portion.

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19. The percussive massage device of claim 18 wherein the first side portion and second side portion are generally symmetrical.

20. The percussive massage device of claim 19 wherein the housing defines a housing axis, and wherein the reciprocation axis and the housing axis are co-axial.

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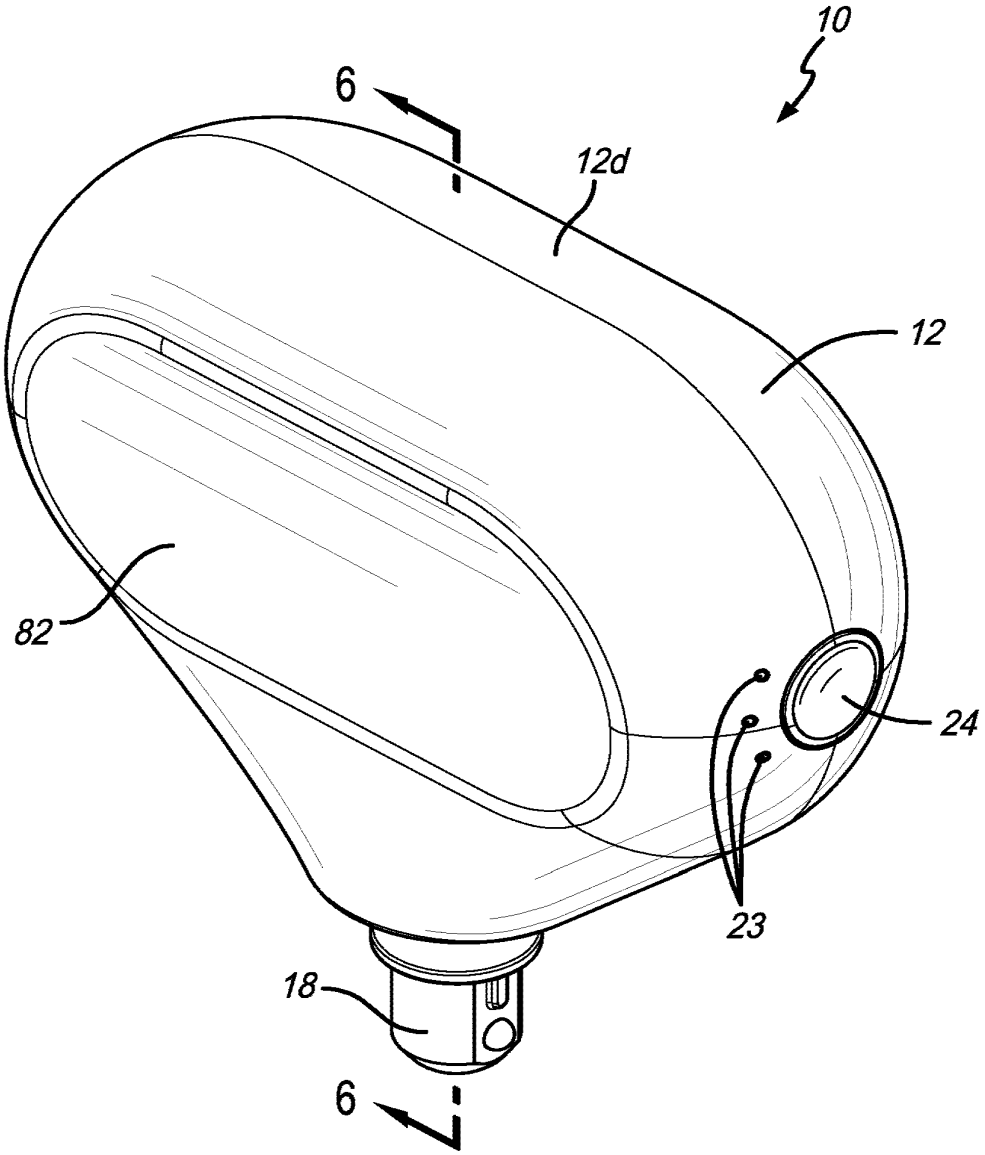

FIG. 1

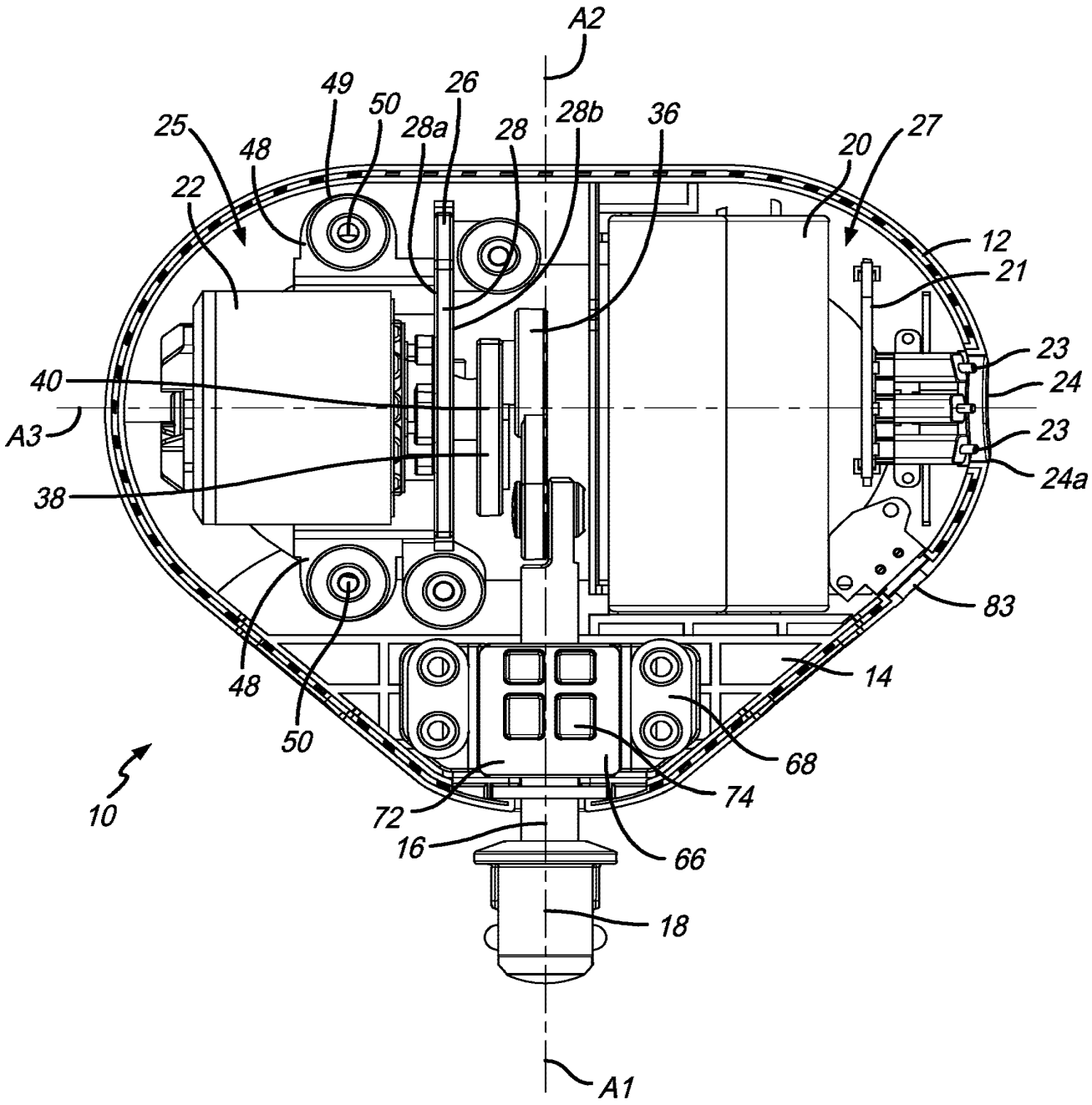
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FIG. 2

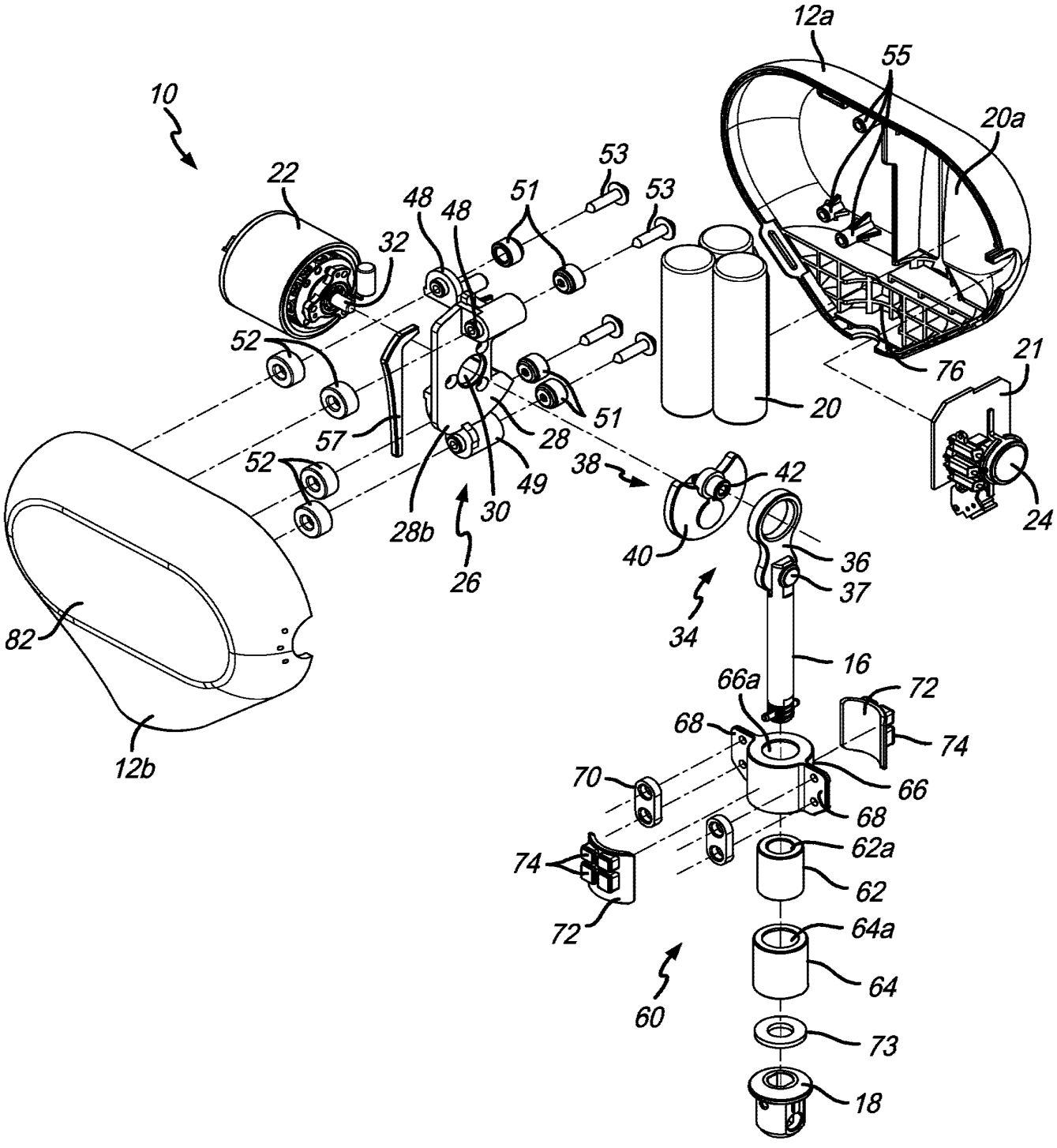
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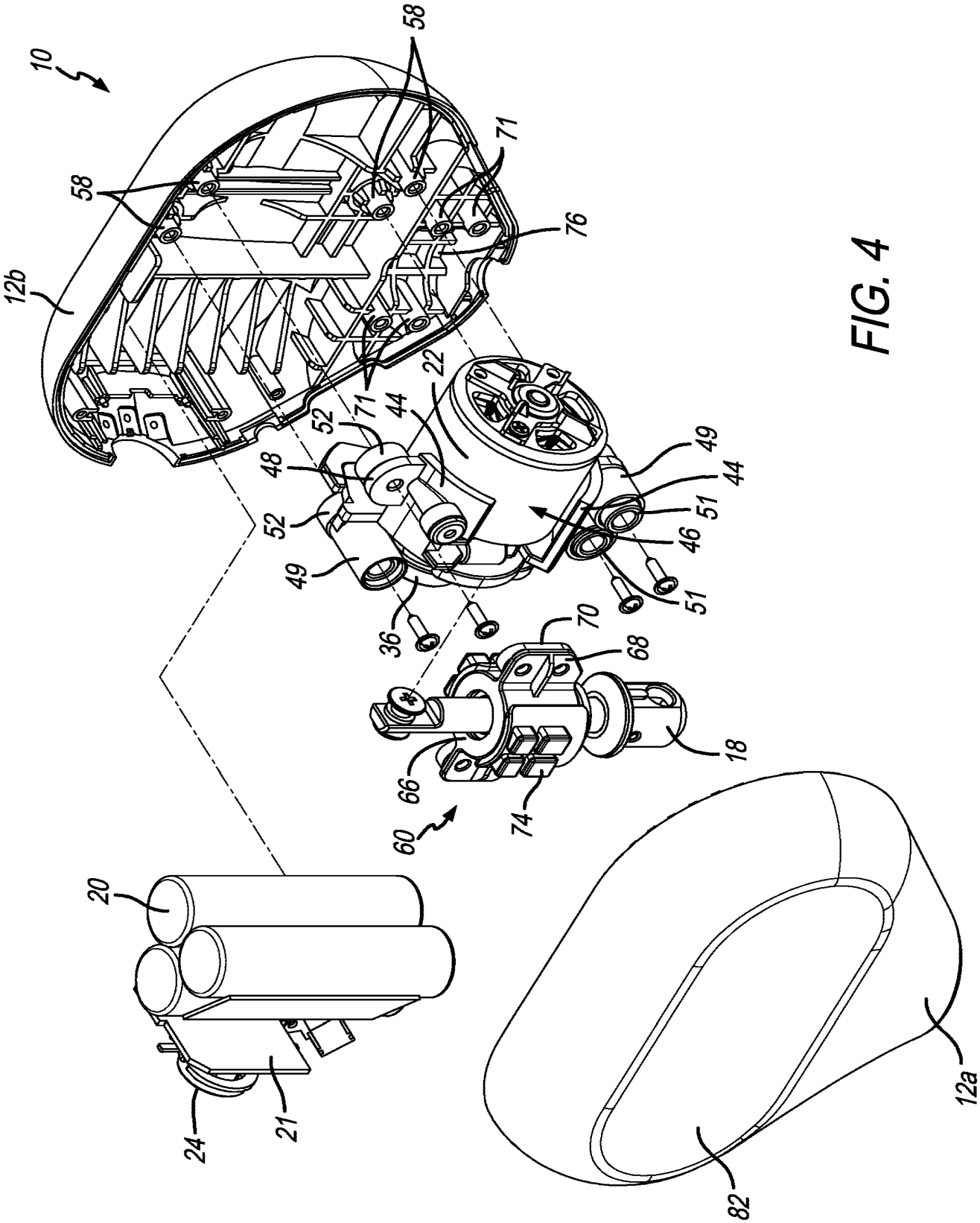
FIG. 3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12a

FIG. 4

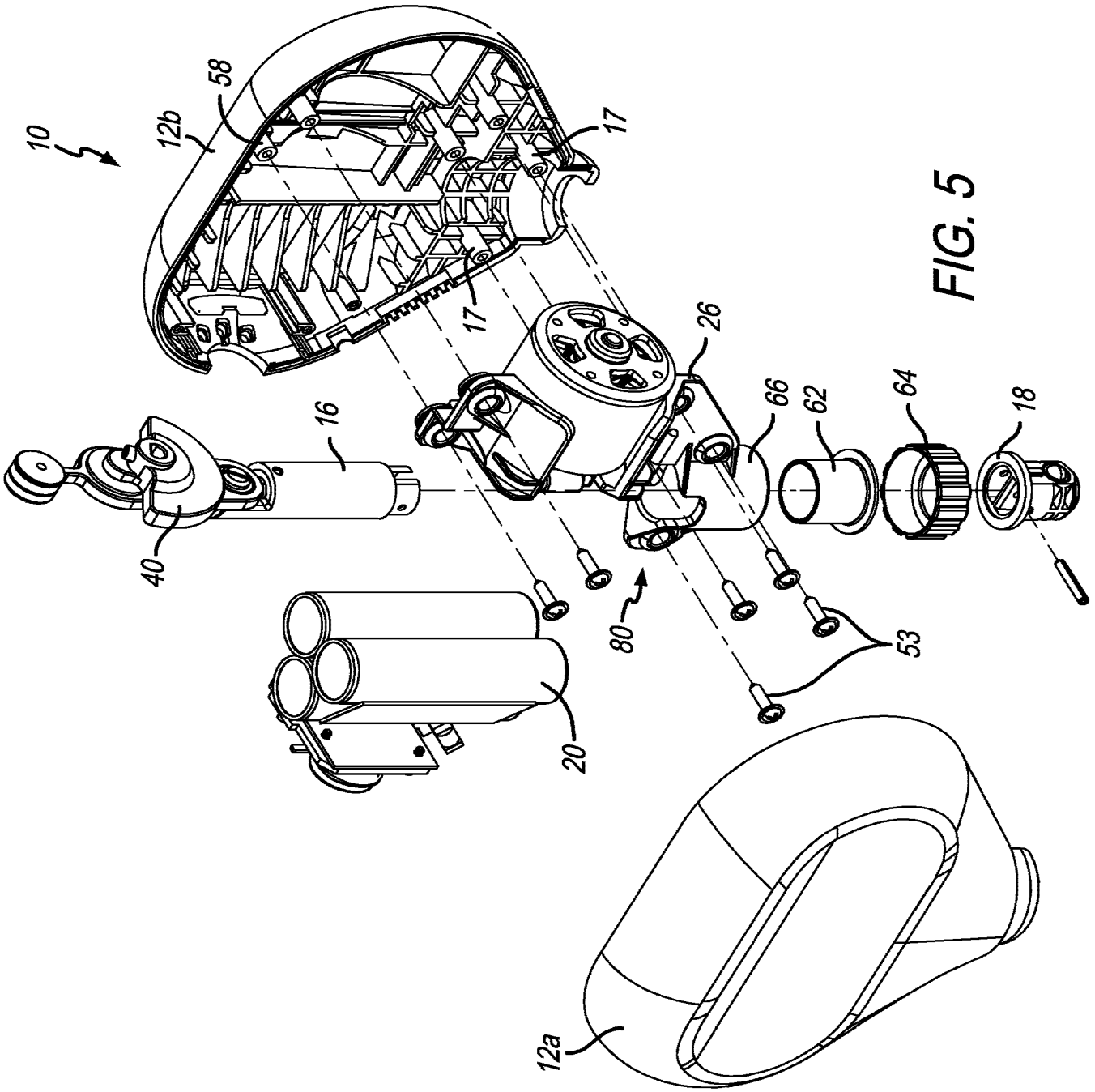
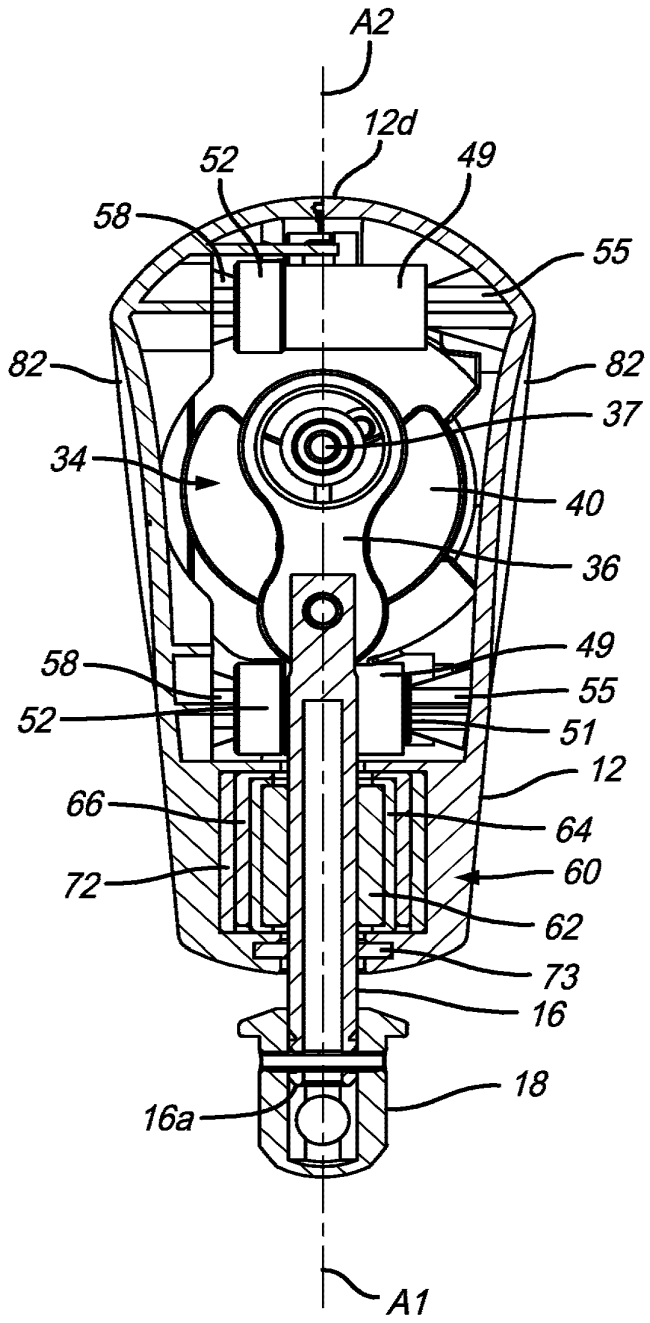


FIG. 5


A2
12d
52
49
58
55
82
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16a
A1

FIG. 6

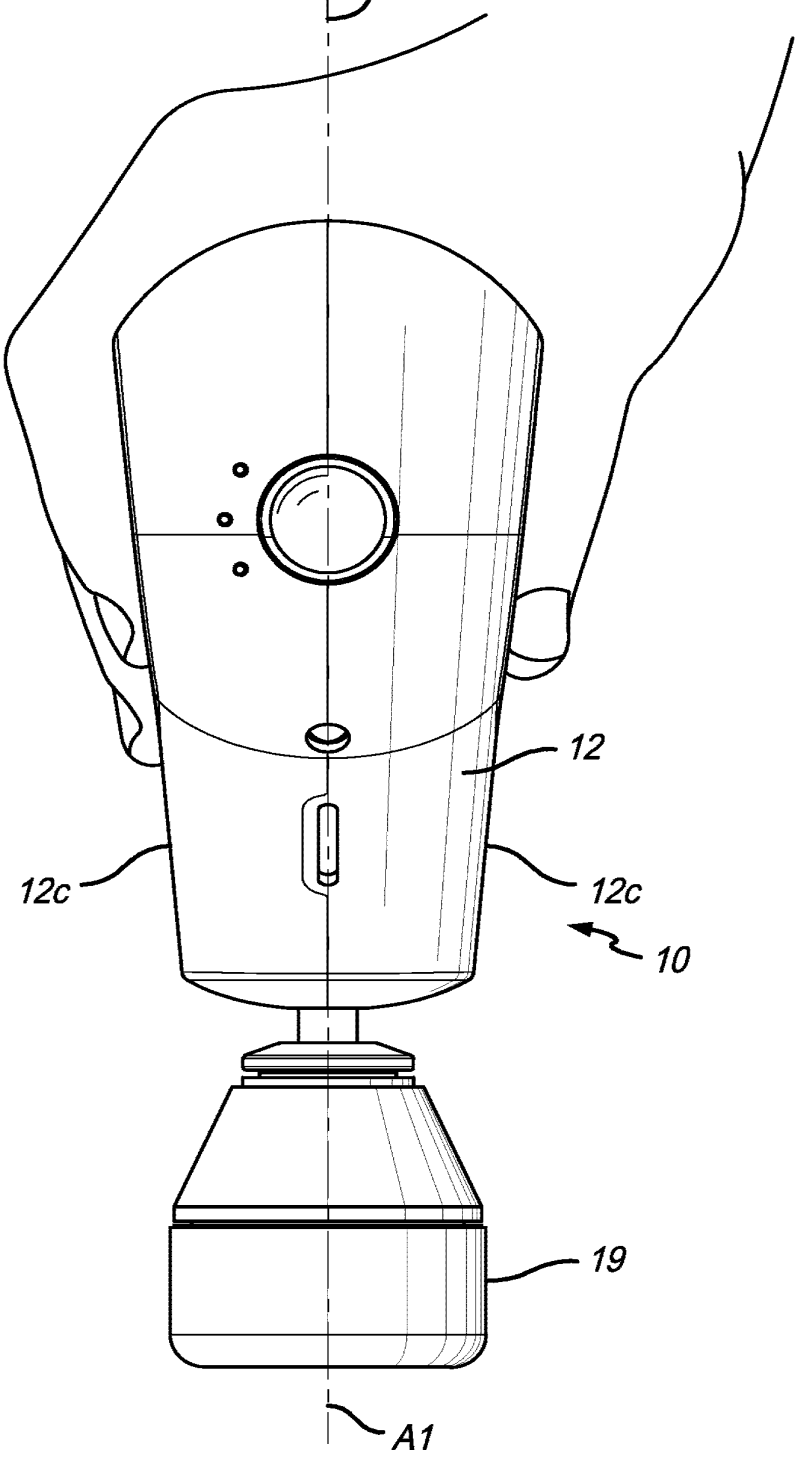

FIG. 7

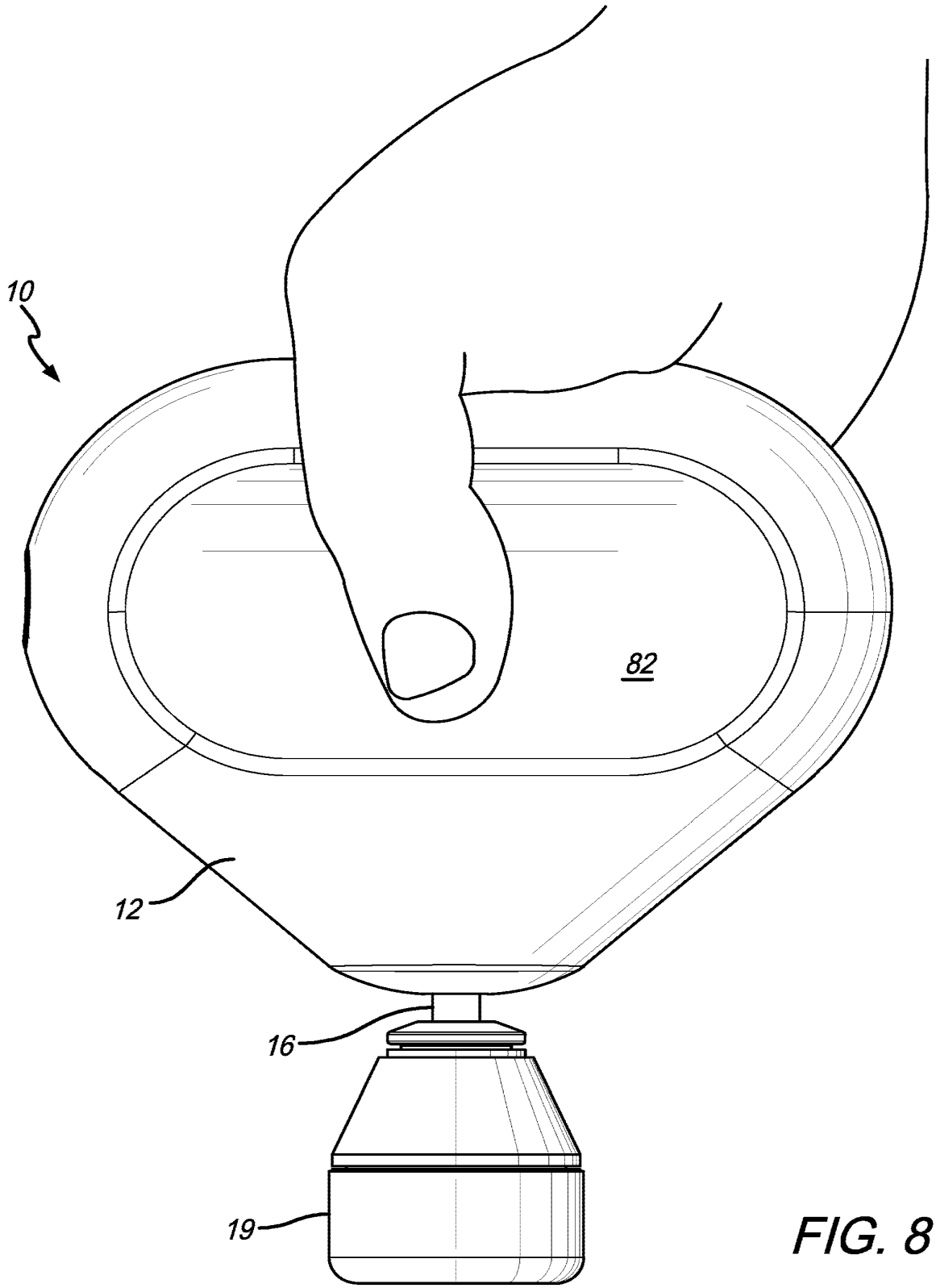

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2020/031339

A. CLASSIFICATION OF SUBJECT MATTER

IPC: A61M 3/02, 25/04, 29/02, 25/10; A61B 17/34; A61H 23/00
CPC: A61M 3/0291, 25/04, 29/02, 25/10; A61B 2017/3484

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

CPC: A61H 1/008, 9/00, 0007, 0021, 001, 002, 003, 004, 005, 2201/0153, 0157, 0165,1669, 1671,1664,1657, 23/00, 006, 0254, 0263, 0218, 008

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

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

US-PGPUB; USPAT; EPO; JPO; FPRS; DERWENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y X	US 4,088,128 (MABUCHI) 09 May 1978 (09.05.1978), entire document, entire document.	1-8, 13-14, 17-20 9-12, 15-16
Y	US 5,935,089 (SHIMIZU) 10 August 1999 (10.08.1999), entire document.	8-10, 14-15
Y	US 4,566,442 (MABUCHI ET AL.) 28 January 1986 (28.01.1986)	1, 11-12
Y	US 2003/0014079 A1 (TUCEK) 16 January 2003 (16.01.2003), entire document.	15-16

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 May 2020 (28.05.2020)	10 JUN 2020
Name and mailing address of the ISA/US **COMMISSIONER FOR PATENTS MAIL STOP PCT, ATTN: ISA/US P.O. BOX 1450 ALEXANDRIA, VA 22313-1450, UNITED STATES OF AMERICA** Facsimile No. **(571)273-8300**	Authorized officer **HARRY KIM** Telephone No. **571-272-4300**

Form PCT/ISA/210 (second sheet) (July 2019)

Petitioner Therabody Ex-1004, 1863

Patent Translate
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Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

ABSTRACT JP2012223582A

[]

13 A battery assembly for a surgical device having battery terminals and operating parameters. A battery assembly of the present invention includes a housing configured to be removably connected to a battery terminal. The housing includes a modular battery operable at the terminal to provide power to the surgical device, and the housing has a control circuit having a microprocessor, memory, and a real-time clock. A control circuit is communicatively coupled to the battery to detect an identification of the surgical device and to determine at least one information regarding at least one of the operating parameters of the surgical device based on the detected identification, and storing information in at least the memory; and selectively enabling or disabling power from a battery to the surgical device based on the information. [Selection diagram] Figure 28

Petitioner Therabody Ex-1004, 1864

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/515,112	**02/15/2024 05:08:10 PM Z ET**	**HYP-034C5**

Title of Invention

MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2915	FILED BY	Anna Beaulieu
PATENT CENTER #	64339901	AUTHORIZED BY	Hunter Malboeuf
CUSTOMER #	162143	FILING DATE	11/20/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Philip C. Danby

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1146	**E20242EH09369006**	**Anna Beaulieu**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2501	UTILITY ISSUE FEE	480.00	1	480.00
			TOTAL AMOUNT:	**$480.00**

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 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.

UNITED STATES
PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/515,112	**02/15/2024 05:08:10 PM Z ET**	**HYP-034C5**

Title of Invention

MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

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CONFIRMATION #	2915	FILED BY	Anna Beaulieu
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CUSTOMER #	162143	FIRST NAMED INVENTOR	Philip C. Danby
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Hunter Malboeuf

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
HYP-034C5 - ISSFEE.pdf	1	Issue Fee Payment (PTO-85B)	37 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
HYP-034C5 - ISSFEE.pdf	A4E17B3EB4AFD42EBF2E9E1C058F19B5C2CD1B5847730BED37B74D4868F74A901B6490C0A385AAA8DE100FD48B582F11F74E89F25D86D20ABC08E1CA44C80793

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

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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.

PART B–FEE(S) TRANSMITTAL

Complete and send this form, together with the applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By fax, send to: (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

GOODWIN PROCTER LLP
100 Northern Avenue
IP DOCKETING DEPT./7TH FL
Boston, Massachusetts 02210

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	2915

TITLE OF INVENTION: MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

APPLN: TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480.00	$0.00	$0.00	$480.00	05/15/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
T. A. Stanis	3785	601-101000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363)

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. Goodwin Procter LLP
2.
3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: HYPERICE IP SUBCO, LLC

(B) RESIDENCE: (CITY and STATE or COUNTRY): Irvine, California

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees Submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment (*Please first reapply any previously paid fee shown above*):

☒ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 07-1700

5. Change of Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29. NOTE: Absent a valid Certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27. NOTE: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status. NOTE: Checking this box will be taken as a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature: /Hunter Malboeuf/ Date: February 15, 2024

Typed or printed name: Hunter Malboeuf Registration No. 79,730

Petitioner Therabody Ex-1004, 1869

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/515,112	Danby et al.
	Examiner	Art Unit
	TIMOTHY A STANIS	3785

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/12/2024	01/31/2024							
1	1	✓	=							
2	2	✓	=							
3	3	✓	=							
4	4	✓	=							
5	5	✓	=							
6	6	✓	=							
7	7	✓	=							
8	8	✓	=							
9	9	✓	=							
10	10	✓	=							
11	11	✓	=							
12	12	✓	=							
13	13	✓	=							
14	14	✓	=							
15	15	✓	=							
16	16	✓	=							
17	17	✓	=							
18	18	✓	=							

Petitioner Therabody Ex-1004, 1870

Bibliographic Data

Application No: 18/515,112

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /TIMOTHY A STANIS/ Examiner's Signature | Initials

Title: MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/20/2023	601	3785	HYP-034C5
RULE			

APPLICANTS

HYPERICE IP SUBCO, LLC, Irvine, CA, UNITED STATES

INVENTORS

Philip C. Danby, Key Biscayne, FL, UNITED STATES

John Charles Danby, Witham, UNITED KINGDOM

CONTINUING DATA

This application is a CON of 18466702 09/13/2023

18466702 is a CON of 17681367 02/25/2022 PAT 11857482 Yes /TS/ 2/6/24

17681367 is a CON of 15892665 02/09/2018 PAT 11285075

15892665 is a CON of 14317573 06/27/2014 PAT 9889066

14317573 has PRO of 61841693 07/01/2013

FOREIGN APPLICATIONS Yes /TS/ 2/6/24

IF REQUIRED, FOREIGN LICENSE GRANTED**

12/04/2023

** SMALL ENTITY **

STATE OR COUNTRY

UNITED STATES

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PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210
UNITED STATES

FILING FEE RECEIVED

$2,400

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/515,112	Danby et al.
	Examiner	Art Unit
	TIMOTHY A STANIS	3785

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61H23/0254	01/13/2024	TS
A61H2201/0107,0153,0157,1215,1418,149,1664,5005,501	01/13/2024	TS
Updated Above Search	02/06/2024	TS

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor Search in PE2E and PALM	01/13/2024	TS
See attached PE2E search	01/13/2024	TS
Updated Search; see attached PE2E search	02/06/2024	TS

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	PGPub Datase Searched	02/06/2024	TS

/TIMOTHY A STANIS/ Primary Examiner, Art Unit 3785	

Petitioner Therabody Ex-1004, 1873

Docket No.: HYP-034C5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Philip C. Danby et al.

Application No.: 18/515,112 Confirmation No.: 2915

Filed: November 20, 2023 Art Unit: 3785

For: MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH Examiner: T. A. Stanis

Filed Electronically

INFORMATION DISCLOSURE STATEMENT (IDS)

Pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98, the attention of the United States Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of the above-identified application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed more than three months after the filing date of this application, OR more than three months after the date of entry of the national stage in the international application, AND after the mailing date of a first Office Action on the merits, but before the mailing date of any of a Final Action under 37 C.F.R. § 1.113, a Notice of Allowance under 37 C.F.R. § 1.311 or an action that otherwise closes prosecution in this application (37 C.F.R. § 1.97(c)).

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of U.S. patents and U.S. patent application publications are not submitted. Submitted herewith are copies of foreign patents and non-patent literature in accordance with 37 C.F.R. § 1.98(a)(2).

In accordance with 37 C.F.R. § 1.98(d)(1) and as noted by a double-asterisk next to the Cite No. on the attached PTO/SB/08, the following references are not supplied because they were previously cited by or submitted to the Office in prior application numbers 18/466702 filed

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

Petitioner Therabody Ex-1004, 1874

Receipt date: 01/26/2024 18/515,112 - GAU: 3785

September 13, 2023, 17/681367 filed February 25, 2022, 15/892665 filed February 9, 2018, and 14/317573 filed June 27, 2014 and relied on in the above-identified application for an earlier effective filing date under 35 U.S.C. § 120.

Applicant hereby apprises the Examiner of the following patent applications, including the contents of the file wrappers, the claims, any Office Actions issued therein, and any Notices of Allowance issued therefor:

Docket No.	**U.S. Serial No.:**	**Title**	**Filing Date**
HYP-002CIP	17/083,118 Published as: US2021/0038472	SYSTEM AND PROCESS FOR DETERMINING PRESSURE SETTINGS FOR A PERCUSSIVE MASSAGE APPLICATOR	10/28/20
HYP-034C4	18/466,702 Published as: 2024/0000656	MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH	9/13/23
HYP-034C6	18/515,119	MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH	11/20/23
HYP-034C7	18/515,122	MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH	11/20/23
HYP-034C9	18/515,126	MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH	11/20/23
HYP-044C1	17/972,421	PERCUSSIVE MASSAGE DEVICE WITH SELECTABLE STROKE LENGTH	10/24/22

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

Petitioner Therabody Ex-1004, 1875

Docket No.	U.S. Serial No.:	Title	Filing Date
HYP-060C5	17/136,218 Published as: US2021/0361524	BATTERY-POWERED PERCUSSIVE MASSAGE DEVICE	12/29/20
HYP-067C1	18/342,158	PERCUSSIVE MASSAGE DEVICE WITH SELF-LUBRICATING CYLINDER	6/27/23
HYP-075C2	18/452,274	MOTOR AND PISTON ASSEMBLY FOR PERCUSSIVE DEVICE	8/18/23
HYP-084	17/402,201 Published as: US2023/0048861	COMBINATION APPLICATOR AND ADAPTOR FOR PERCUSSIVE MASSAGE DEVICE	8/13/21
Examiner Signature		Date Considered	

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed as a representation that a search has been made. In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in this Information Disclosure Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b).

It is submitted that the Information Disclosure Statement is in compliance with 37 C.F.R. § 1.98, and the Examiner is respectfully requested to consider the listed references.

Please charge our Credit Card in the amount of $104.00 covering the fee set forth in 37 C.F.R. § 1.17(p). The Director is hereby authorized to charge any deficiency in the fees filed,

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

Petitioner Therabody Ex-1004, 1876

asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 07-1700, under Order No. HYP-034C5.

Dated: January 26, 2024

Respectfully submitted,

Electronic signature: /Hunter Malboeuf/
Hunter Malboeuf
Registration No.: 79,730
GOODWIN PROCTER LLP
100 Northern Avenue
IP DOCKETING DEPT./7TH FL
Boston, Massachusetts 02210
(617) 570-1000
Agent For Applicant

IPTS/125412870.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

PTO/SB/08a (07-09)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 10

Complete if Known	
Application Number	18/515,112-Conf. #2915
Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	US-863525	12-10-1907	Gardy	
	A2	US-4,698,869	10-13-1987	Mierau et al.	
	A3	US-4,726,430	02-23-1988	Hendrikx et al.	
	A4	US-5,043,651	08-27-1991	Tamura, Yoshiharu	
	A5	US-5,134,777	08-04-1992	Meyer et al.	
	A6	US-5,769,657	06-23-1998	Kondo et al.	
	A7	US-5,935,089	08-10-1999	Shimizu	
	A8	US-6,602,211	08-05-2003	Tucek, Kevin B.	
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/T.A.S/	B1	CA-188544-A	02-04-1919	Bennett, James C		
/T.A.S/	B2	CA-188545-A	02-04-1919	Briese, Frederick W		
/T.A.S/	B3	CA-188553-A	02-04-1919	Hoag, David Edgar		
/T.A.S/	B4	CN-101801326-A	08-11-2010	Activator Methods Internationa		√
/T.A.S/	B5	CN-103248096-A	08-14-2013	Wu, Mingfen		√
/T.A.S/	B6	CN-103398298-A	11-20-2013	Ningbo Aisen Electric Appliance Co., Ltd		√

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	2	of	10

Complete if Known	
Application Number	18/515,112-Conf. #2915
Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

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	A20	US-10,492,984	12-03-2019	Marton et al.	
	A21	US-10,561,574	02-18-2020	Marton et al.	
	A22	US-10,617,588	04-14-2020	Wersland et al.	
	A23	US-10,702,448	07-07-2020	Wersland et al.	
	A24	US-10,774,860	09-15-2020	Wersland et al.	
	A25	US-10,847,984	11-24-2020	Solana et al.	
	A26	US-10,857,064	12-08-2020	Wersland et al.	
	A27	US-10,888,492	01-12-2021	Marton et al.	
	A28	US-10,905,627	02-02-2021	Marton et al.	
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	A31	US-11,166,863	11-09-2021	Wersland et al.	
	A32	US-2002/0177795-A1	11-28-2002	Frye	
	A33	US-2002/0188233-A1	12-12-2002	Denyes	
	A34	US-2003/0014079-A1	01-16-2003	Tucek	
	A35	US-2003/0028134-A1	02-06-2003	Lev et al.	
	A36	US-2004/0254507-A1	12-16-2004	Off, Robert	
	A37	US-2005/0075591-A1	04-07-2005	Hafemann, Klaus	
	A38	US-2005/0113870-A1	05-26-2005	Miller, Edward W.	

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/T.A.S/	B7	CN-103655142-A	03-26-2014	Fan, Shuyin		√
/T.A.S/	B8	CN-111759711-A	10-13-2020	Wuxi Mochi Tech Co Ltd		√
/T.A.S/	B9	CN-202459196-U	10-03-2012	Qingdao Hailimian International Trade Co., Ltd		√
/T.A.S/	B10	CN-203395603-U	01-15-2014	Led Lenser Co., Ltd		√
/T.A.S/	B11	CN-205017429-U	02-03-2016	Wang, Jun		√
/T.A.S/	B12	CN-205268525-U	06-01-2016	Guangzhou Boshikang Medical Equipment Co., Ltd		√

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

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	A39	US-2005/0131461-A1	06-16-2005	Tucek et al.	
	A40	US-2006/0116614-A1	06-01-2006	Jones et al.	
	A41	US-2006/0211961-A1	09-21-2006	Meyer et al.	
	A42	US-2006/0293711-A1	12-28-2006	Keller et al.	
	A43	US-2007/0257638-A1	11-08-2007	Amend et al.	
	A44	US-2008/0262399-A1	10-23-2008	Kovelman et al.	
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	A46	US-2010/0145242-A1	06-10-2010	TSAI	
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	A48	US-2011/0017742-A1	01-27-2011	Sausen et al.	
	A49	US-2012/0197357-A1	08-02-2012	Dewey et al.	
	A50	US-2012/0215141-A1	08-23-2012	Peddicord, Herschel	
	A51	US-2012/0296244-A1	11-22-2012	Ceoldo et al.	
	A52	US-2013/0030506-A1	01-31-2013	BARTOLONE et al.	
	A53	US-2013/0289457-A1	10-31-2013	Young et al.	
	A54	US-2014/0031866-A1	01-30-2014	Fuhr et al.	
	A55	US-2014/0221887-A1	08-07-2014	Wu	
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	A57	US-2015/0107383-A1	04-23-2015	Duesselberg et al.	

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/T.A.S/	B13	CN-206381369-U	08-08-2017	Touchbeauty (shenzhen) Tech Co Ltd		√
/T.A.S/	B14	CN-206381389-U	08-08-2017	3rd Affiliated Hospital Xinxiang Medical Univ		√
/T.A.S/	B15	CN-210301676-U	04-14-2020	Shenzhen Jiuyida Electronics Co Ltd		√
/T.A.S/	B16	CN-2144503-Y	10-27-1993	Guo Liwen		√
/T.A.S/	B17	EP-0158870-A1	10-23-1985	Blendax Werke Schneider Co		√
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Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

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/T.A.S/	B20	EP-3320888-A1	05-16-2018	Family Inada Co., Ltd		
/T.A.S/	B21	EP-3435381-A1	01-30-2019	Family Inada Co., Ltd		
/T.A.S/	B22	JP-1683409-S	04-19-2021			√
/T.A.S/	B23	JP-2781408-B2	07-30-1998	Teranishi Denki Seisakusho:KK		√
/T.A.S/	B24	JP-2999872-B2	01-17-2000	Sanyo Electric Co Ltd		√

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First Named Inventor	Philip C. Danby
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Examiner Name	T. A. Stanis
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	A77	US-2020/0222263-A1	07-16-2020	Wersland et al.	
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	A79	US-2020/0274162-A1	08-27-2020	GALCERAN MESTRES et al.	
	A80	US-2020/0276079-A1	09-03-2020	Cheng, Guomei	
	A81	US-2020/0289365-A1	09-17-2020	Wersland et al.	
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/T.A.S/	B25	JP-3813828-B2	08-23-2006	Daito Denki Kogyo KK		√
/T.A.S/	B26	JP-5859905-B2	02-16-2016	Covidien AG		√
/T.A.S/	B27	JP-H0733329-B2	06-20-1995	Yamaguchi		√
/T.A.S/	B28	KR-102078829-B1	02-19-2020	St Co., Ltd		√
/T.A.S/	B29	KR-3010427980000	01-29-2020	Dongguan Xiqin Electrical Appliance Co., Ltd.		√
/T.A.S/	B30	TW-202017550-A	05-16-2020	Hyper Ice, Inc		√

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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	A96	US-D553,252	10-16-2007	Masuda	
	A97	US-D581542	11-25-2008	Ferber et al.	
	A98	US-D581543	11-25-2008	Ferber et al.	
	A99	US-D582049	12-02-2008	Ferber et al.	
	A100	US-D606,192	12-15-2009	Summerer et al.	
	A101	US-D613416	04-06-2010	Schupman, Mark	
	A102	US-D627897	11-23-2010	Yde et al.	
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	A104	US-D649,657	11-29-2011	Petersen et al.	
	A105	US-D658,759	05-01-2012	Marescaux et al.	
	A106	US-D665915	08-21-2012	Ma, Xuejun	
	A107	US-D708,742	07-08-2014	Dallemagne et al.	
	A108	US-D719273	12-09-2014	Chen, Jue-Yao	
	A109	US-D725790	03-31-2015	Givord, Bertrand	
	A110	US-D734,863	07-21-2015	Hennessey	
	A111	US-D735,348	07-28-2015	Hennessey	
	A112	US-D759,237	06-14-2016	Heath et al.	
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/T.A.S/	B31	TW-D202371-S	01-21-2020	Dongguan Xiqin Electrical Appliance Co., Ltd		√
/T.A.S/	B32	TW-M599159-U	08-01-2020	Tokuyo Biotech Co., Ltd		√
/T.A.S/	B33	WO-2011/159906-A2	12-22-2011	Peddicord, Herschel		
/T.A.S/	B34	WO-2012/177028-A2	12-27-2012	Amorepacific Corp		√
/T.A.S/	B35	WO-2014/038359-A1	03-13-2014	Makita Corp		√
/T.A.S/	B36	WO-2020/101725-A1	05-22-2020	Hyper-ice, Inc		

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Attorney Docket Number	HYP-034C5

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A115	US-D778,439	02-07-2017	Hakansson et al.	
	A116	US-D810280	02-13-2018	Tharp et al.	
	A117	US-D819,221	05-29-2018	Lei	
	A118	US-D837,395	01-01-2019	Gan	
	A119	US-D838,378	01-15-2019	Cao	
	A120	US-D840,547	02-12-2019	Harle et al.	
	A121	US-D843,656	03-19-2019	Zhang et al.	
	A122	US-D843002	03-12-2019	Yarborough et al.	
	A123	US-D844,896	04-02-2019	Levi et al.	
	A124	US-D845499	04-09-2019	Wersland et al.	
	A125	US-D847,362	04-30-2019	Tang	
	A126	US-D847,364	04-30-2019	Lee et al.	
	A127	US-D847,990	05-07-2019	Kimball	
	A128	US-D848089	05-07-2019	Cunniff, Kyle	
	A129	US-D849260	05-21-2019	Wersland et al.	
	A130	US-D850640	06-04-2019	Wersland et al.	
	A131	US-D855,822	08-06-2019	Marton et al.	
	A132	US-D865192	10-29-2019	Nazarian, Benjamin	
	A133	US-D890,942	07-21-2020	Wersland et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/T.A.S/	B37	WO-2020/227225-A1	11-12-2020	Theragun, Inc		
/T.A.S/	B38	WO-2020/227230-A1	11-12-2020	Theragun, Inc		
/T.A.S/	B39	WO-2020/227569-A1	11-12-2020	Theragun, Inc		

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

IPTS/125412875.1

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PTO/SB/08a (07-09)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 8 of 10

Complete if Known	
Application Number	18/515,112-Conf. #2915
Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A134	US-D890,943	07-21-2020	Wersland et al.	
	A135	US-D890353	07-14-2020	Nazarian, Benjamin	
	A136	US-D896,393	09-15-2020	Wersland et al.	
	A137	US-D903140	11-24-2020	Andrejs, Monahovs	
	A138	US-D907792	01-12-2021	Marton et al.	
	A139	US-D908235	01-19-2021	Marton et al.	
	A140	US-D910870	02-16-2021	Marton et al.	
	A141	US-D918404	05-04-2021	Wersland et al.	
	A142	US-D928334	08-17-2021	Chou, Kathy	
	A143	US-D932036	09-28-2021	Nazarian, Benjamin	
	A144	US-D946166	03-15-2022	Li, Gangxuan	
	A145	US-D949365	04-19-2022	Li, Gangxuan	
	A146	US-D949416	04-19-2022	Khubani et al.	
	A147	US-D949417	04-19-2022	Khubani et al.	
	A148	US-D949418	04-19-2022	Khubani et al.	
	A149	US-D952878	05-24-2022	Lin, Xiaohong	
	A150	US-D970743	11-22-2022	Brailey, Harry	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	9	of	10

Complete if Known	
Application Number	18/515,112-Conf. #2915
Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/T.A.S/	C1	Amazon, "Theragun G3PRO Percussive Therapy Device", (February 13, 2019) https://www.amazon.com/G3PRO-Percussive-Professional-Stimulator-Performance/dp/B07MJ2MCT3, 13 pages.	
/T.A.S/	C2	CAVITY - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english/cavity; retrieved 09/23/2020 (9 pages).	
/T.A.S/	C3	CURRICULUM VITAE of Philip J. O'Keefe, PE (10 pages).	
/T.A.S/	C4	DECLARATION OF PHILIP O'KEEFE, P.E., IN SUPPORT OF PETITION OR POST-GRANT REVIEW dated 09/30/2020 (136 pages).	
/T.A.S/	C5	Hyperlce PGR (FINAL FILING DRAFT); Shenzhen Shufang Innovation Technology Co., Ltd.; Nenz Electric Technology (Dongguan) Co., Ltd.; Shenzhen Xinde Technology Co., Ltd.; Performance Health Systems, LLC; Yongkang Aijiu Industrial & Trade Co., Ltd. (Petitioner) v. Hyper Ice, Inc. (Patent Owner) Petition for Post Grant Review U.S. Patent No. 10,561,574 dated 09/30/2020 (119 pages - uploaded in two parts p. 1-59 and p. 60-119).	
/T.A.S/	C6	INNER - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english/inner; retrieved 08/20/2020 (2 pages).	
/T.A.S/	C7	International Search Report and the Written Opinion of corresponding International application PCT/US2018/053352, dated May 14, 2019, 16 pages.	
/T.A.S/	C8	International Preliminary Report on Patentability and Written Opinion of International Application No. PCT/US2021/057033 dated May 11, 2023, 9 pages.	
/T.A.S/	C9	International Preliminary Report on Patentability of International Application No. PCT/US2021/041073 dated January 10, 2023, 10 pages.	
/T.A.S/	C10	International Search Report and Written Opinion of PCT/US2019/013769 dated August 9, 2019, 13 pages.	

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	10	of	10

Complete if Known	
Application Number	18/515,112-Conf. #2915
Filing Date	November 20, 2023
First Named Inventor	Philip C. Danby
Art Unit	3785
Examiner Name	T. A. Stanis
Attorney Docket Number	HYP-034C5

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/T.A.S/	C11	International Search Report and Written Opinion of PCT/US2021/057033 dated February 16, 2022, 14 pages.	
/T.A.S/	C12	LONGITUDINAL - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english longitudinal; retrieved 09/22/2020 (8 pages).	
/T.A.S/	C13	Microchip MCP73833/4 Stand-Along Linear Li-Ion / Li-Polymer Charge Management Controller; 2009 Microchip Technology Inc. (32 pages).	
/T.A.S/	C14	OUTER - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english/outer; retrieved 09/22/2020 (8 pages).	
/T.A.S/	C15	PERIMETER - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english/perimeter; retrieved 08/20/2020 (1 page).	
/T.A.S/	C16	Practical Electronics for Inventors by Paul Scherz, 2000; (3 pages: cover, copyright page and page 200).	
/T.A.S/	C17	SUL, Douglas Young, Examiner USPTO Art Unit 3785, Office Action for US Patent Application No. 16/107,587, mailed December 26, 2018, 36 pages.	
/T.A.S/	C18	WITHIN - definition in the Cambridge English Dictionary; https://dictionary.cambridge.org/us/dictionary/english/within; retrieved 08/20/2020 (3 pages).	
/T.A.S/	C19	WOODWARD, Valerie Lynn, Examiner USPTO Art Unit 3785, February 27, 2019 Office Action for US Patent Application No. 16/201,542.	
/T.A.S/	C20	International Search Report and Written Opinion of PCT application number PCT/US2021/057717, dated February 23, 2022, 7 pages.	

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/31/2024

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[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.

IPTS/125412875.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

162143 7590 02/15/2024

GOODWIN PROCTER LLP/SILICON VALLEY
PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210

EXAMINER	
STANIS, TIMOTHY A	
ART UNIT	PAPER NUMBER
3785	

DATE MAILED: 02/15/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	2915

TITLE OF INVENTION: MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	05/15/2024

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

Petitioner Therabody Ex-1004, 1888

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

162143 7590 02/15/2024
GOODWIN PROCTER LLP/SILICON VALLEY
PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	2915

TITLE OF INVENTION: MASSAGE DEVICE HAVING VARIABLE STROKE LENGTH

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	05/15/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
STANIS, TIMOTHY A	3785	601-101000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Petitioner Therabody Ex-1004, 1889

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	2915

162143 7590 02/15/2024

GOODWIN PROCTER LLP/SILICON VALLEY
PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210

EXAMINER	
STANIS, TIMOTHY A	
ART UNIT	**PAPER NUMBER**
3785	

DATE MAILED: 02/15/2024

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Petitioner Therabody Ex-1004, 1890

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).
https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to:

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3) a contractor of the USPTO having need for the information in order to perform a contract;
4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
9) the Office of Personnel Management (OPM) for personnel research purposes; and
10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 18/515,112	Applicant(s) Danby et al.	
	Examiner TIMOTHY A STANIS	Art Unit 3785	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the amendment and terminal disclaimer filed 1/26/24.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-18 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/TIMOTHY A STANIS/
Primary Examiner, Art Unit 3785

Petitioner Therabody Ex-1004, 1892

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

1. This office action is in response to the amendment and Terminal Disclaimer (TD) filed on 1/23/2024. As directed by the amendment, claim 18 has been amended and no claims have been added or canceled. Thus, claims 1-18 are pending in the application and are in condition for allowance per the reasons for allowance outlined below.

The terminal disclaimer filed on 1/23/2024 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of **Patent Number 11,857,482** has been reviewed and is accepted. The terminal disclaimer has been recorded.

REASONS FOR ALLOWANCE

2. The following is an examiner's statement for the reasons for allowance: the prior art of record by itself or in combination does not disclose all of the structural and functional limitations as recited in the claims. Specifically, the prior art of record does not disclose:

(1) A percussive massager comprising a housing, a piston having a proximal end and a distal end, "the distal end of the piston having a substantially cylindrical bore" (claim 1, ln. 3-4), a motor, a drive mechanism, and a quick-connect system comprising the distal end of the piston and a first massaging head, "wherein the quick-connect system is configured to have a proximal end of the first massaging head inserted into or

removed from the bore while the piston reciprocates [a] predetermined stroke length" (claim 1, ln. 9-11) in combination with the remaining limitations of claim 1; and

(2) A method of assembling a percussive massager, the method comprising: operatively connecting a motor to a proximal end of a piston, "wherein the distal end of the piston has a bore" (claim 18, ln. 4-5); and providing a drive mechanism configured to control a predetermined stroke length of the piston; and providing a quick-connect system comprising the distal end of the piston and a first massaging head, "wherein a proximal end of the first massaging head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length" (claim 18, ln. 9-11) in combination with the remaining limitations of claim 18.

The closest prior art of record is Pivaroff (6,682,496), Rhoades (2008/0243039), and Colloca et al (2007/0150004).

While Pivaroff discloses a percussive massager comprising a housing, a piston having a distal end with a threaded bore, a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed, a drive mechanism that controls a predetermined stroke length, and a quick-connect system comprising the distal end of the piston and a first massaging head, Pivaroff does not disclose a quick-connect system configured to allow a massaging head to be secured or connected to the percussive massager **while the piston reciprocates** as required by claims 1 and 18. The quick connect system of Pivaroff uses a threading system between its piston and its massaging head which would prevent the user from inserting or removing the massaging head **while the piston reciprocates**.

While Rhoades discloses a quick-connect system that uses magnetic coupling that *might* allow for a massage head to attach to a piston while the piston reciprocates, Rhoades does not disclose the claimed structure of the quick release connection system - namely a bore at the distal end of a piston (claims 1 and 18), wherein a massaging head is configured to be inserted into or removed from the bore.

Finally, Colloca discloses a chiropractic adjustment device comprising a thrust nose piece with a bore at its distal end configured to receive an impact head. However, Colloca does not disclose the bore as located at the distal end of a ***piston***. Additionally, Colloca does not disclose inserting or removing the impact head from the **bore *while a piston reciprocates***. Therefore, the claims and application are in condition for allowance.

Conclusion

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMOTHY A STANIS whose telephone number is (571)272-5139. The examiner can normally be reached on Mon - Fri 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached at (571) 272-4835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TIMOTHY A STANIS/
Primary Examiner, Art Unit 3785

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	60	((US-1269803-A OR US-1339179-A OR US-1657765-A OR US-2078025-A OR US-3626934-A OR US-3710785-A OR US-4088128-A OR US-4513737-A OR US-4549535-A OR US-4566442-A OR US-4716890-A OR US-4827914-A OR US-4841955-A OR US-4858600-A OR US-4858599-A OR US-5085207-A OR US-5140979-A OR US-5327887-A OR US-5447491-A OR US-5925002-A OR US-6228042-B1 OR US-5803916-A OR US-6379375-B1 OR US-6478755-B2 OR US-6503211-B2 OR US-6537236-B2 OR US-6616621-B1 OR US-6663657-B1 OR US-6682496-B1 OR US-6723060-B2 OR US-7503923-B2 OR US-7927259-B1 OR US-7927294-B2 OR US-3837335-A OR US-4079733-A OR US-6165145-A).did. AND USPT.dbnm.) OR ((US-20020072693-A1 OR US-20020082536-A1 OR US-20030195443-A1 OR US-20060047315-A1 OR US-20060155197-A1 OR US-20060178715-A1 OR US-20060293711-A1 OR US-20070150004-A1 OR US-20070144310-A1 OR US-20070270727-A1 OR US-20080306417-A1 OR US-20100185127-	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/12 03:40 PM

Petitioner Therabody Ex-1004, 1897

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L2	106	((US-5085207-A OR US-5300095-A OR US-6902525-B1 OR US-4549535-A OR US-4790296-A OR US-6503211-B2 OR US-4716890-A OR US-7927259-B1 OR US-7503923-B2 OR US-6682496-B1 OR US-6537236-B2 OR US-6478755-B2 OR US-6228042-B1 OR US-5925002-A OR US-5447491-A OR US-5327887-A OR US-5140979-A OR US-4827914-A OR US-1657765-A OR US-4566442-A OR US-4513737-A OR US-4088128-A OR US-3626934-A OR US-3710785-A OR US-2078025-A OR US-1339179-A OR US-1269803-A OR US-4841955-A OR US-6357125-B1 OR US-4137632-A OR US-4031763-A OR US-4236874-A OR US-4245966-A OR US-4261228-A OR US-5134777-A OR US-5581896-A OR US-7658012-B2 OR US-6616621-B1 OR US-6432072-B1 OR US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/12 03:43 PM

Petitioner Therabody Ex-1004, 1898

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Petitioner Therabody Ex-1004, 1899

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L3	1334	a61h23/0254.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:01 AM
L4	474	a61h2201/0107,0153,0157,1215,1418,149,1664,5005,501.cpc. AND percuss$3	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:01 AM
L5	1960	a61h$.cpc. AND ((interchang$4 OR replac$5 OR remov$4) WITH head)	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:02 AM
L6	997	a61h$.cpc. AND massag$3 AND ((interchang$4 OR replac$5 OR remov$4) WITH head)	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:02 AM
L7	41	(Philip WITH Danby OR John WITH Danby).in.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:05 AM
L8	6	(Philip WITH Danby OR John WITH Danby).in.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:06 AM

Petitioner Therabody Ex-1004, 1900

		AND while.clm.					
L9	1	"11857482".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:08 AM
L10	1414	((interchang$4 OR replac$5 OR remov$4) WITH ((massag$3 OR treatment) near3 head))	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:10 AM
L11	989	a61h2201/1685.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:14 AM
L12	1140	a61h23/00.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:15 AM
L13	699	a61h23/006.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:15 AM
L14	1073	a61h2201/0107.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/13 09:16 AM
L15	127	((US-20180200141-A1 OR US-20160367425-A1 OR US-20150305972-A1 OR US-20140194790-A1 OR US-20140114220-A1 OR US-20140094724-A1 OR US-20130261516-A1 OR US-20130281897-A1 OR US-20110118638-A1 OR US-20130138023-A1 OR US-20100312155-A1 OR US-20100274162-A1 OR US-20100185127-A1 OR US-20080306417-A1 OR US-20070270727-A1 OR US-20070144310-A1 OR US-20070150004-A1 OR US-20060293711-A1 OR US-20060178715-A1 OR US-20060155197-A1 OR US-20060047315-A1 OR US-20030195443-A1 OR US-20020082536-A1 OR US-20020072693-A1 OR US-20020115947-A1 OR US-20020177795-A1 OR US-20020183668-A1 OR US-20030009116-A1 OR US-20030028134-A1 OR US-20030149381-A1 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/01/31 10:51 AM

Petitioner Therabody Ex-1004, 1901

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Petitioner Therabody Ex-1004, 1902

		7503923-B2 OR US-6723060-B2 OR US-6682496-B1 OR US-6663657-B1 OR US-6616621-B1 OR US-6537236-B2 OR US-6503211-B2 OR US-6478755-B2 OR US-6379375-B1 OR US-6228042-B1 OR US-5925002-A OR US-6165145-A OR US-5803916-A OR US-5447491-A OR US-5327887-A OR US-5140979-A OR US-5085207-A OR US-4858599-A OR US-4858600-A OR US-4841955-A OR US-4827914-A OR US-4716890-A OR US-4566442-A OR US-4549535-A OR US-4513737-A OR US-4088128-A OR US-4079733-A OR US-3837335-A OR US-3710785-A OR US-3626934-A OR US-2078025-A OR US-1657765-A OR US-1339179-A OR US-1269803-A OR US-4031763-A OR US-4137632-A OR US-4236874-A OR US-4245966-A OR US-4261228-A OR US-4730605-A OR US-4790296-A OR US-5134777-A OR US-5300095-A OR US-5581896-A OR US-6357125-B1 OR US-5935089-A OR US-6432072-B1 OR US-6902525-B1 OR US-7144417-B2 OR US-7658012-B2 OR US-10201470-B2 OR US-10314762-B1 OR US-10603208-B2 OR US-10653581-B2).did. AND USPT.dbnm.)				
L16	2	"10561574".pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2024/01/31 12:24 PM

Petitioner Therabody Ex-1004, 1903

			AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L17	1	("863525" OR "4,698,869").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 02:50 PM
L18	25	("863525" OR "4,698,869" OR "4,726,430" OR "5,043,651" OR "5,134,777" OR "5,769,657" OR "5,935,089" OR "6,602,211" OR "7,144,417" OR "7,169,169" OR "7,503,923" OR "7,658,012" OR "8,435,194" OR "8,826,547" OR "8,841,871" OR "9,364,626" OR "10,201,470" OR "10,456,325" OR "10,470,970" OR "20020177795" OR "20020188233" OR "20030014079" OR "20030028134" OR "20040254507" OR "20050075591" OR "20050113870").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 02:54 PM
L19	18	("20050131461" OR "20060116614" OR "20060211961" OR "20060293711" OR "20070257638" OR "20080262399" OR "20080275371" OR "20100145242" OR "20100160841" OR "20110017742" OR "20120197357" OR "20120215141" OR "20120296244" OR "20130030506" OR "20130289457" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 02:59 PM

Petitioner Therabody Ex-1004, 1904

		"20140031866" OR 2014/0221887 OR "2014" "0288473" OR "20150107383").pn.					
L20	689	a61h$.cpc. AND massag$3 AND ((exchang$3 OR chang$3 OR inter$1chang$4 OR replac$4 OR swap$4) WITH (while OR during) WITH (operation$2 OR reciprocat$4 OR use OR using))	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 03:39 PM
L21	1	"20080243039".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 03:40 PM
L22	390	a61h$.cpc. AND massag$3 AND ((exchang$3 OR chang$3 OR inter$1chang$4 OR replac$4 OR swap$4) near10 (while OR during) near10 (operation$2 OR reciprocat$4 OR use OR using))	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 03:42 PM
L23	65	theragun.as.	(US-PGPUB; USPAT)	OR	ON	ON	2024/01/31 04:39 PM
L24	131	((US-20180200141-A1 OR US-20160367425-A1 OR US-20150305972-A1 OR US-20140194790-A1 OR US-20140114220-A1 OR US-20140094724-A1 OR US-20130261516-A1 OR US-20130281897-A1 OR US-20110118638-A1 OR US-20130138023-A1 OR US-20100312155-A1 OR US-20100274162-A1 OR US-20100185127-A1 OR US-20080306417-A1 OR US-20070270727-A1 OR US-20070144310-A1 OR US-20070150004-A1 OR US-20060293711-A1 OR US-20060178715-A1 OR US-20060155197-A1 OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/02/06 10:51 AM

Petitioner Therabody Ex-1004, 1905

		20060047315-A1 OR US-20030195443-A1 OR US-20020082536-A1 OR US-20020072693-A1 OR US-20020115947-A1 OR US-20020177795-A1 OR US-20020183668-A1 OR US-20030009116-A1 OR US-20030028134-A1 OR US-20030149381-A1 OR US-20040049137-A1 OR US-20050113724-A1 OR US-20050113870-A1 OR US-20050222525-A1 OR US-20060025710-A1 OR US-20060058714-A1 OR US-20060135319-A1 OR US-20060253051-A1 OR US-20070167888-A1 OR US-20070179414-A1 OR US-20080319357-A1 OR US-20090270915-A1 OR US-20100137760-A1 OR US-20120253245-A1 OR US-20130102937-A1 OR US-20130158547-A1 OR US-20130060176-A1 OR US-20130338550-A1 OR US-20140135875-A1 OR US-20140194900-A1 OR US-20140288364-A1 OR US-20140180181-A1 OR US-20140371690-A1 OR US-20150005679-A1 OR US-20150005682-A1 OR US-20150182078-A1 OR US-20150182290-A1 OR US-20150305969-A1 OR US-20160151238-A1 OR US-20170087041-A1 OR US-20170172837-A1 OR US-20170304144-A1 OR US-20170304145-A1 OR US-20180280675-A1					

Petitioner Therabody Ex-1004, 1906

		OR US-20190262607-A1 OR US-20190365598-A1 OR US-20200085684-A1 OR US-20200085675-A1 OR US-20200390644-A1 OR US-20210077340-A1 OR US-20220085628-A1 OR US-20030014079-A1 OR US-20050131461-A1).did. AND PGPB.dbnm.) OR ((US-7927294-B2 OR US-7927259-B1 OR US-7503923-B2 OR US-6723060-B2 OR US-6682496-B1 OR US-6663657-B1 OR US-6616621-B1 OR US-6537236-B2 OR US-6503211-B2 OR US-6478755-B2 OR US-6379375-B1 OR US-6228042-B1 OR US-5925002-A OR US-6165145-A OR US-5803916-A OR US-5447491-A OR US-5327887-A OR US-5140979-A OR US-5085207-A OR US-4858599-A OR US-4858600-A OR US-4841955-A OR US-4827914-A OR US-4716890-A OR US-4566442-A OR US-4549535-A OR US-4513737-A OR US-4088128-A OR US-4079733-A OR US-3837335-A OR US-3710785-A OR US-3626934-A OR US-2078025-A OR US-1657765-A OR US-1339179-A OR US-1269803-A OR US-4031763-A OR US-4137632-A OR US-4236874-A OR US-4245966-A OR US-4261228-A OR US-4730605-A OR US-4790296-A OR US-5134777-A OR US-					

Petitioner Therabody Ex-1004, 1907

		5300095-A OR US-5581896-A OR US-6357125-B1 OR US-5935089-A OR US-6432072-B1 OR US-6902525-B1 OR US-7144417-B2 OR US-7658012-B2 OR US-10201470-B2 OR US-10314762-B1 OR US-10603208-B2 OR US-10653581-B2 OR US-7169169-B2 OR US-10470970-B2).did. AND USPT.dbnm.)					
L25	82	("1787211" | "4088128" | "4513737" | "4827914" | "4841955" | "4858600").pn. OR ("6682496").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2024/02/06 11:02 AM
L26	1	"20150374576".pn.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2024/02/06 11:16 AM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	1641	((percuss$3 OR reciprocat$3) AND (piston OR rod) AND (motor OR actuator) AND (bore OR port OR opening OR slot) AND (head OR applicator OR end$1effect$3)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/06 11:55 AM
N2	711	((percuss$3 OR reciprocat$3) AND (piston OR rod) AND (motor OR actuator) AND (bore OR port OR opening OR slot) AND (head OR applicator OR end$1effect$3) AND (insert$4 OR chang$4 OR inter$1chang$4 OR remov$4 OR replac$5)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/06 11:56 AM
N3	45	((percuss$3 OR reciprocat$3) AND (piston OR rod) AND (motor OR actuator) AND (bore OR port OR opening OR slot) AND (head OR applicator OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/02/06 11:57 AM

Petitioner Therabody Ex-1004, 1908

		end$1effect$3) AND (insert$4 OR chang$4 OR inter$1chang$4 OR remov$4 OR replac$5)).clm. AND (massag$3 OR therapy)					

Petitioner Therabody Ex-1004, 1909

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/515,112	Danby et al.
	Examiner	**Art Unit**
	TIMOTHY A STANIS	3785

CPC						
Symbol					**Type**	**Version**
A61H	/	23	/	0254	F	2013-01-01
A61H	/	2201	/	5005	A	2013-01-01
A61H	/	2201	/	5038	A	2013-01-01
A61H	/	2201	/	149	A	2013-01-01
A61H	/	2201	/	5097	A	2013-01-01
A61H	/	2201	/	1215	A	2013-01-01
A61H	/	2201	/	501	A	2013-01-01
A61H	/	2201	/	5035	A	2013-01-01
A61H	/	2201	/	0157	A	2013-01-01
A61H	/	2201	/	0107	A	2013-01-01
A61H	/	2201	/	1418	A	2013-01-01
A61H	/	2201	/	1664	A	2013-01-01
A61H	/	2201	/	0153	A	2013-01-01
A61H	/	2201	/	5015	A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	18	
/TIMOTHY A STANIS/ Primary Examiner, Art Unit 3785	31 January 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1, 18	1, 6A

U.S. Patent and Trademark Office — Part of Paper No.: 20240131

Petitioner Therabody Ex-1004, 1910

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/515,112	Danby et al.
	Examiner	Art Unit
	TIMOTHY A STANIS	3785

INTERNATIONAL CLASSIFICATION					
CLAIMED					
A61H	/	23	/	02	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE (Assistant Examiner) (Date)	Total Claims Allowed: 18	
/TIMOTHY A STANIS/ Primary Examiner, Art Unit 3785 (Primary Examiner) 31 January 2024 (Date)	O.G. Print Claim(s) 1, 18	O.G. Print Figure 1, 6A

U.S. Patent and Trademark Office Part of Paper No.: 20240131

Petitioner Therabody Ex-1004, 1911

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/515,112	Danby et al.
	Examiner	**Art Unit**
	TIMOTHY A STANIS	3785

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10												
2	2	11	11												
3	3	12	12												
4	4	13	13												
5	5	14	14												
6	6	15	15												
7	7	16	16												
8	8	17	17												
9	9	18	18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	18	
/TIMOTHY A STANIS/ Primary Examiner, Art Unit 3785	31 January 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1, 18	1, 6A

Petitioner Therabody Ex-1004, 1912

Notice of References Cited	Application/Control No. 18/515,112	Applicant(s)/Patent Under Reexamination Danby et al.	
	Examiner TIMOTHY A STANIS	Art Unit 3785	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-1269803-A	1918-06-18	~~Name not available~~ Sharpnack	A61H23/0254	601/108
*	B	US-2078025-A	1937-04-20	SAMUELS ABE O	A61H23/0218	601/81
*	C	US-3837335-A	1974-09-24	Teranishi; Akihiko	A61H23/0254	601/103
*	D	US-4079733-A	1978-03-21	Denton; Robert C.	A61H23/0254	601/108
	E					
	F					
	G	Change(s) applied				
	H	to document,				
	I	/B.P./				
	J	2/22/2024				
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

Petitioner Therabody Ex-1004, 1913

PTO/SB/08a (07-09)
Approved for use through 05/31/2024. OMB 0651-0031
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 7 of 18

Complete if Known	
Application Number	Not Yet Assigned
Filing Date	Concurrently Herewith
First Named Inventor	Philip C. Danby
Art Unit	N/A
Examiner Name	Not Yet Assigned
Attorney Docket Number	HYP-034C5

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A115	US-7,470,242	12-30-2008	Ferber et al.	
	A116	US-7,507,198	03-24-2009	Ardizzone et al.	
	A117	US-7,517,327	04-14-2009	Knight	
	A118	US-7,597,669	10-06-2009	Huang	
	A119	US-7,629,766	12-08-2009	Sadow	
	A120	US-7,634,314	12-15-2009	Applebaum et al.	
	A121	US-7,927,294	04-19-2011	Kamimura et al.	
	A122	US-7,976,485	07-12-2011	Huang	
	A123	US-8,052,625	11-08-2011	Tsai et al.	
	A124	US-8,083,699	12-27-2011	Colloca et al.	
	A125	US-8,092,407	01-10-2012	Tsukada et al.	
	A126	US-8,192,379	06-05-2012	Huang	
	A127	US-8,282,583	10-09-2012	Tsai	
	A128	US-8,317,733	11-27-2012	Chen et al.	
	A129	US-8,342,187	01-01-2013	Kalman et al.	
	A130	US-8,475,362	07-02-2013	Sohn et al.	
	A131	US-8,632,525	01-21-2014	Kerr et al.	
	A132	US-8,673,487	03-18-2014	Churchill	
	A133	US-8,951,216	02-10-2015	Yoo et al.	

Change(s) applied to document, /J.E.B./ 2/23/2024

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1] EM	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/T.A.S/	B37**	~~EU~~-004377638-0002	10-25-2017	Einhell Germany AG		
/T.A.S/	B38**	FI-903376-A	12-31-1991	Mirfakhraei, Kaveh	Engl. Abstract	
/T.A.S/	B39**	GB-1293876-A	10-25-1972	Sunbeam, Corporation		
/T.A.S/	B40**	GB-188946-A	11-23-1922	James, Charles Hillman		
/T.A.S/	B41**	GB-191209026-A	03-06-1913	Johansen, Johannes Christian		
/T.A.S/	B42**	GB-191509508-A	06-29-1916	Begonin, Paul		

Examiner Signature	/TIMOTHY A STANIS/	Date Considered	01/12/2024

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

IPTS/125359394.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.A.S/

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/515,112	03/26/2024	11938082	HYP-034C5	2915

162143 7590 03/06/2024

GOODWIN PROCTER LLP/SILICON VALLEY
PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

Petitioner Therabody Ex-1004, 1915

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Philip C. Danby, Key Biscayne, FL;
John Charles Danby, Witham, UNITED KINGDOM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

HYPERICE IP SUBCO, LLC, Irvine, CA;

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Petitioner Therabody Ex-1004, 1916

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ACKNOWLEDGEMENT OF LOSS OF ENTITLEMENT TO ENTITY STATUS DISCOUNT

APPLICATION #	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET #	REQUEST ID
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	187839

The entity status change request below filed through Patent Center on 03/22/2024 has been accepted.

Certifications

APPLICANT CHANGING TO REGULAR UNDISCOUNTED FEE STATUS

Signature

I certify, in accordance with 37 CFR 1.4(d)(4), that I am one of the signatories making the entity status change.

Signature	Name	Registration #
/Hunter Malboeuf/	Hunter Malboeuf	79730

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/515,112	11/20/2023	Philip C. Danby	HYP-034C5	2915

162143 7590 03/26/2024

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100 NORTHERN AVENUE
BOSTON, MA 02210

EXAMINER	
STANIS, TIMOTHY A	

ART UNIT	PAPER NUMBER
3785	

NOTIFICATION DATE	DELIVERY MODE
03/26/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JGoodwin@goodwinlaw.com
TFRANKLIN@GOODWINLAW.COM
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Petitioner Therabody Ex-1004, 1918

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/515,112	26-Mar-2024	11938082

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EGRANT NOTIFICATION

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Petitioner Therabody Ex-1004, 1919

Notice of Potential Erroneous Release of Patent Application Titles

On February 5, 2024, the United States Patent and Trademark Office (USPTO), replaced the Electronic Patent Assignment System (EPAS) and Electronic Trademark Assignment System (ETAS) with Assignment Center.

Between February 5, 2024 and March 29, 2024, the USPTO, unintentionally, through a computer programming error, permitted bibliographic information to be viewed by unauthorized individuals with access to registered Assignment Center accounts. This bibliographic information was limited to the application number (the two-digit series code plus the six-digit serial number) and title of the invention.

You are receiving this notification because your application's patent title may have been viewed during that time frame by individual(s) who lacked permission to do so. The software error was first reproduced by USPTO on March 28, 2024, and was corrected on March 29, 2024. Only application numbers and titles were disclosed; it is important to note that your specification and claims were not part of the information made available and were not accessed.

Any improper access of the application information between the dates of February 5, 2024 and March 29, 2024, is not considered a publication of such applications under 35 U.S.C. 122(b). No rights in United States patents are threatened by the access to unpublished applications. It is extremely unlikely that the title could disclose the invention in a way that would constitute patent-defeating prior art in any jurisdiction. To the extent any issue is raised, the USPTO will assist applicants by confirming that the disclosure was erroneous and inadvertent.

We're committed to data security and are taking enhanced steps to prevent incidents such as this from happening in the future. The USPTO sincerely regrets this error and is instituting more testing controls, both manual and automated testing, to prevent similar processing errors in the future.

Inquiries regarding this matter may be directed to Mark Polutta, Senior Legal Advisor, at (571) 272-7709 or Andrew Stclair, Legal Advisor, at (571) 270-0238, both of the Office of Patent Legal Administration or via email addressed to Patent.Practice@uspto.gov.

Henry "Jamie" Holcombe
Chief Information Officer
US Patent and Trademark Office
Office +1 (571) 272-9400

Dated: April 27th, 2024

Petitioner Therabody Ex-1004, 1920

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
18/515,112	11/20/2023	Danby et al.	HYP-034C5

GOODWIN PROCTER LLP/SILICON VALLEY PATENT ADMINISTRATOR
100 NORTHERN AVENUE
BOSTON, MA 02210

EXAMINER	
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ART UNIT	PAPER
--	20240427-YiEfK8

DATE MAILED: 27 April 2024

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

PTO-90C (Rev.04-03)

OPAP
JUN 24 2024
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent of Danby et al. Patent No. 11,938,082 Issued: March 26, 2024
For: Massage Device Having Variable Stroke Length

Submission of Prior Art Under 37 CFR 1.501

Hon. Commissioner for Patent
P.O. Box 1450 Alexandria,
VA 22313-1450

Sir:

The undersigned herewith submits in the above-identified patent the following prior art (including copies thereof) which is pertinent and applicable to the patent and is believed to have a bearing on the patentability of claims 1-18 thereof:

Pivaroff U.S. 6,682,496 Jan. 27, 2004
Bosten et al. U.S. 3,696,693 Oct. 10, 1972
Harris et al. U.S. 6,432,072 Aug. 13, 2002
Noble et al. U.S. 4,730,605 Mar. 15, 1988
Elmen U.S. 1,339,179 May 04, 1920
Smith U.S. 5,215,051 Jun. 1, 1993

Each of the references discloses an apparatus strikingly similar to the device of Danby et al.. It is believed that each of the references has a bearing on the patentability of claims 1-18 of the Danby et al. patent.

Claim 1 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim	Combination of Pivaroff in view of Bosten

Petitioner Therabody Ex-1004, 1922

Elements	
Claim 1 - A percussive massager comprising:	Pivaroff teaches "A deep muscle stimulation device" (col. 1, line 8; Figs. 1-6).
a housing;	Pivaroff teaches a housing. (Fig. 2, body 12 and top element 16 form an overall "housing" for the device)
a piston having a proximal end and a distal end, the distal end of the piston having a bore;	Pivaroff teaches a piston having a proximal end and a distal end. (Figs. 3-5, link 34 and rod 38 form a "piston". Link 34 is located at the proximal end of the piston and rod 38 is located at the distal end of the piston.) Bosten discloses an impact wrench (Fig. 1 device 10) having a quick release connector for attaching removable bit 144 (Figs. 2-3). Bosten teaches "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines 52-56; Figs. 2-3)
a motor operatively connected to the proximal end of the piston, wherein the motor is configured to cause the piston to reciprocate at a first speed;	Pivaroff teaches a motor at least partially within the housing and operatively connected to the proximal end of the piston (Fig. 6, electrical motor 24 is mounted within the handle portion of the housing. Motor 24 is

Petitioner Therabody Ex-1004, 1923

	connected to the link 34 via rotary shaft 26, coupling system 28, cam 30, and finger 32), wherein the motor is configured to cause the piston to reciprocate at a first speed (col. 3, lines 44-47, discloses speeds between 2000 to 3600 RPM).
a drive mechanism that controls a predetermined stroke length of the piston; and	Pivaroff teaches a drive mechanism that controls a predetermined stroke length of the piston (Figs. 3-5, cam 30 with finger 32 forms a part of the drive mechanism that controls the stroke length of the piston 34/38. The amount of offset of the finger 32 from the central axis of the cam 30 determines the stroke length of the piston).
a quick-connect system comprising the distal end of the piston and a first massaging head, wherein the quick-connect system is configured to have a proximal end of the first massaging head inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.	Pivaroff teaches a quick release connector at the distal end of the piston, wherein the quick release connector is configured to connect to a first massaging head (Fig. 3, recessed opening 40 in rod 38 is threaded and forms a "quick release" connector for attaching a mating head 44). Pivaroff does not explicitly disclose that the quick release connector is configured to connect a first massaging head "while the piston reciprocates the predetermined stroke length at the first

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	speed". However, Bosten discloses an impact wrench (Fig. 1 device 10) having a quick release connector for attaching removable bit 144 (Figs. 2-3). Bosten teaches "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines 52-56; Figs. 2-3) and "One exemplary scheme of retaining the bit, shown in FIG. 2, involves the use of a magnet 158 slidably received in guide 148." (col. 5 lines 5-7; Figs. 2-3)

Claims 2-5 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Harris, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten and Harris
Claim 2 - The percussive massager of claim 1, wherein the motor is configured to cause the piston to reciprocate at a second speed.	Harris teaches a hand-held percussive massager (Fig. 1 massager 50) comprising a control panel (Fig. 1, control panel 5) comprising a speed setting control button that allows the user to percuss the massager a different speeds (Fig. 1, speed control button

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	5b; see col. 2, lines 49-57)
Claim 3 - The percussive massager of claim 1, further comprising: a control panel positioned on an exterior of the housing.	Harris teaches a hand-held percussive massager (Fig. 1 massager 50) comprising a control panel (Fig. 1, control panel 5) comprising a speed setting control button that allows the user to percuss the massager a different speed (Fig. 1, speed control button 5b; see col. 2, lines 49-57)
Claim 4 - The percussive massager of claim 3, wherein the control panel is configured to display one or more visual indicators.	The modified apparatus of Pivaroff has the control panel as configured to display one or more visual indicators (Harris, Figs. 1-2 LED speed indicator 5C).
Claim 5 - The percussive massager of claim 1, further comprising a handle and a flywheel, wherein the handle is on an opposite side of the flywheel with respect to the motor.	Pivaroff teaches "the deep muscle stimulation device 10 of the present invention includes a body 12 comprised of an elongated, substantially hollow handle 14, a top element or housing 16, and a hollow head 44" (col. 2, lines 30-33; Fig. 2) and "The rotary shaft 26 is coupled by any available or desired means, such as a coupling system 28 to an offset cam element or means 30, having an upwardly extending offset element or finger 32 connected to a reciprocating link 34." (col. 2, lines 40-44; Figs. 3-5)

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Claim 6 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Noble, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten and Noble
Claim 6 - The percussive massager of claim 1, further comprising a handle, wherein the motor is positioned within the housing opposite the handle.	Noble teaches a percussion massager (Fig. 5) comprising a housing (Fig. 5, casing 20) and two handles located on opposite sides of the housing (Fig. 5, handle 22 is located on an opposite side of the casing 20 from handle 24). Noble teaches that the arrangement of these two handles provides the advantage of allowing the operator to manipulate the massager in many ways (col. 6, lines 34-43).

Claim 7 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Elmen, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten, and Elmen
Claim 7 - The percussive massager of claim 1, wherein the motor has an output shaft configured to rotate about a rotation axis, and wherein the drive mechanism comprises: a flywheel	Elmen teaches a percussion massage device (Fig. 2) comprising a motor having an output shaft (Fig. 2, casing 1 houses a motor; see Pg. 1, col 2, lines 65-67. Fig. 2 depicts a motor shaft 9 that would be connected to the motor.

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operatively connected to the output shaft of the motor to rotate about a flywheel axis, the output shaft extending into the flywheel along the flywheel axis; and a crank pin extending from the flywheel, the crank pin being operatively connected to the piston.	The shaft 9, disk 12, and disk pin 12a are all considered part of a single "output shaft" of the motor); and a drive mechanism comprising a flywheel operatively connected to the output shaft (Fig. 2, rotatable head block 7 is operatively connected to the shaft 9, disk 12, and disk pin 12a), wherein the output shaft extends into the flywheel along the flywheel axis (Fig. 2, disk pin 12a) considered part of the "output shaft" extends into the rotatable head block 7.

Claim 8 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Noble, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten and Noble
Claim 8 - The percussive massager of claim 7, further comprising a handle, wherein the motor and the handle are on opposite sides of a plane perpendicular to the flywheel axis that extends through the flywheel.	Noble teaches a percussion massager (Fig. 5) comprising a housing (Fig. 5, casing 20) and two handles located on opposite sides of the housing (Fig. 5, handle 22 is located on an opposite side of the casing 20 from handle 24). Noble teaches that the arrangement of these two handles provides the advantage of allowing the operator to manipulate the

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	massager is many ways (col. 6, lines 34-43)

Claims 9-10 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten
Claim 9 - The percussive massager of claim 7, further comprising a handle, wherein the motor and the handle are on a same side of a plane perpendicular to the flywheel axis that extends through the flywheel.	The modified device of Pivaroff provides a handle (body 12) wherein the motor (electric motor 24) and the handles are on a same side of a plane perpendicular to the flywheel axis that extends through the flywheel. (Fig. 6)
Claim 10 - The percussive massager of claim 7, wherein an offset between the flywheel axis and an axis of the crank pin controls the predetermined stroke length of the piston.	The modified device of Pivaroff has an offset between the flywheel axis and an axis of the crank pin controls the predetermined stroke length of the piston (Pivaroff, Fig. 6, depicts an offset between the central axis of the cam element 30 and the central axis of the finger 32).

Claim 11 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Elmen, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim	Combination of Pivaroff in view of Bosten,

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Elements	and Elmen
Claim 11 - The percussive massager of claim 7, wherein the motor is directly connected to the flywheel, and wherein the crank pin is directly connected to the flywheel.	The modified device of Pivaroff has the motor directly connected to the flywheel (Elmen, Fig. 2, the electric motor is directly connected to the flywheel 7 via the output shaft comprising shaft 9, disk 12, and disk pin 12a. The modified device would have this type of "direct" drive train connection between the motor and the cam (flywheel), and wherein the crank pin is directly connected to the flywheel (Pivaroff, finger 32 is directly connected to the cam element 30).

Claim 12 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, and further in view of Smith, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten, and Smith
Claim 12 - The percussive massager of claim 7, wherein the motor is configured to cause the piston to reciprocate at the first speed along a longitudinal axis, and further comprising: a first bearing located on a first side of the flywheel; and a	Smith teaches "The modified crankshaft 28 has one U-shaped crank arm 30, respectively, for each piston 18, and further has at least two modified crankshaft journals 32, each of which seating into a respective modified engine block bearing 34. Each piston 18 is connected with the modified crankshaft 28

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second bearing located on a second side of the flywheel, wherein the first bearing and the second bearing are configured to restrain reciprocation of the piston to the longitudinal axis.	via a respective connecting rod 36. In this regard, each connecting rod 36 is pivotally connected at one end with its respective piston 18 and rotatably connected, via a connecting rod bearing 38, with its respective crank arm 30." (col. 3, lines 49-59; Figs. 1-2). Smith discloses a first bearing (engine block bearing 34) located on a first side of the flywheel (crank arm 30) and a second bearing (connecting rod bearing 38) located on a second side of the flywheel (crank arm 30), wherein the first bearing and the second bearing are configured to restrain reciprocation of the piston (piston 18) to the longitudinal axis.

Claims 13-17 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten
Claim 13 - The percussive massager of claim 1, wherein the bore comprises a substantially cylindrical bore.	Bosten teaches "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines

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	52-56; Figs. 2-3)
Claim 14 - The percussive massager of claim 1, further comprising a substantially cylindrical structure within the bore.	Bosten teaches "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines 52-56; Figs. 2-3)
Claim 15 - The percussive massager of claim 14, wherein the substantially cylindrical structure comprises a cylindrical seat.	Bosten teaches "Bit retainer 158 and bit 144 are biased to the left as shown in FIGS. 2 and 3 by a compression spring 166 fixed to magnet 158 and to a pin or rod 168 fitted in the rear end of guide 148." (col. 5, lines 7-10; Figs. 2-3). The modified device of Pivaroff has a cylindrical seat by using a compression spring 166 (Fig. 2)
Claim 16 - The percussive massager of claim 14, wherein the substantially cylindrical structure comprises a magnet.	Bosten teaches "One exemplary scheme of retaining the bit, shown in FIG. 2, involves the use of a magnet 158 slidably received in guide 148". (col. 5, lines 5-7; Figs. 2-3)
Claim 17 - The percussive massager of claim 1, wherein a proximal end of the first massaging head has a pocket to receive the distal end of the piston.	Bosten teaches "Bit retainer 158 and bit 144 are biased to the left as shown in FIGS. 2 and 3 by a compression spring 166 fixed to magnet 158 and to a pin or rod 168 fitted in the rear end of guide 148." (col. 5, lines 7-10;

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	Figs. 2-3). The modified device of Pivaroff has a pocket (guide 148) to receive the distal end of the piston.

Claim 18 of U.S. Patent 11,938,082 is unpatentable under 35 U.S.C. 103 as being obvious over Pivaroff in view of Bosten, as shown by the following claim chart:

U.S. Patent 11,938,082 Claim Elements	Combination of Pivaroff in view of Bosten
Claim 18 - A method of assembling a percussive massager, the method comprising:	Pivaroff teaches "A deep muscle stimulation device" (col. 1, line 8; Figs. 1-6).
operatively connecting a motor to a proximal end of a piston, wherein the motor is configured to cause the piston to reciprocate at a first speed, wherein a distal end of the piston has a bore,	Pivaroff teaches a piston having a proximal end and a distal end. (Figs. 3-5, link 34 and rod 38 form a "piston". Link 34 is located at the proximal end of the piston and rod 38 is located at the distal end of the piston.) Pivaroff teaches a motor at least partially within the housing and operatively connected to the proximal end of the piston (Fig. 6, electrical motor 24 is mounted within the handle portion of the housing. Motor 24 is connected to the link 34 via rotary shaft 26, coupling system 28, cam 30, and finger 32), wherein the motor is configured to cause the piston to reciprocate at a first speed (col. 3,

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	lines 44-47, discloses speeds between 2000 to 3600 RPM). Bosten teaches "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines 52-56; Figs. 2-3)
providing a drive mechanism configured to control a predetermined stroke length of the piston; and	Pivaroff teaches a drive mechanism that controls a predetermined stroke length of the piston (Figs. 3-5, cam 30 with finger 32 forms a part of the drive mechanism that controls the stroke length of the piston 34/38. The amount of offset of the finger 32 from the central axis of the cam 30 determines the stroke length of the piston).
providing a quick-connect system comprising the distal end of the piston and a first massaging head, wherein a proximal end of the first massaging head is configured to be inserted into or removed from the bore while the piston reciprocates the predetermined stroke length at the first speed.	Pivaroff teaches a quick release connector at the distal end of the piston, wherein the quick release connector is configured to connect to a first massaging head (Fig. 3, recessed opening 40 in rod 38 is threaded and forms a "quick release" connector for attaching a mating head 44). Pivaroff does not explicitly disclose that the quick release connector is configured to connect a first

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	massaging head "while the piston reciprocates the predetermined stroke length at the first speed". However, Bosten discloses an impact wrench (Fig. 1 device 10) having a quick release connector for attaching removable bit 144 (Figs. 1-3). "As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit." (col. 4 lines 52-56; Figs. 2-3) "One exemplary scheme of retaining the bit, shown in FIG. 2, involves the use of a magnet 158 slidably received in guide 148." (col. 5 lines 5-7; Figs. 2-3)

Respectfully submitted,

/Tsz Lun TAM/

Tsz Lun TAM

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Certificate of Service

I hereby certify on this twenty-first date of June 2024, that a true and correct copy of the foregoing "Submission of Prior Art" was mailed by Priority Mail, postage paid, to:

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US006682496B1

(12) **United States Patent**
Pivaroff

(10) **Patent No.: US 6,682,496 B1**
(45) **Date of Patent: Jan. 27, 2004**

(54) **DEEP MUSCLE STIMULATOR DEVICE**

(76) Inventor: **Jake W. Pivaroff**, 2711 E. Coast Hwy., Suite 206, Corona Del Mar, CA (US) 92625

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 181 days.

(21) Appl. No.: **09/473,792**

(22) Filed: **Dec. 28, 1999**

(51) **Int. Cl.**[7] **A61H 1/00**

(52) **U.S. Cl.** **601/108**; 601/97; 601/101; 601/107

(58) **Field of Search** 601/70, 84, 97, 601/101, 107–108, 85, 87, 89, 93, 94, 102, 103, 109–111, 72, 80; 606/237–239

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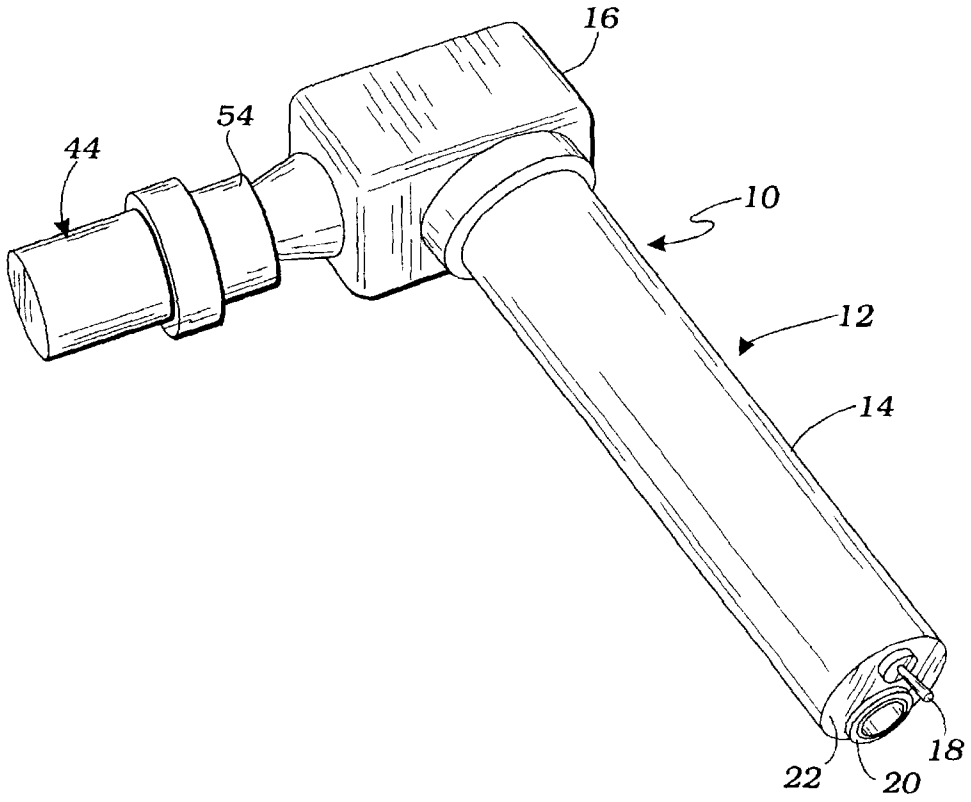
(57) **ABSTRACT**

A deep muscle stimulation device having a titanium hollow head with loosely packed granular materials held therein is reciprocally mounted in a hollow top and driven by a rotating electrical motor held in a hollow handle so as to provide deep muscle tissue with kinetic forms of percussion and concussion vibration so as to benefit damaged muscles in a patient. The hollow head is connected by a number of reciprocating elements to a finger on a rotating cam so as to have between a ⅛ to ½ inch stroke at a high rate of speed to provide deep penetrating muscle tissue stimulation. The device is easy to handle, and includes an on/off switch and an electrical cable-coupling element. The device is made from high strength materials, such as stainless steel or titanium, so as to hold up under heavy use by professionals in a number of disciplines. The granular materials fill approximately ⅓ the volume of the hollow head and are selected from diamonds, rubies, copper, bloodstone, garnet, malachite and carbon.

7 Claims, 2 Drawing Sheets



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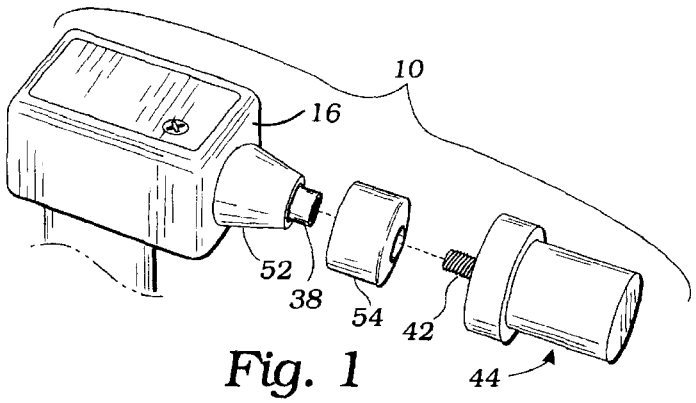

Fig. 1

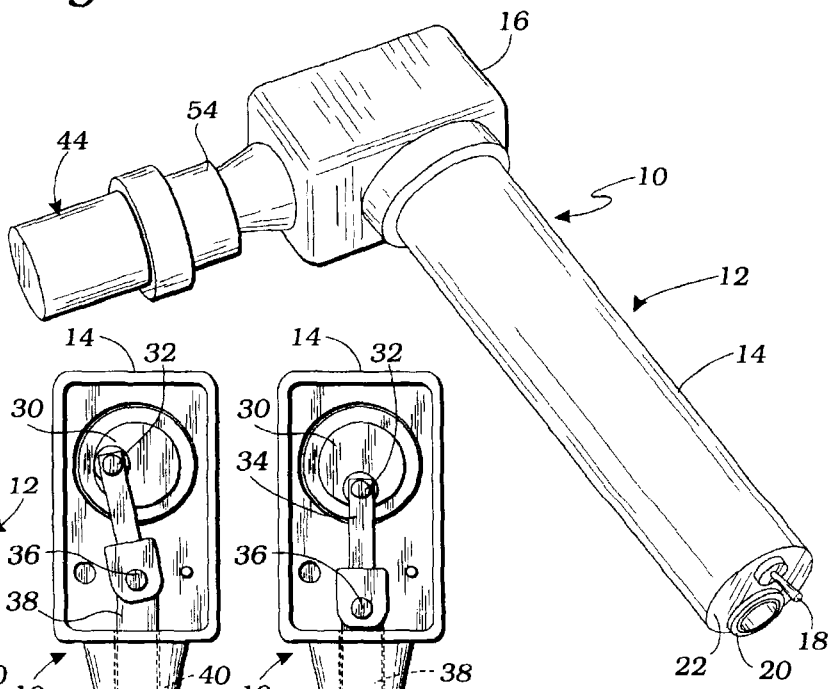

Fig. 2

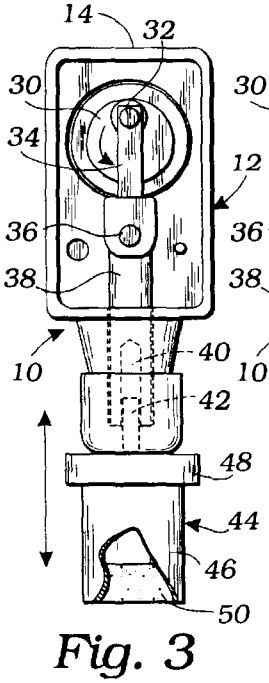

Fig. 3

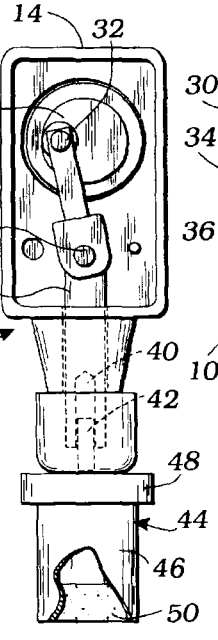

Fig. 4

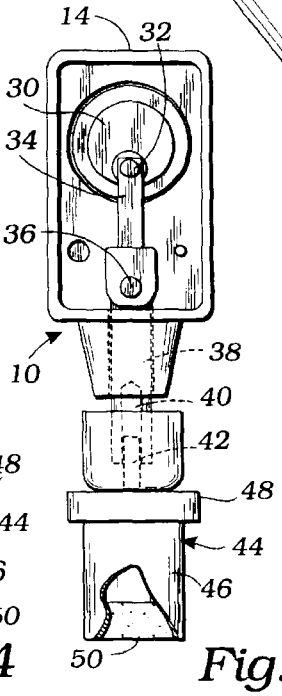

Fig. 5

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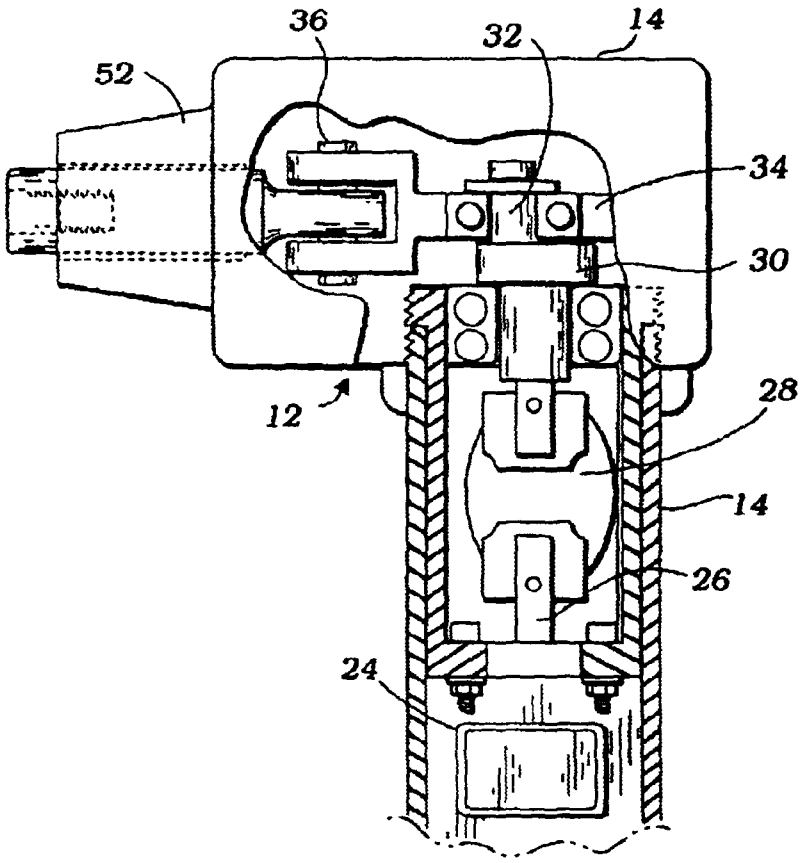

Fig. 6

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DEEP MUSCLE STIMULATOR DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to medical devices, and, more particularly, to a deep muscle stimulator device to increase muscle metabolism, increase the lactic acid cycle and to relieve pain.

2. Description of Related Art

Many types of a vibrating massage-type devices are known for use on different portions of a person's body, to help relieve stress, or tightened muscles. However, the known devices either do not vibrate at high enough speeds and/or do not provide sufficient force to reach deep muscle tissues.

Much of muscle pain stems from various conditions, caused by overstressing or over using muscles. These include strain, lactic acid build-up, scar tissue build-up, etc. The known prior art devices do not reach deep enough into the muscle tissues to provide the necessary relief for many persons. Therefore, there exists a need in the art for a deep muscle stimulator, such as the present invention, which uses percussion and mechanical vibrations that reach deep into the muscle tissue, to stimulate proprioceptive functions.

SUMMARY OF THE INVENTION

It is, therefore, a general object of the present invention to provide an improved muscle stimulation device. It is a particular object of the present invention to provide an improved deep muscle stimulation device, which provides deep muscle tissue with kinetic forms of percussion. It is another particular object of the present invention to provide an improved deep muscle stimulation device, which provides deep muscle tissue with concussion vibration to provide improved benefits for patients. It is yet another particular object of the present invention to provide an improved deep muscle stimulation device which provides increased circulation, increased performance, reduced pain, accelerated rehabilitation from injury, breakup of muscular scar tissue, reduced lactic acid build-up, increased flexibility, endurance and speed, and increased lymphatic flow. And, it is still another particular object of the present invention to provide an improved deep muscle stimulation device, which concentrates on general and/or local muscle spasms, to increase muscle metabolism and thereby increase the lactic acid cycle to thereby relieve pain.

These and other objects of the present invention are achieved by providing a deep muscle stimulation device having a body, which includes a holding portion with an electric motor held therein, and wherein the electric motor includes a rotating central arbor, which is coupled to a device for changing the rotational movement of the electric motor into reciprocating motion. And, wherein the motion-converting device is connected via a plurality of elements to a hollow movable head having a number of ingredients therein to apply pressure against selected portions of a patient's body, to thereby provide therapeutic results to the patient.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects and features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The present invention, both as to its

objects and advantages, may best be understood by reference to the following description, taken in connection with the accompanying drawings, wherein like reference numerals are used throughout the several views, and, in which:

FIG. **1** is a partial exploded perspective view, with a portion broken away, of an improved deep muscle stimulation device of the present invention;

FIG. **2** is a further perspective view of an assembled deep muscle stimulation device of the present invention; and

FIGS. **3–5** are top plan views of the deep muscle stimulation device, with a top plate removed, showing rotation of a cam and the reciprocating movement of a linkage and a partially broken away hollow head of the improved device of the present invention.

FIG. 6 is an enlarged partial cross-sectional view of the improved device of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventor of carrying out his invention. Various modifications, however, will remain readily apparent to those skilled in the art, since the generic principles of the present invention have been defined herein specifically to provide for an improved deep muscle stimulation device, generally indicated by the numeral **10**.

As shown in the drawings, the deep muscle stimulation device **10** of the present invention includes a body **12** comprised of an elongated, substantially hollow handle **14**, a top element or housing **16**, and a hollow head **44**.

The elongated handle **14** is preferably made of metal, such as stainless steel or titanium, and includes an on/off switch **18** and an electric cable connection port **20**, preferably formed flush with a bottom surface **22** of the handle **14**. An electrical motor **24** is mounted within the elongated, hollow handle **14**, and includes a central rotary arbor or shaft **26**, driven by the motor. The rotary shaft **26** is coupled by any available or desired means, such as a coupling system **28** to an offset cam element or means **30**, having an upwardly extending offset element or finger **32** connected to a reciprocating link **34**. The reciprocating link **34** is coupled to a connecting element or rod **38**, as by means of a pin **36**, held in one or more openings formed in a first or inner end of the connecting element or rod **38**. The inner end of rod **38** or an outer end or reciprocating link **34** may be bifurcated. The other or outer end of the rod **38** includes a recessed opening **40** formed therein. The recessed opening **40** captures one end of a connecting means, such as a pin **42**, as by having screw threads formed therein. The other or outer end of the pin **42** is screw threaded or otherwise captured in the hollow head **44**.

The hollow head **44** includes a hollow body **46** and a cap element **48** held thereon, as by means of threads formed there between. The hollow body **46** and cap **48** are preferably formed from titanium, or other suitable metal. The hollow body **46** includes an inner chamber, which contains loosely packed granular material **50**. The granular material is loosely held within the hollow head and only fills between ¼ and ½ of the volume of the inner chamber, and preferably about one third. Various granular materials, such as diamond, ruby, copper, bloodstone, garnet, malachite or carbon are mixed together and inserted within the head **50**. It has been found that various mixtures of these granular

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below in tabular form are various preferred mixtures of the same, in grains, which preferably total between approximately 335 to about 500 grains:

DIA	RUBY	COPPER	BLOODSTONE	GARNET	MALACHITE	CARBON	TOTAL GRAINS
50	100	100	100				350
30	50	200	20			50	350
75		100	50	50	150	50	475
50	150	150	100			50	500
25	100	130	50	25		50	380
15	35	200				100	350
15	40	200				100	355
50	75	100		25		100	350
10	25	200				100	335
25	70	200				100	375
20	30	200			GOLD 20	100	370

In particular, it has been found that improved and extraordinary results are obtained by using a mixture of 10 grains of diamond, 25 grains of ruby, 200 grains of copper and 100 grains of carbon for a total of 335 grains of material. Although no explanation can be given for these surprising and unexpected results, it appears that somehow the movement of the mixed grains of material within the interior hollow chamber made from titanium, during reciprocally motion thereof, is transferred to a patient's body in an affected deep muscle area to produce improved and superior deep muscle relief.

FIG. **6** is an enlarged partial cross-sectional view of the improved device of the present invention.

The top hollow housing **16** of the device **10** of the present invention is preferably made from the same material as the elongated handle **14**, and includes a removable top plate and a truncated, pyramid-shape extending portion **52** which surrounds and provides protection around the reciprocating rod **38**. In addition, a protective cup **54** is held between cap **48** of the head **44** and the portion **52** on the top housing **16** to provide further protection from the reciprocating rod **38**.

In operation, an electrical cable is connected into the connection port **20** to provide electricity to the motor **24**. Upon operation of the on/off switch **18** the electric motor will be operated. Preferably, the electric motor operates at a speed of between about 2000 to 3600 RPM, so as to rotate the shaft **26** and coupling system **28** at that speed. This rotational speed is transferred to a reciprocating motion, as shown by arrow **56** in FIG. **3**, whereby the head **44** is quickly reciprocated back and forth to provide sufficient percussion and mechanical vibrations against a portion of a patient to which it is applied by a user, to provide the deep muscle tissue within the patient's body with kinetic forms of percussion and concussion vibration. This stimulates the proprioceptive functions and provides relief in increasing strength for a person suffering from chronic pain and restricted movement to under conditioned and/or damaged muscle tissue. Furthermore, the selected mixture of granular materials in the hollow head **44** provide even further deep muscle relief.

The head **44** moves or reciprocates between approximately ⅛ and ½ of an inch, preferably about ¼ inch to provide maximum concussion and percussion, and, therefore, maximum muscle relief.

It, therefore, can been seen that the deep muscle simulation device of the present invention has been developed for cal therapy fields. These professionals may also include massage therapists, rehabilitation providers and sports trainers in all athletic disciplines. The deep muscle stimulation device of the present invention is used for a range of patients who suffer chronic pain in both everyday life and professional athletes. The device of the present invention produces effective and improved management of acute and chronic pain, including, but not limited to the following: migraine headaches, sciatica, TMJ, carpal tunnel syndrome, tendinitis, bursitis, edema and frozen joints.

Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiments can be configured without departing from the scope and spirit of the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

What is claimed is:

1. A deep muscle stimulation device comprising, in combination:

a body having an elongated hollow handle with an on/off switch, an electrical connection and an electrical motor held therein;

a hollow top housing being connected to the elongated hollow handle;

a cam element having a finger held therein held in the hollow top housing;

the cam element coupled to the electric motor to translate rotary motion of a shaft of the electric motor to reciprocating motion of a titanium hollow head;

the titanium hollow head being attached to a linkage means coupled to the finger to allow reciprocation of the hollow head a predetermined amount, in a rapid manner, determined by the speed of the electrical motor;

the titanium hollow head having a hollow inner chamber with granular material held therein and filing between ¼ and ½ of the volume of the hollow inner chamber; and

the hollow inner chamber having approximately 10 grains of granular diamonds, 25 grains of granular rubies, 200 grains of granular copper and 100 grains of carbon therein.

2. The deep muscle stimulation device of claim **1** wherein the hollow head is comprised of a titanium hollow body and a titanium cap secured to the hollow body, and the titanium cap is secured to the linkage means.

3. The deep muscle stimulation device of claim **2** wherein the linkage means includes a rod and a link, secured together

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4. A deep muscle stimulation device comprising, in combination:

a body having an elongated hollow handle with an on/off switch, an electrical connection and an electrical motor held therein;

a hollow top housing being connected to the elongated hollow handle;

an offset means held in the hollow top housing and coupled to the electric motor to translate rotary motion of a shaft of the electric motor to reciprocating motion of a titanium hollow head;

the titanium hollow head being attached to a rod and a link coupled to the offset means to allow reciprocation of the titanium hollow head a distance of between about ⅛" and ½" in a rapid motion;

the titanium hollow head having a hollow inner chamber with granular material held therein and filing between about ¼ and ½ of the volume of the hollow inner chamber;

the offset means being a cam element having a finger held therein, and the cam element being rotatably secured to the electrical motor by a coupling element whereby the finger is rotated, and wherein the finger is coupled to the link to reciprocate the rod and attached titanium hollow head; and

the hollow inner chamber contains approximately 335 grains of a mixture of granular diamonds, rubies, copper and carbon.

5. The deep muscle stimulation device of claim 4 wherein there are approximately 10 grains of granular diamonds, 25 grains of granular rubies, 200 grains of granular copper and 100 grains of carbon.

6. A deep muscle stimulation device comprising, in combination:

a metal body having an elongated hollow handle with an on/off switch, an electrical connection and an electrical motor held therein;

a metal hollow top housing being connected to the elongated hollow handle;

a cam element held in the hollow top housing and coupled to the electric motor to translate rotary motion of a shaft of the electric motor to reciprocating motion of the titanium hollow head;

the titanium hollow head being attached to a pin, a rod and a link coupled to the cam element to allow reciprocation of the titanium hollow head in a rapid manner, determined by the speed of the electrical motor;

the hollow head having a hollow inner chamber with granular material held therein and filing approximately ⅓ of the volume of the hollow inner chamber;

the cam element having a finger held therein, and wherein the finger is coupled to the link to reciprocate the hollow head through the rod and pin between about ⅛" to about ½"; and

the hollow inner chamber contains approximately 335 grains of granular diamonds, rubies, copper and carbon.

7. The deep muscle stimulation device of claim 6 wherein there are approximately 10 grains of granular diamonds, 25 grains of granular rubies, 200 grains of granular copper and 100 grains of carbon.

* * * * *

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United States Patent

Bosten et al.

[15] **3,696,693**

[45] **Oct. 10, 1972**

[54] **IMPACT WRENCH**

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[73] Assignee: **Rockwell Manufacturing Company,** Pittsburgh, Pa.

[22] Filed: **Nov. 18, 1969**

[21] Appl. No.: **877,688**

[52] **U.S. Cl.**.....**81/52.3,** 81/56

[51] **Int. Cl.**.....**B25b 17/00,** B25b 19/00

[58] **Field of Search** 81/52.3, 56, 125; 51/170; 77/7; 145/61; 16/114; 143/43.1; 74/548, 543

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Primary Examiner—James L. Jones, Jr.
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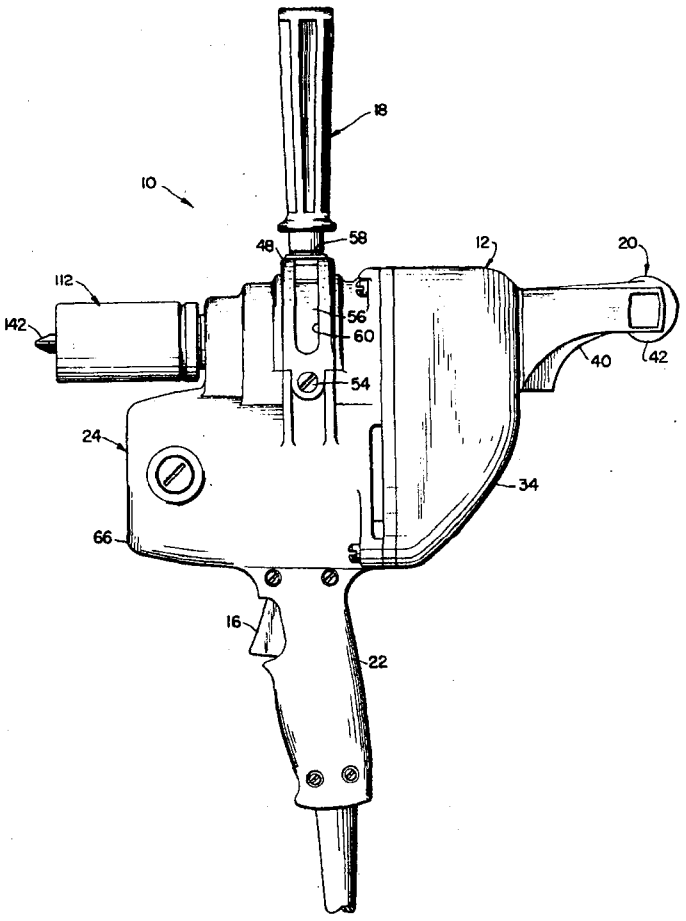
[57] **ABSTRACT**

Impact wrenches comprising a casing housing an axially movable, non-rotatable, fastener-engaging component, a retainer engaging component, and a motor for rotating the retainer-engaging component.

10 Claims, 4 Drawing Figures



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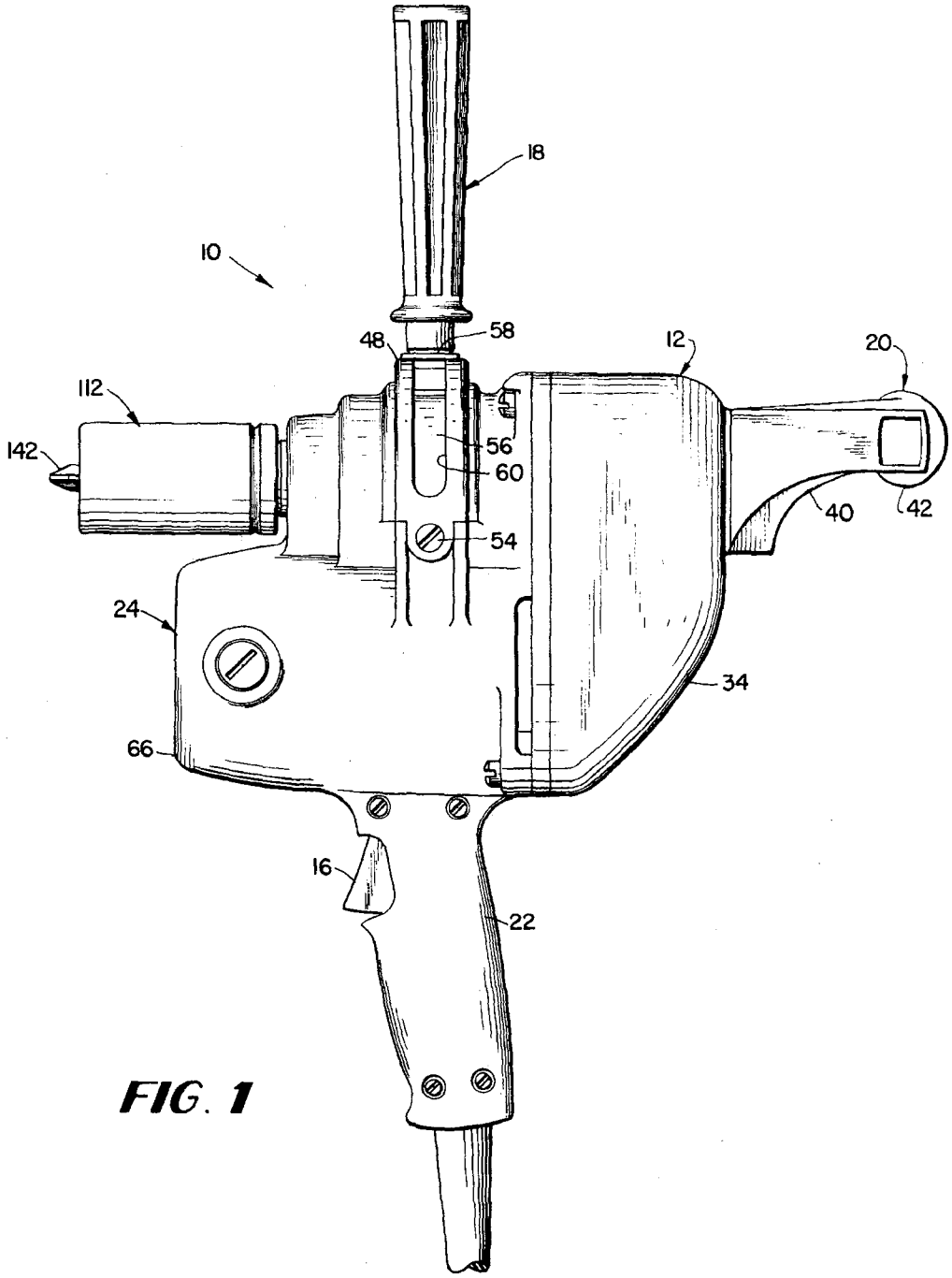

FIG. 1

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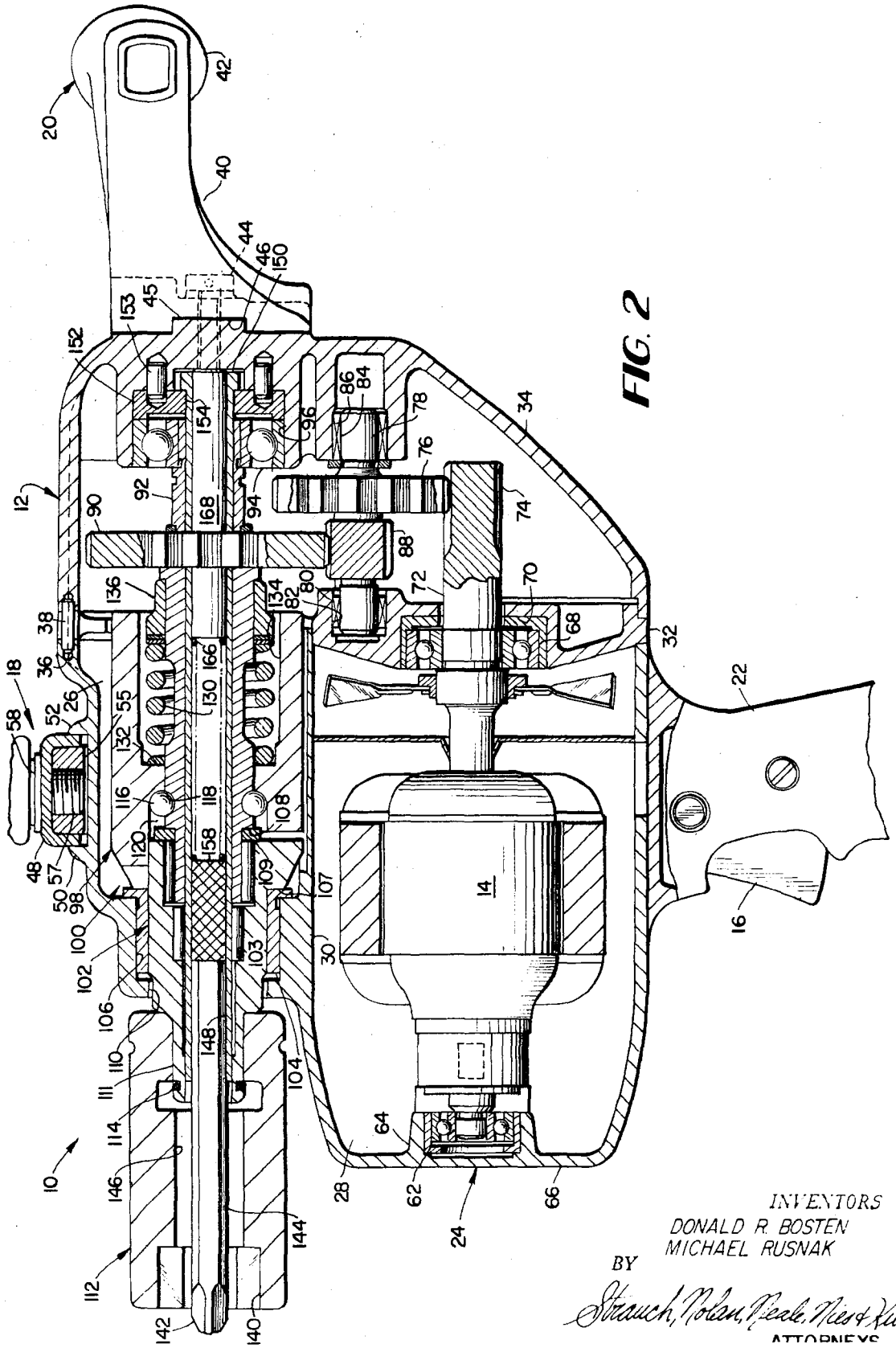

FIG. 2

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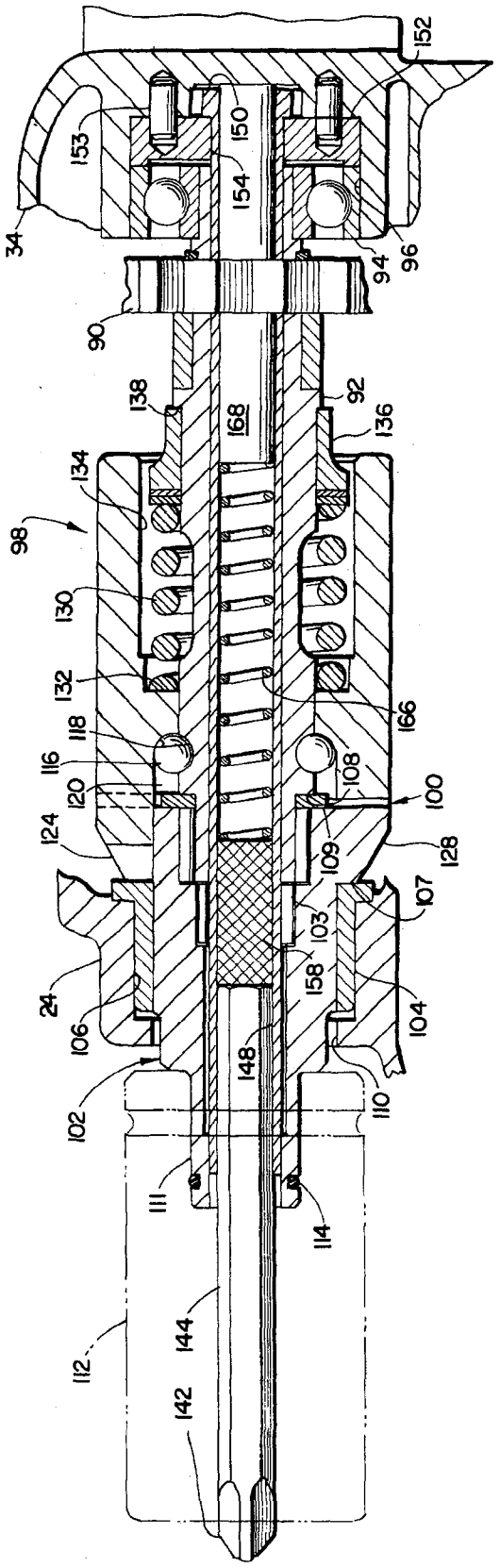

FIG. 3

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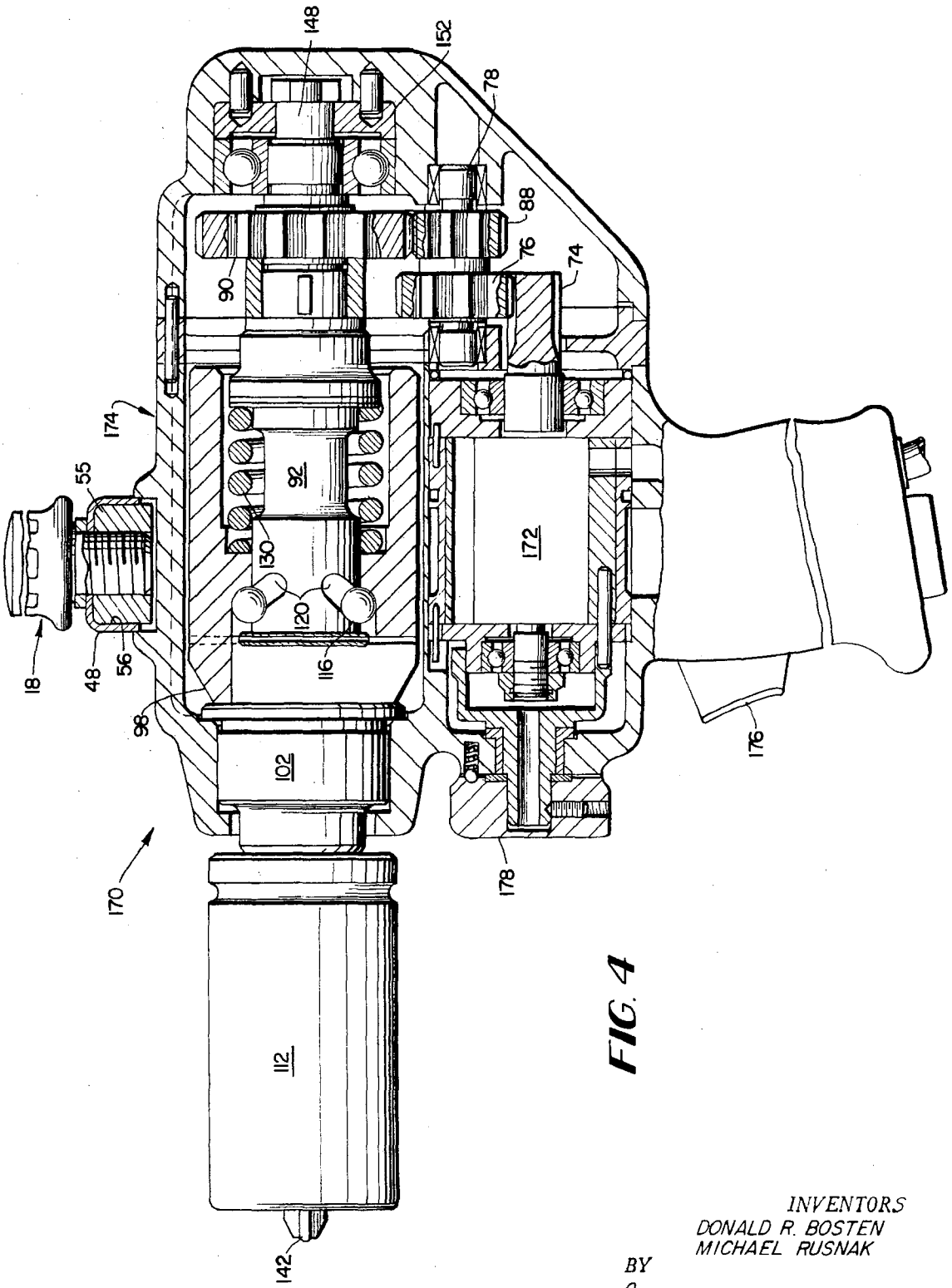

FIG. 4

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IMPACT WRENCH

This invention relates to novel, improved tools for threading a retainer onto a fastener while holding the fastener against rotation.

In many instances it is necessary to fasten two members together in a confined space or in other circumstances where a fastener and retainer can be reached from only one side of an assemblage of members being joined. There have been developed for such applications fasteners which have a socket in their shank end so that they can be held against rotation from the side of the assemblage on which the retainer is threaded onto the fastener. Accordingly, in circumstances of the type just described, access to one side of the fastener is all that is required.

Power tools have heretofore been developed for installing or setting fasteners of the type just described. Typical of these are the bolt-holding wrenches described in La Torre U.S. Pat. No. 2,955,496 and Bangerter U.S. Pat. No. 3,323,394. These include an axially movable, non-rotatable mandrel for holding a bolt against rotation while a rotatable socket threads a retainer onto the fastener.

One of the disadvantages of the tools described in the patents just mentioned are that they lack compactness. Accordingly, they do not lend themselves to use in numerous applications for which fasteners of the type described above were developed.

Other disadvantages of heretofore available tools of the type in question are excessive weight and lack of proper balance, which make them difficult to handle in many circumstances, and lack of sufficient output torque. Also, prior art tools are difficult to handle in some orientations due to the utilization of fixed grips or handles. Further, it is commonly undesirably difficult in such tools to change the fastener-engaging working component or bit.

Also, in many is not most instances, it is desirable to impart a rotary impact to the retainer as it is tightened to prevent the retainer from loosening later. Tools such as those described in the La Torre patent mentioned above have the disadvantage that there is no provision for supplying such an impact.

It is one important and primary object of the present invention to provide novel, improved tools for holding fasteners against rotation while threading retainers thereon which do not have the disadvantages of previously proposed tools of this character.

In the lightweight, high output torque tools of the present invention, by which the foregoing and other important objects are obtained, much the same types of components are employed as in the tools described in the patents identified above. However, a novel over and under arrangement is employed with the motor of the tool being disposed beneath the operating mechanism. The result is a more more compact tool, which can accordingly be used in close quarters where the heretofore available tools cannot. Another advantage of this novel arrangement is that it produces an extremely well balanced tool, which is a significant advantage for obvious reasons.

In conjunction with the foregoing the tools of the present invention are preferably provided with a novel handle which can be quickly adjusted to extend from

mediate positions. This further facilitates the handling of the tool, especially in otherwise awkward positions or orientations.

Still another novel feature of the present invention is the use of a magnetic holder to retain the fastener restraining work performing component or bit in place. This arrangement makes the changing of bits a much simpler procedure than it is in heretofore available tools of the type with which the present invention is concerned.

From the foregoing it will be apparent that other important but more specific objects of the present invention reside in the provision of tools of the type in question:

1. which are light, compact, and well balanced, and therefore relatively easy to handle in what would normally be awkward orientations or positions or cramped quarters. cramped

2. which, in conjunction with the preceding object, have a novel over and under arrangement of components in which the motor of the tool is located beneath its operating mechanism.

3. which are capable of exerting rotary impacts on retainers to insure that they are securely tightened.

4. which have a novel adjustable handle that further makes them easy to manage in a variety of positions or orientations.

5. which may be equipped with a novel magnetic bit holder arrangement that facilitates the removal and replacement of the fastener engaging component.

6. which have various combinations of the novel attributes just listed.

Other objects and advantages and further novel features of the present invention will become apparent from the appended claims and as the ensuing detailed description and discussion proceeds in conjunction with the accompanying drawing, in which:

FIG. 1 is a side view of a power tool constructed in accord with the principles of the present invention;

FIG. 2 is a partial longitudinal section through the tool of FIG. 1;

FIG. 3 is a longitudinal section through the upper part of the tool of FIG. 1 to an enlarged scale; and

FIG. 4 is a longitudinal section through a second form of the invention.

Referring now to the drawing, FIGS. 1–3 depict a power tool 10 constructed in accord with the principles of the present invention and designed to thread a retainer on a fastener while restraining the fastener against rotation. Power tool 10 includes a casing 12 housing a motor 14, the operation of which is controlled by an on-off switch 16 and a forward-reverse switch (not shown). A novel adjustable handle 18 intermediate the ends of casing 12 and a removable handle 20 at the rear end of the casing are provided for use in conjunction with pistol grip 22 to manipulate tool 10.

The details of casing 12 are not important as far as the present invention is concerned and they will accordingly not be described in detail herein. Briefly speaking, however, casing 12 includes a forward section 24 divided into upper and lower compartments 26 and 28 by a horizontal partition 30, a vertical partition member 32, and rear section 34. The three casing components 24, 32, and 34 are maintained in assembled relationship by screw-locks 36 in "HELICOIL" inserts

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The handle 20 at the rear of casing 12 includes a rearwardly extending leg 40 and a laterally extending grip 42. The handle is fixed to the casing as by a cap screw 44. A cooperating lug 45 on the rear of the casing and notch 46 in the handle keep the latter from rotating relative to the casing.

Referring now particularly to FIGS. 1 and 2, it was pointed out briefly above that tool 10 is also preferably equipped with an adjustable handle 18 intermediate the ends preferably casing 12 to facilitate manipulation of the tool. As best shown in FIG. 1, a generally semicircular, laterally oriented bracket 48 is fixed to forward casing section 24 between forward and rear projections 50 and 52 as by screws 54. Disposed between bracket 48 and casing section 24 is an internally threaded retainer 55, which is dimensioned for a sliding fit without rotation in the channel or track 56 between the member and casing 12. The lower end 57 of handle 18 is threaded and extends through a washer 58 and an elongated groove 60 in bracket 48 into channel 56, where it is threaded into retainer 55. Accordingly, when handle 18 is tightened, bracket 48 is clamped between handle 18 and retainer 55, immobilizing the handle. The handle is adjusted by loosening it and sliding it together with retainer 55 to the desired new position and then retightening it.

The handle can be adjusted to extend horizontally to the left and right and vertically from tool 10 and to intermediate positions therebetween. As indicated above, this makes it possible to use tool 10 with ease in positions or orientations in which it would otherwise be difficult to manipulate.

Referring again to FIG. 2, the motor 14 of tool 10 is housed in the lower compartment 28 of casing 12. It is supported by a bearing 62 seated in a boss 64 extending rearwardly from the front wall 66 of casing member 24 and by a bearing 68 seated in an aperture 70 in vertical casing member 32.

The output shaft 72 of motor 14 extends toward the rear of tool 10, and a gear or pinion 74 is formed on its free rear end. Gear 74 is one member of a gear pair including, in addition, a gear 76 keyed or otherwise fixed to an intermediate drive shaft 78 for rotation therewith. Shaft 78 is disposed above and in parallel spaced relationship to motor output shaft 72. It is supported for rotation in a bearing 80 seated in a recess 82 in casing member 32 and by a bearing 84 seated in a recess 86 in the rearmost part of casing member 34.

Also fixed to intermediate drive shaft 78 for rotation therewith is a second pinion or gear 88 constituting one member of a second gear pair, which also includes gear 90. Gear 90 is keyed or otherwise fixed for rotation therewith to a hollow final drive shaft 92 disposed above and in parallel spaced relationship to the previously discussed intermediate drive shaft 78 and motor output shaft 72.

As shown in FIG. 2, the rear end of final drive shaft 92 is rotatably supported in casing 12 by a bearing 94 seated in a recess 96 formed in the rearmost part of rear casing member 34. Adjacent its forward end shaft 92 extends through the axially displaceable input element or hammer 98 of a torque responsive, rotary impact impacting mechanism 100, which also includes an anvil 102 in which the shaft is journalled by bearing

The anvil is supported in casing 12 in axial alignment with hammer 98 in a sleeve bearing 104, which is seated in a recess 106 in the forward end and upper compartment of casing member 24. Anvil 102 is fixed against axial movement in the casing by bearing 104, which abuts a shoulder 107 on the anvil and by a shoulder 108 on final drive shaft 92 from which the anvil is separated by bearing member 109.

The anvil projects from casing member 24 through an opening 110 in the forward end of the casing section and terminates in a necked down socket receiving portion 111. This projecting, necked down section 111 of the anvil will typically have a square or other non-circular cross section to provide a drive connection between the anvil and a retainer engaging socket 112 seated on the forward portion of the anvil and retained in place as by a conventional spring type retainer 114.

Final drive shaft 92 and hammer 98 are fixed together for concomitant rotation by balls 116 seated in recesses 118 in the drive shaft and elongated grooves 120 in the hammer. Hammer 98 is, in turn, normally drive connected to anvil 102 (see FIG. 3) by cooperating drive elements or lugs 124 on the hammer and 128 on the anvil. These drive elements are biased into engaging relationship by a spring 130 surrounding final drive shaft 92. As shown in FIGS. 2 and 3, the forward end of drive spring 130 abuts a radial shoulder 132 in the bore 134 of the hammer. The rear end of the spring is fixedly positioned by a member 136 which surrounds drive shaft 92 and is fixed against rearward movement by a radial shoulder 138 on the drive shaft.

The tool components just described provide a drive path from motor 14 to socket 112 through motor output shaft 72, gear pair 74, 76, intermediate drive shaft 78, gear pair 88, 90, final drive shaft 92, balls 116, hammer 98, and anvil 102. Accordingly, when on-off switch 16 is depressed to energize motor 14, socket 112 is rotated to thread a retainer seated in recess 140 onto or off of an associated fastener, depending upon the position of the forward-reverse switch.

As indicated above, tool 10 also functions to restrain the fastener against rotation while the retainer is threaded onto it. Fasteners of the type with which tool 10 is intended to be used, have a Phillips or similar socket formed in their shank end. In the operation of tool 10, such fasteners are restrained against rotation by engaging in these apertures a similarly configured tip 142 formed on the forward end of a work performing component or bit 144 having a hexagonal or other non-circular cross sectional configuration. As these in both FIGS. 2 and 3, bit 144 extends through the bore 146 of socket 112 into a sleeve-like guide 148 having an internal configuration matching the external configuration of the bit.

Guide 148 extends through hollow drive shaft 92 to the rear end of casing 12 where it terminates in a head 150. Guide 148 is positioned longitudinally in casing 12 and restrained against rotation by the rear wall of casing member 34 and by a fitting 152 fixed to the casing member by fasteners 153. More specifically, the head 150 of the guide is confined against the rear wall of the casing member and fitting 152 to fix the guide longitudinally in the casing. An aperture 154 in fitting 152 through which guide 148 extends is configured to

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guide. Accordingly, the fitting prevents rotation of guide **148**.

Referring still to FIGS. **2** and **3**, the bit **144** just described may be retained in guide **148** in any desired fashion. One exemplary scheme of retaining the bit, shown in FIG. **2**, involves the use of a magnet **158** slidably received in guide **148**. Bit retainer **158** and bit **144** are biased to the left as shown in FIGS. **2** and **3** by a compression spring **166** fixed to magnet **158** and to a pin or rod **168** fitted in the rear end of guide **148**.

To fit a retainer onto a fastener with tool **10**, the retainer is inserted into the retainer receiving recess **140** in the front end of socket **112** or started on the fastener, and the tip **142** of bit **144** is engaged in the socket in the shank end of the fastener. Switch **16** is then depressed to energize motor **14**, effecting a rotation of socket member **112** through the drive train discussed above. This threads the retainer onto the fastener, which is held against rotation by bit **144**. As the retainer moves down the shank end of the fastener, compression spring **166** accommodates movement of bit **144** to the right as shown in FIGS. **2** and **3** so that the retainer remains seated in the recess **140** at the forward end of socket **112**.

The threading of the retainer onto the fastener continues until the retainer is tightened. At this point, socket **112** and anvil **102** are restrained against rotation by the retainer. Since hammer **98** is still being rotated through the drive train discussed above, the drive elements **124** on its forward end ride over those on the anvil, the hammer moving toward the rear of the tool against the bias exerted by spring **130** and balls **116** moving forwardly in grooves **120** as the hammer retracts. This disengages the driving elements **124** and **128** on the hammer and anvil respectively. As the hammer continues to rotate, the driving elements reengage, imparting a rotary impact to the anvil and, therefore, socket **112** and the retainer to insure that the latter is securely tightened.

In the embodiment of the invention just described the tool is powered by an electric motor. This is not a prerequisite of the present invention, however, since an air motor can equally well be employed as in the tool **170** illustrated in FIG. **4**. In this tool, the source of motive power is air motor **172**. Motor **172** is mounted in the casing **174** of tool **170** in much the same manner that motor **14** is mounted in the casing **12** of tool **10**. The operation of the motor is controlled by a trigger type valve actuator **176** which controls the flow of air to the motor through a valve (not shown) of conventional type. The direction of rotation of the motor is controlled by a forward-reverse knob **178** in a manner which is also conventional.

In this embodiment of the invention the positions of the output gear in the first gear pair and the input gear to the second gear pair are reversed on the intermediate drive shaft. Otherwise, this embodiment of the invention is the same as that described earlier with the exception of minor structural differences as indicated by the use of identical reference characters. This embodiment of the invention will typically be even more compact and lighter than the tool **10** described previously; and it may accordingly be preferred in applications where a source of compressed air is readily available.

Tools employing the principles of the present invention may of course take many different forms than those illustrated in FIGS. **1-4** and described above. To the extent that these other forms of the invention are not expressly excluded from the appended claims, they are fully intended to be covered therein.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A tool for threading retainers onto bolts and other fasteners comprising a casing; a first rectilinearly displaceable, non-rotatable component engageable with the fastener to prevent it from rotating housed in and protruding from one end of said casing; a second component for rotating the retainer relative to the fastener to thread the retainer therealong rotatably housed in said casing; a motor having an output shaft housed in said casing; means drive-connecting said motor output shaft to said second component to rotate said component and said retainer; a handle for supporting said tool; and means for fixing said handle to said casing at selectively variable orientations relative thereto to thereby facilitate the handling of said tool, the end of the handle adjacent the casing being threaded and the means for fixing the handle to the casing comprising a track providing member oriented laterally relative to and extending at least partially around said casing, said track member having an elongated groove through which the threaded end of the handle extends, and an internally threaded retainer slidable in said member and adapted to have said handle threaded thereinto to clamp said track providing member between said retainer and said handle to fix the handle relative to the casing.

2. The tool of claim **1**, wherein the means for rotating said second component comprises said motor output shaft, an intermediate drive shaft, and a final drive shaft, said shafts being disposed in parallel, spaced apart relationship, a first gear pair drive-connecting said motor output shaft to said intermediate drive shaft, a second gear pair distinct from said first gear pair drive-connecting said intermediate drive shaft to said final drive shaft, and means providing a drive connection between said final drive shaft and said second component.

3. The tool of claim **2**, wherein the means drive-connecting the final drive shaft to the retainer rotating component comprises a torque responsive, rotary impact imparting mechanism which includes a hammer rectilinearly movable on said final drive shaft, means connecting said hammer to said shaft for rotation therewith, a rotatable anvil aligned with said hammer, there being cooperating means on said hammer and said anvil which are engageable to provide a drive connection therebetween and, during the existence of a restraining torque of predetermined magnitude on said

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to said anvil and an appurtant production of rotary impacts on said anvil, and said second component being fixed to said anvil for rotation therewith.

4. The tool of claim 3, together with means engaged with and biasing said hammer toward said anvil to maintain said cooperating means in drive connection providing engagement in the absence of said restraining torque.

5. The tool of claim 1, together with a magnetic type retainer means for retaining said first component in said guide, said retainer means including a magnet mounted in said guide, and a compression spring having one end fixed relative to said guide and the other end fixed to said magnet and biasing said first component toward the end of the casing from which said first component protrudes.

6. A tool for threading retainers onto bolts and other fasteners comprising a casing; a first component protruding from said casing and engageable with the fastener to prevent it from rotating, a guide for said first component fixed against rotation in said casing, said first component being slidable in said guide and said guide and said component being so configured as to restrain said component against rotation in said guide; a second component for rotating the retainer relative to the fastener to thread the retainer therealong; and means for rotating said second component including a motor, a drive shaft, means drive-connecting said motor to said drive shaft, and a torque responsive, rotary impact imparting mechanism; said drive shaft surrounding said guide to thereby foreshorten and increase the compactness of the tool and said impact imparting mechanism including a hammer axially movable relative to said drive shaft and fixed to said shaft for rotation therewith, an anvil rotatably mounted in said casing and having said second component rotatable therewith, there being cooperating drive connection providing elements on said hammer and said anvil, means biasing said hammer toward said anvil and toward the end of the casing from which said first component protrudes to engage said elements, and bearing means interposed between said guide and said anvil and between said anvil and said drive shaft for making said anvil rotatable relative to said guide and said drive shaft.

7. The tool of claim 6, wherein said motor has an output shaft parallel to and spaced from said guide surrounding drive shaft and wherein the means drive connecting said motor to said drive shaft comprises an intermediate drive shaft disposed in parallel relationship to said motor output shaft, a first gear pair drive-connecting said motor output shaft to said intermediate drive shaft, and a second gear pair drive-connecting said intermediate drive shaft to the guide surrounding drive shaft.

8. The tool of claim 6, together with a magnetic type retainer means for retaining said first component in said guide, said retainer means including a magnet mounted in said guide, and a compression spring having one end fixed relative to said guide and the other end fixed to said magnet and biasing said first component toward the end of the casing from which said first component protrudes.

9. A tool for threading retainers onto bolts and other protruding from said casing and engageable with the fastener to prevent it from rotating; a guide for said first component fixed against rotation in said casing, said first component being slidable in said guide and said guide and said component being so configured as to restrain said component against rotation in said guide; a second component for rotating the retainer relative to the fastener to thread the retainer therealong; means for rotating said second component including a motor, a drive shaft surrounding said guide, means drive-connecting said motor to said drive shaft, and a torque responsive, rotary impact imparting mechanism including a hammer axially movable relative to said drive shaft and fixed to said shaft for rotation therewith, an anvil rotatably mounted in said casing and having said second component rotatable therewith, there being cooperating drive connection providing elements on said hammer and said anvil, and means surrounding said drive shaft for biasing said hammer toward said anvil to engage said drive connection providing elements; a handle for supporting the tool; and means for fixing said handle to said casing at selectively variable orientations relative thereto to thereby facilitate the handling of said tool, one end of the handle being adjacent the casing, said one handle end being threaded, and the means for fixing the handle to the casing comprising a track providing member oriented laterally relative to and extending at least partially around said casing, said track providing member having therein an elongated groove through which the threaded end of the handle extends, and an internally threaded retainer slidable in said member and adapted to have said handle threaded thereinto to clamp said track providing member between said retainer and said handle to fix the handle relative to the casing.

10. A tool for threading retainers onto bolts and other fasteners comprising a casing; a first component protruding from said casing and engageable with the fastener to prevent it from rotating; a guide for said first component fixed against rotation in said casing, said first component being slidable in said guide and said component being so configured as to restrain said component against rotation in said guide; a second component for rotating the retainer relative to the fastener to thread the retainer therealong; means for rotating said second component including a motor, a drive shaft surrounding said guide, means drive-connecting said motor to said drive shaft, and a torque responsive, rotary impact imparting mechanism including a hammer axially movable relative to said drive shaft and fixed to said shaft for rotation therewith, an anvil rotatably mounted in said casing and having said second component rotatable therewith, there being cooperating drive connection providing elements on said hammer and said anvil, means biasing said hammer toward said anvil to engage said elements, and bearing means interposed between said guide and said anvil and between said anvil and said drive shaft for making said anvil rotatable relative to said guide and said drive shaft; a handle having one end adjacent said casing; and means for fixing said handle to said casing at selectively variable orientations relative thereto to thereby facilitate the handling of said tool, the end of the handle adjacent the casing being threaded and the means for fixing the han-

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oriented laterally relative to and extending a at least partially around said casing, said track member having therein an elongated groove through which the threaded end of the handle extends, and an internally threaded retainer slidable in said member and adapted to have said handle threaded thereinto to clamp said track providing member between said retainer and said handle to fix the handle relative to the casing.

* * * * *

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,696,693 Dated October 10, 1972

Inventor(s) Donald R. Bosten and Michael Rusnak

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 40, change "is" (first occurrence) to --if--.

Column 1, line 58, after "a" delete the word "more".

Column 2, line 18, after the period delete "cramped".

Column 3, line 10, after "ends" delete the word "preferably" and insert --of--.

Column 3, line 65, change "impacting" to --imparting--.

Column 4, line 50, change "these" to --shown--.

Column 5, line 20, after "shank" delete "end".

Column 8, line 43, before "component" insert --guide and said--.

Column 9, line 1, after "extending" delete "a".

Signed and sealed this 20th day of February 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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US006432072B1

(12) **United States Patent**
Harris et al.

(10) **Patent No.: US 6,432,072 B1**
(45) **Date of Patent: Aug. 13, 2002**

(54) **HAND HELD PERCUSSIVE MASSAGER WITH ADJUSTABLE NODES**

(75) Inventors: **David Harris**; **Rudy Woodard**, both of Nashua, NH (US)

(73) Assignee: **Brookstone Company, Inc.**, Nashua, NH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/489,049**

(22) Filed: **Jan. 21, 2000**

(51) **Int. Cl.**[7] **A61H 23/02**
(52) **U.S. Cl.** **601/108**; 601/111; 601/101; 601/103; 601/70
(58) **Field of Search** 601/134, 135, 601/97, 101, 103, 107, 108, 110, 111, 112, 113, 70, 72

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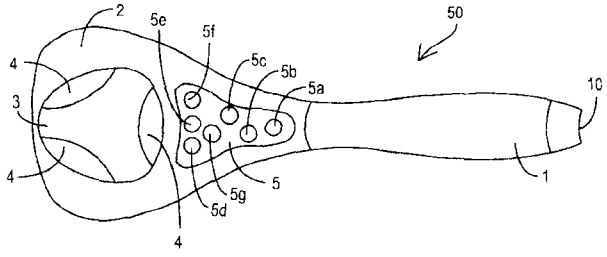
Primary Examiner—Michael A. Brown
Assistant Examiner—Benjamin K. Koo
(74) *Attorney, Agent, or Firm*—Hayes Soloway P.C.

(57) **ABSTRACT**

A hand-held massager having a flat vibrating massage head and a pair of percussion massage nodes all being driven by a single internal drive unit. The percussion massage nodes are adjustable for width adjustments being manually controlled by the flat massage head on the opposite side of the massage head. Separate push button controls covered by a sealing membrane are carried on the body of the unit to control power, speed and type of massage.

22 Claims, 4 Drawing Sheets



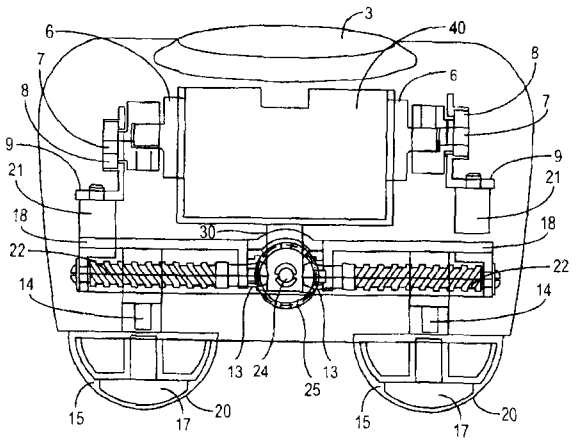


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FIG. 1

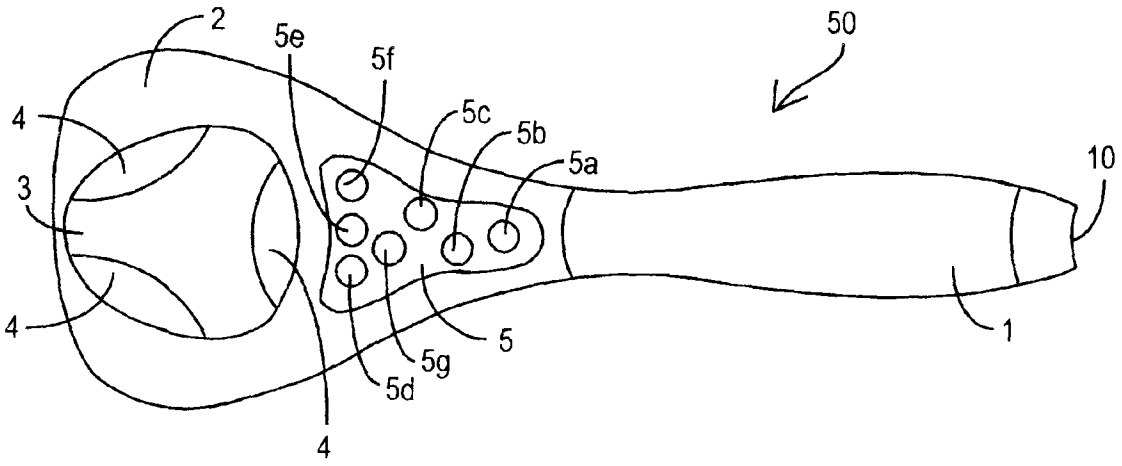

FIG. 2

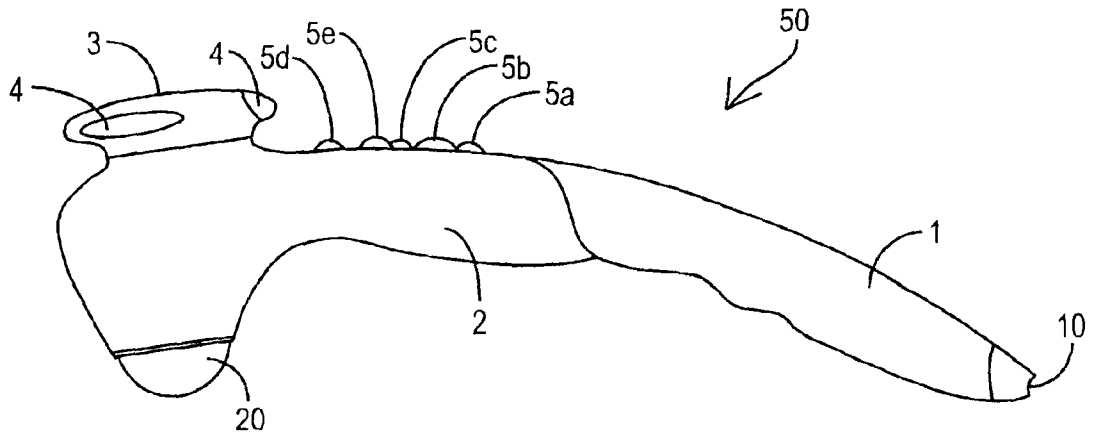

FIG. 3

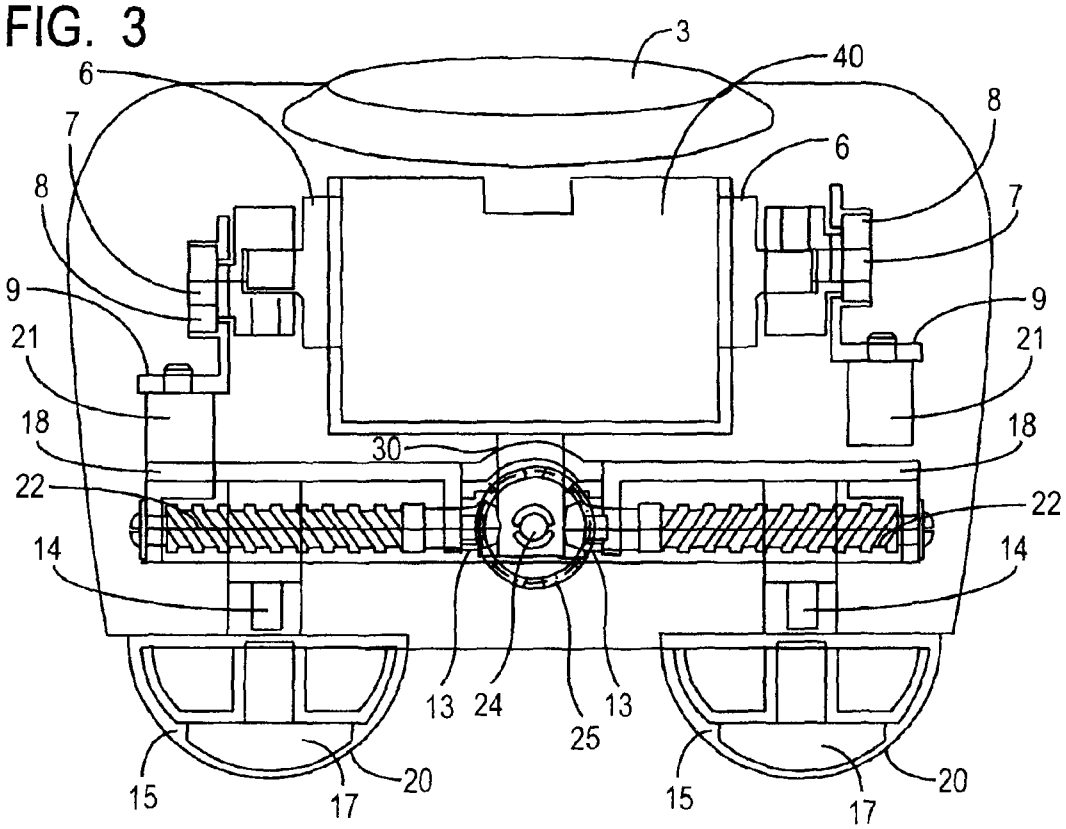

FIG. 4

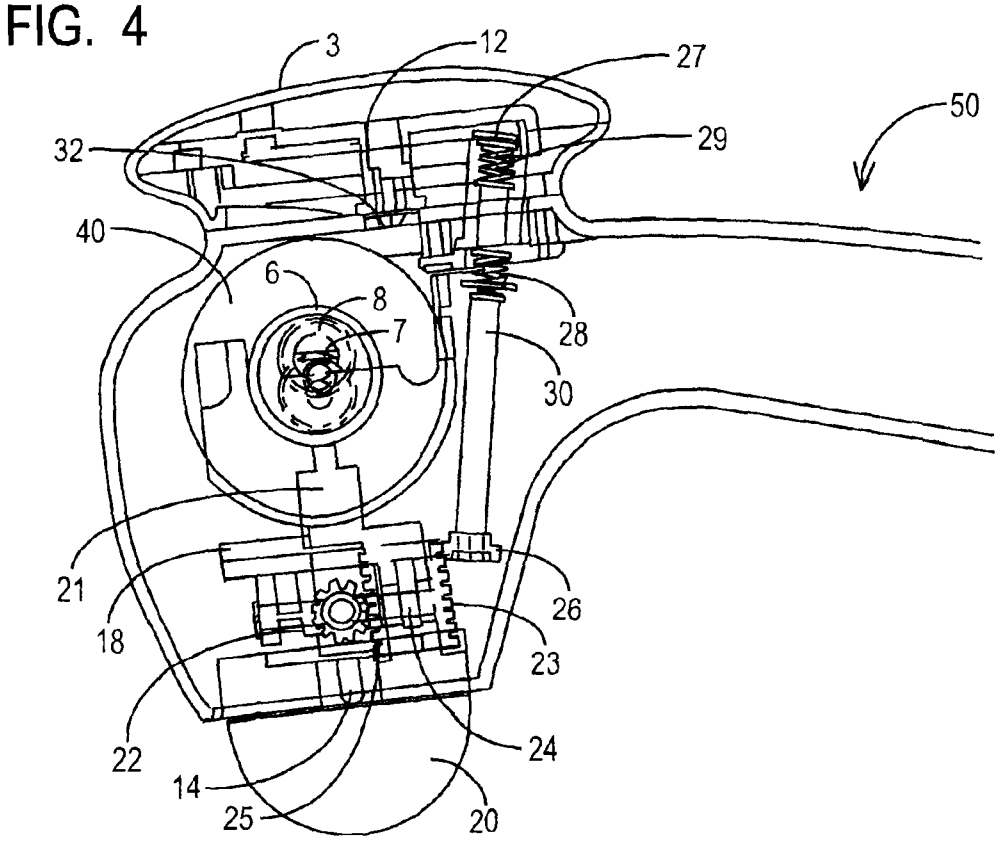

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FIG. 5

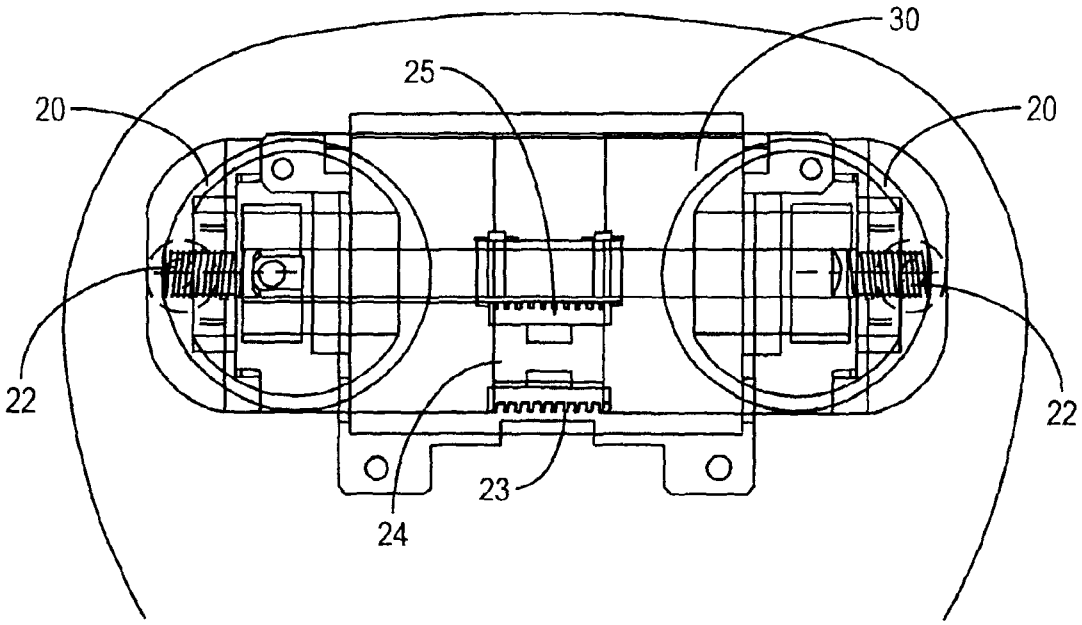


FIG. 6

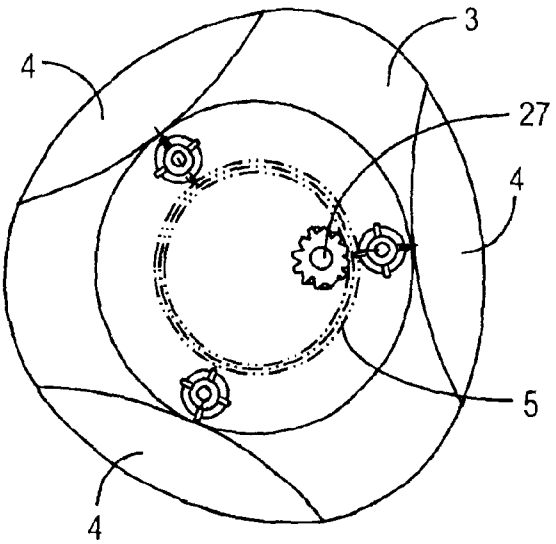


FIG. 7a

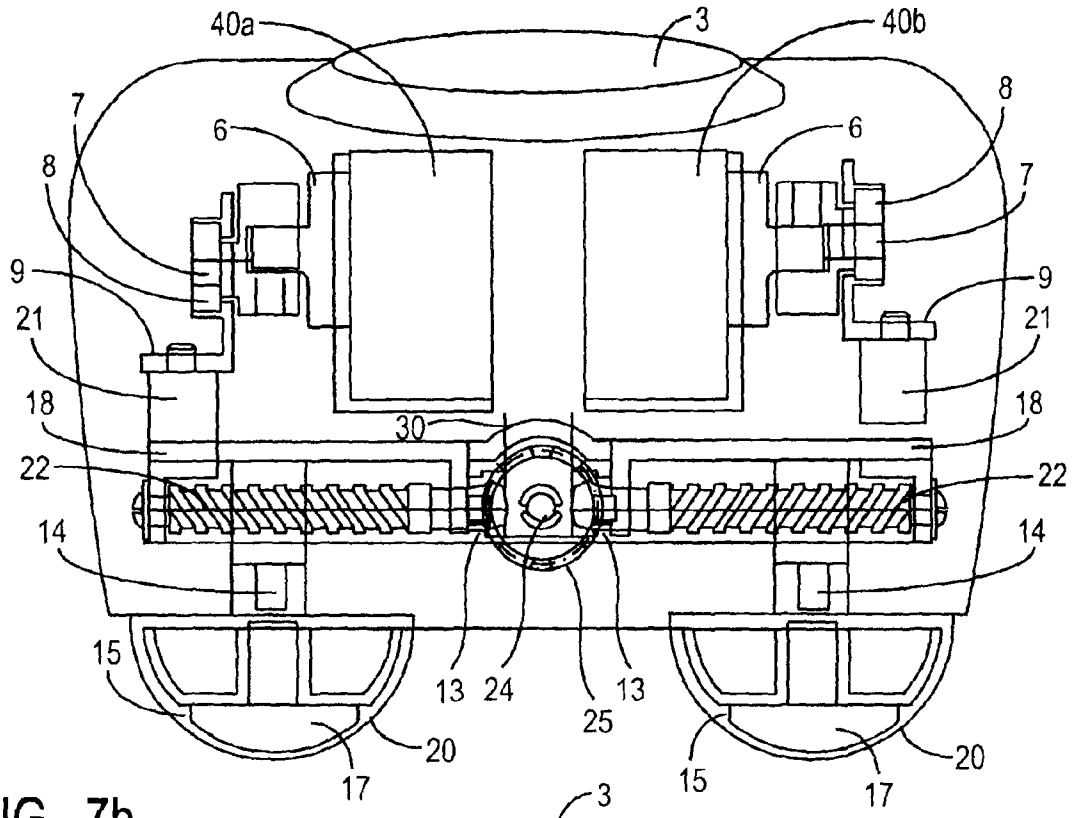
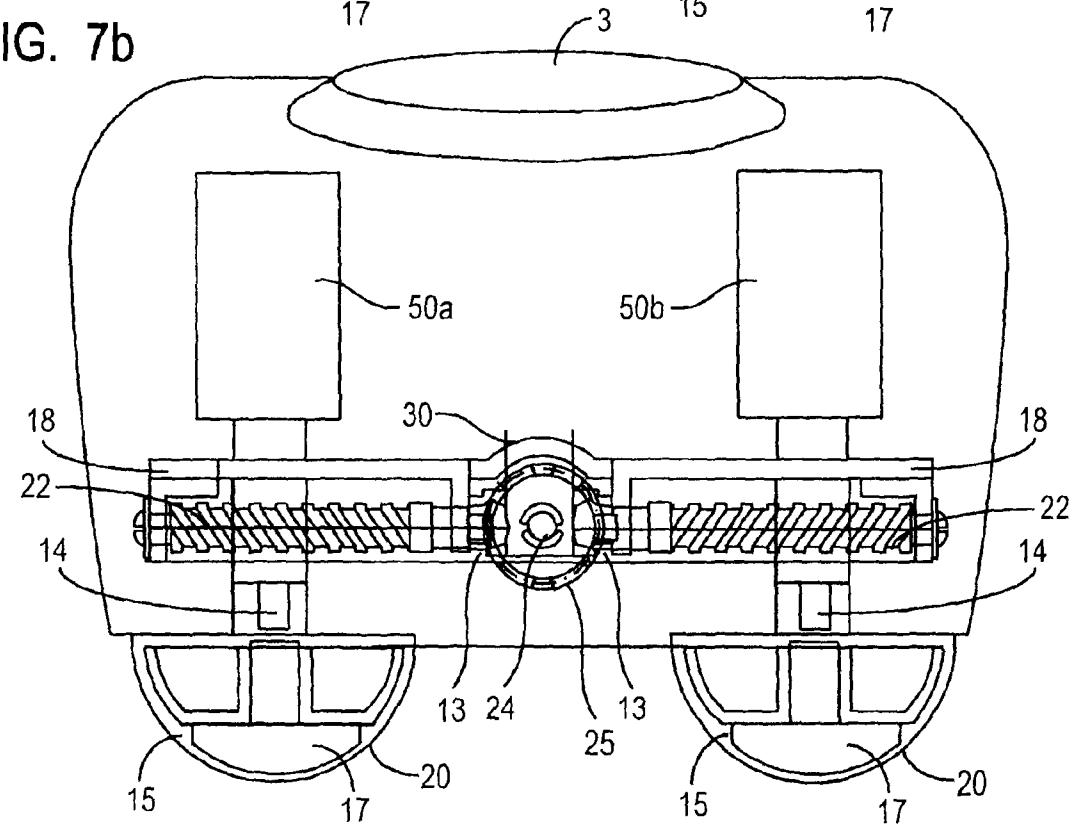


FIG. 7b



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HAND HELD PERCUSSIVE MASSAGER WITH ADJUSTABLE NODES

FIELD OF THE INVENTION

The present invention relates to a personal hand-held massaging device and more particularly to a hand-held combination vibratory/percussive massager having a pair of adjustable width percussion massage nodes, the adjustment for width thereof being controlled by an opposing flat vibratory massage head, and independent controls for setting the levels of the vibration of the massaging elements.

BACKGROUND OF THE INVENTION

Hand-held vibrating massagers are well known in the art. Such massagers include a handle attached to a vibratory massaging head and driven by an electric motor with limited adjustment for intensity of the vibration. Also known in the art are hand-held percussive massagers, typically having a pair of percussion massage nodes. The heads or nodes of these conventional massagers are in a fixed location in the massager. Thus, while providing a vibratory sensation they are limited in ability to adjust to the various contours of a person's anatomy, for example, the neck, shoulders, arms and legs, thereby limiting the point of contact of the massage to a pre-set spacing. Moreover, conventional hand-held massagers typically provide either vibratory or percussive massage, but not both. Thus, the consumer is forced to purchase two devices in order to enjoy both types of massage.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a hand-held massager having both vibratory and percussive massage capabilities and including a vibratory massage head, and a pair of percussive massage nodes suitable to deliver an effective therapeutic massage to the various contours of the body. In a preferred embodiment of the invention, the percussive massage nodes are adjustable in width using an adjustment mechanism, which can be manually or automatically engaged. In another and preferred embodiment, the massager includes an elongated contoured handle, a control panel including an on-off switch and power setting switch, a first massaging element comprising a generally flat rounded massage head for localized vibrational massage, and a second massaging element comprising a pair of percussion massage nodes, which are adjustable width-wise. Preferably, the percussion massage nodes are semi-spherical in shape, and width adjustment between the percussion massage nodes is made by turning the opposing flat massage head which is connected to a shaft driving a rack and pinion mechanism connected to a screw drive, or worm and roller type device, which causes the nodes to move laterally in relation to each other.

The source of vibration and percussion is provided through unbalanced eccentric cams attached to the shaft of a single rotary electric motor carried in the massager. In operation the drive shaft rotates the unbalanced eccentric cams on both sides thereby providing reciprocating percussion movement to the percussive massage nodes. In an alternate embodiment, the cams corresponding to each of the massage nodes are also adjustable so that the positions of the cams may be in phase, causing the massage nodes to move simultaneously, out of phase, causing the massage nodes to move reciprocally, or any setting thereinbetween to vary the vibratory effect. The reciprocating percussion movement of

single massage head. In yet another embodiment of the invention, two separate motors, which may be rotational or linear, e.g. solenoids, may be employed for creating in-phase/out-of-phase vibrating action.

In a particularly preferred embodiment, independent controls for setting the speed of the motor, the levels of the vibration of the vibratory and percussive massaging elements and for power, preferably in the form of touch sensitive buttons maintained beneath a thin rubber-like membrane, are mounted on the handle of the massager. The thin membrane covers the individual buttons thereby preventing introduction of powders, fluids, oils or the like, into the switches while allowing independent setting of the controls.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the present invention will be better understood with reference to the detailed description of the preferred embodiment and the accompanying drawings, wherein numerals depict like parts, and wherein:

FIG. **1** is a top plan view of the hand-held massager in accordance with the present invention;

FIG. **2** is a side plan view of the hand-held massager shown in FIG. **1**;

FIG. **3** is a cross-sectional diagrammatic view of the front of the hand-held massager;

FIG. **4** is a cross-sectional side elevational view of the hand-held massager shown in FIG. **3**;

FIG. **5** is a cross-sectional top view of the hand-held massager shown in FIG. **4**;

FIG. **6** is a top plan view of the flat head massager and width adjustment control according to the present invention; and

FIGS. **7***a* and **7***b* are views similar to FIG. **3**, and showing two alternative embodiments of the hand-held massager of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to FIGS. **1** and **2**, a hand-held massager **50** comprises an elongated handle **1** contoured so as to be comfortable grasped in the hand of the user. The handle **1** is connected to the massager body **2** which includes control panel **5**, a first vibratory massaging element comprising a generally flat rounded massage head **3**, and a second percussive massaging element comprising two substantially semi-spherical shaped adjustable massage nodes **20**. The control panel **5** preferably comprises a capacitive switch having an elastomeric membrane activator, sealed to the handle, and covering a plurality of touch sensitive control buttons or switches, including power control button **5***a*, speed setting control button **5***b*, LED speed indicator **5***c*, and various massage program buttons **5***d–g* for setting massage sensation, intensity and frequency of the vibrations of the percussive massage nodes **20** and vibratory massage head **3**. As shown in FIG. **6**, vibratory massage head **3** is generally rounded in shape with a gently curved upper surface with resilient insert elements **4**, such as of rubber, attached or mounted thereon, for delivering direct localized vibratory massage. Vibratory massage head **3** preferably also serves as a manual adjustment mechanism for adjusting the width of generally semi-spherical percussive massage nodes **20**. As will be discussed below, width adjustment between the percussive massage nodes **20** preferably is made by vibra-

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driving a rack and pinion mechanism connected to screw drive, or worm and roller type device, in either direction which causes percussive massage nodes **20** to move laterally in relation to each other. Alternatively, the width adjustment mechanism may be power driven, for example, by connection to the motor, and controlled by a switch provided on the control panel **5**.

Percussive massage nodes **20** are generally semi-spherical in shape and have an outer surface **15** of resilient material such as rubber or other suitable cushioning material covering massage head **17** which is made of a harder plastic or the like. The percussive massage nodes **20** are adjustable width-wise in relation to each other in order to accommodate the various contours of the body to deliver an effective safe therapeutic massage. That is to say, the node width adjustment allows the nodes to be placed at the appropriate spacing to avoid damaging or bruising the vertebrae. Power to the massager is provided by electricity through AC cord plug connection at the end **10** of the massager or by rechargeable battery housed within the massager and chargeable through a connection (not shown) mounted on the massager.

Referring now to FIG. **3**, electric rotary motor **40** is connected to rotating drives **6** on either side connected to rotary drive arms **7** eccentrically installed to cylindrical cams **8**, disposed in such a manner that as motor **40** turns, the rotation of rotary drives **6** causes cylindrical cams **8** to rotate around rotary drive arms **7** and reciprocally lift and push down pivot arms **9** attached to spacers **21**. The downward stroke of spacers **21** strikes respective housings **18** interposed above percussive massage node mounts **14** to respective percussive massage nodes **20**, thereby resulting in percussive driving of the massage nodes **20**. Preferably, a screw drive **22** is mounted in respective housing **18** for adjusting the width of the percussive nodes **20** as will be described below. As power to the motor **40** increases, the rotational speed of cylindrical eccentric cams **8** driven by rotary drives **6** and rotary drive arms **7** increases, increasing the speed of the stroke cycle of spacers **21** striking surfaces **18**, resulting in greater intensity of the percussion of massage nodes **20**. The stroke cycle of spacers **21** may be adjusted by rotating respective rotary drives **6** and rotary drive arms **7** to be more or less in phase so that the downward strokes of spacers **21** occur in unison, or out of phase so that the downward strokes of respective spacers **21** are opposing, or any other setting in between. This adjustment may be performed automatically by one of the massage program buttons on control panel **5**. In order to accommodate adjustments in phase of the downward stroke, screw drives **22**, housings **18** and massage nodes **20**, on each side of flat gear **25** and shaft **24** are independently suspended therefrom in the manner of half-shafts. In an alternative embodiment, massager **50** is not phase-adjustable thereby permitting screw drives **22**, housings **18** and massage nodes **20** to be mounted on a single axle-like fashion on each side of flat gear **25** and shaft **24**.

Percussion massage nodes **20** are adjustable width-wise in relation to each other by a rack and pinion-type mechanism controlled by massage head **3** connected thereto by a shaft **30**. In use massage head **3**, is turned in a clock-wise or counter-clockwise direction engaging flat gear **27** attached to the top of shaft **30** as shown in FIG. **6**. Referring to FIGS. **3–5**, as shaft **30** is rotated, flat gear **26** attached at the lower end of shaft **30** also rotates, engaging gear flat **23** attached to shaft **24** at the one end and to flat gear **25** at the other, causing flat gear **25** to turn, engaging flat gears **13** engaging percussive massage node mounts **14** which are internally threaded are caused to move laterally in opposite directions along the shafts of screw drives **22**, thereby resulting in the desired width adjustment of percussive massage nodes.

As shown in FIG. **4**, flat massage head **3** is rotatably connected to massager body **2** by screw **32** and fitting **12**. Flat gear **27** is situated on the underside of flat massage head **3** and meshes with gearing **5** of flat massage head **3** so that as massage head **3** is rotated flat gear **27** and shaft **30** to which it is attached, also turn. As described above, the rotation of massage head **3** causes a change in spacing between the percussive massage nodes. By virtue of its direct connection to the percussive massage node width adjustment mechanism by shaft **30**, in operation the same electric motor **40** which drives the percussive massage nodes **20** also transmits a generalized vibration to flat massage head **30**. Springs **28** and **29** on shaft **30** serve to dampen the vibration so transmitted and enhance the effect of the vibratory massage provided by head **30**.

Through adjustment of the width of the generally semi-spherical massage nodes, the hand-held massager is capable of adjusting to and making contact with the contours of the body thereby providing maximum therapeutic massage effect to various body parts previously unreached by conventional massagers.

This will provide the user with a greater range of therapy and will accordingly be of greater benefit. In addition, with the ability to independently manipulate the speed, intensity and the pattern of the vibratory massage, the user may create a multitude of sensations to attain the desired result. Further, the thin tactile membrane covering the full control panel will keep massage oils, powder, fluids, or the like from gumming up the buttons or otherwise entering the massage unit itself. This will make cleaning easier and provide longer operational life.

Various changes may be made without departing from the spirit and scope of the invention. For example, percussive nodes **20** which preferably are threaded on shafts **14** may be made replaceable with different size/shape nodes. Also, a heating and/or cooling element may be incorporated into vibratory massage head **3** for warming the vibratory massage head and/or in percussive massage mounts **14** for warming the percussive massage nodes **20**. Further, as shown in FIG. *7a* two separate rotational motors **40***a*, **40***b* which may be selectively driven in-phase or out-of-phase be employed in place of the single motor **40**. Or, as shown in FIG. *7b*, a pair of linear motors, i.e. solenoids **50***a*, **50***b* may be employed, fixed directly to node mounts **14**.

Although described in terms of the presently preferred embodiment, those skilled in the art will appreciate that the present invention is not limited to the embodiment described.

What is claimed is:

1. A hand-held massager comprising:

an elongated handle connected to the massager body having a control means;

a first vibratory massaging element mounted to one side of said massager body, and a pair of percussive massage nodes mounted to the side opposite; and

a motor drive for powering both said vibratory massaging element and said percussive massager nodes;

wherein the percussive massage nodes are adjustable in width by rotation of said vibratory massaging element; and

wherein the vibratory massaging element is rotatably

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connected to a screw drive for causing changes in the width of the percussive massage nodes mounts attached to the massage nodes..

2. The hand-held massager of claim 1, wherein the motor drive comprises a single electric rotary motor having a rotating shaft extending from either side of said motor, said rotating shaft being connected to rotary drive arms eccentrically carried on a pair of canes, each said cam being connected to a reciprocal pivot arm attached to said percussive massage nodes, as wherein rotation of said motor causes rotation of the said rotary drive arms which in turn cause said cams to move said pivot arms whereby to induce percussive movement of said massage nodes.

3. The hand-held massager of claim 2, wherein the motor drive is powered by a rechargeable battery housed within the massager.

4. The hand-held massager of claim 1, wherein the vibratory massaging element is generally rounded in shape with a generally flat upper surface and having resilient insert elements.

5. The hand-held massager of claim 1, wherein said percussive massage node mounts are internally threaded to move laterally in opposite directions along the shafts of the said screw drives.

6. The hand-held massager of claim 1, wherein the percussive massage nodes are removably mounted on said mounts.

7. The hand-held massager of claim 1, wherein the percussive massage nodes comprise semi-spherical shaped elements.

8. The hand-held massager of claim 1, and including a control panel having an elastomeric membrane sealed to the handle and covering a plurality of touch sensitive control buttons or switches.

9. The hand-held massager of claim 8, wherein the control panel includes a power control button, a speed setting control button, and LED speed indicator, and a plurality of the massage program buttons for setting massage sensation and intensity of the vibrations of the massage elements.

10. The hand-held massager of claim 9, wherein the width adjustment mechanism is powered and is controlled by a switch on the control means.

11. The hand-held massager of claim 1, wherein phase of movement of the percussive massage nodes is adjustable.

12. The hand-held massager of claim 1, wherein the percussive massage node mounts are independently suspended from the width adjustment and connected to the motor by shafts.

13. The hand-held massager of claim 1, wherein the vibratory massaging element is connected to the massage node width adjustment mechanism by a shaft which transmits a generalized vibration to the vibratory massage element coincident with movement of the percussive massaging nodes.

14. The hand-held massager of claim 13, and further including springs operatively disposed on said shaft to dampen vibration.

15. The hand-held massager of claim 1, wherein the motor drive comprises a pair of electric rotary motors, each having a rotating shaft extending therefrom, each said rotating shaft being connected to a rotary drive arm eccentrically carried on a cam, each said cam being connected to a reciprocal pivot arm attached to said percussive massage nodes, wherein rotation of said motor causes rotation of its respective rotary drive arm which in turn causes a respective cam to move its respective pivot arm whereby to induce percussive movement of its respective massage node.

16. The hand-held massager of claim 1, wherein the motor drive comprises a pair of linear motors.

17. The hand-held massager of claim 1, wherein the vibratory massaging element is rotatably mounted on a shaft, said shaft driving a rack and pinion connected to a screw drive, which causes changes in the width of the percussive massage node mounts attached to the massage nodes.

18. The hand-held massager of claim 17, wherein said percussive massage node mounts are internally threaded to move laterally in opposite directions along the shafts of the said screw drives.

19. The hand-held massager of claim 17, wherein the percussive massage nodes are removably mounted on said mounts.

20. The hand-held massager of claim 6, wherein the percussive massage node mounts are independently suspended from the width adjustment and connected to the motor by shafts.

21. The hand-held massager of claim 6, wherein the vibratory massaging element is connected to the massage node width adjustment mechanism by a shaft which transmits a generalized vibration to the vibratory massage element coincident with movement of the percussive massaging nodes.

22. The hand-held massager of claim 21, and further including springs operatively disposed on said shaft to dampen vibration.

* * * * *

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

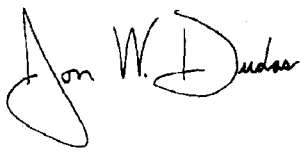
PATENT NO. : 6,432,072 B1
DATED : August 13, 2002
INVENTOR(S) : Harris et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 5,
Line 8, "canes" should be -- cams --.

Signed and Sealed this

Twenty-eighth Day of December, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office

Petitioner Therabody Ex-1004, 1963

United States Patent [19]

Noble et al.

[11] **Patent Number: 4,730,605**

[45] **Date of Patent: Mar. 15, 1988**

[54] **PERCUSSING BODY MASSAGER HAVING AMPLITUDE ADJUSTMENT MEANS**

[75] Inventors: **Edward D. Noble**, Willowdale; **Duke Harding**, Markham, both of Canada

[73] Assignee: **Wellness Innovations Corp.**, Markham, Canada

[21] Appl. No.: **884,851**

[22] Filed: **Jul. 14, 1986**

[51] **Int. Cl.**[4] **A61H 23/02**

[52] **U.S. Cl.** **128/55;** 128/44; 128/52

[58] **Field of Search** 128/44, 32, 45, 46, 128/48, 49, 54, 55, 52; D24/41

[56] **References Cited**

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2,964,037	12/1960	Johnston	128/49
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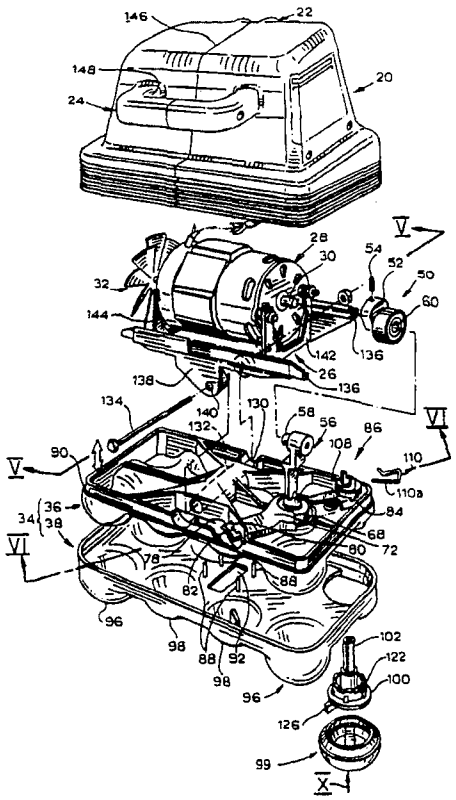
4,150,668	4/1979	Johnston	128/49
4,430,992	2/1984	Christ	128/46

Primary Examiner—Edgar S. Burr
Assistant Examiner—Tonya Lamb
Attorney, Agent, or Firm—Rogers, Bereskin & Parr

[57] **ABSTRACT**

A body massager includes a casing having handles at opposite sides disposed in planes mutually at right angles, for ease of manipulation of the massager. A massage head is mounted in the casing for pivotal rocking movement about a transverse axis and has a contoured massage surface for imparting a percussive massage action to a patient. The massage head is driven from an electric motor by a dynamically balanced eccentric driving a connecting rod connected to the massage head by way of a resilient link that can be adjusted to vary the amplitude of the rocking motion.

10 Claims, 9 Drawing Figures



Petitioner Therabody Ex-1004, 1964

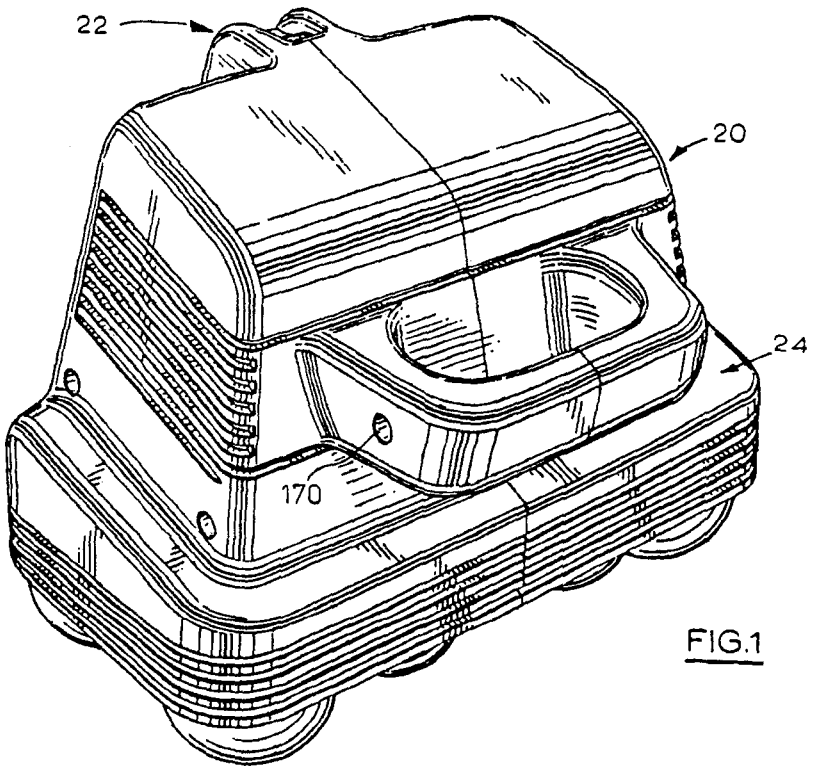


FIG.1

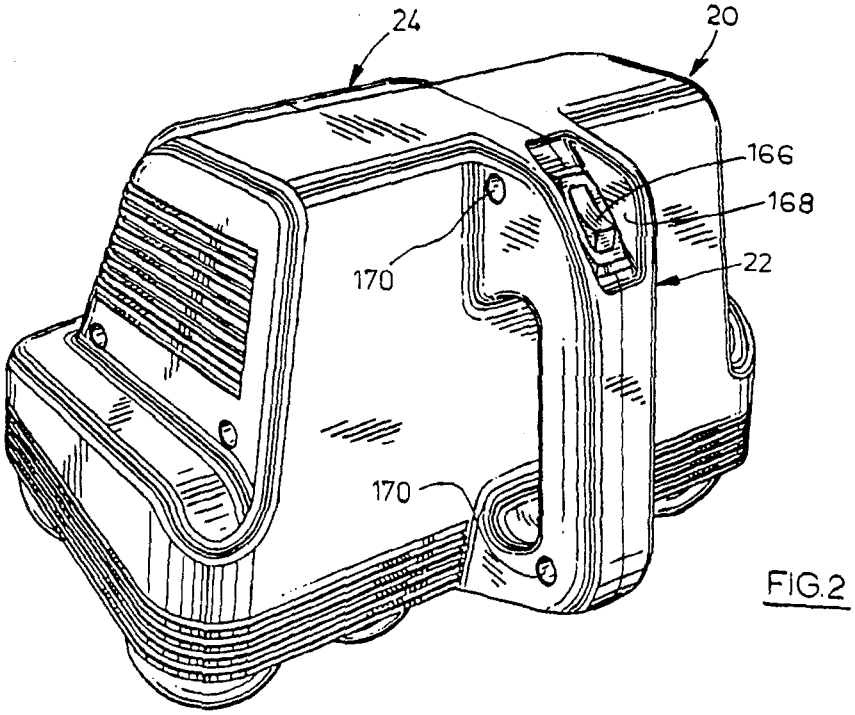


FIG.2

Petitioner Therabody Ex-1004, 1965

FIG. 3

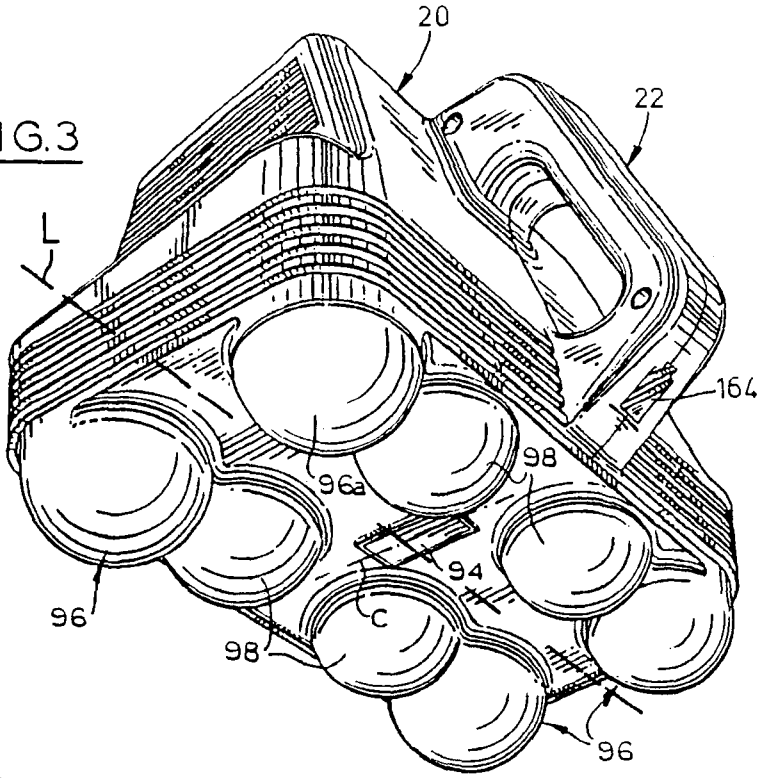
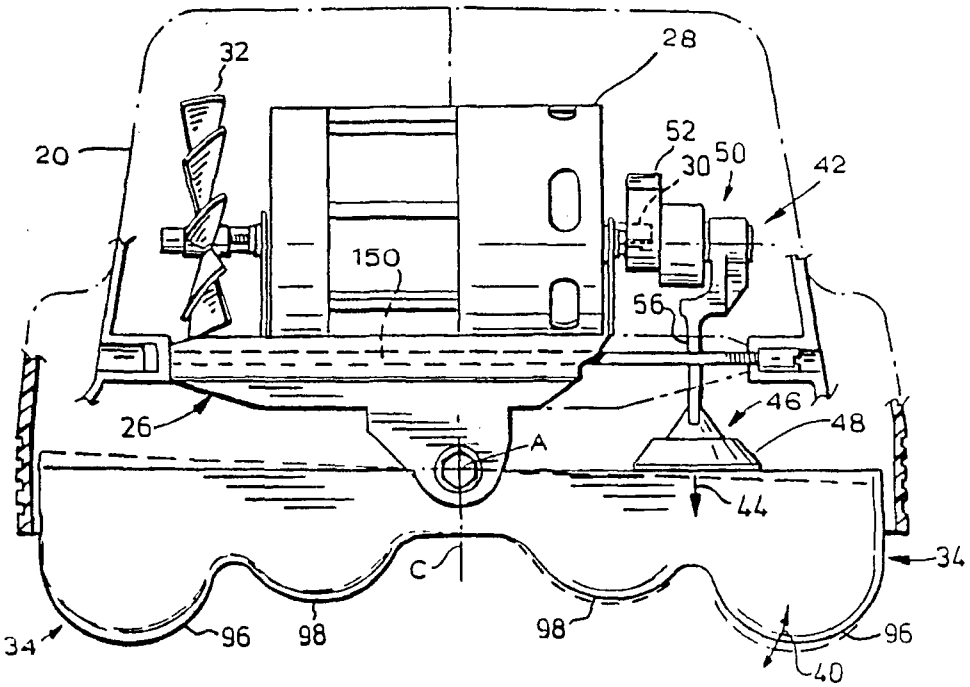


FIG. 8



Petitioner Therabody Ex-1004, 1966

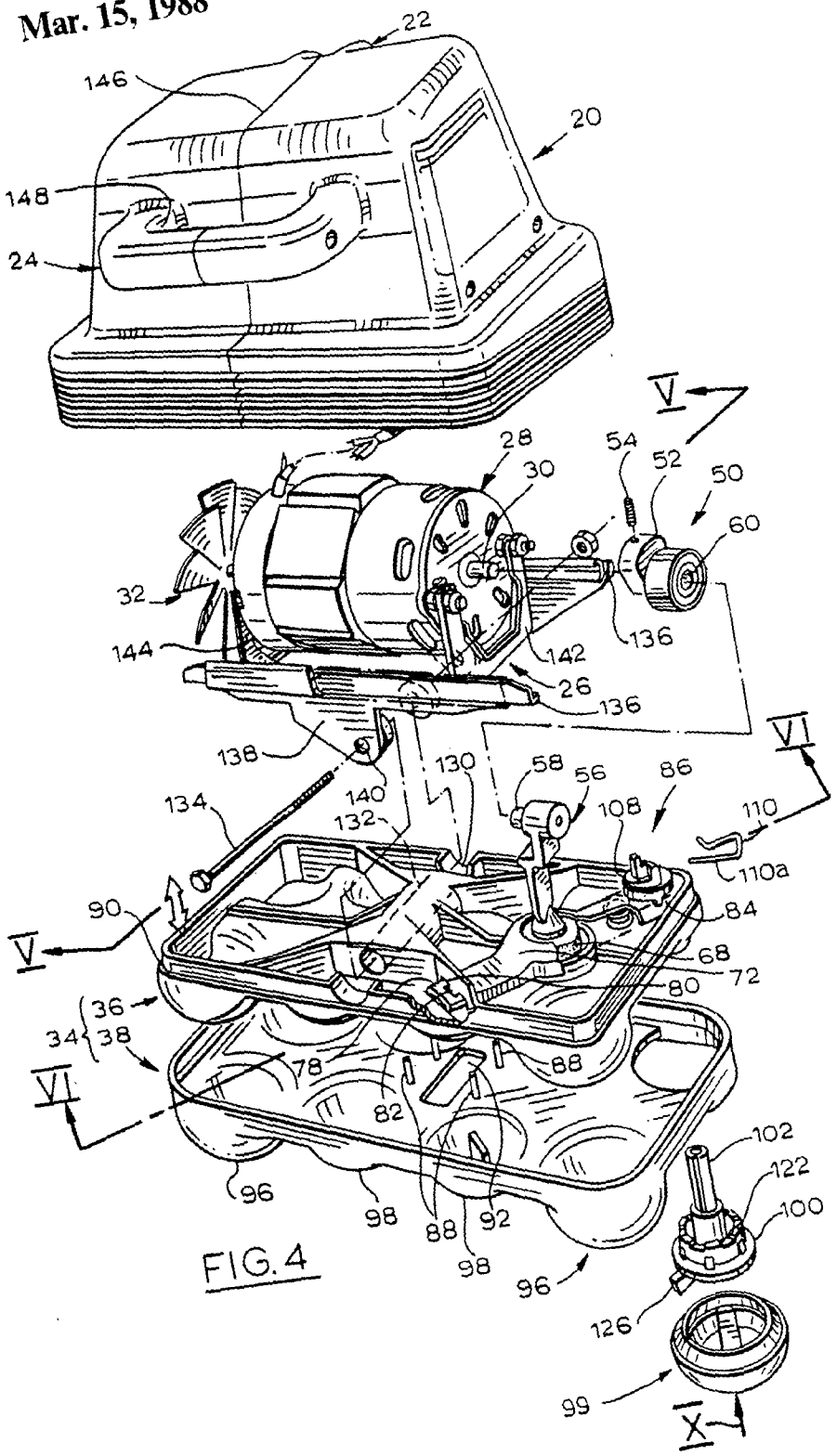


FIG. 4

Petitioner Therabody Ex-1004, 1967

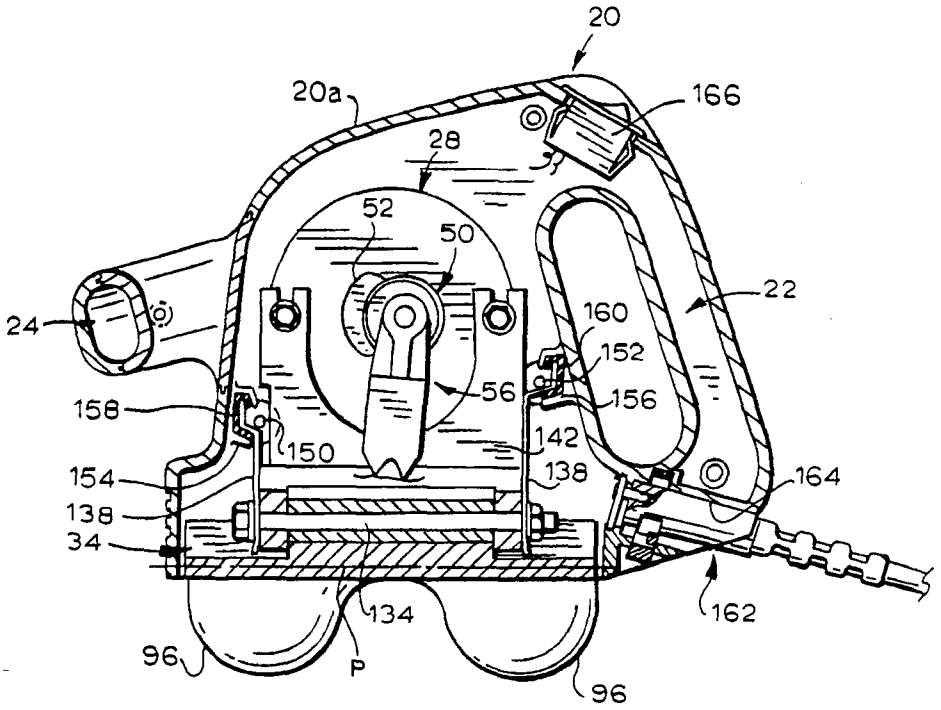


FIG.5

Petitioner Therabody Ex-1004, 1968

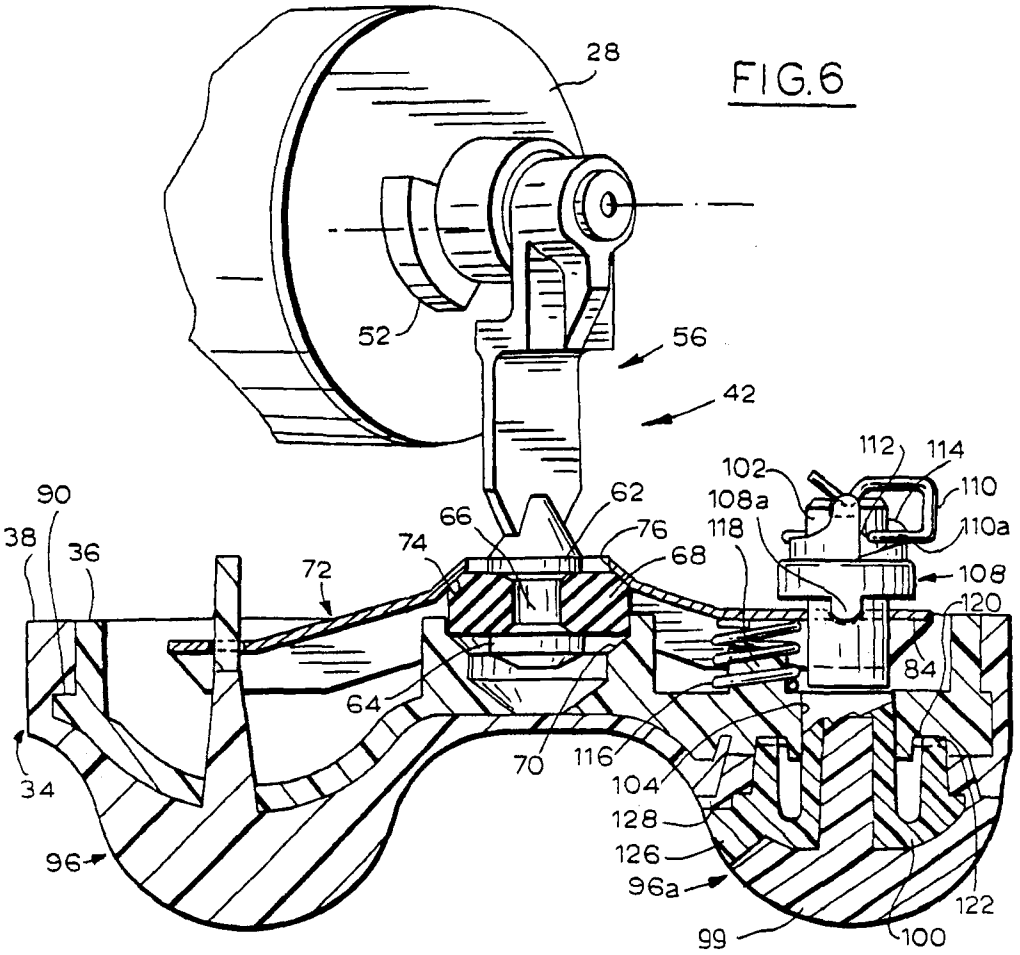


FIG.6

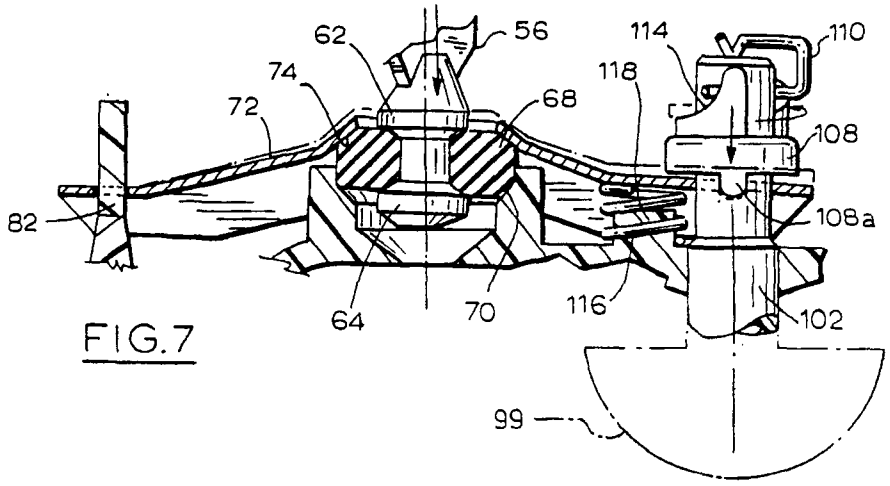


FIG.7

Petitioner Therabody Ex-1004, 1969

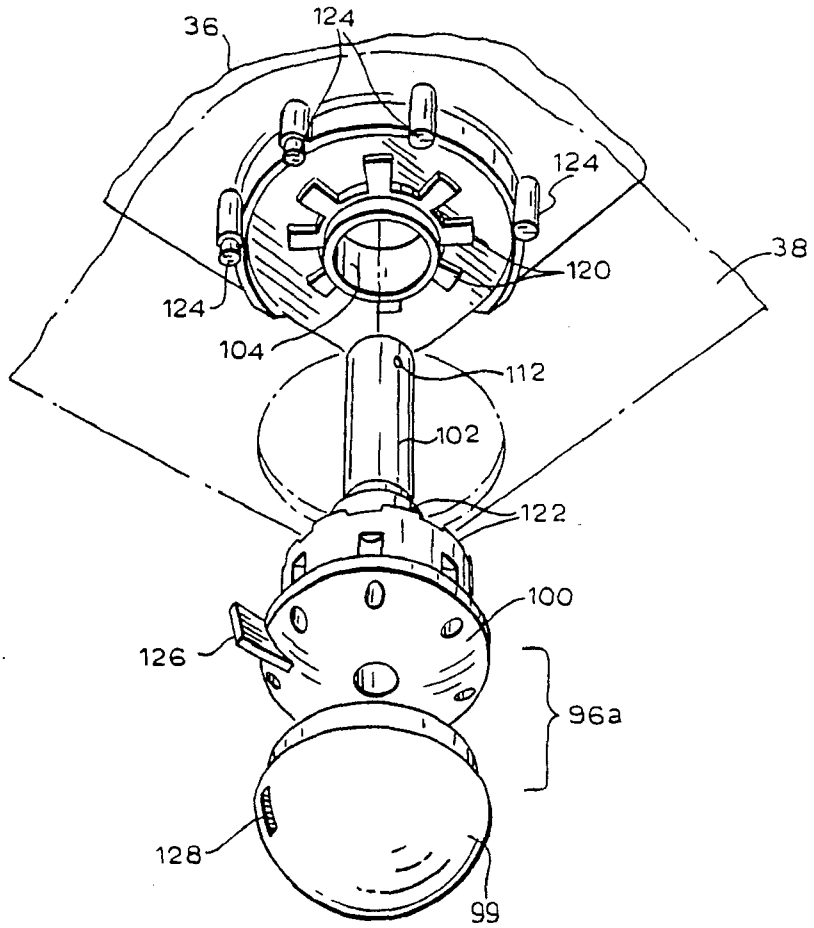


FIG. 9

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PERCUSSING BODY MASSAGER HAVING AMPLITUDE ADJUSTMENT MEANS

FIELD OF THE INVENTION

This invention relates generally to power operated body massagers.

BACKGROUND OF THE INVENTION

Traditionally, doctors, chiropractors and other professional therapists have used power operated massagers to give treatment involving manipulation of body structures. Therapy of this type has been found particularly effective in treating muscle tension and fatigue, for example in athletes.

DESCRIPTION OF THE PRIOR ART

Generally, most prior art massagers have operated by exerting an orbital rubbing action on the body. However, this type of action often causes irritation or other discomfort to the patient. Further, it is now thought that the therapeutic effect of this type of rubbing action may not be particularly beneficial and that a percussive massage action may be preferred. Massagers operating on this principle have previously been proposed. Examples are shown in U.S. Pat. No. Des. 261,428 and in U.S. Pat. No. 4,150,668.

An object of the present invention is to provide improvements in power operated massagers of the percussive type.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a body massager comprising a base structure including a casing having handles for use by an operator in manipulating the massager, a drive unit carried by the base structure, a massage head having an external massage surface contoured symmetrically about a transverse centre line for percussive massage of the body, the massage head being coupled to the base structure for pivotal rocking movement about an axis disposed parallel to said transverse centre line, and means coupling the motor with the massage head to reciprocate the massage head in a direction generally normal to said axis at a position spaced from said centre line and thereby produce said rocking movement of the head. The coupling means includes a resilient link which is alternately compressed and relaxed during reciprocation, and adjustable means constraining the link to limit the extent of said compression and relaxation at each reciprocation, and thereby control the amplitude of the pivotal rocking movement of the massage head.

In summary, a massager of this form has the advantage that the amplitude of the pivotal rocking movement of the massage head can be adjusted to vary the percussive massage effect as required. For example, for some treatments, it may be desirable to provide for a maximum amplitude of percussive massage, to penetrate deep into the body and obtain a desired therapeutic effect. In other cases, lighter massage may be desirable.

Another aspect of the invention provides a massager of the form defined above which may or may not include the said resilient link and adjustable constraining means but in which two handles are provided on the casing of the massager and are disposed one at each side of the casing generally at opposite ends of the said pivotal axis of the massage head. Each handle comprising a generally U-shaped formation extending outwardly of the casing with one handle disposed generally parallel to a general plane containing the massage head and the other handle disposed at right angles to the said plane.

In other words, the two handles of the casing are disposed mutually at right angles, one generally horizontal and one vertical considering the massager disposed on a horizontal surface. This handle arrangement has been found to be particularly useful in that it allows the massager to be held in an almost infinite variety of positions as required by the particular treatment being given.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which illustrate a particular preferred embodiment of the invention by way of example, and in which:

FIGS. **1** and **2** are perspective views from opposite sides and above of a massager in accordance with one embodiment of the invention;

FIG. **3** is a perspective view from below and from the same side as FIG. **2**;

FIG. **4** is an exploded perspective view of the massager as seen from the same side as FIG. **1** and the opposite end;

FIGS. **5** and **6** are sectional views taken generally on line V—V and VI—VI respectively of FIG. **4** but with the massager in an assembled condition;

FIG. **7** is a view similar to FIG. **6** showing an adjusted position of the massager;

FIG. **8** is a side elevational view, partly in section, of the massager; and,

FIG. **9** is a detail exploded perspective view generally in the direction of arrow X in FIG. **4**, showing the knob for adjusting the percussive effect of the massager.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, FIGS. **1** to **3** show the external appearance of the massager while FIGS. **4** to **9** illustrate its internal structure. The massager has a casing generally denoted by reference numeral **20** (FIGS. **1** to **4**) having handles **22, 24** at opposite sides. The casing forms part of a base structure of the massager that also includes a mounting bracket **26** for a drive unit **28** as seen in FIG. **4**. In this embodiment, the drive unit is a conventional a.c. electric motor and has a rotary output shaft **30** at one end and a cooling fan **32** at the opposite end, on the same shaft.

The massager also includes a massage head **34** which in this embodiment is a composite of a pair of moulded shells comprising a relatively rigid inner shell **36** and an outer shell **38**. The external appearance of the massage head is best shown in FIG. **3** and appears there as seen from the bottom of the massager. The external massage surface is contoured symmetrically about a transverse centre line C as will be described, for percussive massage of the body. As best seen in FIG. **8**, the massage head **34** is pivotally coupled to the drive motor mounting brackets **26** (part of the base structure of the massager) for pivotal rocking movement about an axis A disposed parallel to the transverse centre line of the massage head. Arrow **40** in FIG. **8** illustrates the rocking action of the massage head **34** about axis A. This action is produced by a coupling arrangement generally indicated at **42** in FIG. **8** between the drive motor **28**

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and the massage head 34. The arrangement is designed to cause the motor to reciprocate the massage head in a direction denoted 44 in FIG. 8 in a direction generally normal to the pivot axis A of the massage head at a position spaced from its centre line C.

Details of the coupling arrangement will be described in more detail later. For present purposes, it is sufficient to note that the coupling arrangement 42 includes a resilient link in the area indicated at 46 in FIG. 8 which is alternately compressed and relaxed during reciprocation of the massage head. In this embodiment, the link takes the form of a resilient bush (not visible in FIG. 8) constrained in a housing 48 that can be adjusted to limit the extent to which the bush can compress and relax at each reciprocation so as to control the amplitude of the pivotal rocking movement of the massage head and hence the percussive massage effect applied to the body.

Referring now to the drawings in more detail and particularly to FIGS. 4, 5 and 6 it will be seen that the coupling arrangement 42 includes an eccentric 50 mounted on the drive motor output shaft 30 and an associated eccentric counterbalance weight 52. Weight 52 ensures that the eccentric is dynamically balanced and avoids undesirable vibrations when motor 28 is running. A setscrew 54 for securing the eccentric to the motor output shat is visible in FIG. 4.

A connecting rod 56 extends between the eccentric 50 and the massage head 34 and includes a stub shaft 58 (FIG. 4) received in a bearing 60 in eccentric 50.

Referring now to FIG. 6, the lower end portion of connecting rod 56 is shaped to define a pair of enlarged annular shoulders 62, 64 separated by a narrow "neck" portion 66 around which is fitted a resilient bushing 68 forming the compressible resilient "link" referred to previously. As can best be seen in FIG. 4, bushing 68 is generally of annular form and is trapped between the two shoulders 62, 64 of connecting rod 56. At its lower side, bushing 68 rests on a conical seating surface 70 at the top of the upper shell 36 of massage head 34. A lever 72 a shape of which can best be seen in FIG. 4 provides a corresponding seating surface 74 (FIG. 6) for the top surface of bush 68 and the lever has an opening 76 through which the connector the connecting rod extends. Accordingly, the bushing 68 is constrained between the two seats 70 and 74.

Referring back to FIG. 4, it will be seen that lever 72 engages bushing 68 generally in the region of the centre of its length. Lever 72 is pivotally coupled to the upper shell 36 of massage head 34 at one end while its opposite end can be adjusted vertically to vary the degree of constraint applied to bushing 68. Thus, as seen in FIG. 4, the left-hand end 78 of lever 72 is received in a slot 80 in shell 36 and a tongue 82 on the shell extends through a slot in the lever to in effect capture the lever while allowing it to pivot up and down in a vertical plane. The right-hand end portion 84 of lever 72 co-operates with an adjuster 86 (to be described) that allows the vertical height of that end of the lever to be varied for varying the constraint applied to bushing 68.

It will be seen from a comparison of FIGS. 6 and 7 that, in FIG. 6, bushing 68 is relatively lightly constrained as compared with FIG. 7 in which the right-hand end 84 of lever 72 has been moved down to more tightly retain the bush. In the latter configuration, the massage head 34 is relatively tightly coupled to connecting rod 56 while in the FIG. 6 configuration, bushing 68 is allowed to flex so that relative movement can take place between the massage head and the connecting rod within the limits of the resiliency of bush 68. Accordingly, when the lever is adjusted as shown in FIG. 6, the amplitude of the percussive action applied by the massage head will be less than when the lever is adjusted downwardly as shown in FIG. 7 to more tightly constrain bushing 68.

In this particular embodiment, bushing 68 is a microcellular "doughnut" structure and has the characteristics that it does not bulge significantly or generate heat when compressed. Accordingly, it is believed that bushing 68 should be capable of relatively long life. The bushing is resiliently deformable to an extent sufficient to permit it to be distorted to be fitted over the lower shoulder 64 on connecting rod 56 when the massager is assembled. The connecting rod itself is moulded in NYLON 66 (trademark).

Before referring in detail to the adjustment mechanism 86 for lever 72, it may be convenient to describe in more detail the structure of the massage head 34. As mentioned previously, the massage head comprises upper and lower "shells" 36 and 38. Each of these shells is moulded in a plastic material. Shell 36 is relatively rigid and may for example be moulded in foamed polypropylene while shell 38 is relatively resilient and may be moulded in foamed polyurethane. Shell 38 is designed to fit closely over and in effect form the exterior surface of massage head. FIG. 6 shows the two shells fitted together and it will be seen that portions of the outer shell are relatively deep to provide a thick resilient cushion on protruding portions of the massage head. Referring back to FIG. 4, a series of plastic "fingers" 88 are moulded onto the inner surface of shell 38 and extend through corresponding openings (not shown) in shell 36 where they are frictionally retained. Around its perimeter, shell 36 defines a ledge 90 while the corresponding inner surface of shell 38 is complimentarily shaped as best seen in FIG. 6 so that the outer shell will tend to "cling" to the inner shell around its periphery.

As seen in FIG. 4, a rectangular "window" 92 is formed generally in the centre of the outer shell 38 while the inner shell has a corresponding protrusion 94 (FIG. 3) that will extend into and be visible through the window when the two shells are assembled together. The inner shell is preferably coloured red and the outer shell black so that the formation 94 will appear in sharp contrast to the remainder of the exterior surface of the massage head.

FIG. 3 also illustrates the contour of the massage surface of the massage unit. Four relatively large hemispherical formations 96 are provided adjacent the four corners of the massage head while four smaller hemispherical formations 98 are provided inwardly of the outer formations. The respective sets of formations are spaced on either sides of the transverse centre line C and on either side of a corresponding longitudinal centre line L. This configuration has been anatomically designed to present an ideal contour for numerous massage therapy techniques. For example, the massager can be placed transversely across the lap of a person sitting upright with their knees together and the formations 96 will be appropriately positioned for massaging the thighs of both legs at the same time. The massager can also be placed longitudinally in the spine area of the back with the longitudinal centre line between the formations at the position of the spine. All of the forma-

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tions will then be appropriately positioned for massaging the back on opposite sides of the spine.

One of the four large hemispherical formations **96** also acts as an adjustment knob for the adjustment mechanism **86** discussed previously. In FIG. **3**, that knob is denoted by reference numeral **96***a* and the knob is also visible in FIGS. **4**, **6**, **7** and **9**.

FIG. **9** shows the adjustment knob **96***a* as seen from the opposite side as compared with FIG. **3**. The knob comprises a cap **99** which is made of the same resilient plastic material as the outer shell **38**, and an inner core **100** having a shaft **102** that projects through an opening **104** in the bottom of the inner shell **36**. Shaft **102** then extends upwardly through an opening in the right-hand end **84** of lever **72** and through a cam member **108** above lever **72** as best seen in FIG. **6**. A spring clip **110** is fitted through an opening **112** adjacent the upper end of shaft **102** and has a horizontal limb **110***a* that rests on a cam surface **114** of cam **108**. Cam **108** has a protrusion **108***a* in its lower surface which is received in a complimentary recess in lever **72** so that the cam is restrained from turning with respect to the lever. Accordingly, if shaft **102** is turned by turning knob **96***a*, the spring clip **110** will in effect ride up or down the cam surface **114** (depending on the direction of turning) so that the end **84** of lever **72** will either be pressed down or allowed to rise thereby changing the compressive restraint on bushing **68**. The end **84** of lever **72** is in fact biassed upwardly by a spring **116** retained on a moulded post **118** on the inner shell and arranged to press upwardly on the lever **72** adjacent its end **84**.

In summary, by turning knob **96***a* the end of lever **72** denoted **84** is raised or lowered depending on the direction of turning thereby correspondingly compressing or releasing bushing **68**.

Referring back to FIG. **9**, a series of detents **120** are moulded into the inner shell **36** around opening **104** and co-operate with corresponding teeth **122** moulded onto the inner core of knob **96***a*. These co-operating teeth and detents provide for positive location of knob **96***a* in each of a series of adjusted positions. Four posts **124** are moulded into the inner shell outwardly of the detents **102** and act as markers for indicating the position selected by knob **96***a*. The outer ends of these posts are of respectively different diameters and project through corresponding openings in the outer shell so as to be visible from externally of the massager (although not seen in FIG. **3**). A corresponding "flag" or indicator **126** is moulded into the knob core **100** and projects through a window **128** in the outer cover of the knob **96***a*. It will be remembered that the inner shell **36** is coloured red while the outer shell is black. Accordingly, the posts **124** will appear as red dots in the massage surface of the massage head **34**. Similarly, core **100** is coloured red while the knob cover **98** is coloured black so that the flag **126** will be clearly visible.

Referring back to FIG. **4**, the pivot axis for the massage head **34** (see axis "A" in FIG. **8**) is defined by a moulded formatin **130** on the inner shell **36** having a transverse opening **132** for receiving a bolt **134** coupling the motor mounting bracket **26** to the massage head. Thus, it will be seen that bracket **26** includes a pair of side rails **136** of angle shape in cross-section having depending lugs **138** formed with openings **140** for receiving bolt **134**. Connecting the side rails **136** are a pair of U-shaped end brackets **142** and **144** at which the motor **28** is bolted to the bracket.

Casing **20** of the massager is moulded in two halves that meet at a joint line denoted **146** in FIG. **4** while the inside surface **148** of handle **24** is a separate moulding that is trapped between the two main halves when then are assembled together. The two halves are held together by a pair of bolts, one of which is visible at **150** in FIG. **8** that extend from end to end of the casing along the drive motor support bracket side rails **136** as shown in FIG. **5**. There, the two bolts are denoted **150** and **152**. Generally C-shaped mouldings **154** and **156** inside the casing embrace the motor mount side rails with the interposition of rubber vibration isolating strips **158** and **160** to locate the casing with respect to the base structure of the massager. FIG. **5** also shows a detachable electrical cord fitment **162** that plugs into an opening **164** in casing **20**, and an electrical on/off switch **166** at the top of handle **22**. As best seen in FIG. **2**, the casing is recessed **168** so that switch **166** is below the profile contour of the handle and is therefore less likely to be accidentally operated during manipulation of the massager. FIGS. **1** and **2** also show openings **170** for supplementary bolts securing the casing halves together.

Referring back to FIGS. **1** to **3**, the arrangement of the two handles **22** and **24** on casing **20** is also believed to be an advantageous feature of the invention. The handles are disposed one at each side of the casing generally at opposite ends of the pivot axis for the massage head. Each handle comprises a generally U-shaped formation extending outwardly of the casing with one handle disposed generally parallel to a general plane P (FIG. **5**) containing the massage head and the other at right angles to the said plane.

As mentioned previously, this handle configuration allows an operator to mainpulate the massager in many different ways, using one or two hands. For example, referring to FIG. **1**, an operator standing on the far side of the massager as drawn could place his or her left arm across the top of the casing **20** and grasp handle **24** with the arm straight while the other arm would be bent while holding handle **22**. The massage can then easily traversed generally in an arc outwardly from the users body without undue effort.

It will also be noted from FIG. **5** that the top surface **20***a* of casing **20** slopes downwardly away from the handle **22** towards handle **24**. This not only assists in permitting the massager to be held in the way described above but also allows the massager to be conveniently inverted and supported on a generally horizontal surface, for example for massaging the feet.

In summary, the massager shown in the drawings is believed to offer numerous advantages over the prior art including ease of manipulation, effective percussive massage and the facility for controlling the amplitude of the percussive strokes and thereby the intensity of the treatment. In prior art massagers the massage effect can be varied only by changing the frequency of massage by means of a rheostat in the power supply to the drive motor of the massager. By contrast, the massager provided by the invention is superior in that the amplitude and hence the penetration of the massage effect can be varied.

It should of course be appreciated that the preceding description relates to a particular preferred embodiment of the invention only and that many modifications are possible within the broad scope of the invention.

For example, the handle configuration described above could be used with a massage mechanism other

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than of the form described. Conversely, a different casing could be used with the mechanism described. It probably would also be possible to use a different form of drive unit such as an electrical vibrator mechanism or even a pneumatic drive source. The arrangement used for coupling the drive unit with the massage head may also vary. For example, a cam arrangement could be used for reciprocating the massage head rather than the connecting rod and eccentric arrangement disclosed, and could still incorporate a resilient link.

We claim:

1. A body massager comprising:

a base structure including a casing having handles for manipulating the massager;

a drive unit carried by said base structure;

a massage head having an external massage surface contoured symmetrically about a transverse centre line for percussive massage of the body, the massage head being coupled to the base structure for pivotal rocking movement about an axis parallel to said transverse centre line; and;

means coupling said drive unit with said massage head to reciprocate said massage head in a direction generally normal to said axis at a position spaced from said centre line, for producing said rocking movement of the head;

wherein two said handles are provided and are disposed one at each side of the casing generally at opposite ends of said axis, each said handle comprising a generally U-shaped formation extending outwardly of the casing with one handle disposed generally parallel to a general plane containing the massage head and the other handle at right angles to said plane.

2. A massager as claimed in claim 1, wherein said drive unit is an electric drive motor and wherein one of said handles incorporates an on/off switch for said motor, said switch being disposed in a recess in the handle so that the switch does not project above the profile of the handle in the region of the recess.

3. A body massager comprising:

a base structure including a casing having handles for manipulating the massager;

a drive unit carried by said base structure and comprising an electric motor having a driven rotary output shaft;

a massage head having an external massage surface contoured symmetrically about a transverse centre line for percussive massage of the body, the massage head being coupled to the base structure for pivotal rocking movement about an axis parallel to said transverse centre line; and,

means coupling said drive unit with said massage head to reciprocate said massage head in a direction generally normal to said axis at a position spaced from said centre line, for producing said rocking movement of the head, said means including: an eccentric carried by said output shaft; a connecting rod extending between the eccentric and said massage head at said position spaced from the centre line of said massage surface for converting rotary motion of said output shaft into reciprocatory motion of the massage head at said position; a resilient link which is alternately compressed and relaxed during said reciprocation and which comprises a resilient bushing carried by said connecting rod; and adjustable means constraining said link to limit the extent of said compression and relaxation at each reciprocation, and thereby control the amplitude of said pivotal rocking movement of the massage head, said adjustable means comprising a seat on the massage head and a lever carried by said head, the bushing being constrained between the lever and seat, and the lever being adjustable to vary the constraint applied to the bushing.

4. A massager as claimed in claim 3, wherein said lever is pivotally coupled to said massage head at one end and at its opposite end is provided with adjustment means for varying the height of said lever above said massage head.

5. A massager as claimed in claim 4, wherein said adjustment means comprises a shaft turnably mounted in said massage head and extending through an opening in said end of the lever generally in the direction in which said end is to be adjusted, said shaft being turnable from externally of the massage head while being fixed axially, a stationary annular cam member bearing on said lever and through which said shaft extends, said cam member having a cam surface that progressively curves away from the lever and said shaft being provided with a follower arranged to move up or down said cam surface in response to turning of the shaft, thereby moving the cam member towards or away from the lever depending on the direction in which the shaft is turned, the lever being spring-biassed towards said cam.

6. A massager as claimed in claim 5, wherein said shaft is coupled to a knob contoured to form part of said massage surface of the massage head.

7. A massager as claimed in claim 6, further comprising detent means between said knob and said massage head for determining discrete angular positions of said shaft corresponding to predetermined adjusted positions of said lever, and indicia on said knob and massage head for denoting said positions.

8. A massager as claimed in claim 1, wherein said eccentric includes an eccentric balance weight dynamically balancing said eccentric.

9. A massager as claimed in claim 1, wherein said massage head comprises a relatively rigid inner shell and a resilient outer shell providing cushioned areas of said contoured massage surface, said shells each being moulded in a plastic material.

10. A massager as claimed in claim 1, wherein said massage surface is a generally rectangular shape and is contoured to define four generally hemispherical protrusions adjacent respective corners of the massage surface and four smaller generally hemispherical protrusions disposed inwardly of the corner protrusions, the protrusions being spaced symmetrically on opposite sides of said transverse centre line and being spaced symmetrically on opposite sides of a corresponding longitudinal centre line to provide an anatomically contoured massage surface.

* * * * *

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G. P. ELMEN.

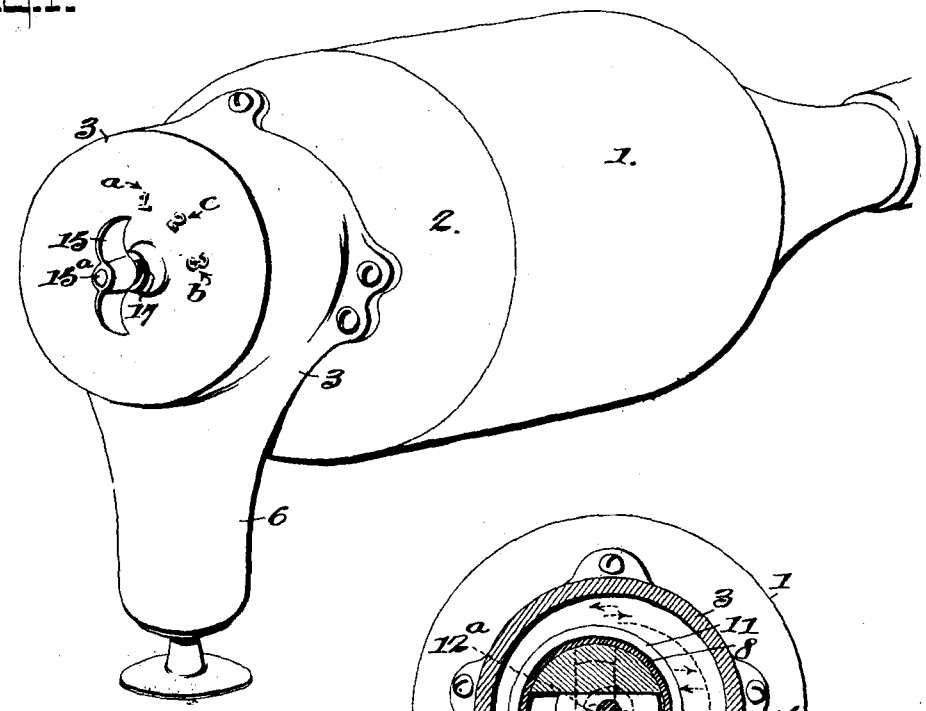
VIBRATOR.

APPLICATION FILED JUNE 14, 1918.

1,339,179. **Patented May 4, 1920.**

2 SHEETS—SHEET 1.

Fig. 1.



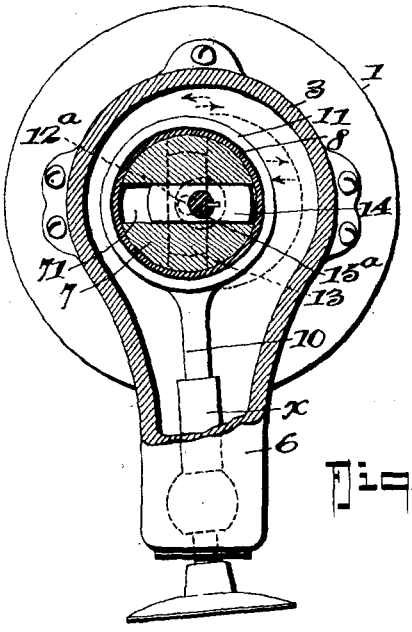


Fig. 4.

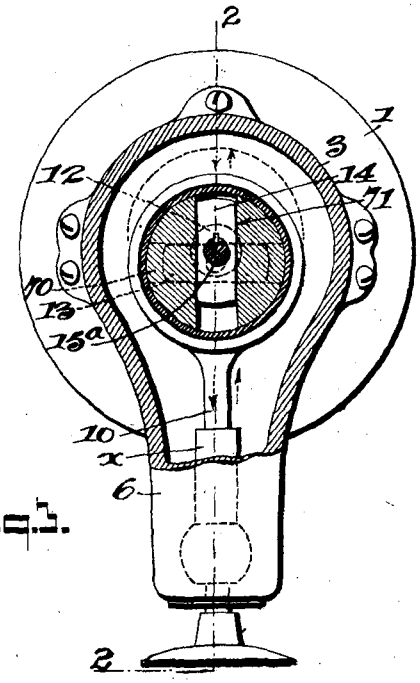


Fig. 3.

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1,339,179.

Patented May 4, 1920.

2 SHEETS—SHEET 2.

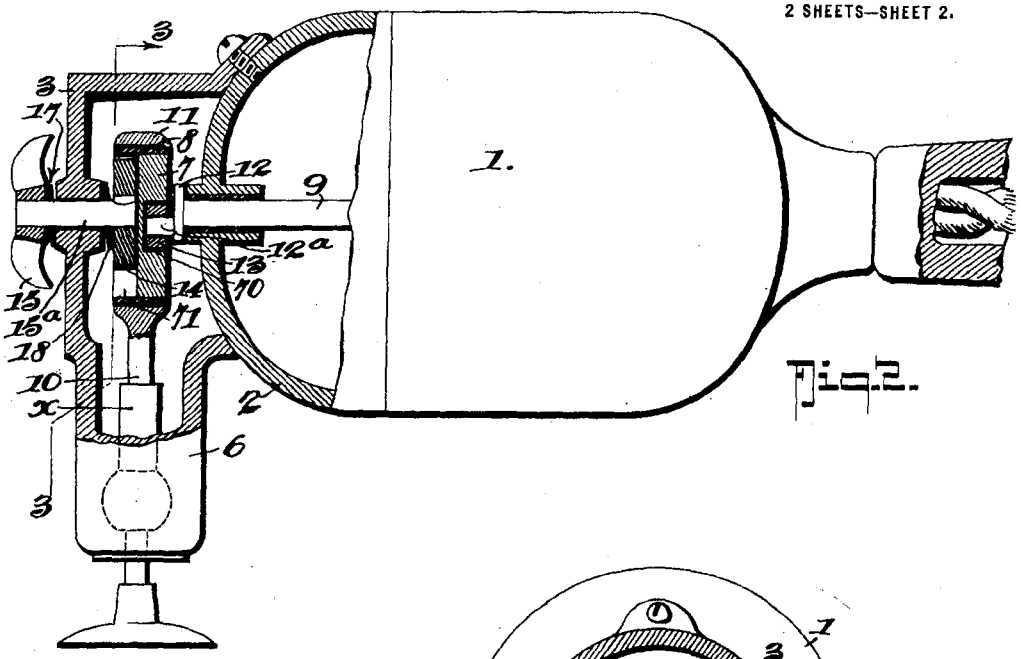

Fig. 2.

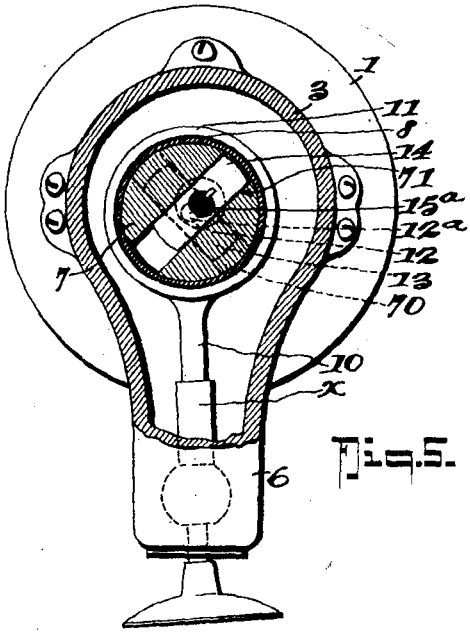

Fig. 5.

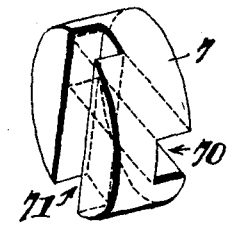

Fig. 6.

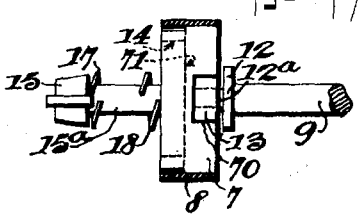

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE P. ELMEN, OF LINCOLN, NEBRASKA.

VIBRATOR.

1,339,179. Specification of Letters Patent. Patented May 4, 1920.

Application filed June 14, 1918. Serial No. 240,045.

To all whom it may concern:

Be it known that I, GEORGE P. ELMEN, a citizen of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented certain new and useful Improvements in Vibrators, of which the following is a specification.

This invention has reference to certain new and useful improvements in vibrators, especially those of the massage type and the invention primarily has for its object to provide a vibrator in which two distinctly different strokes, one a percussion stroke and the other a brushing stroke, can be obtained or a combination of the said two strokes may be had.

Another object of my invention is to provide, in a device of the character stated, an improved construction of the controlling means for setting the power transmission connections between the crank disk and the applicator or plunger, that is simple and inexpensive in the manufacture thereof, by which the several adjustments can be practically instantly made for adapting the applicator to the percussion stroke, the brushing stroke, or the combination or mixed stroke.

With other objects in view that will hereinafter appear, my invention embodies, in a vibrator of the character outlined, certain details of construction and combination of parts specifically brought out in the following description and the appended claims and illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of my invention.

Fig. 2 is a longitudinal section thereof taken practically on the line 2—2 on Fig. 3, parts being in elevation.

Fig. 3 is a cross section thereof taken on the line 3—3 on Fig. 2, the shifting or controlling members of the power transmission connected with the applicator arm, being positioned to impart a percussion stroke to the said applicator arm.

Fig. 4 is a detail cross section of the housing, the upper end of the applicator or plunger and the stroke controller devices, the latter being shown as adjusted for imparting the brushing motion to the plunger or applicator.

Fig. 5 is a similar view, the parts being

Fig. 6 is a perspective view of the slotted head block.

Fig. 7 is a detail plan view that illustrates the correlation of the controlling or head block turning member and the driving member that attaches to the crank disk and imparts movement to the head block.

In the practical arrangement of my invention, the main or supporting casing 1, in which the driving (electric) motor is mounted and which has the usual handle, is of the conventional form, as indicated in Fig. 1.

The front section 2 of the casing supports the operating parts of the vibrator and to it is attached, by any suitable means, a housing 3 for the power transmission devices that connect with the applicator or plunger arm 10, presently again referred to.

The housing 3 includes a neck 6 in which the applicator arm 10 is reciprocably mounted in the usual way with the lower end thereof extended beyond the said neck 6, as shown.

In my improved construction of vibrator, the upper end of the plunger or applicator member 10 is formed as a ring-shaped band 11 to fit over a vertically reciprocable and rotatable head block 7, engaged by the band 11 and the said end, as shown, carries a steel bearing sleeve 8, which latter may, however, in practice, be omitted.

The head block 7 has two elongated recesses or slots 70—71, one at each end and the said slots extend across their respective ends and are arranged at right angles to each other, and to make the head block of light weight, the slots may extend inwardly nearly close enough to merge, as is clearly shown in Figs. 2, 6 and 7.

9 designates the motor shaft, the outer end of which extends into the housing 3 and upon the said end is mounted a crank disk 12 that is located in close relation to the inner face of the head block 7.

By referring now more particularly to Figs. 2 and 3 of the drawings, it will be noticed a short bar or member 13 seats within the slot 70 on the inner face of the block 7 and connects with the eccentric stud pin 12^a of the disk 12.

A similar member that is hereinafter termed the controller block 14 seats in the elongated recess or slot 71 in the outer face

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connected a short spindle 15ª that journals in the front side of the housing and which carries a thumb knob 15, as shown.

To hold the said knob 15 and the head block to their adjusted position, a spring disk washer 17 is mounted upon the spindle 15ª between the knob and the housing and to properly center the block 7, a similar spring washer 18 is located between the head block 7 and the inner wall of the housing 3, as is clearly shown in Fig. 2.

It is to be understood that the applicator or plunger arm operates through a rocker bar, indicated by *x* on Fig. 2 mounted in the lower end of the neck 6 to allow for the sidewise or brushing movement of the said applicator or plunger arm. The thumb knob 15 also serves as an indicator for designating the set of the transmission mechanism, the outer face of the housing 3 having suitable indication points *a*, *b*, and *c* that designate the percussion, the brushing, and the combined percussion and brushing strokes respectively for which the plunger may be adjusted.

From the foregoing description taken in connection with the accompanying drawings, the complete construction, the manner of its operation, and the advantages of my improved vibrator construction will be readly apparent to those skilled in the art to which my invention relates.

The connection of the controller block with the head block 7 is such that the said block 7 can be instantly adjusted within the ring-like head of the applicator or plunger 10 by turning the said knob 15.

By turning the knob 15 to the vertical position, the controller block or bar rotates the block 7 until the said block or bar 14 is in the vertical position and the short bar 13 is at a horizontal position, thereby providing for the up and down or full percussion stroke of the applicator.

When the thumb knob is turned, in either direction, right or left, to the horizontal position, the other member 13 assumes the vertical position and owing to the peculiar connection of the head block 7 with the said member 13 and with the applicator head portion, brushing movement of the applicator is provided for and, by setting the thumb knob midway between the two positions mentioned, the combination or mixed stroke of the applicator is had.

What I claim is:

1. In a vibrator, a support, an applicator having longitudinal and lateral bearing in the said support, a drive shaft, a connection between the drive shaft and the said applicator, and means for varying the direction of movement of the applicator, the said means including a head block having rotatatransversely elongated socket in that face adjacent the drive shaft, a follower mounted in the said socket, and crank pin and disk connections that join the drive shaft and the follower, and means operable externally of the casing for setting the head block to locate the follower at a horizontal, a vertical or a midway position relatively to the drive shaft, said means including a tension device for holding the head block to the shifted position.

2. In a vibrator, a support that includes a housing having a neck provided with a spherical bearing seat, an applicator arm, one end of which extends through the said bearing seat and the housing and whose other end terminates in a ring-like band, a drive shaft, a crank disk on that end of the shaft adjacent the applicator, a power transmission connecting the crank disk and the applicator, said transmission consisting of a cylindrical head that forms the bearing connection for the ring-like band of the applicator arm, the said head having a transversely extended elongated socket in each of the opposite ends thereof, the said sockets being disposed at right angles to each other, a controller block mounted in the socket in the outer face of the head, a bar held in the socket in the other face of the head with which the crank disk pivotally connects midway the ends thereof, the controller block having an attached spindle that journals in and extends through the housing, a thumb knob attached to the outer end of the spindle, whereby the controller block can be turned to rotate the head to bring the crank disk connected bar at the different positions for effecting the desired changes of motion of the applicator, and tension devices for holding the head block to the thumb knob controlled position.

3. In a vibrator, a support, a first motion crank shaft, a vibrator plunger arm, an oscillatable bearing in which said plunger arm is reciprocably mounted, a circular head block having a diametrical groove on each side, one groove being extended at right angles to the other, a strap, carried by said plunger arm, in which said circular head block is located, a slide operable in one of said head block grooves and apertured to receive the crank of the first motion shaft, a second slide operable in the other groove of said head block, an adjusting shaft mounted in a bearing in said support and keyed to said second slide block, and means by which said adjusting shaft may be turned to turn said head block for purposes of adjustment and thereby to vary the stroke of said plunger arm, and means for holding said adjusting shaft in the positions to which it is set.

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US005215051A

United States Patent [19]

Smith

[11] Patent Number: 5,215,051

[45] Date of Patent: Jun. 1, 1993

[54] **MODIFIED ASPIRATED INTERNAL COMBUSTION ENGINE**

[75] Inventor: **Jack E. Smith**, Warren, Mich.

[73] Assignees: **Nicholas J. Lopiccolo**, Rochester; **Peter D. Keefe**, Clinton Township, Macomb County, both of Mich.

[21] Appl. No.: **962,894**

[22] Filed: **Oct. 19, 1992**

[51] **Int. Cl.**[5] **F02B 75/06**; F02B 75/04

[52] **U.S. Cl.** ..... **123/197.4**; 123/78 F; 74/596; 74/44

[58] **Field of Search** ..... 123/197.4, 197.3, 48 B, 123/78 F; 74/595, 596, 44

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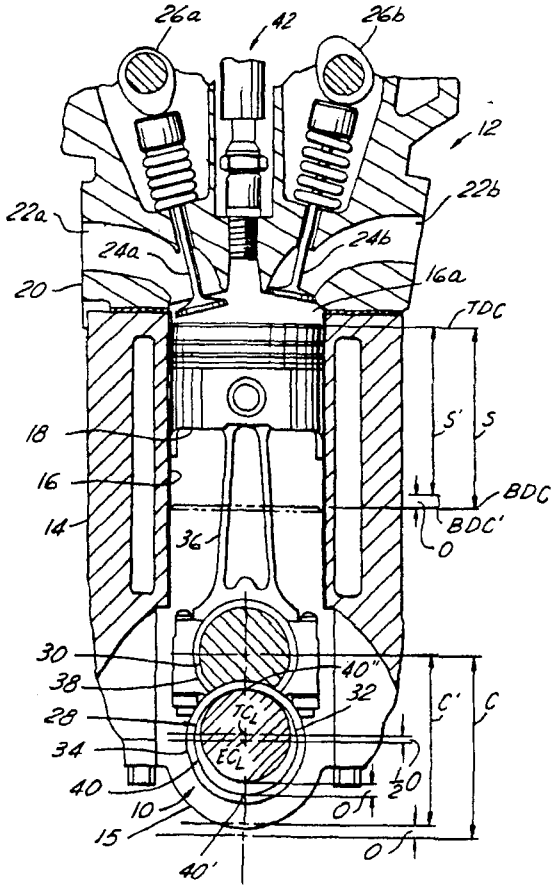
Primary Examiner—E. Rollins Cross
Assistant Examiner—M. Macy
Attorney, Agent, or Firm—Peter D. Keefe

[57] **ABSTRACT**

A crankshaft eccentrically mounted to the engine block bearings of an internal combustion engine for providing improved volumetric efficiency. A modified crankshaft journal and engine block bearing structure is provided at each crankshaft support location so that the connecting rod bearings rotate about an eccentric centerline (EC_L). Eccentricity is achieved by off-setting the crankshaft journals a predetermined distance above the original true centerline (TC_L) of the crankshaft, preferably on the order of about one-quarter to one-half inch. The top dead center (TDC) of each piston remains the same relative to its cylinder, but the bottom dead center (BDC) of each piston relative to its cylinder is lowered by the amount of the off-set because the engine block bearings are lowered with respect to the true centerline of the crankshaft by the amount of the off-set on the crankshaft journals. The crankshaft is forged with the eccentric off-set, then is machined to provide the precise tolerance needed for fitting into the engine block bearings and is harmonically balanced as needed. The engine block bearings are enlarged over the original specification, and are lowered the same predetermined eccentric off-set distance. The crankshaft is then installed in the engine block.

6 Claims, 2 Drawing Sheets



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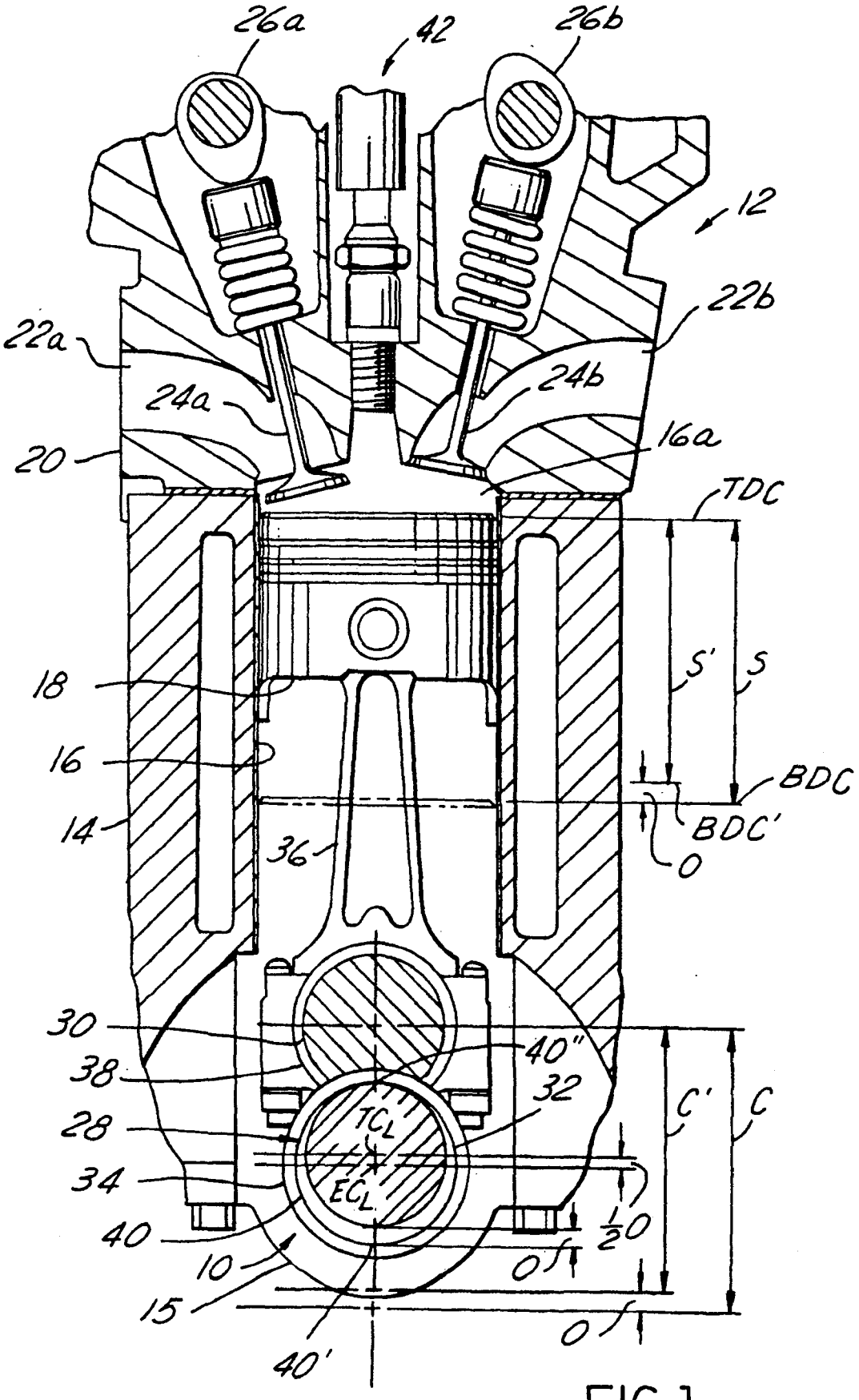

FIG. 1

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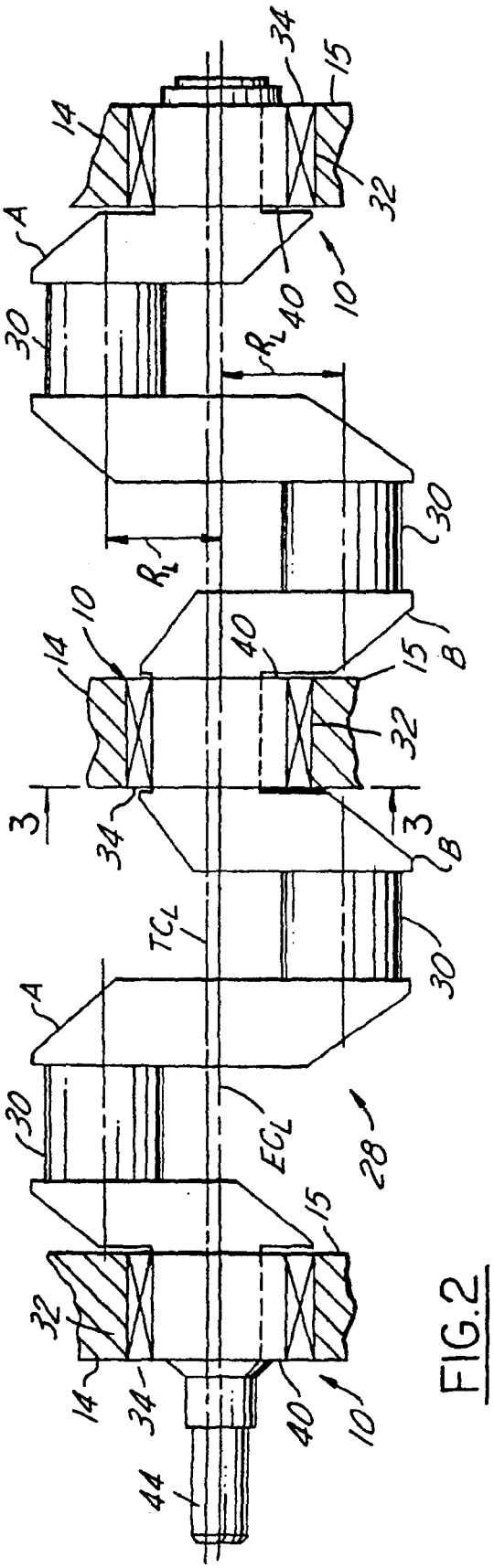

FIG.2

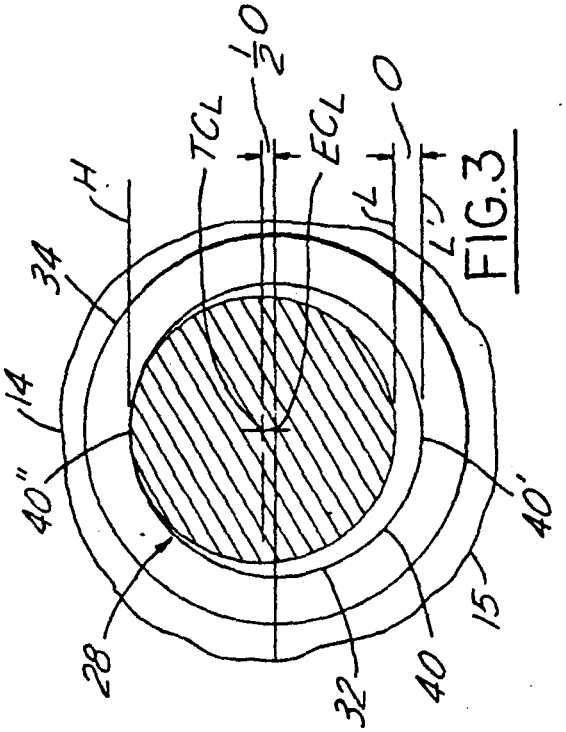

FIG.3

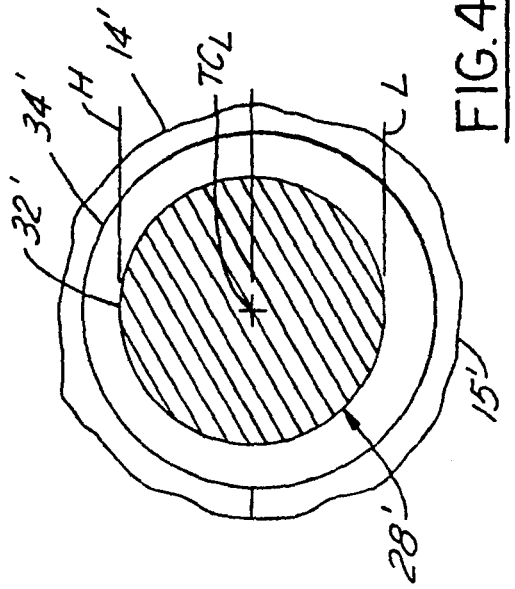

FIG.4

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MODIFIED ASPIRATED INTERNAL COMBUSTION ENGINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to reciprocating internal combustion engines, and more particularly to the crankshaft and engine block bearings thereof. Still more particularly, the present invention relates to a modified crankshaft having eccentric crankshaft journals mounted with respect to modified engine block bearings.

2. Description of the Prior Art

Conventional reciprocating internal combustion engines utilize an engine block, cylinders in the engine block, pistons reciprocable within the cylinders, a crankshaft rotatably mounted at its journals to the engine block via engine block bearings, and connecting rods connecting each of the pistons to the crankshaft. Once these components are designed for a particular engine, the specifications are set and are not variable.

Because the pistons travel reciprocably within the cylinders based upon a circular movement of the connecting rod bearings about the centerline of the crankshaft, there are inevitable volumetric losses in the combustion chamber (that part of the cylinder above the piston). One source of volumetric losses arises because of combustion by-product gases in the combustion chamber after the exhaust stroke. As a result, the intake stroke mixes fuel and air with these by-product gases, thereby contributing to an inefficient power stroke. This loss is inevitable because of atmospheric equalization of pressure occurring during the exhaust stroke, preventing complete purging of the combustion chamber. Another source of volumetric losses arises because during the power stroke, heat and pressure are compounded by the rate of displacement of the piston, thereby resulting potentially in detonation, loss of engine power, fuel inefficiency and dirty emissions.

In the internal combustion art, it is known to relieve the aspiration related problems by installing accessory devices, such as blowers and turbines, which overcome atmospheric pressure. However, these devices are expensive, require maintenance and are most suitable to a narrow range of operating speeds.

Accordingly, what remains needed in the art is an increase in volumetric efficiency by introducing a variable in the displacement which affords increased aspiration during the intake stroke and affords a slower rate of combustion gas pressure build-up during the power stroke.

SUMMARY OF THE INVENTION

The present invention is a reciprocating internal combustion engine having a high volumetric efficiency because of an increment in the displacement due to increased piston travel which affords improved aspiration during the intake and exhaust strokes, a higher compression ratio during the compression stroke, and a slower rate of combustion gas pressure build-up during the power stroke.

The essential concept of the present invention is to eccentrically mount the crankshaft with respect to the engine block bearings by providing a modified crankshaft journal and engine block bearing structure at each crankshaft support location so as to cause the connecting rod bearings to rotate about an eccentric centerline (EC_L). Eccentricity is achieved by off-setting the crankshaft journals a predetermined distance from the original true centerline (TC_L) of the crankshaft. The top dead center (TDC) of each piston remains the same relative to its cylinder, but the bottom dead center (BDC) of each piston relative to its cylinder is lowered by the amount of the off-set because the engine block bearings are lowered with respect to the one or more cylinders by the amount of the off-set on the crankshaft journals. In this regard, the crank arms are configured so that each has an equal radial displacement from the eccentric centerline.

As a result of this eccentricity of the crankshaft journals, the maximum combustion chamber volume is incremented and the piston speed is increased per revolution per unit of time. These modifications to the original specifications of the engine effect to increase the volumetric efficiency of the engine from its original design. This occurs because of two aspects. The first aspect involves additional air being allowed into the combustion chamber during the intake stroke. The added air minimizes the effect of by-product air being present during the power stroke, thereby improving combustion and reducing harmful emissions. The second aspect involves increased speed and displacement of the piston due to the eccentric movement of the connecting rods at the crankshaft. This results in a slower rate of combustion gas pressure build-up without detonation, an increased fuel-air mix volume, and an increased compression ratio. These two aspects combine so as to provide higher volumetric efficiency for the engine, even approaching 100 percent. Thus, by providing modified crankshaft and modified engine block bearing structures, the benefits derived include: added power, improved air to fuel ratio, increased compression ratio, higher engine torque, increased miles per gallon, and cleaner emissions over the original engine specifications.

To establish the modified crankshaft journals having the eccentric off-set, the modified crankshaft is forged with the predetermined eccentric off-set with the crank arms centered about the eccentric centerline. The modified crankshaft is then machined to provide the precise tolerance needed for fitting into the engine block bearings and is harmonically balanced as needed. The engine block bearings are enlarged over the original specification, and are lowered the same predetermined eccentric off-set distance. The modified crankshaft is then installed in the engine block.

Accordingly, it is an object of the present invention to provide a reciprocating internal combustion engine having a modified aspiration function which increases the volumetric efficiency of the engine.

It is another object of the present invention to provide a reciprocating internal combustion engine having a modified crankshaft including modified crankshaft journals provided with an eccentric off-set, the modified crankshaft journals being mounted with respect to engine block by modified engine block bearings which are lowered in a direction away from the one or more cylinders by the same off-set, the combination of the modified crankshaft and modified engine block bearings providing increased volumetric efficiency of the engine over the original engine specifications.

It is a further object of the present invention to provide a reciprocating internal combustion engine having

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a modified aspiration function which provides for a better air to fuel ratio.

It is yet a further object of the present invention to provide a reciprocating internal combustion engine having a modified aspiration function which provides for an improved combustion process.

It is still another further object of the present invention to provide a reciprocating internal combustion engine having a modified aspiration function which provides for improved efficiency and reduced emissions.

These, and additional objects, advantages, features and benefits of the present invention will become apparent from the following specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partly sectional end view of a reciprocating internal combustion engine provided with the modified crankshaft and engine block bearing structure according to the present invention.

FIG. **2** is a side view of a modified crankshaft according to the present invention depicted with partly broken away adjacent modified engine block bearing structure.

FIG. **3** is a partly sectional end view of the modified crankshaft and modified engine block bearing structures, seen along lines 3—3 in FIG. **2**.

FIG. **4** is a partly sectional end view of a crankshaft and engine block bearing structures of a conventional internal combustion engine before being modified according to the present invention as depicted in FIGS. **1**, **2** and **3**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the Drawing, FIG. **1** depicts the modified crankshaft and engine block bearing structures **10** according to the present invention in relation to an internal combustion engine **12**. The internal combustion engine **12** by way of example is of the reciprocating, four cycle type, having an engine block **14** containing one or more cylinders **16**, a piston **18** reciprocably movable in each cylinder, respectively, a head **20** connected with the engine block and covering the top end of each cylinder so as to form a combustion chamber **16***a* above each piston, intake and exhaust manifolds **22***a*, **22***b* for each cylinder, intake and exhaust valves **24***a*, **24***b* for each cylinder which are timed by one or more cams **26***a*, **26***b*, the cams being rotatably timed by mechanical linkage with respect to a modified crankshaft **28**. The modified crankshaft **28** has one U-shaped crank arm **30**, respectively, for each piston **18**, and further has at least two modified crankshaft journals **32**, each of which seating into a respective modified engine block bearing **34**. Each piston **18** is connected with the modified crankshaft **28** via a respective connecting rod **36**. In this regard, each connecting rod **36** is pivotally connected at one end with its respective piston **18** and rotatably connected, via a connecting rod bearing **38**, with its respective crank arm **30**. An ignition device **42** is ordinarily located at the head **20** for providing initiation and timing of combustion in each combustion chamber **16***a*, which may or may not be in the form of an electronic ignition.

In the foregoing description, the internal combustion engine **12** operates in a conventional four cycle manner (each piston having an intake stroke, a compression stroke, a power stroke and an exhaust stroke during the whole of which the crankshaft makes two complete revolutions), except as pertains to the effects of the modified crankshaft and engine block bearing structures **10**, as will be detailed hereinbelow.

As can be discerned from FIG. **1**, the piston **18** reciprocates from a highest location in the cylinder **16**, known as top dead center to a lowest location in the cylinder, known as bottom dead center. The internal combustion engine **12** depicted in FIG. **1** was originally designed to have the piston **18** reciprocate between an original top dead center TDC and an original bottom dead center BDC'. However, the modified crankshaft and engine block bearing structures **10** now result in the piston **18** reciprocating between the aforesaid top dead center TDC and a modified bottom dead center BDC. While the location of the top dead center TDC remains unchanged, the travel difference between the original bottom dead center BDC' and the modified bottom dead center BDC is an amount of increased travel of the piston **18** in the cylinder **16** which translates into an increased maximum volume of the combustion chamber **16***a*. The amount of increase of travel of the piston **18** is equal to the off-set O provided by the modified crankshaft and engine block bearing structures **10**. This increased displacement is due to each crank arm **30** now rotating about a new center of rotation, an eccentric centerline EC_L, that is displaced a distance of one-half the off-set O in relation to the original center of rotation, the true centerline TC_L. More specifically, since each crank arm **30** rotates about the eccentric centerline EC_L rather than the true centerline TC_L, the diameter of travel of the crank arm over each rotation is now a length C which is larger than the original length C' by a distance equal to the off-set O. The off-set O is preferred to have a length of about one half inch, but can be otherwise within the limits of the original structure of the internal combustion engine **12**. That is, the off-set O may be set to a certain maximum length which does not result in interference between relatively moving parts and which does not result in impaired engine operation, such as if the piston travel reaches an untowardly too low location in its cylinder.

While movement of one piston has been detailed in the foregoing description, the aforesaid piston travel between the top dead center TDC and the modified bottom dead center (BDC') applies similarly to all pistons of the internal combustion engine **12**.

The change of piston travel between the original bottom dead center BDC and the modified bottom dead center BDC' is the result of the modified crankshaft and engine block bearing structures **10**, the nature of which will now be detailed.

Firstly, the modifications necessary to provide the modified crankshaft **28** will be detailed with the aid of FIGS. **1** and **2**.

The modified crankshaft **28** is provided by being forged, machined and balanced as needed. In so doing, at least two modified crankshaft journals **32** are provided, and at least one crank arm **30** is provided.

In the case of a multi-cylinder internal combustion engine **12**, a crank arm **30** is provided for each piston **18** of each cylinder **16**. In this regard, each crank arm **30** is located in axial alignment with its respective cylinder. The crank arms **30** have predetermined radial displacement from the eccentric centerline EC_L, ordinarily being all equal to a radial length R_L (wherein $2R_L$ equals C in FIG. **1**). For example, FIG. **2** shows a modified crankshaft **28** for a four cylinder combustion engine **12** in which a first set A of crank arms is located on a first

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side of the modified crankshaft, while a second set B of crank arms is located on a second, opposite side of the modified crankshaft. Each crank arm **30** extends the radial length R_L from the eccentric centerline EC_L. Accordingly, one aspect of the aforesaid modifications is to change the radial length of the crank arms from being centered on the original, true centerline TC_L to being centered on the new, eccentric centerline EC_L.

Each modified crankshaft journal **32** includes an off-set portion **40**. The off-set portion **40** has a maximum **40'** that is equal to the off-set O. The maximum **40'** of the off-set portion **40** is shown located on the second side of the modified crankshaft, that is, on the side thereof facing toward the second set B of crank arms, but this location is not a requirement. The off-set portion **40** smoothly decreases on either side of the maximum **40'** to a minimum **40''** that is equal to a zero off-set at the opposite side of the modified crankshaft on the first side thereof, that is, on the side thereof facing toward the first set A of crank arms. The off-set portion **40** is provided at the time the crankshaft **28** is forged, and is subsequently machined into preset tolerance.

The original crankshaft **28'** (shown in FIG. **4**) rotated about the true centerline TC_L, however, the modified crankshaft **28** now rotates about the eccentric centerline EC_L. The original crank arms of the original crankshaft **28'** all had a predetermined radial length. Since an off-set portion **40** has been provided on the modified crankshaft **28**, the radial length of the crank arms thereof must be elongated from that of the original crank arm corresponding thereto by the amount of the off-set at the corresponding side of the modified crankshaft. In the example depicted in FIG. **2**, the radial length for the first set A of crank arms **30** did not need elongation over that of the corresponding original crank arms of the original crankshaft **28'** because they are located on the side of the modified crankshaft having the minimum **40''**, whereas the radial length of the second set B of crank arms must be elongated over that of the corresponding original crank arms of the original crankshaft by an amount of the off-set O, since they are located on the side of the modified crankshaft having the maximum **40'**. A crank arm located at an arbitrary location on the modified crankshaft would be provided with a radial length R_L which is elongated with respect to the radial length of the corresponding original crank arm of the original crankshaft **28'** by an amount equal to the off-set at that particular location.

Whenever a crank arm **30** is located on the side of the modified crankshaft having the minimum **40''**, no elongation of the radial length R_L over that of the corresponding original crank arm of the original crankshaft **28'** is required. Accordingly, minimum modification is involved for single cylinder internal combustion engines where the off-set portion **40** is provided so that the minimum **40''** thereof is on the same side of the modified crankshaft as the crank arm **30**.

The modified engine block bearing **34** (shown in FIG. **3**) is provided by enlargement of the original engine block bearing **34'** (shown in FIG. **4**) in order to accommodate the increased diameter of the modified crankshaft journal **32** (the diameter of the original crankshaft journal **32'** of the original crankshaft **28'** being depicted in FIG. **4**). The difference in diameters between the original crankshaft journal **32'** and the modified crankshaft journal **32** is the off-set O. Now, since the off-set portion **40** on the modified crankshaft journal **32** tends to raise the maximum height of travel of the piston **18** in the cylinder **16** above top dead center TDC by the amount of the off-set O, the modification of the original engine block bearing **34'** is executed so as to provide a new, eccentric centerline EC_L that is located displaced from the original, true centerline TC_L of the original engine block bearing **34'** (as shown in FIG. **3**) by a distance of one-half the off-set O. The process is carried-out by removing the original engine block bearing caps **15'** and the original engine block bearings **34'**, machining the engine block **14** so as to accommodate the modified engine block bearings **34**, installing the modified engine block bearings **34** and installing the modified engine block bearing caps **15**.

The aforesaid modification specifications can be best understood by comparative examination between FIGS. **3** and **4**. The maximum high point H of the original crankshaft journal **32'** and the modified crankshaft journal **32** is the same relative to the engine block. However, the original crankshaft journal **32'** has a low point of L relative to the engine block, while the modified crankshaft journal has a low point of L' relative to the engine block. Since the high point H remains the same, the top dead center TDC of the piston **18** remains the same, whereas since the low points L and L' are different by the amount of the off-set O, the bottom dead centers BDC, BDC' are also different by the amount of the off-set O. In this regard, the modified bearing low point off-set from L to L', and the centerline off-set from TC_L to EC_L are both in line with the cylindrical axis of each of the one or more cylinders **16** of the internal combustion engine **12**.

As can be discerned from FIG. **2**, the output shaft portion **44** of the crankshaft **28** is located in line with the eccentric centerline EC_L.

The modified crankshaft journal and engine block bearing **10** may be applied to modify an already existing engine, or to modify manufacturing specifications at a manufacturing plant with respect to engines formerly being produced under an original set of specifications. Since the off-set O is preferably kept small enough so as to avoid interference among relatively moving parts and without impairment of engine operation, many originally specified internal combustion engines can be modified according to the present invention, as the new piston travel will be accommodated by the engine block, the cylinders and other components thereof without (in most cases) further modification.

In operation, since the connecting rods rotate about the eccentric centerline EC_L, increased piston travel is achieved which provides increased piston velocity per revolution per unit of time which translates into a whole host of benefits over a conventional internal combustion engine having an original set of specifications. Due to the increased speed of the piston, more complete purging of combustion by-product gases during the exhaust stroke is achieved. This occurs because as the combustion chamber volume decreases the piston speed increases so as to expel more combustion by-product gases than would otherwise be possible. Due to the increased piston displacement, an increased volume of air or air/fuel mixture is drawn into the combustion chamber during the intake stroke which provides for a greater chemical potential energy content in the combustion chamber. During the compression stroke, the added piston displacement results in the air or air/fuel mixture present in the combustion chamber from the intake stroke to be compressed to a higher compression ration. During the power stroke, the increased maxi-

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mum volume of the combustion chamber provides a more favorable combustion chamber expansion relationship with respect to the expanding gas during combustion, thus promoting combustion gases to burn progressively rather than compounding. This translates into a more complete combustion in which detonation is assuaged because combustion is more evenly distributed within the combustion chamber during the power stroke.

In order to maximize the foregoing benefits of the modified crankshaft journal and engine block bearing structure **10**, various other components of the internal combustion engine **12** may be adjusted, such as the timing and shape of the cams **26***a*, **26***b*.

To those skilled in the art to which this invention appertains, the above described preferred embodiment may be subject to change or modification. For instance, while an in-line, four cycle, four cylinder internal combustion engine has been shown in FIG. **2**, the present invention can be readily applied to single cylinder internal combustion engines and to multi-cylinder internal combustion engines of any configuration, such as for example "V-8" or radial configurations, to internal combustion engines operating on the Otto or Diesel principle, and to four or two cycle internal combustion engines. Such change or modification can be carried out without departing from the scope of the invention, which is intended to be limited only by the scope of the appended claims.

What is claimed is:

1. An internal combustion engine, comprising:

an engine block;

at least one cylinder located in said engine block, said at least one cylinder having a top end;

at least one piston, each piston of said at least one piston being reciprocably movable in a respective cylinder of said at least one cylinder between a top dead center and a bottom dead center;

a head connected with said engine block for covering said top end of said at least one cylinder so as to form a combustion chamber above said at least one piston;

aspiration means for providing gas entry into said combustion chamber of said at least one cylinder and for providing gas exit from said combustion chamber of said at least one cylinder;

valve means for timing communication of said combustion chamber of said at least one cylinder with respect to said aspiration means;

ignition means for providing initiation and timing of combustion in said combustion chamber of said at least one cylinder;

a crankshaft rotatably mounted to said engine block, said crankshaft having at least one crank arm;

connecting rod means between said at least one piston and said at least one crank arm for translating reciprocation of said at least one piston into rotation of said crankshaft;

mounting means for rotatably mounting said crankshaft to said engine block, said mounting means being located at least two mutually spaced mounting locations with respect to said engine block, said mounting means at each said mounting location comprising:

a crankshaft journal located on said crankshaft, said crankshaft journal having a crankshaft journal cross-section, said crankshaft journal cross-section including a crankshaft cross-section and an off-set portion, said off-set portion having a maximum which is equal to a predetermined off-set, said predetermined off-set being greater than a zero off-set, said maximum being located on a predetermined side of said crankshaft, said off-set portion smoothly decreasing from said maximum to a minimum from each side of said maximum, said minimum being equal to a zero off-set, said minimum being located on said crankshaft opposite said maximum; and

an engine block bearing connected with said engine block, said engine block bearing rotatably supporting said crankshaft journal;

wherein said crankshaft rotates in relation to said engine block about an eccentric centerline passing axially through said crankshaft journal cross-section, said eccentric centerline being displaced from a true centerline passing axially through said crankshaft cross-section by a distance equal to one-half said off-set, wherein said at least one crank arm has a predetermined radial length centered on said eccentric centerline, and wherein said modified crankshaft has at least one output shaft portion axially aligned with said eccentric centerline.

2. The internal combustion engine of claim **1**, wherein said at least one cylinder comprises at least two cylinders, said at least one piston comprises at least two pistons and said at least one crank arm comprises at least two crank arms, each crank arm of said at least two crank arms having said predetermined radial length centered on said eccentric centerline.

3. A crankshaft and engine block bearing structure for a reciprocating internal combustion engine, comprising:

an engine block;

a crankshaft rotatably mounted to said engine block, said crankshaft having at least one crank arm, said at least one crank arm being located on a first side of said crankshaft;

at least two crankshaft journals located on said crankshaft, each crankshaft journal of said at least two crankshaft journals having a crankshaft journal cross-section, said crankshaft journal cross-section including a crankshaft cross-section and an off-set portion, said off-set portion having a maximum which is equal to a predetermined off-set, said predetermined off-set being greater than a zero off-set, said maximum being located on a predetermined side of said crankshaft, said off-set portion smoothly decreasing from said maximum to a minimum from each side of said maximum, said minimum being equal to a zero off-set, said minimum being located on a side of said crankshaft opposite said maximum; and

at least two engine block bearings connected with said engine block, each said engine block bearing rotatably supporting a respective said crankshaft journal;

wherein said crankshaft rotates in relation to said engine block about an eccentric centerline passing axially through said crankshaft journal cross-section, said eccentric centerline being displaced from a true centerline passing axially through said crankshaft cross-section by a distance equal to one-half said off-set, wherein said at least one crank arm has a predetermined radial length centered on said eccentric centerline, and wherein said modified

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crankshaft has at least one output shaft portion axially aligned with said eccentric centerline.

4. The crankshaft and engine block bearing structure of claim 3, wherein said at least one crank arm comprises at least two crank arms, each crank arm of said at least two crank arms having said predetermined radial length centered on said eccentric centerline.

5. A method for modifying an internal combustion engine, the internal combustion engine including an engine block, at least one cylinder located in the engine block, at least one piston, each piston of said at least one piston being reciprocably movable in a respective cylinder of said at least one cylinder between a top dead center and an original bottom dead center, an original crankshaft rotatably mounted to the engine block, the original crankshaft having at least one crank arm, connecting rod means between the at least one piston and the at least one crank arm for translating reciprocation of the at least one piston into rotation of the original crankshaft, and mounting means for rotatably mounting the original crankshaft to the engine block, the mounting means being located at at least two mutually spaced mounting locations with respect to the engine block, the mounting means at each mounting location including an original crankshaft journal located on the original crankshaft, the original crankshaft journal having an original crankshaft journal cross-section, and an original engine block bearing connected with the engine block, the original engine block bearing rotatably supporting the original crankshaft journal, wherein the original crankshaft rotates in relation to the engine block about a true centerline passing axially through the original crankshaft journal cross-section, the original crankshaft having at least one original output shaft portion axially aligned with respect to the true centerline, said method comprising the steps of:

removing the original crankshaft from the engine block;

providing a modified crankshaft having at least two modified crankshaft journals connected thereto, said modified crankshaft further having at least one output shaft portion connected thereto, each said modified crankshaft journal having a modified crankshaft journal cross-section, said modified crankshaft journal cross-section including the original crankshaft cross-section and an off-set portion, said off-set portion having a maximum equal to a predetermined off-set, said predetermined off-set being greater than a zero off-set, said maximum being located on a predetermined side of said modified crankshaft, said off-set portion smoothly decreasing from said maximum to a minimum from each side of said maximum, said minimum being equal to a zero off-set, said minimum being located on said modified crankshaft opposite said maximum;

removing the original engine block bearing from the engine block at each of the at least two mounting locations;

providing at least two modified engine block bearings, each modified engine block bearing of said at least two modified engine block bearings being structured for rotatably supporting a respective said modified crankshaft journal;

machining the engine block at each of the at least two mounting locations so as to accommodate installation with respect thereto of said at least two engine block bearings; and

installing said at least two modified engine block bearings and said modified crankshaft in said engine block so that said modified crankshaft is supported rotatably with respect to said engine block by said at least two modified engine block bearings;

wherein said modified crankshaft rotates in relation to said engine block about said eccentric centerline, said eccentric centerline passing axially through said modified crankshaft journal cross-section, said eccentric centerline being displaced from said true centerline a distance one-half said off-set in a direction away from said at least one cylinder; wherein said at least one output shaft portion is axially aligned with respect to said eccentric centerline; and wherein said at least one piston reciprocates between the top dead center and a new bottom dead center, said new bottom dead center being farther from the top dead center than was the original bottom dead center by a distance equal to said off-set.

6. A method for modifying production of internal combustion engines, each internal combustion engine produced having a predetermined set of specifications for its components, the components including an engine block, at least one cylinder located in the engine block, at least one piston, each piston of said at least one piston being reciprocably movable in a respective cylinder of said at least one cylinder between a top dead center and an original bottom dead center, an original crankshaft rotatably mounted to the engine block, the original crankshaft having at least one crank arm, connecting rod means between the at least one piston and the at least one crank arm for translating reciprocation of the at least one piston into rotation of the original crankshaft, and mounting means for rotatably mounting the original crankshaft to the engine block, the mounting means being located at at least two mutually spaced mounting locations with respect to the engine block, the mounting means at each mounting location including an original crankshaft journal located on the original crankshaft, the original crankshaft journal having an original crankshaft journal cross-section, and an original engine block bearing connected with the engine block, the original engine block rotatably supporting the original crankshaft journal, wherein the original crankshaft rotates in relation to the engine block about a true centerline passing axially through the original crankshaft journal cross-section, the original crankshaft having at least one original output shaft portion axially aligned with respect to the true centerline, said method comprising the steps of:

substituting for the original crankshaft a modified crankshaft having at least two modified crankshaft journals connected therewith and further at least one output shaft portion connected therewith, each said modified crankshaft journal having a modified crankshaft journal cross-section, said modified crankshaft journal cross-section including the original crankshaft cross-section and an off-set portion, said off-set portion having a maximum equal to a predetermined off-set, said predetermined off-set being greater than a zero off-set, said maximum being located on a predetermined side of said modified crankshaft, said off-set portion smoothly decreasing from said maximum to a minimum from each side of said maximum, said minimum being equal to a zero off-set, said minimum being located

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on said modified crankshaft opposite said maximum;

substituting for the at least two original engine block bearings at least two modified engine block bearings, each modified engine block bearing of said at least two modified engine block bearings being structured for rotatably supporting a respective said modified crankshaft journal;

providing the engine block with a modified specification at each of the at least two mounting locations so as to accommodate installation with respect thereto of said at least two engine block bearings; and

installing said at least two modified engine block bearings and said modified crankshaft in the engine block so that said modified crankshaft is supported rotatably with respect to said engine block by said at least two modified engine block bearings;

wherein said modified crankshaft rotates in relation to said engine block about said eccentric centerline, said eccentric centerline passing axially through said modified crankshaft journal cross-section, said eccentric centerline being displaced from said true centerline a distance one-half said off-set in a direction away from said at least one cylinder; wherein said at least one output shaft portion is axially aligned with respect to said eccentric centerline; and wherein said at least one piston reciprocates between the top dead center and a new bottom dead center, said new bottom dead center being farther from the top dead center than was the original bottom dead center by a distance equal to said off-set.

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