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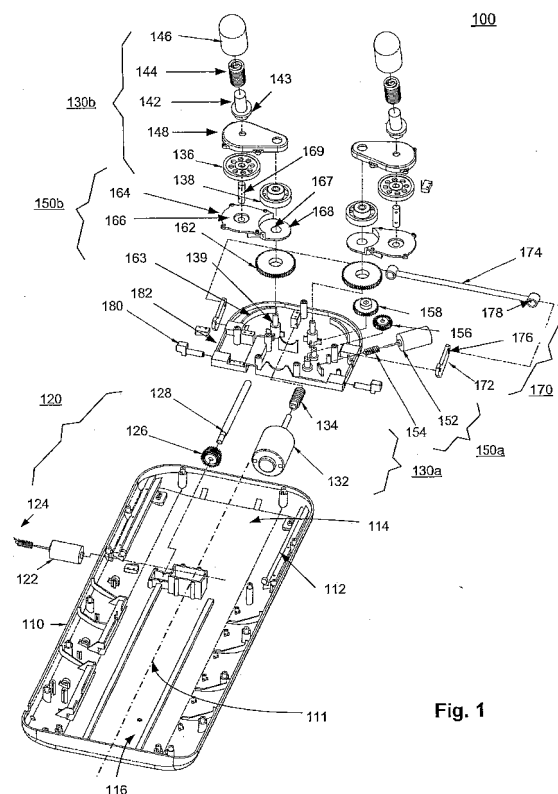
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(54) **Massage device with massage head distance adjusting mechanism**

(57) In one aspect, the present invention relates to a massage device having a massage head distance adjustment mechanism. In one embodiment, the massage head distance adjustment mechanism comprises a first motor, a first worm coaxially connected to the first motor, a first worm wheel meshing with the first worm, a first gear meshing with the first worm wheel, and a pair of second gears having one second gear meshed with the first gear. The pair of second gears meshes with each other. In operation, the first motor drives, in sequence, the first worm, the first worm wheel, the first gear, and the pair of second gears, thereby causing the pair of massage heads to move along a corresponding pair of arc-shaped slots. Accordingly, the distance between the two massage heads is adjusted.



**Fig. 1**

## Description

### CROSS-REFERENCE TO RELATED PATENT APPLICATION

[0001] This application claims priority to and the benefit of E.P. patent application Serial No. EP10168309.2, filed July 2, 2010, entitled "Massage Device," by Chichun Wu and Zhao Zhang, which is incorporated herein in its entirety by reference.

[0002] This application claims priority to and the benefit of, pursuant to 35 USC §119(a), Chinese patent application Serial No. 200920133729.0, filed July 10, 2009, entitled "MASSAGE DEVICE WITH A MESSAGE HEAD DISTANCE ADJUSTING MECHANISM," by Chichun Wu, which is incorporated herein by reference in its entirety.

### FIELD OF THE INVENTION

[0003] The present invention relates generally to a massage device, and more particularly to a massage device with a massage head distance adjusting mechanism.

### BACKGROUND OF THE INVENTION

[0004] With the improved living standard in modern times, people are experiencing faster social pace and higher levels of stress. To reduce stress, various ways of relaxation and exercise have become increasingly important in people's daily lives. Consequently, various sports and health apparatuses have become household items. In particular, for people who spend long hours reading, writing, or in front of computers, they often experience severe sore and pain in the neck and shoulder areas. In severe cases, neck and shoulder movements may become restricted, affecting suffers' daily functions. Massaging has increasingly become a popular method of relieving neck and shoulder pains. Neck and shoulder massage is usually performed either by a human or by a mechanical massage device. Human massaging requires highly experienced technicians, is usually performed in a special facility, and is expensive.

[0005] Therefore, a heretofore unaddressed need exists in the art to address the aforementioned deficiencies and inadequacies.

### SUMMARY OF THE INVENTION

[0006] The present invention, in one aspect, relates to a massage device 100. In one embodiment, the massage device 100 comprises a base cover 110. The base cover 110 has a longitudinal axis 111, a first end portion 114 and an opposite, second end portion 116, and two slots 112 located at the two opposite lateral sides of the first end portion 114.

[0007] In one embodiment, the massage device 100

further comprises an up-down movement mechanism 120 engaged with the base cover 110, and a kneading mechanism 130, which comprises a pair of massage heads 146 and is engaged with a base 182 of a movable module 180. The base 182 of the movable module 180 is engaged with the up-down movement mechanism 120 so that the movable module 180 can be driven up and down along the longitudinal axis 111 of the base cover 110.

[0008] In one embodiment, the massage device 100 further comprises a massage head distance adjustment mechanism 150. The massage head distance adjustment mechanism 150 comprises a first motor 152, a first worm 154 coaxially connected to the first motor 152, a first worm wheel 156 which meshes with the first worm 154, a first gear 158 which meshes with the first worm wheel 156, and a pair of second gears 162, one of which meshes with the first gear 158. The pair of second gears 162 mesh with each other. In operation, the first motor 152 drives, in sequence, the first worm 154, the first worm wheel 156, the first gear 158, and the pair of second gears 162, thereby causing the pair of massage heads 146 to move along a corresponding pair of arc-shaped slots 163 located on the base 182 of the movable module 180, whereby adjusting the distance between the two massage heads.

[0009] In one embodiment, the massage device 100 further comprises a massage head up-down position adjustment mechanism 170. The massage head up-down position adjustment mechanism 170 comprises a pair of top bars 172 and a top beam 174. Each of the pair of top bars 172 has a portion defining a hole 176. The top beam 174 has two opposite end portions, each end portion having a cylindrical member 178, which is received by the hole 176 defined by the corresponding top bar 172. Each top bar 172 is received by the corresponding slot 112 located at the corresponding lateral side of the first end portion 114 of the base cover 110.

[0010] In one embodiment, the massage head distance adjustment mechanism 150 is located behind one of the massage heads 146. The first motor 152 is horizontally engaged with the base 182 of the movable module 180.

[0011] In one embodiment, the pair of second gears 162 rotate in opposite directions with respect to each other, thereby causing the two massage heads 146 to move along the two arc-shaped slots 163 located on the base 182 of the movable module 180, whereby adjusting the distance between the two massage heads.

[0012] In one embodiment, each of the pair of second gears 162 is connected to a corresponding bracket 164, causing the bracket 164 to rotate with the second gear 162.

[0013] In one embodiment, each of the pair of brackets 164 has a high platform 166, and a low platform 168. The high platform 166 is connected to a first cylindrical shaft 169, which is connected to a second worm wheel 136. The low platform 168 is connected to a third worm wheel

138. The second worm wheel 136 meshes with the corresponding third worm wheel 138. The pair of third worm wheels 138 mesh with a second worm 134, which is driven by a second motor 132.

[0014] In one embodiment, the low platform 168 defines a central hole 167, through which a second cylindrical shaft 139 is coaxially mounted. The second cylindrical shaft 139 is coaxially connected to the corresponding second gear 162 and is fixed to the base 182 of the movable module 180.

[0015] In one embodiment, the third worm wheel 138 and the second worm wheel 136 are enclosed in a cover 148. A third shaft 142 of the massage head 146 is engaged with the cover 148, forming an acute angle with the normal of the cover 148. A spring 144 is coaxially engaged with the third shaft 142, one end of the spring 144 being against an eccentric lip 143 of the third shaft 142, the other end of the spring 144 being against an inner wall of the massage head 146.

[0016] In one embodiment, the up-down movement mechanism 120 comprises a third motor 122, a third worm 124 coaxially connected to the third motor 122, a third worm 124 coaxially mounted to the third motor 122, a screw rod 128 coaxially connected to the fourth worm wheel 126. The screw rod 128 is connected to the base 182 of the movable module 180, thereby causing the movable module 180 to move up and down along the longitudinal axis 111 of the base cover 110 as the third motor 122 rotates.

[0017] In one embodiment, the cylindrical members 178 of the top beam 174 have a free travel distance along the longitudinal axis 111 over the first end portion 114 of the base cover 110, causing the massage heads 146 to protrude.

[0018] These and other aspects of the present invention will become apparent from the following description of the preferred embodiment taken in conjunction with the following drawings, although variations and modifications therein may be affected without departing from the spirit and scope of the novel concepts of the disclosure.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The accompanying drawings illustrate one or more embodiments of the invention and, together with the written description, serve to explain the principles of the invention. Wherever possible, the same reference numerals are used throughout the drawings to refer to the same or like elements of an embodiment, and wherein:

Fig. 1 shows an exploded view of a massage device according to one embodiment of the present invention;

Fig. 2 shows a front view of the movable module of the massage device as shown in Fig. 1;

Fig. 3 shows a side view of the movable module of

the massage device as shown in Fig. 1;

Fig. 4 shows a perspective view of the movable module of the massage device as shown in Fig. 1;

Fig. 5 shows a perspective view of the massage device as shown in Fig. 1; and

Fig. 6 shows a front view (A) and a side view (B) of the massage device as shown in Fig. 1.

## DETAILED DESCRIPTION OF THE INVENTION

[0020] The present invention is more particularly described in the following examples that are intended as illustrative only since numerous modifications and variations therein will be apparent to those skilled in the art. Various embodiments of the invention are now described in detail. Referring to the drawings, like numbers indicate like components throughout the views. As used in the description herein and throughout the claims that follow, the meaning of "a", "an", and "the" includes plural reference unless the context clearly dictates otherwise. Also, as used in the description herein and throughout the claims that follow, the meaning of "in" includes "in" and "on" unless the context clearly dictates otherwise.

[0021] With the improved living standard in modern time, people are experiencing faster social pace and higher levels of stress. To reduce stress, various ways of relaxation and exercise have become increasingly important in people's daily lives. Consequently, various sports and health apparatuses have become household items. In particular, for people who spend long hours reading, writing, or in front of computers, they often experience severe sore and pain in the neck and shoulder areas. In severe cases, neck and shoulder movements may become restricted, affecting suffers' daily functions. Massaging has increasingly become a popular method of relieving neck and shoulder pains. Neck and shoulder massage is usually performed either by a human or by a mechanical massage device. Human massaging requires highly experienced technicians, is usually performed in a special facility, and is expensive. On the other hand, in most existing mechanical massage devices, the distance between the two massage heads is fixed. Since the size of the neck differs greatly from person to person, such massage devices cannot always achieve optimum massaging effects. In addition, for most existing mechanical massage devices, the up-down position of the massage heads are fixed. As a result, uniform massaging effect cannot be achieved. One object of the present invention is to provide a massage device with adjustable massage head distance and adjustable massage head position.

[0022] Embodiments of the present invention will be described in conjunction with the accompanying drawings in Figs. 1-6.

[0023] Referring to Figs. 1-6, and in particular, to Fig. 1, one embodiment of a massage device 100 includes a base cover 110, the base cover 110 having a longitudinal axis 111, a first end portion 114 and an opposite, second

end portion 116, and two slots 112 located at the two opposite lateral sides of the first end portion 114. The massage device 100 further includes an up-down movement mechanism 120 engaged with the base cover 110, and a kneading mechanism 130 engaged with a base 182 of a movable module 180, which is engaged with the up-down movement mechanism 120 so that the movable module 180 can be driven up and down along the longitudinal axis 111 of the base cover 110. The massage device 100 further includes a massage distance adjustment mechanism 150, and a massage head up-down position adjustment mechanism 170.

**[0024]** Still referring to Fig. 1, the up-down movement mechanism 120 includes a third motor 122, a third worm 124 coaxially mounted to the third motor 122, a fourth worm wheel 126 which meshes with the third worm 124, and a screw rod 128 coaxially connected to the fourth worm wheel 126. The screw rod 128 is connected to the base 182 of the movable module 180, thereby causing the movable module 180 to move up and down along the longitudinal axis 111 of the base cover 110 as the third motor 122 rotates.

**[0025]** Still referring to Fig. 1, the kneading mechanism 130 includes a second motor 132, a second worm 134 coaxially connected to the second motor 132, a pair of third worm wheels 138 which mesh with the second worm 134, a pair of second worm wheels 136, each meshing with the corresponding third worm wheel 138, and a pair of massage heads 146. In operation, the second motor 132 drives, in sequence, the second worm 134, the pair of third worm wheels 138, the pair of second worm wheels 136, and the pair of massage heads 146.

**[0026]** Still referring to Fig. 1, the massage head distance adjustment mechanism 150 includes a first motor 152, a first worm 154 coaxially connected to the first motor 152, a first worm wheel 156 that meshes with the first worm 154, a first double gear 158 that meshes with the first worm wheel 156, and a pair of second gears 162, one of which meshes with the first double gear 158, and the pair of second gears 162 mesh with each other. In operation, the first motor 152 drives, in sequence, the first worm 154, the first worm wheel 156, the first double gear 158, and the pair of second gears 162. The pair of second gears 162 rotate in opposite directions with respect to each other, thereby causing the pair of massage heads 146 to move along a corresponding pair of arc-shaped slots 163 located on the base 182 of the movable module 180, whereby adjusting the distance between the two massage heads. The massage head distance adjustment mechanism 150 is mounted behind one of the massage heads 146. The first motor 152 is horizontally engaged with the base 182 of the movable module 180.

**[0027]** Still referring to Fig. 1, each of the pair of second gears 162 is connected to a bracket 164, causing the bracket 164 to rotate with it. Each bracket 164 has a high platform 166 and a low platform 168. The high platform 166 is connected to a first cylindrical shaft 169, which is connected to the second worm wheel 136. The low plat-

form 168 is connected to the third worm wheel 138. The low platform 168 defines a central hole 167, through which a second cylindrical shaft 139 is coaxially mounted. The second cylindrical shaft 139 is also coaxially connected to the corresponding second gear 162 and is fixed to the base 182 of the movable module 180.

**[0028]** Still referring to Fig. 1, the third worm wheel 138 and the second worm wheel 136 are enclosed in a cover 148, on which a third shaft 142 of the massage head 146 is mounted, forming an acute angle with the normal of the cover 148. A spring 144 is coaxially engaged with the third shaft 142. One end of the spring 144 is against an eccentric lip 143 of the third shaft 142; the other end of the spring 144 is against an inner wall of the massage head 146.

**[0029]** Still referring to Fig. 1, the massage head up-down position adjustment mechanism 170 includes a pair of top bars 172 and a top beam 174. Each top bar having a portion defining a hole 176. The top beam 174 has two opposite end portions, each end portion having a cylinder member 178. Each cylinder member 178 of the top beam 174 is received by the hole 176 defined by the corresponding top bar 172. Each top bar 172 is received by the corresponding slot 112 located at the corresponding lateral side of the first end portion 114 of the base cover 110. The cylinder members 178 of the top beam 174 have a free travel distance along the longitudinal axis 111 over the first end portion of the base cover 110, causing the massage heads 146 to protrude.

**[0030]** The foregoing description of the exemplary embodiments of the invention has been presented only for the purposes of illustration and description and is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in light of the above teaching.

**[0031]** The embodiments were chosen and described in order to explain the principles of the invention and their practical application so as to activate others skilled in the art to utilize the invention and various embodiments and with various modifications as are suited to the particular use contemplated. Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description and the exemplary embodiments described therein.

**[0032]** In one aspect, the present invention relates to a massage device having a massage head distance adjustment mechanism. In one embodiment, the massage head distance adjustment mechanism comprises a first motor, a first worm coaxially connected to the first motor, a first worm wheel meshing with the first worm, a first gear meshing with the first worm wheel, and a pair of second gears having one second gear meshed with the first gear. The pair of second gears meshes with each other. In operation, the first motor drives, in sequence, the first worm, the first worm wheel, the first gear, and

the pair of second gears, thereby causing the pair of massage heads to move along a corresponding pair of arc-shaped slots. Accordingly, the distance between the two massage heads is adjusted.

## Claims

### 1. A massage device (100), comprising:

- (a) a base cover (110), the base cover having a longitudinal axis (111), a first end portion (114) and an opposite, second end portion (116), and two slots (112) located at the two opposite lateral sides of the first end portion (114);
- (b) an up-down movement mechanism (120) engaged with the base cover (110);
- (c) a kneading mechanism (130) engaged with a base (182) of a movable module (180), the kneading mechanism (130) having a pair of massage heads (146), the base (182) of the movable module (180) being engaged with the up-down movement mechanism (120) so that the movable module (180) can be driven up and down along the longitudinal axis (111) of the base cover (110);
- (d) a massage head distance adjustment mechanism (150), having:

- (i) a first motor (152);
  - (ii) a first worm (154) coaxially connected to the first motor (152);
  - (iii) a first worm wheel (156) meshing with the first worm (154);
  - (iv) a first gear (158) meshing with the first worm wheel (156); and
  - (v) a pair of second gears (162), one of the second gears meshing with the first gear (158), and the pair of second gears (162) meshing with each other;
- wherein, in operation, the first motor (152) drives, in sequence, the first worm (154), the first worm wheel (156), the first gear (158), and the pair of second gears (162), thereby causing the pair of massage heads (146) to move along a corresponding pair of arc-shaped slots (163) located on the base (182) of the movable module (180), whereby adjusting the distance between the two massage heads; and

- (e) a massage head up-down position adjustment mechanism (170), having:

- (i) a pair of top bars (172), each top bar having a portion defining a hole (176); and
- (ii) a top beam (174) having two opposite end portions, each end portion having a cy-

lindrical member (178);

wherein each cylindrical member (178) of the top beam (174) is received by the hole (176) defined by the corresponding top bar (172); and wherein each top bar (172) is received by the corresponding slot (112) located at the corresponding lateral side of the first end portion (114) of the base cover (110).

- 2. The massage device of claim 1, wherein the massage head distance adjustment mechanism (150) is located behind one of the massage heads (146); and wherein the first motor (152) is horizontally engaged with the base (182) of the movable module (180).
- 3. The massage device of claim 2, wherein the pair of second gears (162) rotate in opposite directions with respect to each other, thereby causing the two massage heads (146) to move along the two arc-shaped slots (163) located on the base (182) of the movable module (180), whereby adjusting the distance between the two massage heads.
- 4. The massage device of claim 3, wherein each of the pair of second gears (162) is connected to a corresponding bracket (164), causing the bracket (164) to rotate with the second gear (162).
- 5. The massage device of claim 4, wherein each of the pair of brackets (164) has a high platform (166), and a low platform (168); wherein the high platform (166) is connected to a first cylindrical shaft (169), the first cylindrical shaft (169) being connected to a second worm wheel (136); wherein the low platform (168) is connected to a third worm wheel (138); wherein the second worm wheel (136) meshes with the corresponding third worm wheel (138); and wherein the pair of third worm-wheels (138) mesh with a second worm (134), the second worm (134) being driven by a second motor (132).
- 6. The massage device of claim 5, wherein the low platform (168) defines a central hole (167), through the central hole (167) a second cylindrical shaft (139) is coaxially mounted; and wherein the second cylindrical shaft (139) is coaxially connected to the corresponding second gear (162) and is fixed to the base (182) of the movable module (180).
- 7. The massage device of claim 6, wherein the third worm wheel (138) and the second worm wheel (136) are enclosed in a cover (148); wherein a third shaft (142) of the massage head (146) is engaged with the cover (148), forming an acute angle with the normal of the cover (148); and

wherein a spring (144) is coaxially engaged with the third shaft (142), one end of the spring (144) being against an eccentric lip (143) of the third shaft (142), the other end of the spring (144) being against an inner wall of the massage head (146).

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8. The massage device of claim 7, wherein the up-down movement mechanism (120) comprises:

(a) a third motor (122); 10

(b) a third worm (124) coaxially connected to the third motor (122);

(c) a fourth worm wheel (126) meshing with the third worm (124); and

(d) a screw rod (128) coaxially connected to the fourth worm wheel (126); 15

wherein the screw rod (128) is connected to the base (182) of the movable module (180), thereby causing the movable module (180) to move up and down along the longitudinal axis (111) of the base cover (110) as the third motor (122) rotates. 20

9. The massage device of claim 8, wherein the cylindrical members (178) of the top beam (174) have a free travel distance along the longitudinal axis (111) over the first end portion (114) of the base cover (110), causing the massage heads (146) to protrude. 25

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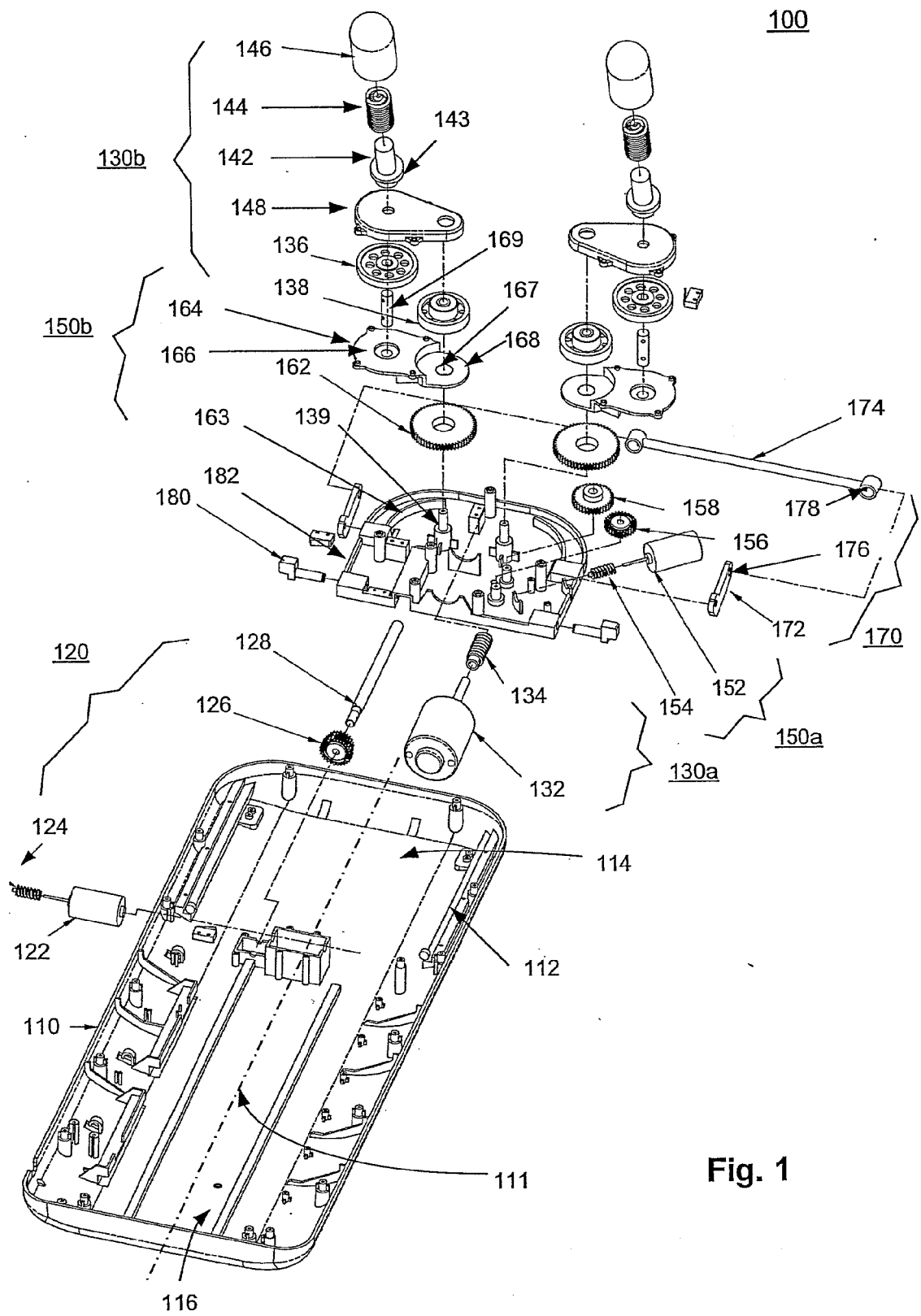


Fig. 1

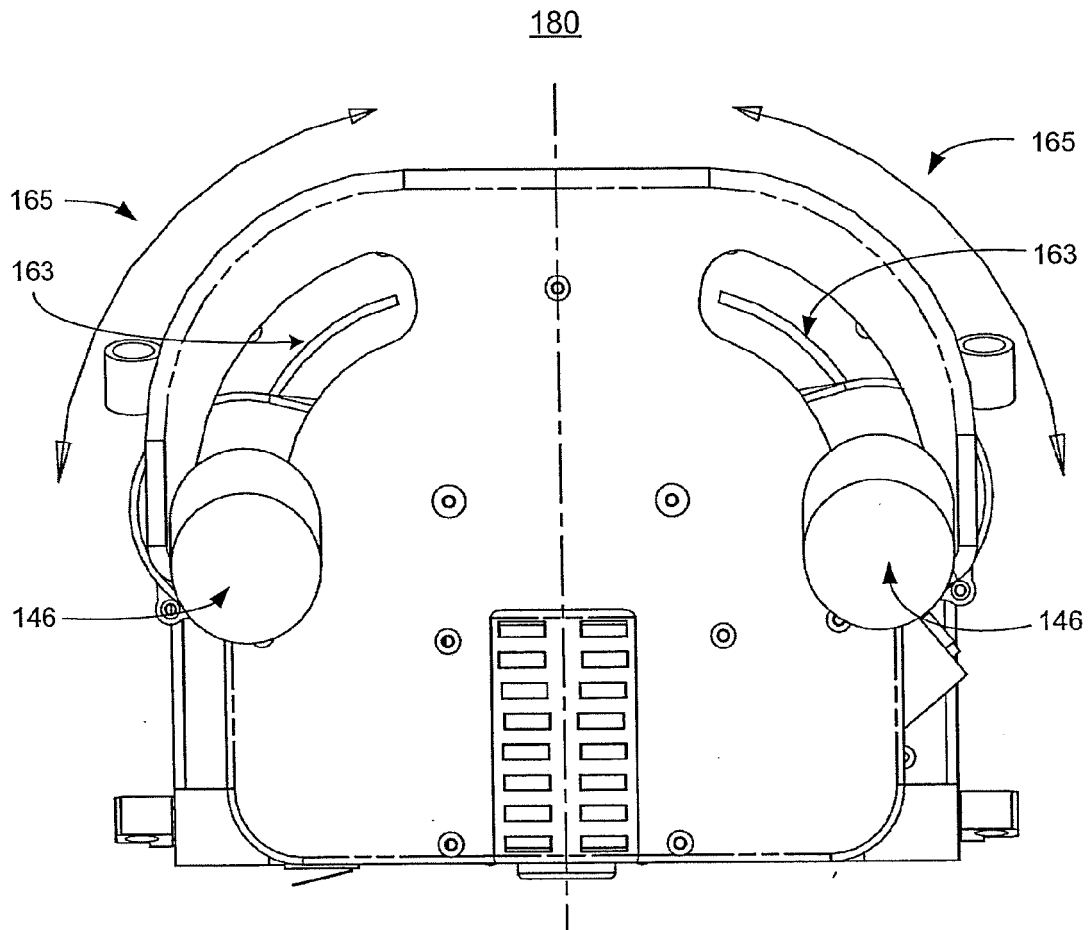
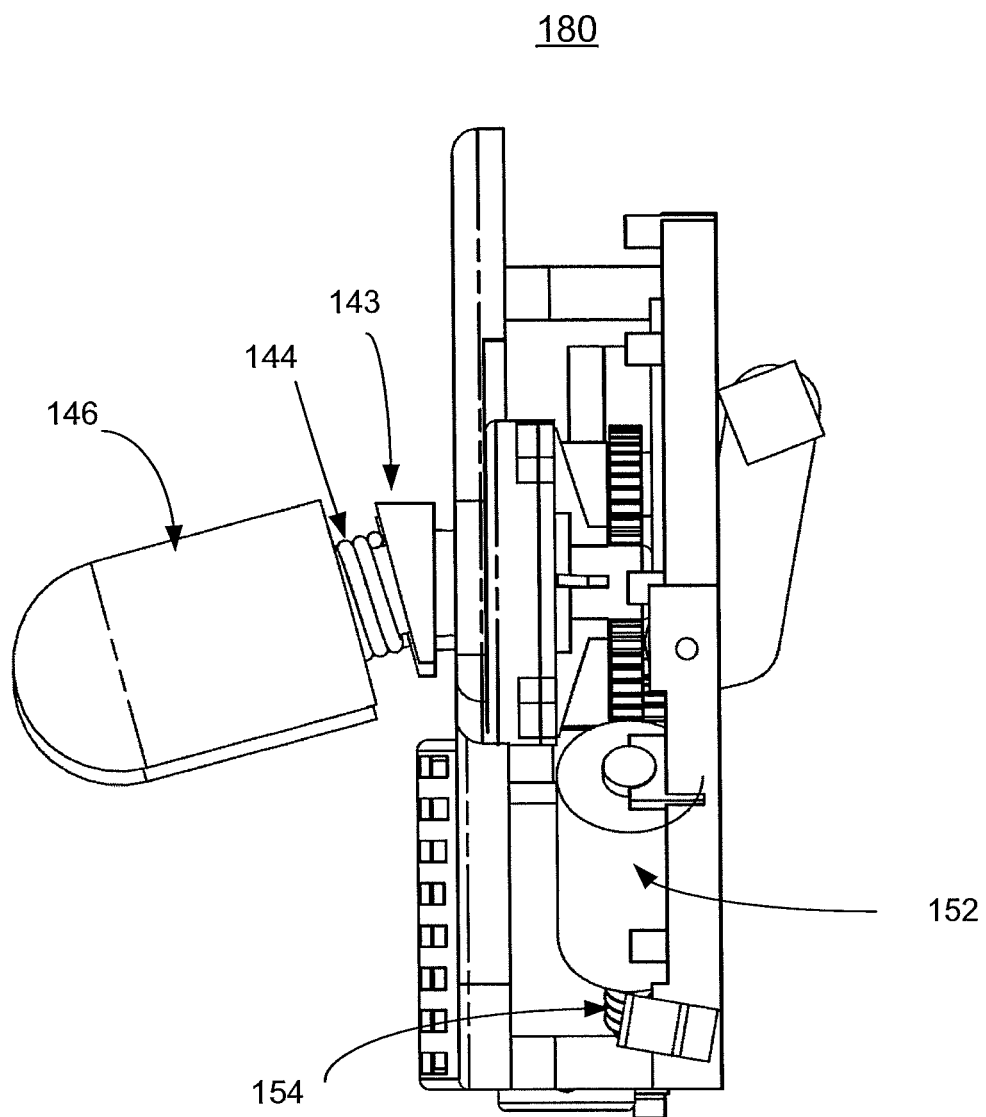


Fig. 2





**Fig. 3**

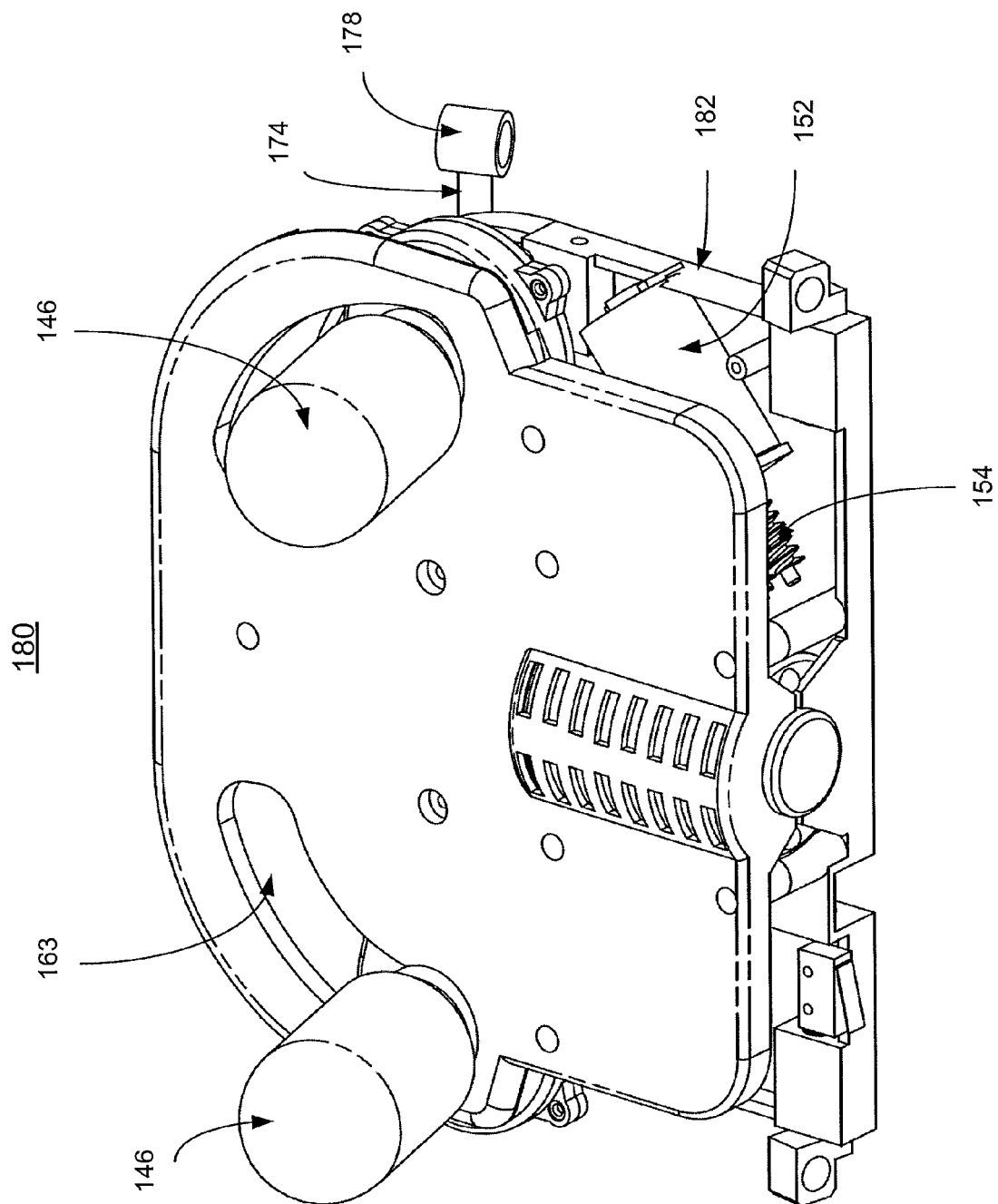


Fig. 4

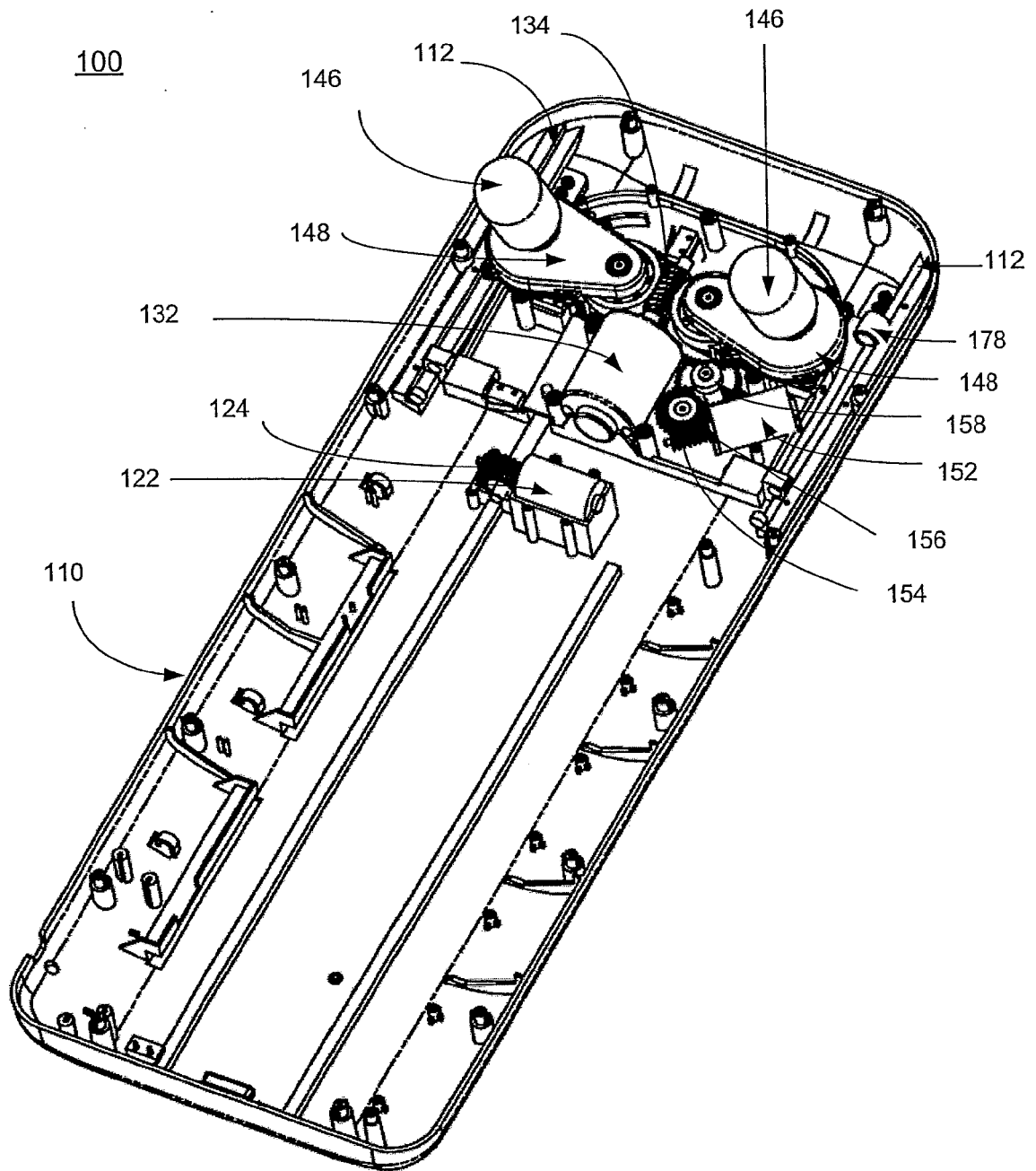


Fig. 5

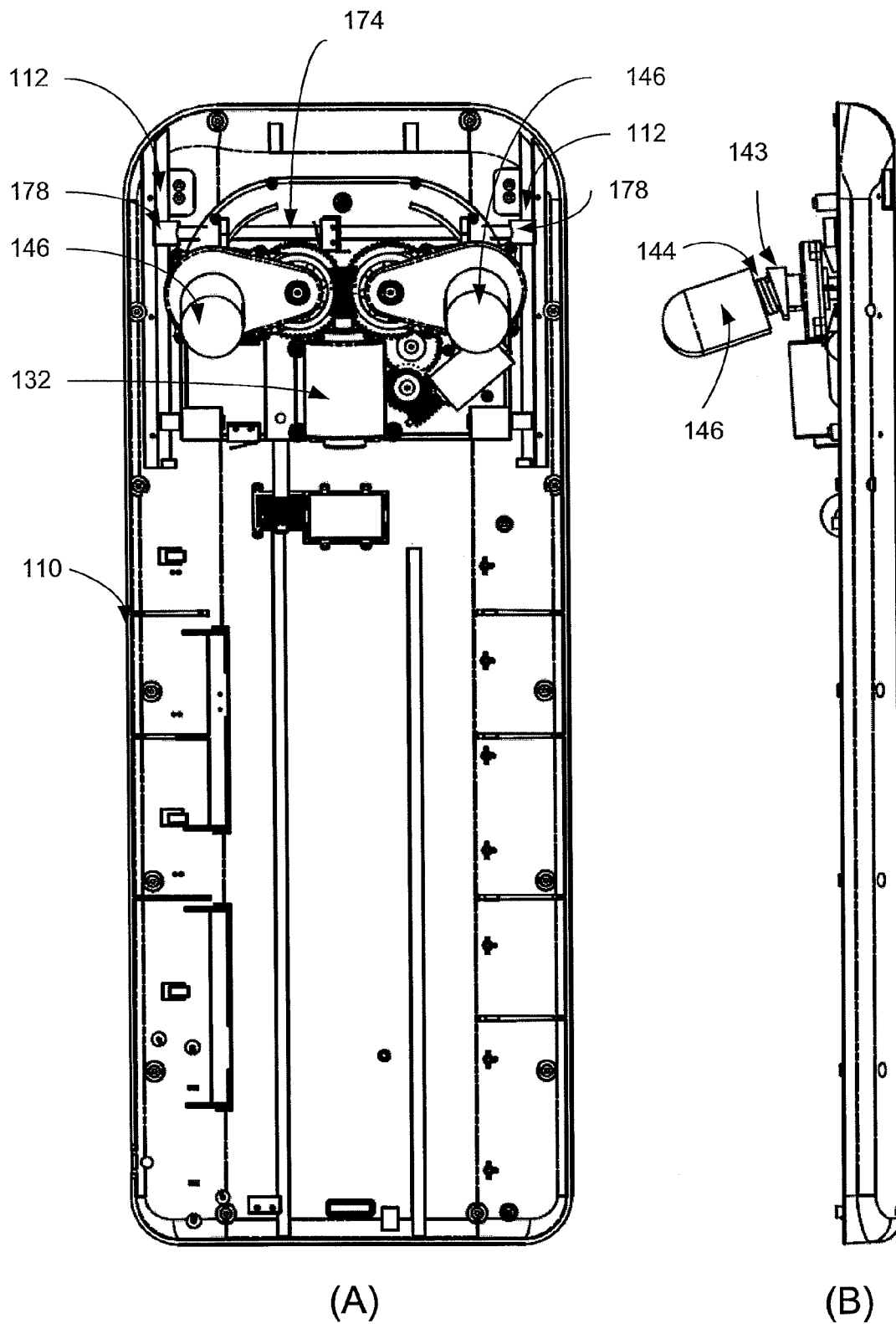


Fig. 6



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Application Number  
EP 10 16 8761

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The present search report has been drawn up for all claims			
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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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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