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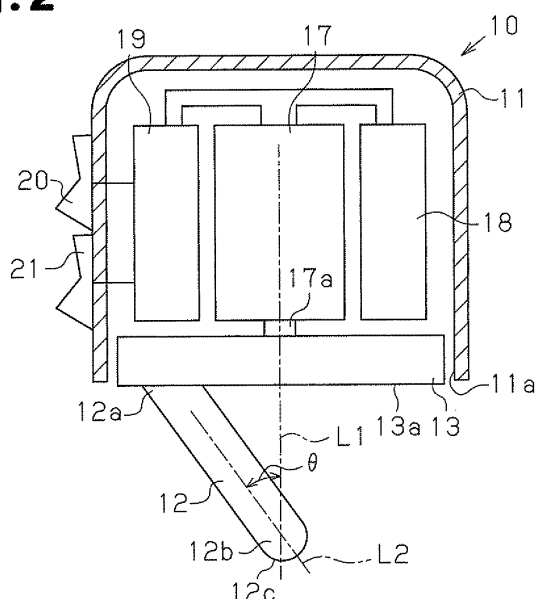
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(54) **SCALP CARE DEVICE**

(57) A scalp care device (10) includes a treatment unit (12) supported on a first rotary plate (13), and a first drive motor (17) for rotating the first rotary plate (13). A

control unit (19) changes the rotation direction of the first rotary plate (13) by controlling the first drive motor (17) according to the operation of a switch (21).

Fig.2



Description

TECHNICAL FIELD

[0001] The present invention relates to a scalp care device that stimulates the scalp and promotes hair growth.

BACKGROUND ART

[0002] In the prior art, a typical brush is used to manually tap the scalp. This massages the scalp. A brush type electric treatment device is also known in the art (for example, refer to patent publication 1).

[0003] The treatment device described in patent publication 1 includes a first casing and a second casing. The first casing has an accommodation portion for electrical components, including a power supply. The second casing supports together a first brush unit and a second brush unit. A brush driving mechanism reciprocates the first and second brush units so that a distal portion of a brush in the first brush unit moves toward and away from a distal portion of a brush in a second brush unit. The movements of the distal portions of the brushes that contact the scalp effectively function to stretch and contract the scalp.

PRIOR ART DOCUMENT

PATENT PUBLICATION

[0004]

Patent Publication 1) WO 2005/25478

SUMMARY OF THE INVENTION

PROBLEMS THAT ARE TO BE SOLVED BY THE INVENTION

[0005] The treatment device of patent publication 1 reciprocates the distal portions of the brushes in fixed directions. Thus, the brushes of the first and second brush units simultaneously stimulate a significantly large region of the scalp.

[0006] It is an object of the present invention to provide a scalp care device that stimulates the scalp in a locally concentrated manner like when performing shiatsu.

MEANS FOR SOLVING THE PROBLEM

[0007] To achieve the above object, one aspect of the present invention provides a scalp care device including a massager member that contacts and massages a scalp, a first rotational drive unit that rotates and drives the massager member, and a control unit that performs a control to change an operation mode related to the rotation and driving of the massager member.

[0008] The scalp care device of this aspect stimulates the scalp in a locally concentrated manner like when performing shiatsu.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a perspective view showing a scalp care device in a first embodiment;

Fig. 2 is a cross-sectional view showing the scalp care device of Fig. 1;

Fig. 3 is a plan view showing a first rotary plate and massager member of Fig. 1;

Fig. 4 is a cross-sectional view showing a scalp care device in a second embodiment;

Fig. 5(a) is a cross-sectional view showing a scalp care device in a third embodiment, Fig. 5(b) is a schematic view of a massager member taken from a basal side, and Fig. 5(c) is an enlarged view showing a distal end of the massager member;

Fig. 6 is a cross-sectional view showing a scalp care device in a fourth embodiment;

Fig. 7 is a cross-sectional view showing a scalp care device in a fifth embodiment;

Fig. 8 is a cross-sectional view showing a scalp care device in a sixth embodiment;

Fig. 9(a) is a cross-sectional view showing a scalp care device in a seventh embodiment, and Fig. 9(b) is a plan view showing the scalp care device;

Fig. 10(a) is a cross-sectional view showing a scalp care device in an eighth embodiment, and Fig. 10(b) is a plan view showing the scalp care device;

Fig. 11(a) is a plan view showing the scalp care device, and Fig. 11(b) is a partially cutaway plan view showing a second rotary plate;

Fig. 12(a) is a cross-sectional view showing a scalp care device in a ninth embodiment, and Figs. 12(b) and 12(c) are plan views showing the scalp care device;

Fig. 13 is a cross-sectional view showing a scalp care device in a further embodiment;

Figs. 14(a) and 14(b) are schematic views showing an inclination sensor;

Fig. 15(a) is a cross-sectional view showing a scalp care device in a further embodiment, and Fig. 15(b) is a plan view showing a drive gear and orbit gears;

Fig. 16(a) is a cross-sectional view showing a scalp care device in a further embodiment, and Fig. 16(b) is a plan view showing a drive gear and orbit gears; and

Fig. 17(a) is a cross-sectional view showing a scalp care device in a further embodiment, and Fig. 17(b) is a plan view showing a drive gear and orbit gears.;

EMBODIMENTS OF THE INVENTION

First Embodiment

[0010] A scalp care device according to a first embodiment of the present invention will now be discussed with reference to Figs. 1 to 4.

[0011] As shown in Fig. 1, a scalp care device 10 of the present embodiment is provided with a tubular housing 11, which includes an opening 11a.

[0012] As shown in Fig. 2, a first drive motor 17 is incorporated in the housing 11 as a first rotational drive unit. The first drive motor 17 includes a rotation shaft 17a coupled to a first rotary plate 13, which serves as a first support member. Further, the first drive motor 17 is electrically connected to a power supply unit 18 and a control unit 19, which are incorporated in the housing 11. The power supply unit 18 and the control unit 19 are electrically connected. Further, the control unit 19 is electrically connected to a power switch 20 and a direction changing switch 21, which are arranged on a side surface of the housing 11.

[0013] As shown in Figs. 2 and 3, the first rotary plate 13, as viewed from above, is disk-shaped and accommodated in the housing 11 near the opening 11a of the housing 11. Further, the first rotary plate 13 includes a cylindrical massager member 12, which contacts and massages the scalp. The massager member 12 projects out of the housing 11 from the opening 11a. The massager member 12 includes a basal end 12a, which is supported at a position slightly separated inward in the radial direction from the peripheral portion of a coupling surface 13a of the first rotary plate 13. Further, the massager member 12 includes a distal end 12b that lies along an axis L1 of the first rotary plate 13. In this manner, the massager member 12 is inclined toward the axis L1 of the first rotary plate 13 from a position slightly separated inward in the radial direction from the peripheral portion of the first rotary plate 13. The massager member 12 is cantilever-supported by the first rotary plate 13.

[0014] An angle θ between an axis L2 of the massager member 12 and the axis L1 of the first rotary plate 13 is set in the range of 15° to 60° . It is further preferable that the angle θ be set in the range of 30° to 45° . Further, the massager member 12 includes a semispherical distal end 12b. The distal end 12b includes a massaging surface 12c, which is a spherical surface (smooth convex surface) that contacts and massages the scalp. The axis L1 intersects with the massaging surface 12c at a position separated from the coupling surface 13a. The massaging surface 12c includes a center that lies along the axis L1 of the first rotary plate 13. The center of the massaging surface 12c is the center of rotation and is, for example, a point along the axis L1 that is farthest from the coupling surface 13a on the distal end 12b of the massager member 12. The massager member 12 is molded to stimulate the scalp in the same manner as a human finger.

[0015] When the power switch 20 is turned on, an input

signal is sent to the control unit 19. In response to the input signal from the power switch 20, the control unit 19 transmits a command signal that activates the power supply unit 18. The power supply unit 18 is activated in accordance with the command signal from the control unit 19 to supply the first drive motor 17 with power. The first drive motor 17, when supplied with power from the power supply unit 18, rotates the first rotary plate 13 (for example, in the clockwise direction as indicated by arrow R1 in Fig. 3).

[0016] When the direction changing switch 21 is pushed in a state in which the first rotary plate 13 is rotating, the direction changing switch 21 sends an input signal to the control unit 19. In response to the input signal from the direction changing switch 21, the control unit 19 controls the first drive motor 17 to rotate the first rotary plate 13 in the reverse direction (for example, in the counterclockwise direction as indicated by arrow R2 in Fig. 3). In this manner, the control unit 19 controls the first drive motor 17 to change the rotation direction of the first rotary plate 13.

[0017] A usage example of the scalp care device 10 formed as described above will now be described.

[0018] A user holds the scalp care device 10, with the distal end 12b of the massager member 12 facing toward the scalp, and operates (turns on) the power switch 20. Then, the user presses the distal end 12b of the massager member 12 against the scalp while the first drive motor 17 rotates the first rotary plate 13. Here, the massager member 12 is arranged on the first rotary plate 13 inclined toward the axis L1 of the first rotary plate 13 from a position slightly separated inward in the radial direction from the peripheral portion of the first rotary plate 13. The pressing force applied by the massager member 12 to the scalp is a combination of a component of the axis L1 (e.g., vector orthogonal to the scalp) and a radial direction component (e.g., vector along the surface of the scalp), which varies during rotation of the first rotary plate 13. Further, when in contact with the massaging surface 12c of the massager member 12, the scalp comes into planar contact with the massaging surface 12c as they are deformed due to their resilience. Thus, in a state in which the first rotary plate 13 is rotating, the pressing force of the massager member 12 is applied to and dispersed in the entire contacted region (contacted surface) of the scalp that is in contact with the massaging surface 12c.

[0019] Further, the center of the massaging surface 12c of the massager member 12 is set to lie along the axis L1 of the first rotary plate 13. Thus, even though the massaging surface 12c of the massager member 12 contacts the scalp while the first rotary plate 13 rotates, the center of the massaging surface 12c of the massager member 12 contacts the scalp concentrated at a single point on the scalp, and the contact point between the massager member 12 and scalp remains the same. Accordingly, the scalp is stimulated at a single concentrated point (contacted portion) like when performing shiatsu. Further, the radial direction component of the pressing

force continuously and cyclically varies due to the rotation. Thus, the pressing force "vibrates" each point in the contacted surface of the scalp. The rotation of the inclined massager member 12 contributes to improving the massaging effect.

[0020] The above embodiment has the advantages described below.

(1) The first rotary plate 13, which is arranged in the scalp care device 10, includes the massager member 12, and the first rotary plate 13 is connected to the first drive motor 17. Thus, while rotating the first rotary plate 13 with the first drive motor 17, the massaging surface 12c of the massager member 12 contacts and stimulates the scalp. This stimulates the scalp in the same manner as shiatsu.

(2) In response to the operation of the direction changing switch 21, the control unit 19 executes a control that changes the rotation direction of the first rotary plate 13. The control unit 19 controls the first drive motor 17 to rotate the first rotary plate 13 in the clockwise direction and the counterclockwise direction. Further, by changing the rotation direction of the first rotary plate 13, the feel of shiatsu on the head is not constant like when the first rotary plate 13 constantly rotates in a constant direction. This allows the feel of shiatsu to be varied.

(3) The center of the massaging surface 12c of the massager member 12 is set to lie along the axis L1 of the first rotary plate 13. Thus, as the first rotary plate 13 rotates, the massaging surface 12c contacts the scalp concentrated at a single point (contacted portion). Thus, the scalp is stimulated at a single concentrated point.

Second Embodiment

[0021] A scalp care device according to a second embodiment of the present invention will now be described with reference to Fig. 4. In the embodiments described hereafter, same reference numerals are given to those components that are the same as the corresponding components of the above embodiment. Such components will not be described in detail.

[0022] As shown in Fig. 4, a speed changing switch 31 is arranged on the side surface of the housing 11. The speed changing switch 31 is electrically connected to the control unit 19. In the illustrated example, the control unit 19 shifts the rotation speed of the first rotary plate 13 in the three ranges of "fast", "medium", and "slow".

[0023] In the same manner as the first embodiment, the first drive motor 17 operates under the control of the control unit 19 and produces rotation when supplied with power from the power supply unit 18. The rotation of the first drive motor 17 rotates the first rotary plate 13, for example, in the clockwise direction at the "slow" speed.

[0024] When the speed changing switch 31 is pushed in a state in which the first rotary plate 13 is rotating in

the clockwise direction at the "slow" speed, the speed changing switch 31 sends an input signal to the control unit 19. In response to the input signal, the control unit 19 controls the first drive motor 17 to change the rotation speed of the first rotary plate 13 from "slow" to "medium". When the speed changing switch 31 is pushed again, the speed changing switch 31 sends an input signal to the control unit 19. In response to the input signal, the control unit 19 controls the first drive motor 17 to change the rotation speed of the first rotary plate 13 from "medium" to "fast". In this manner, the control unit 19 controls the first drive motor 17 to shift the rotation speed of the first rotary plate 13.

[0025] Accordingly, the present embodiment has the following advantage.

(4) In response to the operation of the speed changing switch 31, the control unit 19 executes a control for shifting the rotation speed of the first rotary plate 13. In contrast with a scalp care device that rotates the first rotary plate 13 that constantly rotates at a fixed speed, by shifting the rotation speed of the first rotary plate 13, the speed of the shiatsu performed on the scalp may be changed so that the feel of shiatsu on the scalp is varied. For example, when stimulating the scalp with the massager member 12 in a state in which the rotation speed of the first rotary plate 13 set to "fast", a feeling close to that of massaging can be obtained. When stimulating the scalp with the massager member 12 in a state in which the rotation speed of the first rotary plate 13 set to "slow", a feeling of relaxation can be obtained.

Third Embodiment

[0026] A scalp care device according to a third embodiment of the present invention will now be discussed with reference to Fig. 5.

[0027] As shown in Fig. 5(a), a support plate 41 extends from the coupling surface 13a of the first rotary plate 13 in a direction orthogonal to the coupling surface 13a. Curved guide grooves 42 extend in a side surface 41a of the support plate 41 in a direction that intersects the axis L1 of the first rotary plate 13. The guide grooves 42 are engageable with guide projections (not shown) formed in a side surface of a support member 43 that supports basal end 12a of the massager member 12. The guide projections engage the guide grooves 42 so that they can be guided and moved in the guide grooves 42.

[0028] Further, a reduction gear 44a is coupled to the side surface 41a of the support plate 41, and a radius adjustment drive unit 44 is coupled to the reduction gear 44a. The first radius adjustment drive unit 44 is electrically connected to the power supply unit 18 and the control unit 19. A feed screw 45 is coupled to the first radius adjustment drive unit 44. The feed screw 45 has one end connected to the support member 43. A radius adjust-

ment switch 46 is arranged on the side surface of the housing 11. The radius adjustment switch 46 is electrically connected to the control unit 19.

[0029] When the radius adjustment switch 46 is pushed with the guide projections of the support member 43 engaged with the guide grooves 42, the radius adjustment switch 46 sends an input signal to the control unit 19. In accordance with the input signal, the control unit 19 drives the first radius adjustment drive unit 44. When the first radius adjustment drive unit 44 is driven, the feed screw 45 moves the support member 43 along the curved guide grooves 42 (as indicated by arrow Y1 in Fig. 5(a)). This moves the basal end 12a of the massager member 12 along the curved guide grooves 42. The reduction gear 44a adjusts the speed at which the massager member 12 moves along the guide grooves 42.

[0030] The guide grooves 42, the first radius adjustment drive unit 44, and the feed screw 45 form a first radius adjustment mechanism that changes the rotational path of the basal end 12a of the massager member 12. Further, the control unit 19 controls the first radius adjustment drive unit 44 to change the rotation path of the basal end of the massager member 12. It is preferable that the massaging surface 12c of the massager member 12 be maintained at an initial position intersecting the axis L1 regardless of the distance between the basal end 12a of the massager member 12 and the axis L1.

[0031] In a scalp care device 40 of the structure described above, the control unit 19 controls the first radius adjustment drive unit 44 in accordance with an input signal from the radius adjustment switch 46. As shown in Fig. 5(c), this changes the distance between the basal end 12a of the massager member 12 and the axis L1 of the first rotary plate 13 to change the rotation path of the basal end 12a of the massager member 12. Thus, as shown in Fig. 5(c), the angle of contact between the distal end 12b of the massager member 12 and the scalp may be changed.

[0032] The present embodiment has the following advantage.

(5) The scalp care device 40 includes the first radius adjustment mechanism, which is formed by the guide grooves 42, the first radius adjustment drive unit 44, and the feed screw 45. Thus, the control unit 19 can adjust the rotation radius of the basal end 12a of the massager member 12 by controlling the first radius adjustment drive unit 44. Further, the rotation path of the basal end 12a of the massager member 12 can be changed, and the angle of contact between the massager member 12 and the scalp can be changed. Thus, the feel of shiatsu can be applied to the scalp from various directions other than the vertical direction.

Fourth Embodiment

[0033] A scalp care device according to a fourth em-

bodiment of the present invention will now be discussed with reference to Fig. 6.

[0034] As shown in Fig. 6, curved guide grooves 52 are formed in the housing 11. The guide grooves 52 are engageable with guide projections (not shown) that are formed in a side surface of a support member (motor support member), which is not shown, that supports the first drive motor 17. The guide projections engage the guide grooves 52 so that they can be guided and moved in the guide grooves 52.

[0035] Further, a reduction gear 54a is coupled in the housing 11, and a swing drive unit 54 is coupled to the reduction gear 54a. The swing drive unit 54 is electrically connected to the power supply unit 18 and the control unit 19. A feed screw 55 is coupled to the swing drive unit 54. The feed screw 55 has one end connected to the motor support member. A swing switch 56 is arranged on the side surface of the housing 11. The swing switch 56 is electrically connected to the control unit 19.

[0036] When the swing switch 56 is pushed with the guide projections of the motor support member engaged with the guide grooves 52, the swing switch 56 sends an input signal to the control unit 19. In accordance with the input signal, the control unit 19 drives the swing drive unit 54. When the swing drive unit 54 is driven, the feed screw 55 moves the motor support member along the curved guide grooves 52 (as indicated by arrow Y2 in Fig. 6). This integrally swings the first drive motor 17, the first rotary plate 13, and the massager member 12 along the curved guide grooves 52. The reduction gear 54a adjusts the speed at which the first drive motor 17, the first rotary plate 13, and the massager member 12 move along the guide grooves 52.

[0037] The guide grooves 52, the swing drive unit 54, and the feed screw 55 form a swing mechanism that swings the first rotary plate 13. Further, the control unit 19 controls the swing drive unit 54 to swing the first rotary plate 13. It is preferable that the massaging surface 12c of the massager member 12 be maintained at an initial position intersecting the axis L1 regardless of the swing angle of the first rotary plate 13.

[0038] In a scalp care device 50 of the structure described above, the angle of contact between the massager member 12 and the scalp changes, and the massager member 12 contacts the scalp at various angles. In this state, the pressing force generated when the first rotary plate 13 rotates and the massager member 12 presses the scalp is dispersed at the contacted portions of the scalp that contacts the massager member 12. Thus, pressing force is applied to the scalp from various directions.

[0039] The present embodiment has the following advantage. (5) The scalp care device 50 includes the swing mechanism, which is formed by the guide grooves 52, the swing drive unit 54, and the feed screw 55. Thus, the control unit 19 swings the first rotary plate 13 by controlling the swing drive unit 54. In this state, when the massager member 12 massages the scalp, the angle of con-

tact between the massager member 12 and the scalp changes, and the massager member 12 contacts the scalp at various angles. The pressing force can be dispersed at the contacted portions (contact surface) of the scalp that contacts the distal end 12b of the massager member 12, and the pressing force is applied to the scalp from various directions. This improves the massaging effect.

Fifth Embodiment

[0040] A scalp care device according to a fifth embodiment of the present invention will now be discussed with reference to Fig. 7.

[0041] As shown in Fig. 7, a second drive motor 62 is incorporated in the housing 11. The second drive motor 62 includes a rotation shaft 62a coupled to a second rotary plate 61. A support plate 63 extends from one surface of the second rotary plate 61 in a direction orthogonal to that surface. Straight guide grooves 64 extend in a side surface 63a of the support plate 63 parallel to the surface of the second rotary plate 61. The guide grooves 64 are engageable with guide projections (not shown) that are formed in a side surface of a support member (motor support member), which is not shown, that supports the first drive motor 17. The guide projections engage the guide grooves 64 so that they can be guided and moved in the guide grooves 64.

[0042] The first drive motor 17 is supported by the support plate 63 in a state in which the guide projections formed in the side surface of the motor support member are engaged with the guide grooves 64. The first drive motor 17 and the first rotary plate 13 move within a range in which the axis L1 of the first rotary plate 13 does not overlap with an axis L3 of the second rotary plate 61. The second drive motor 62 is electrically connected to the power supply unit 18 and the control unit 19 that are incorporated in the housing 11.

[0043] Further, a reduction gear 65a is coupled to the side surface 63a of the support plate 63, and a second radius adjustment drive unit 65 is coupled to the reduction gear 65a. The second radius adjustment drive unit 65 is electrically connected to the power supply unit 18 and the control unit 19. A feed screw 66 is coupled to the second radius adjustment drive unit 65, and one end of the feed screw 66 is connected to the motor support member. Further, a radius adjustment switch 67 is arranged on a top plate of the housing 11. The radius adjustment switch 67 is electrically connected to the control unit 19.

[0044] When the power switch 20 is turned on, an input signal is sent from the power switch 20 to the control unit 19. In response to the input signal, the control unit 19 transmits a command signal that activates the power supply unit 18. The power supply unit 18 is activated in accordance with the command signal from the control unit 19 to supply the first drive motor 17 and second drive motor 62 with power. The first drive motor 17 and second

drive motor 62, when supplied with power from the power supply unit 18, respectively rotate the first rotary plate 13 and second rotary plate 61.

[0045] In a scalp care device 60 of the structure described above, the second drive motor 62 rotates the second rotary plate 61 so that the first rotary plate 13, the massager member 12, and the first drive motor 17 orbit, as a single unit, about the axis L3 of the second rotary plate 61. At the same time, the first drive motor 17 rotates the first rotary plate 13. When massaging the scalp with the massager member 12 in this state, the scalp easily follows the massaging surface 12c of the massager member 12. This stimulates the scalp giving a feel of being rubbed in addition to a feel of undergoing shiatsu.

[0046] When the radius adjustment switch 67 is pushed with the guide projections of the motor support member engaged with the guide grooves 64, the radius adjustment switch 67 sends an input signal to the controls unit 19. In accordance with the input signal, the control unit 19 drives the second radius adjustment drive unit 65. The second radius adjustment drive unit 65 moves, with the feed screw 66, the motor support member along the guide grooves 64 in a direction extending along the side surface 63a of the support plate 63 (as indicated by arrow Y3 in Fig. 7). This moves the first rotary plate 13 along the side surface 63a of the support plate 63. The reduction gear 65a adjusts the speed at which the massager member 12 moves along the guide grooves 64.

[0047] The guide grooves 64, the second radius adjustment drive unit 65, and the feed screw 66 form a second radius adjustment mechanism that adjusts the rotating radius (also referred to as the orbiting radius) about the axis L3 of the second rotary plate 61. Here, the "rotating radius" refers to the distance between the axis L1 of the first rotary plate 13 and the axis L3 of the second rotary plate 61.

[0048] Further, the control unit 19 controls the second radius adjustment drive unit 65 to change the rotating radius of the first rotary plate 13 about the axis L3 of the second rotary plate 61.

[0049] In a scalp care device 60 of the structure described above, an increase in the rotating radius of the first rotary plate 13 widens the range of contact between the massager member 12 and the scalp. This enlarges the range in which the scalp follows the massager member 12. A decrease in the rotating radius of the first rotary plate 13 narrows the range of contact between the massager member 12 and the scalp. This reduces the range in which the scalp follows the massager member 12.

[0050] The present embodiment has the advantages described below.

(7) The housing 11 further accommodates the second rotary plate 61 and the second drive motor 62, which rotates the second rotary plate 61. Thus, when rotating the second rotary plate 61 with the second drive motor 62, the first rotary plate 13 and the first

drive motor 17 are rotated as a single unit. Further, the first rotary plate 13 is rotated by the first drive motor 17. When massaging the scalp with the massager member 12 in this state, the scalp easily follows the massager member 12. This stimulates the scalp giving a feel of being rubbed in addition to a feel of undergoing shiatsu, and the massaging effect on the scalp is further improved.

(8) The scalp care device 60 includes the second radius adjustment mechanism, which is formed by the guide grooves 64, the second radius adjustment drive unit 65, and the feed screw 66. Thus, the control unit 19 can change the rotation radius of the first rotary plate 13 about the axis L3 of the second rotary plate 61 by controlling the second radius adjustment drive unit 65. Further, the rotation radius of the massager member 12 about the axis L3 of the second rotary plate 61 can be changed, and a massage that is in accordance with the movement of the scalp, which contacts the massager member 12, can be provided.

Sixth Embodiment

[0051] A scalp care device according to a sixth embodiment of the present invention will now be discussed with reference to Fig. 8. The scalp care device 60 of the sixth embodiment is obtained by eliminating the second radius adjustment mechanism, which includes the guide grooves 64, the second radius adjustment drive unit 65, and the feed screw 66, from the scalp care device 60 of the fifth embodiment.

[0052] As shown in Fig. 8, the rotation shaft 62a of the second drive motor 62 is connected to the second rotary plate 61. One surface of the second rotary plate 61 supports the first drive motor 17. The first drive motor 17 is supported by the second rotary plate 61 so that the axis L1 of the first rotary plate 13 does not overlap with the axis L3 of the second rotary plate 61.

[0053] A projection amount changing drive unit 68 is coupled to the rotation shaft 17a of the first drive motor 17. The projection amount changing drive unit 68 is electrically connected to the power supply unit 18 and the control unit 19. Further, the projection amount changing drive unit 68 is coupled to a feed screw 68a, and one end of the feed screw is coupled to the first rotary plate 13. A massaging strength adjustment switch 69 is arranged on a top plate of the housing 11. The massaging strength adjustment switch 69 is electrically connected to the control unit 19.

[0054] When the massaging strength adjustment switch 69 is pushed, the massaging strength adjustment switch 69 sends an input signal to the control unit 19. The control unit 19, which receives the input signal, controls and drives the projection amount changing drive unit 68. When the projection amount changing drive unit 68 is driven, the feed screw 68a, which is coupled to the projection amount changing drive unit 68, is driven. Fur-

ther, the first rotary plate 13 and the massager member 12 move so as to project out of the opening 11a in the vertical direction relative to the first rotary plate 13.

[0055] In this manner, the projection amount changing drive unit 68 and the feed screw 68a form a projection amount adjustment mechanism that changes the projection amount of the massager member 12. Here, the "projection amount" refers to the movement distance of the massager member 12 when the massager member 12 projects in the vertical direction relative to the first rotary plate 13. Further, the control unit 19 controls the projection amount changing drive unit 68 to control and change the projection amount by which the massager member 12 is projected out of the opening in the vertical direction relative to the first rotary plate 13.

[0056] In the scalp care device 60 of the above structure, an increase in the projection amount of the massager member 12 increases the pressing strength that is produced by pressing the massager member 12 against the scalp. A decrease in the projection amount of the massager member 12 decreases the pressing strength that is produced by pressing the massager member 12 against the scalp.

[0057] The present embodiment has the advantage described below. (9) The scalp care device 60 includes the projection amount adjustment mechanism, which is formed by the projection amount changing drive unit 68 and the feed screw 68a. Thus, the control unit 19 can adjust the projection amount of the massager member 12 by controlling the projection amount changing drive unit 68. Accordingly, the projection amount of the massager member 12 can be changed, the pressing force (massaging strength) of the massager member 12 relative to the scalp can be changed, and the feel of shiatsu can be obtained by the application of different strengths to the scalp.

Seventh Embodiment

[0058] A scalp care device according to a seventh embodiment of the present invention will now be described with reference to Fig. 9.

[0059] As shown in Fig. 9(a), two second drive motors 62 are incorporated in the housing 11. Each second drive motor 62 includes a rotation shaft 62a connected to a second rotary plate 61. One surface of the second rotary plate 61 supports a first drive motor 17. The first drive motor 17 includes a rotation shaft 17a coupled to a first rotary plate 13. In this manner, a scalp care device 70 of the present embodiment includes two rotating-orbiting units 71, each formed by the first rotary plate 13, the first drive motor 17, the second rotary plate 61, and the second drive motor 62.

[0060] As shown in Fig. 9(b), a rotation speed detection sensor 72 (e.g., photoelectric sensor) is arranged to partially surround the peripheral portion of each second rotary plate 61. Each rotation speed detection sensor 72 is electrically connected to the control unit 19. Further,

rotation speed detection holes S are formed at predetermined intervals entirely in the peripheral portion of the second rotary plates 61. The rotation speed detection holes S are formed to pass through the corresponding rotation speed detection sensors 72 when the second rotary plates 61 are rotated by the second drive motors 62.

[0061] When each second rotary plate 61 is rotating, the corresponding rotation speed detection sensor 72 detects the number of the rotation speed detection holes S that pass through the rotation speed detection sensor 72. The control unit 19 controls the two drive motors 62 so that the two rotation speed detection sensors 72 detect the same number of passing rotation speed detection holes S. In this manner, the second drive motors 62 are controlled based on the detection results of the two rotation speed detection sensors 72 so that the rotation speed is the same in the second rotary plates 61. The control unit 19 controls the second drive motors 62 so that the first rotary plates 13 of the two rotating-orbiting units 71 are orbited in synchronism about the axes L3 of the corresponding second rotary plates 61.

[0062] To synchronize the orbiting of the two first rotary plates 13 and rotate the first rotary plates 13 in the same direction (the direction indicated by arrows R3 in Fig. 9 (b)), as shown in Fig. 9(b), the rotation starting positions of the two first rotary plates 13 is required to be at the same position in the circumferential direction of the corresponding second rotary plates 61.

[0063] The present embodiment has the advantages described below.

(10) The control unit 19 controls the second drive motors 62 based on the detection results of the rotation speed detection sensors 72 so that the rotation speed is the same in the second rotary plates 61. This rotates and drives the massager members 12 of the rotating-orbiting units 71 in synchronism. Thus, a difference in the rotation and driving of the massager members 12 is not felt, and a comfortable rubbing feel is obtained without a sense of discomfort. (11) The housing 11 includes the two rotating-orbiting units 71, each formed by the first rotary plate 13, the first drive motor 17, the second rotary plate 61, and the second drive motor 62. The scalp care device 70 of this structure includes the two massager members 12. Thus, in contrast with a scalp care device including only one massager member 12, the scalp may be massaged at two locations at the same time.

Eighth Embodiment

[0064] A scalp care device according to an eighth embodiment of the present invention will now be described with reference to Figs. 10 and 11,

[0065] As shown in Figs. 10(a) and 10(b), a scalp care device 70 of the eighth embodiment is obtained by adding the projection amount adjustment mechanism of the sixth

embodiment, formed by the projection amount changing drive unit 68 and the feed screw 68a, to the structure of the scalp care device 70 of the seventh embodiment.

[0066] Further, as shown in Fig. 11(b), in each second rotary plate 61, an absolute position detection hole S2 is formed in association with one of the rotation speed detection holes S inward in the radial direction of the second rotary plate 61 from the rotation speed detection holes S. In a state in which the second rotary plate 61 is rotated by the second drive motor 62, the absolute position detection hole S2 passes through the corresponding rotation speed detection sensor 72.

[0067] When the power switch 20 is turned on, the second rotary plates 61 rotate in the direction indicated by arrows R4 in Fig. 10(b). When the absolute position detection hole S2 is located in the corresponding rotation speed detection sensor 72, the count value of the rotation speed detection sensor 72, that is, the number of passed rotation speed detection holes S, is set to zero. In the illustrated example, when the passed number of rotation speed detection holes S is reset to zero, the first rotary plates 13 are closest to each other as shown in Fig. 10(b).

[0068] By further rotating the second rotary plates 61 and passing the rotation speed detection holes S through the rotation speed detection sensors 72, the count value (passed number of rotation speed detection holes S) of each rotation speed detection sensor 72 increases. In a state in which the count value reaches one half of the total number of the rotation speed detection holes S of the corresponding rotary plate 61, the first rotary plates 13 are farthest from each other as shown in Fig. 11 (a). From this position, when the second rotary plates 61 are rotated and the count value of each rotation speed detection sensor 72 reaches another one half of the total number of the rotation speed detection holes S of the corresponding rotary plate 61 (i.e., reaches the total number), the first rotary plates 13 are closest from each other.

[0069] In the scalp care device 70 of the above structure, the control unit 19 controls and drives the projection amount changing drive unit 68 in accordance with the detection result of the rotation speed detection sensor 72. For example, the control unit 19 controls the projection amount changing drive units 68 so that the projection amounts of the first rotary plates 13 and the massager members 12 gradually decrease as the passed number of the rotation speed detection holes S, which are detected by the rotation speed detection sensors 72, increases from zero to one half of the total number of the rotation speed detection holes S. Further, the control unit 19 controls the projection amount changing drive units 68 so that the projection amounts of the first rotary plates 13 and the massager members 12 become minimum when the passed number of the rotation speed detection holes S, which are detected by the rotation speed detection sensors 72, reaches one half of the total number.

[0070] The control unit 19 controls the projection amount changing drive unit 68 so that the projection

amounts of the first rotary plates 13 and the massager members 12 gradually increase as the passed number of the rotation speed detection holes S, which are detected by the rotation speed detection sensors 72, increases from one half. Then, the control unit 19 controls the projection amount changing drive units 68 so that the projection amounts of the first rotary plates 13 and the massager members 12 become maximum when the passed number of the rotation speed detection holes S, which are detected by the rotation speed detection sensors 72, reaches the total number.

[0071] In this manner, when the massager members 12 are closest to each other, the first rotary plates 13 and the massager members 12 are most projected in the vertical direction relative to the first rotary plates 13. Further, when the massager members 12 are farthest from each other, the first rotary plates 13 and the massager members 12 are not most projected in the vertical direction relative to the first rotary plates 13.

[0072] In this manner, the control unit 19 controls and changes the projection amounts of the massager members 12 by controlling the projection amount changing drive units 68 in accordance with the relative positions of the massager members 12 when the first rotary plates 13 are rotating about the axes L3 of the second rotary plates 61.

[0073] The present embodiment has the advantages described below.

(12) When the first rotary plates 13 are orbiting about axes L3 of the corresponding second rotary plates 61, the control unit 19 controls the projection amount changing drive units 68 in accordance with the relative positions of the massager members 12 to control and change the projection amount of the massager members 12 when the massager members 12 are closest to each other. The projection amounts of the massager members 12 become maximum when the massager members 12 are closest to each other, and the projection amounts of the massager members 12 become minimum when the massager members 12 are farthest from each other. This increases and locally concentrates the pressing pressure of each massager member 12 applied to the scalp. This stimulates the scalp in a locally concentrated manner giving a feel of being rubbed in addition to a feel of undergoing shiatsu.

Ninth Embodiment

[0074] A scalp care device according to a ninth embodiment of the present invention will now be described with reference to Fig. 12. A scalp care device 10 of the ninth embodiment is obtained by eliminating the control unit 19 from the scalp care device 10 of the first embodiment and coupling an elliptic drive gear 94 to the rotation shaft 17a of the first drive motor 17. As shown in Fig. 12 (b), the rotation shaft 17a is coupled at a position slightly

separated along the major axis of the drive gear 94 relative to the ellipse of the drive gear 94.

[0075] Further, the drive gear 94 is engaged with an elliptic driven gear 95. The driven gear 95 is coupled by a support shaft 95a to the first rotary plate 13. The support shaft 95a is coupled at a position slightly separated along the major axis of the driven gear 95 relative to the ellipse center of the driven gear 95.

[0076] When the drive gear 94 and the driven gear 95 are engaged, the first drive motor 17 rotates the drive gear 94 at a constant rotation speed. The rotation of the drive gear 94 is transmitted to the driven gear 95. This rotates the driven gear 95 and thereby rotates the first rotary plate 13.

[0077] The gear 94 is elliptic. Thus, the rotation angle of the driven gear 95 per rotation angle of the driven gear 94 differs between a state in which the major axis side of the drive gear 94 engages with the minor axis side of the driven gear 95 (Fig. 12(b)) and a state in which the minor axis side of the drive gear 94 engages with the major axis side of the driven gear 95 (Fig. 12(c)). More specifically, in a state in which the major axis side of the drive gear 94 engages with the minor axis side of the driven gear 95, rotation of the drive gear 94 increases the rotation speed of the driven gear 95. This increases the rotation speed of the first rotary plate 13. Further, as shown in Fig. 12(c), in state in which the minor axis side of the drive gear 94 engages with the major axis side of the driven gear 95, rotation of the drive gear 94 decreases the rotation speed of the driven gear 95. This decreases the rotation speed of the first rotary plate 13. In this manner, the drive gear 94 and the driven gear 95 function as a control unit that mechanically switches the rotation speed of the first rotary plate 13.

[0078] The present invention has the following advantage.

(13) By using the elliptic drive gear 94 and driven gear 95, the shapes of the gears 94 and 95 can control changes in the rotation speed of the first rotary plate 13. Thus, the rotation speed of the first rotary plate 13 can be mechanically switched without a control unit that electrically changes the rotation speed of the first rotary plate 13. Accordingly, the rotation speed of the first rotary plate 13 can be mechanically controlled without a complicated control such as when electrically controlling and changing the rotation speed of the first rotary plate 13.

[0079] The embodiments described above may be modified as described below.

[0080] In the fifth embodiment, the control unit 19 controls the second radius adjustment drive unit 65 to drive the second radius adjustment drive unit 65 when the radius adjustment switch 67 is pushed but not limited in such a manner. For example, as shown in Fig. 13, an inclination sensor 81 is incorporated in the housing 11 as an inclination detection means for detecting inclination

of the scalp care device 10 or the main body (e.g., housing 11). The inclination sensor 81 is electrically connected to the control unit 19. As shown in Figs. 14(a) and 14(b), the inclination sensor 81 includes a first terminal 85a, a second terminal 85b, and a third terminal 85c. The first terminal 85a is connected to one end of a resistor 84, and the second terminal 85b is connected to another end of the resistor 84. The third terminal 85c is connected to the resistor 84 via a slide contact 83 that slides and moves integrally with a weight 82 arranged in the inclination sensor 81. For example, when the scalp care device 10 inclines from a horizontal state shown in Fig. 14(a) to a vertical state shown in Fig. 14(b), the weight 82 swings about a rotation shaft 86 and the slide contact 83 slides and moves integrally with the slide contact 83. In this state, the resistance between the slide contact 83 and the first terminal 85a or second terminal 85b changes. The resistance is detected at the third terminal 85c. Based on the resistance detected at the third terminal 85c, the control unit 19 calculates the inclination of the scalp care device 10 and controls the radius adjustment drive unit 65 based on the calculated value (inclination) to change the rotation radius of the first rotary plate 13 about the axis L3 of the second rotary plate 61. As a result, the control unit 19 controls the radius adjustment drive unit 65 in accordance with the angle detected by the inclination sensor 81. Thus, the user is massaged in accordance with the movement of the scalp that contacts the massager member 12 without the user being aware.

[0081] In the fifth and sixth embodiments, the control unit 19 may control the second drive motor 62 to switch the rotation direction of the second rotary plate 61. This allows the second rotary plate 61 to be rotated in the clockwise and counterclockwise directions. Thus, the first rotary plate 13, the massager member 12, and the first drive motor 17 can be rotated as a single unit about the axis L3 of the second rotary plate 61. This stimulates the scalp giving various feels of undergoing shiatsu in addition to being rubbed, and the feel of shiatsu and rubbing is not constant.

[0082] In the seventh embodiment, the control unit 19 may synchronize the orbiting of the first rotary plates 13 about the axes L3 of the second rotary plate 61, while controlling the second drive motors 62 so that they rotate in opposite directions. In this case, the rotation starting positions of the two first rotary plates 13 is required to be at opposition positions in the circumferential direction of the corresponding second rotary plates 61. This allows massaging to be performed so as to pinch the scalp with the massager members 12.

[0083] In the seventh embodiment, at a position adjacent to one of the rotation speed detection holes S in each second rotary plate 61, a further rotation speed detection hole S may be formed to function as an absolute position detection hole. For example, as shown in Fig. 11(b), an absolute position detection hole S2 may be arranged inward in the radial direction of the second rotary plate 61 from one of the rotation speed detection

holes S of the second rotary plate 61. When the second rotary plate 61 is rotated by the second drive motor 62, the absolute position detection hole S2 passes through the rotation speed detection sensor 72.

[0084] In the seventh embodiment, the control unit 19 controls the second drive motors 62 using the rotation speed detection sensors 72 so that the orbiting of the two first rotary plates 13 is synchronized and the rotation speed is the same in the second rotary plates 61 but not limited in such a manner. For example, as shown in Figs. 15(a) and 15(b), a drive gear 91 is coupled to the rotation shafts 62a of the second drive motor 62, and two orbiting gears 92 are engaged with the drive gear 91. The first drive motor 17 is supported on one surface of each of the orbiting gears 92. In the same manner as the seventh embodiment, the first rotary plate 13 and the massager member 12 are provided for each first drive motor 17. In a state in which the drive gear 91 is engaged with each orbiting gear 92, rotation of the drive gear 91 in the counterclockwise direction (the direction indicated by arrow R5 in Fig. 15(b)) rotates the orbiting gears 92 in the same direction (the direction indicated by arrow R6 in Fig. 15(b)). Thus, as shown in Fig. 15(b), as long as the rotation starting position of each first rotary plate 13 is the same about the axis L3 of each orbiting gear 92, the rotations of the first rotary plate 13 may be synchronized without a complicated control that uses the rotation speed detection sensors 72.

[0085] In the seventh embodiment, the second rotary plates 61 are rotated at the same speed by using the two second drive motors 62 and controlling each second drive motor 62 with the control unit 19 but not limited in such a manner. For example, as shown in Figs. 16(a) and 16(b), there may be just one second drive motor 62, and the rotation shaft 62a of the second drive motor 62 may be coupled to the drive gear 91. Further, the drive gear 91 may be coupled to an orbiting gear 92 and a driven gear 93. The driven gear 93 may be engaged with a further orbiting gear 92, which differs from the orbiting gear 92 engaged with the drive gear 91. The first drive motor 17 is arranged on one surface of each orbiting gear 92. Further, in the same manner as the seventh embodiment, the first drive motor 17 is provided with the first rotary plate 13 and the massager member 12. The second drive motor 62 rotates the drive gear 91 counterclockwise (the direction indicated by arrow R5 in Fig. 16(b)). This rotates the orbiting gear 92 that is engaged with the drive gear 91 clockwise (the direction indicated by arrow R7 in Fig. 16(b)). Further, the other orbiting gear 92, which differs from the orbiting gear 92 engaged with the drive gear 91, is rotated counterclockwise (in the direction indicated by arrow R8 in Fig. 16(b)) by the driven gear 93. As a result, the first rotary plates 13 are rotated about the axes L3 of the orbiting gears 92 in opposite direction at the same rotation speed.

[0086] A projection amount adjustment mechanism, which is formed by the projection amount changing drive unit 68 and the feed screw 68a described in the sixth

embodiment, may be further added to the embodiment shown in Figs. 16(a) and 16(b), and the control unit 19 may control and change the projection amount of the massager member 12,

[0087] As shown in Figs. 17(a) and 17(b), in the embodiment shown in Figs. 16(a) and 16(b), one surface of each orbiting gear 92 may support one end of a rotation shaft 92a with a bearing 96. The other end of the rotation shaft 92a is coupled to the first rotary plate 13. In this case, in a state in which massager members 97 are in contact with the scalp, the rotation shafts 92a are freely rotated by the bearings 96. As a result, the massager members 97 can be freely rotated without controlling the rotation direction of the first rotary plate 13 with the control unit 19.

[0088] The massager member 12 is not limited to any particular shape. For example, as shown in Figs. 17(a) and 17(b), the massager member 12 may be brush-shaped. The brush-shaped massager member 97 includes a flat portion 97a, which is coupled to one surface of the first rotary plate 13, and a plurality of projections 97b, which extend generally orthogonal to one surface of the flat portion 97a. The distal ends of the projections 97b are pressed against the scalp to stimulate the scalp.

[0089] In the first embodiment, when the direction changing switch 21 is pushed, the control unit 19 controls the first drive motor 17 to change the rotation direction of the first drive motor 17 but not limited in such a manner. For example, the control unit 19 may monitor the continuous rotation time of the first drive motor 17, and when the rotation of the first drive motor 17 reaches a predetermined time, the control unit 19 may control the first drive motor 17 to change the rotation direction of the first drive motor 17.

[0090] In the first embodiment, when the direction changing switch 21 is pushed, the control unit 19 controls the first drive motor 17 to change the rotation direction of the first drive motor 17 but is not limited in such a manner. For example, the control unit 19 may monitor the number of rotations of the drive motor 17, and when the rotation of the first drive motor 17 reaches a predetermined number, the control unit 19 may control the first drive motor 17 to change the rotation direction of the first drive motor 17.

[0091] In the second embodiment, when the speed changing switch 31 is pushed, the control unit 19 controls the first drive motor 17 to change the rotation speed of the first rotary plate 13 but not limited in such a manner. For example, the control unit 19 may have a timer function and control and change the speed of the first rotary plate 13 so that the rotation of the first rotary plate 13 gradually increases or decreases as time elapses.

[0092] In the second embodiment, when the speed changing switch 31 is pushed, the control unit 19 controls the first drive motor 17 to change the rotation speed of the first rotary plate 13 but not limited in such a manner. For example, the control unit 19 may monitor the number of rotations of the first rotary plate 13 and control and

change the speed of the first rotary plate 13 so that the rotation of the first rotary plate 13 gradually increases or decreases as the number of rotations of the first rotary plate 13 increases.

Claims

1. A scalp care device being **characterized by**:

a massager member that contacts and massages a scalp;
a first rotational drive unit that rotates and drives the massager member; and
a control unit that performs a control to change an operation mode related to the rotation and driving of the massager member.

2. The scalp care device according to claim 1, further being **characterized by** a first support member that supports the massager member and is rotated by the first rotational drive unit, wherein the control unit controls the first rotational drive unit to change a rotation direction of the first support member.

3. The scalp care device according to claim 1, further being **characterized by** a first support member coupled to the massager member and rotated by the first rotational drive unit, wherein the control unit controls the first rotational drive unit to change a rotation speed of the first support member.

4. The scalp care device according to claim 1, further being **characterized by**:

a first support member that supports the massager member and is rotated by the first rotational drive unit; and
a first radius adjustment mechanism that changes a rotation path of a basal end of the massager member;
wherein the control unit controls the first radius adjustment mechanism to change the rotation path of the basal end of the massager member.

5. The scalp care device according to claim 1, further being **characterized by**:

a first support member that supports the massager member and is rotated by the first rotational drive unit; and
a swing mechanism that swings the first support member;
wherein the control unit controls the swing mechanism to swing the first support member.

6. The scalp care device according to claim 1, further being **characterized by**:

- a first support member that supports the massager member and is rotated by the first rotational drive unit; and
 a projection amount adjustment mechanism that changes a projection amount of the massager member;
 wherein the control unit controls the projection amount adjustment mechanism to change the projection amount of the massager member.
7. The scalp care device according to any one of claims 2 to 6, further being **characterized by**:
- a second support member that supports the first rotational drive unit;
 a second rotational drive unit that rotates the second support member, wherein the first support member and the massager member orbit about an axis of the second support member; and
 a second radius adjustment mechanism that adjusts an orbiting radius of the first support member about the axis of the second support member;
 wherein the control unit controls the second radius adjustment mechanism to control and change the orbiting radius of the first support member.
8. The scalp care device according to any one of claims 2 to 6, further being **characterized by**:
- a second support member that supports the first rotational drive unit; and
 a second rotational drive unit that rotates the second support member, wherein the first support member and the massager member orbit about an axis of the second support member; wherein the control unit controls the second rotational drive unit to change a rotation direction of the second support member.
9. The scalp care device according to claim 7, further being **characterized by** an inclination detection means for detecting inclination of the scalp care device, wherein the control unit controls the second radius adjustment mechanism in accordance with an angle detected by the inclination detection means to change the orbiting radius of the first support member about the axis of the second support member.
10. The scalp care device according to any one of claims 7 to 9, further being **characterized by** a plurality of rotating-orbiting units, each including the first support member, the first rotational drive unit, the second support member, and the second rotational drive unit, wherein the control unit controls the second rotational drive units of the rotating-orbiting units to synchronize the orbiting of the first support members about the axes of the second support members in the rotating-orbiting units.
11. The scalp care device according to claim 10, further being **characterized by** a projection amount adjustment mechanism that changes a projection amount of the massager member, wherein when the first support member of each of the rotating-orbiting units is orbiting about the axis of the second support member, the control unit controls the projection amount adjustment mechanism to change the projection amount of each massager member in accordance with relative positions of the massager members respectively supported by the first support members of the rotating-orbiting units.
12. The scalp care device according to claim 4, being **characterized in that** the first radius adjustment mechanism changes a position of the basal end of the massager member relative to the first support member.
13. The scalp care device according to claim 12, being **characterized in that**:
- the massager member is columnar; and
 the first radius adjustment mechanism swings the basal end of the massager member about a distal end of the massager member and changes an inclination angle of the massager member relative to an axis of the first support member.
14. The scalp care device according to claim 5, being **characterized in that**:
- the massager member is columnar;
 the swing mechanism is coupled to the first rotational drive unit in a housing; and
 the swing mechanism swings the first rotational drive unit about a distal end of the massager member and changes an inclination angle of the massager member relative to the housing.
15. The scalp care device according to claim 7, being **characterized in that** the second radius adjustment mechanism is coupled to the first rotational drive unit to move the first rotational drive unit and change a distance between the axis of the first support member and the axis of the second support member.

Fig.1

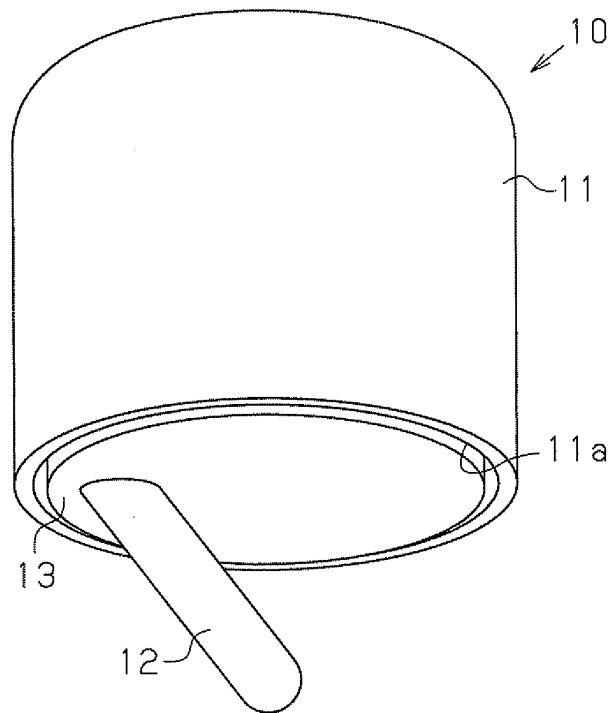


Fig.2

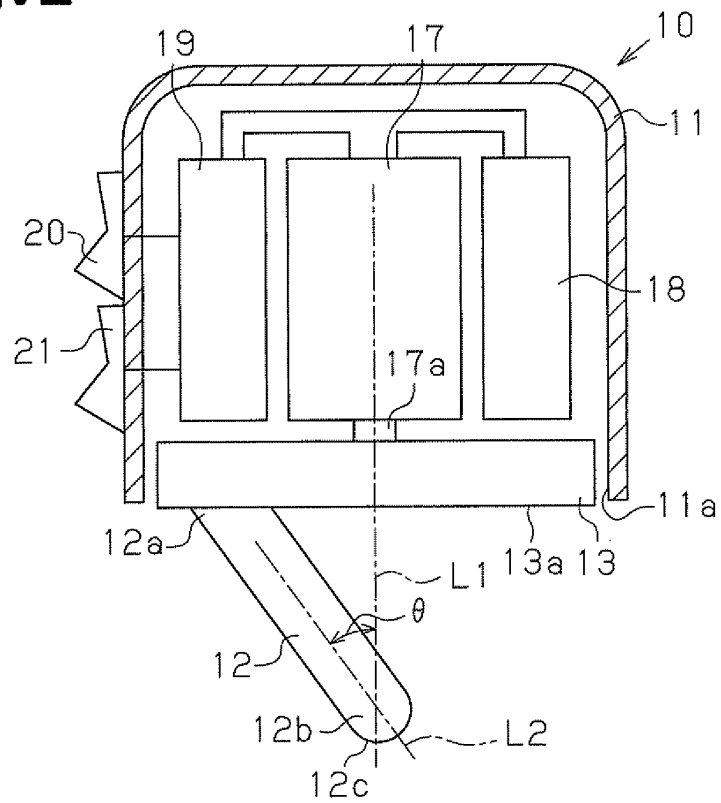


Fig.3

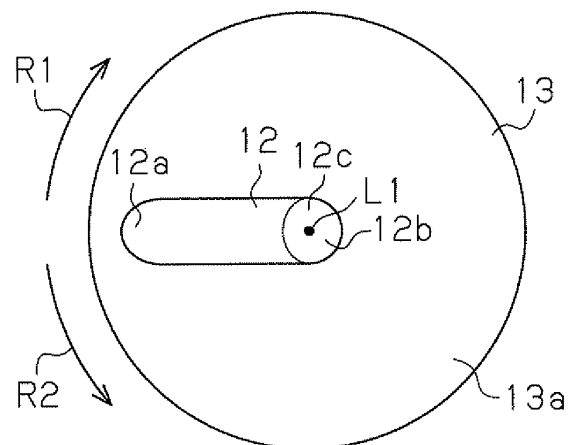


Fig.4

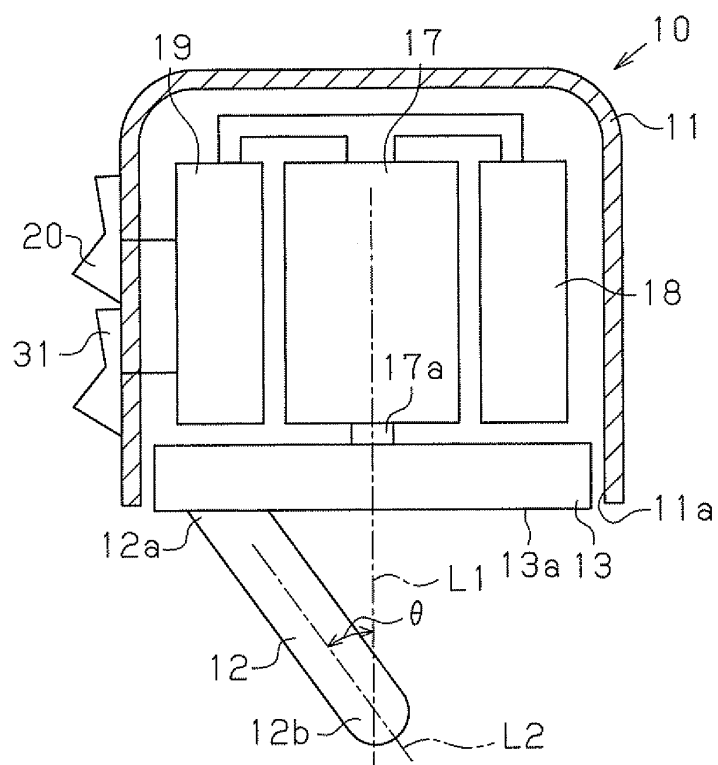


Fig.5(a)

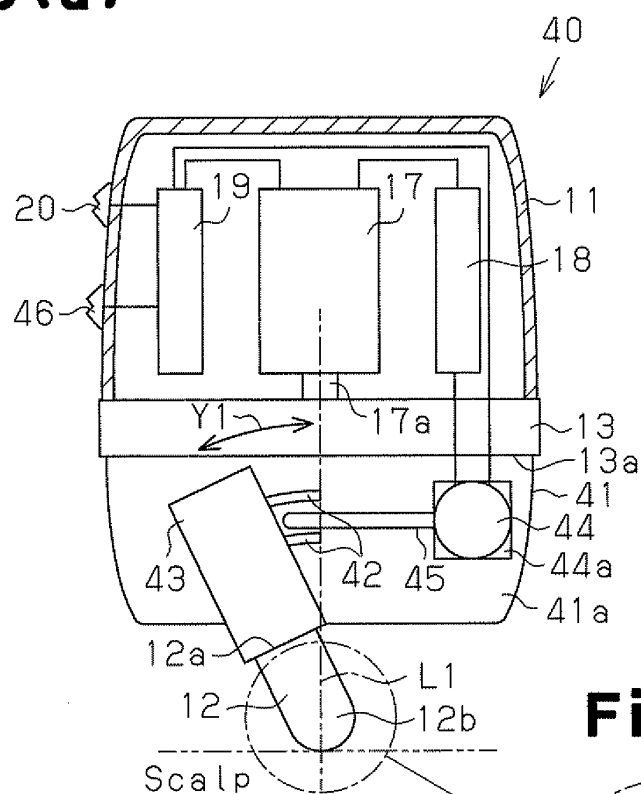


Fig.5(c)

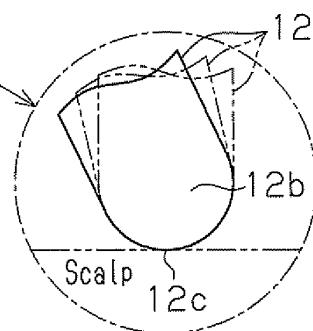


Fig.5(b)

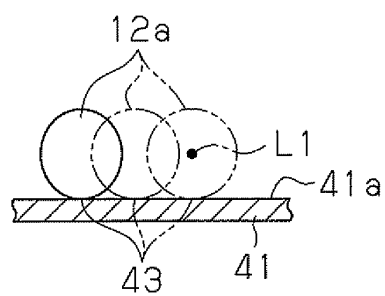


Fig.6

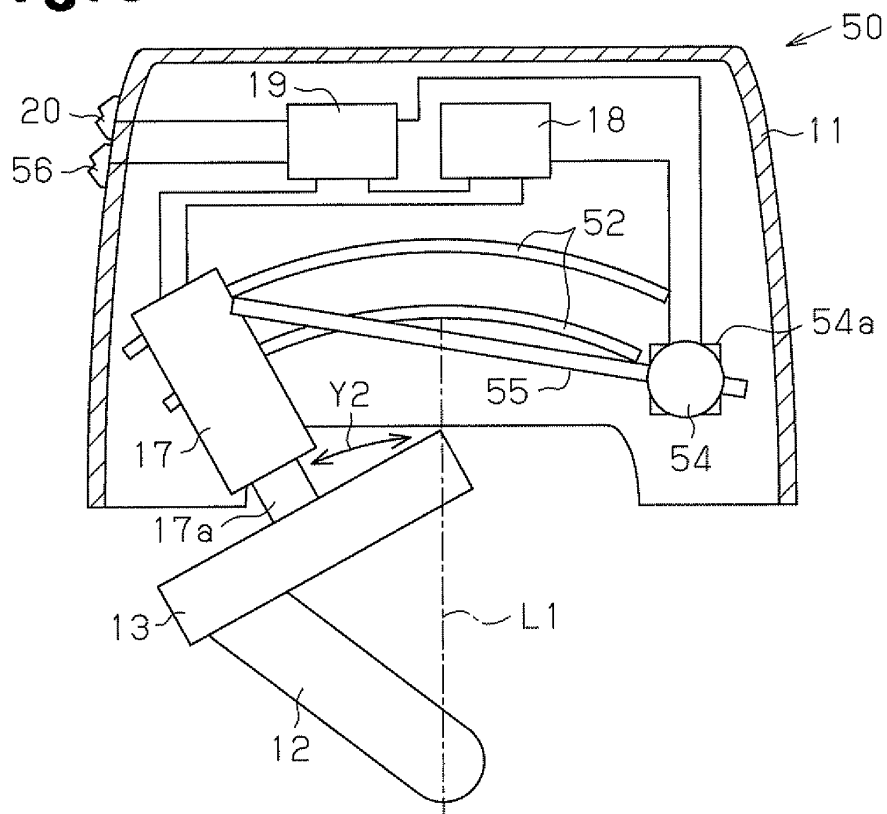


Fig.7

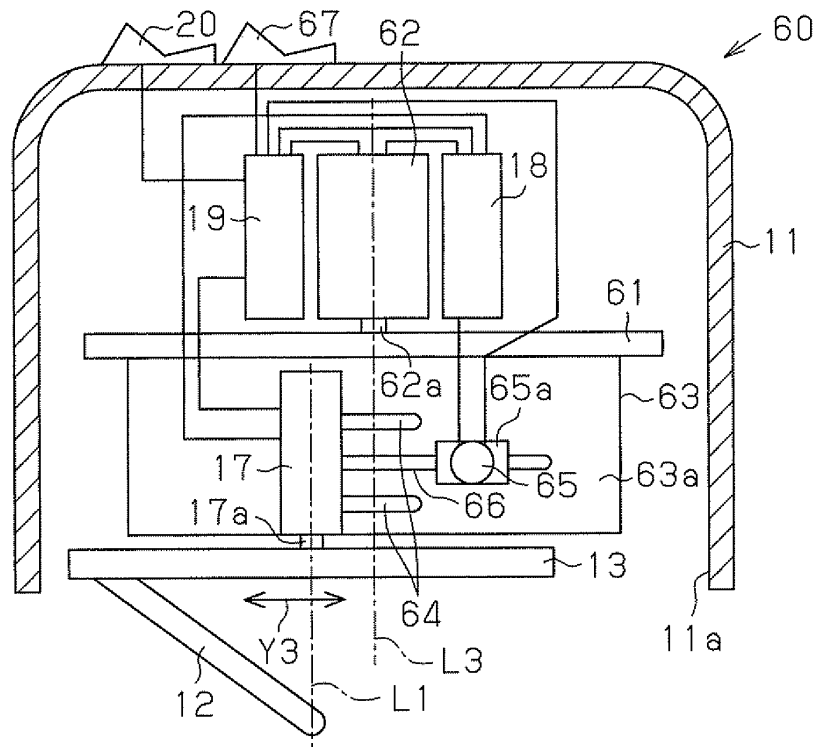


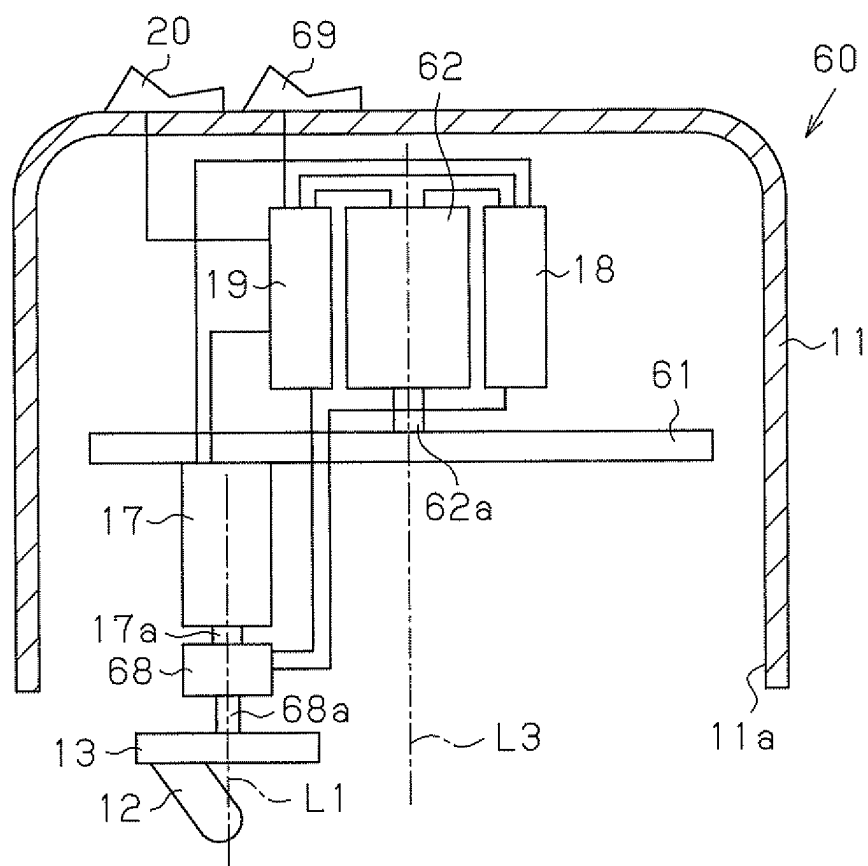
Fig.8

Fig.9(a)

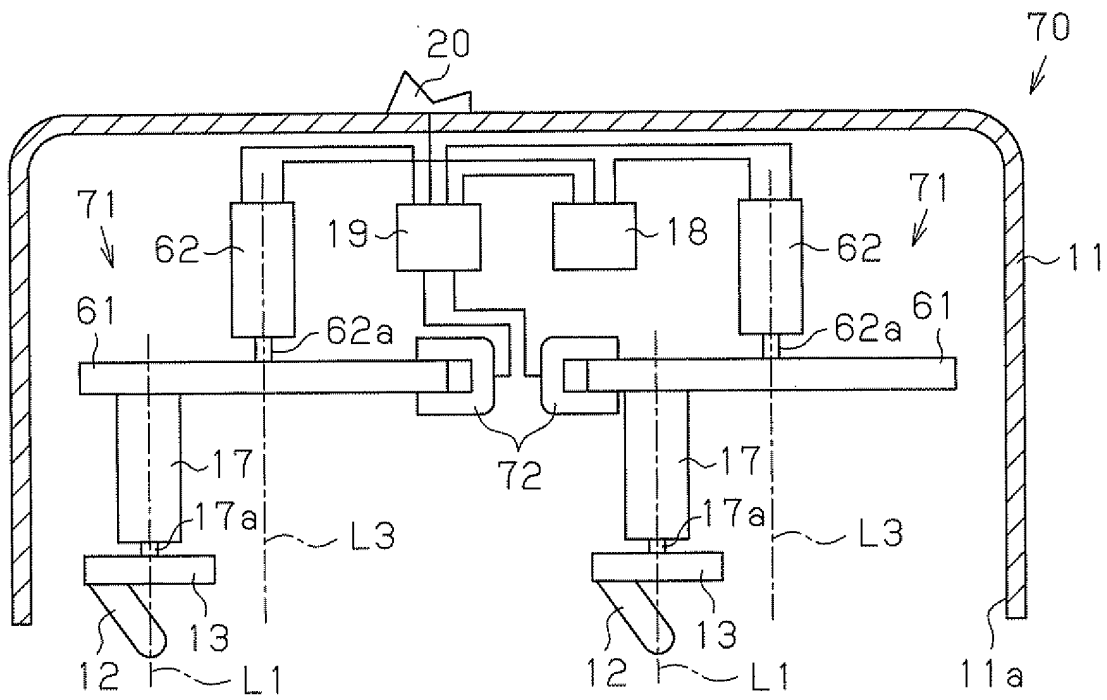


Fig.9(b)

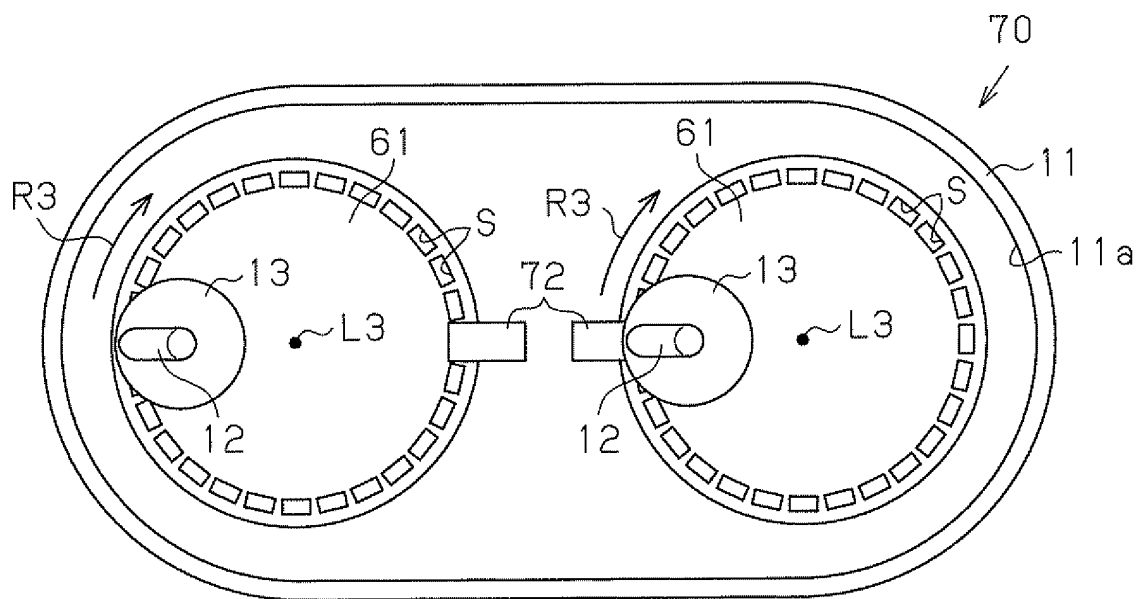


Fig.10(a)

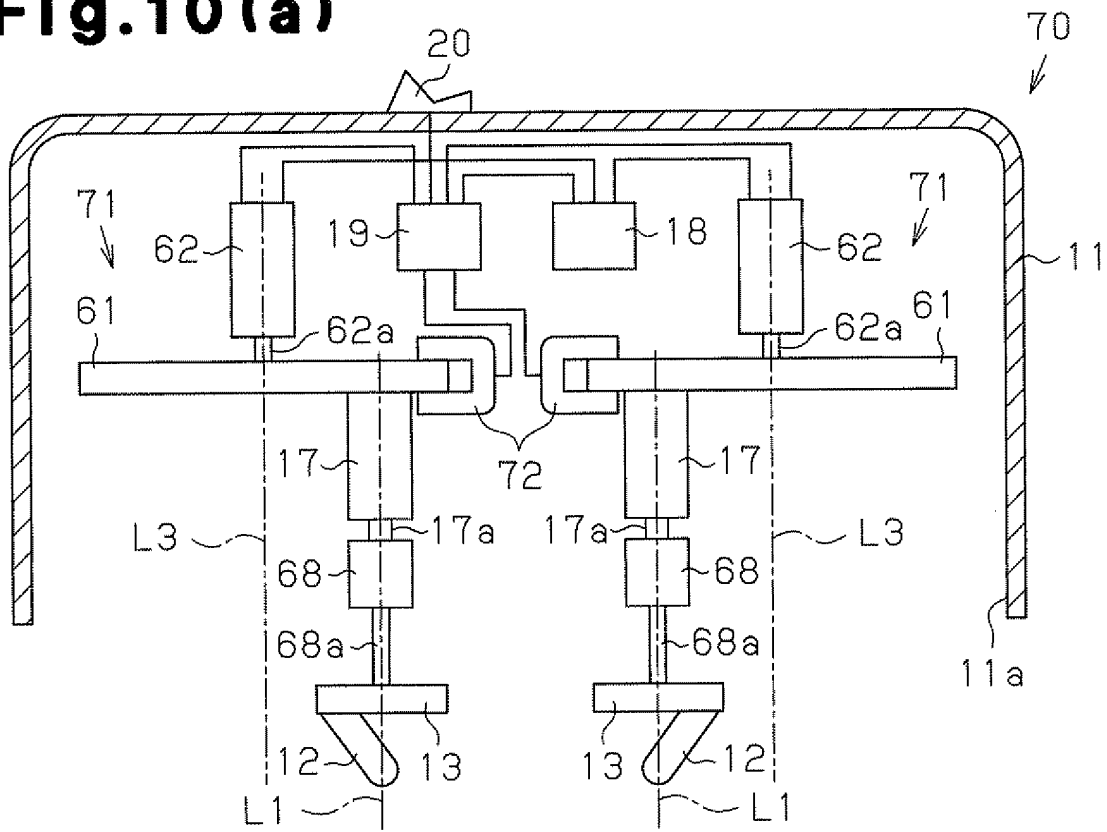


Fig.10(b)

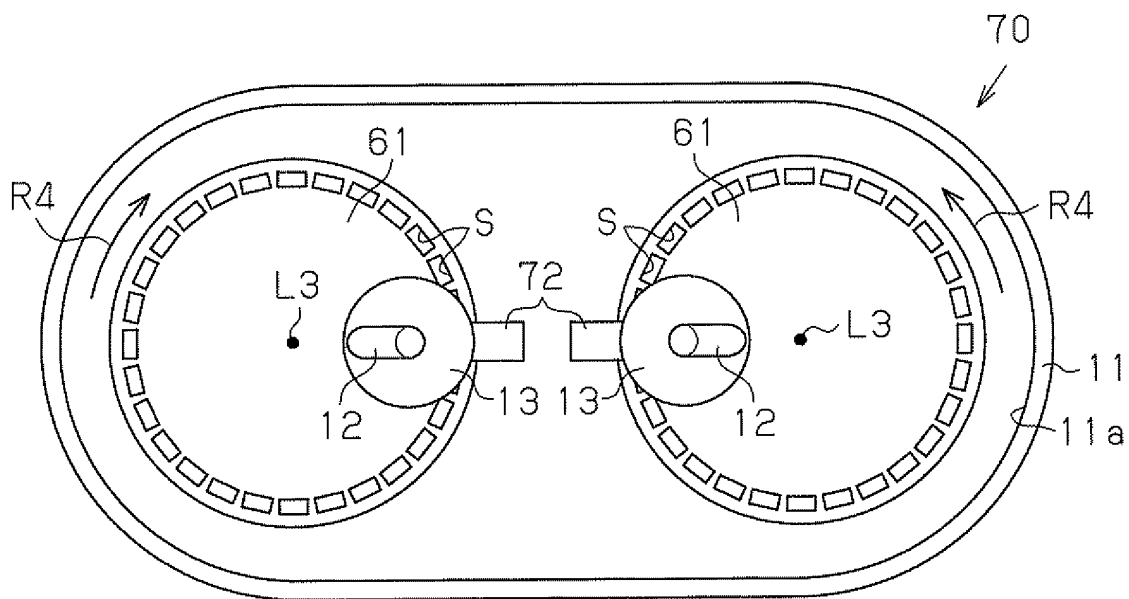


Fig.11 (a)

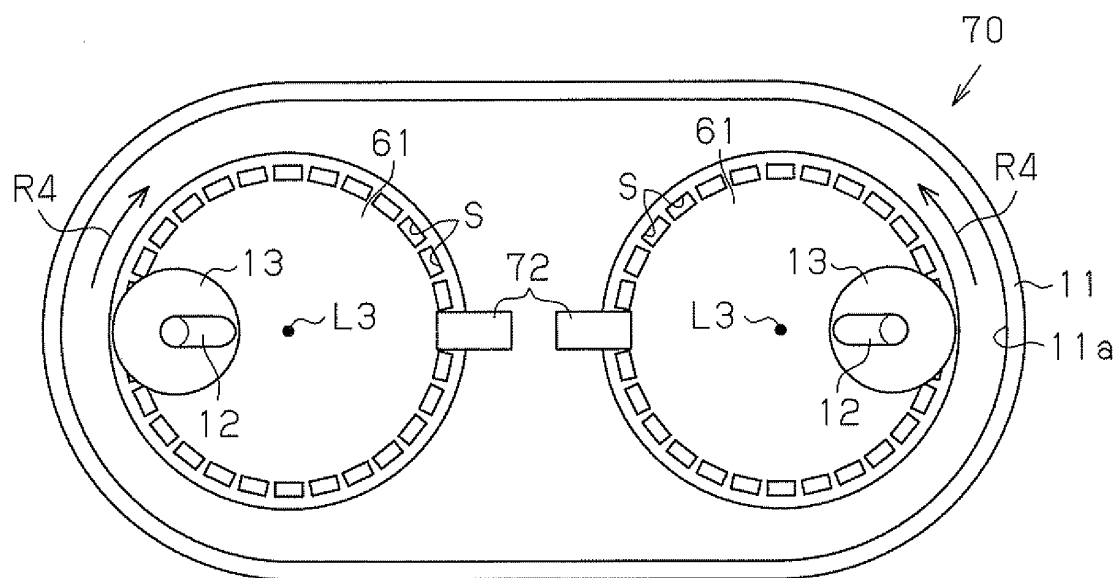


Fig.11 (b)

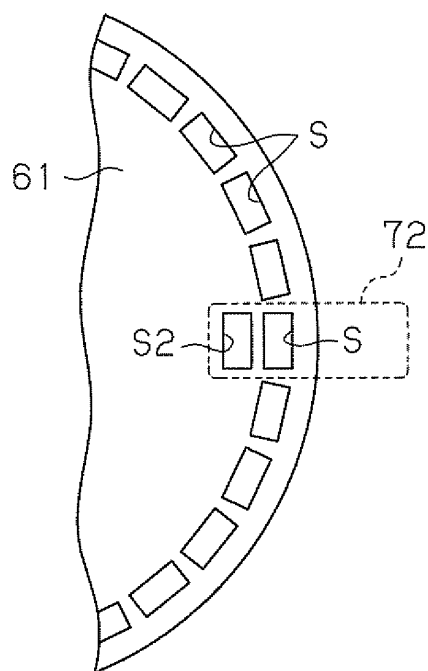


Fig.12(a)

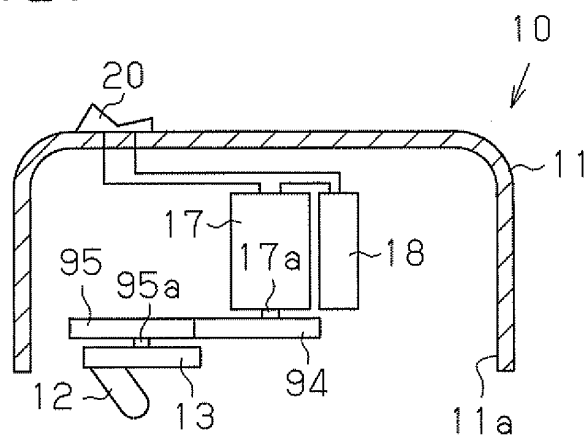


Fig.12(b)

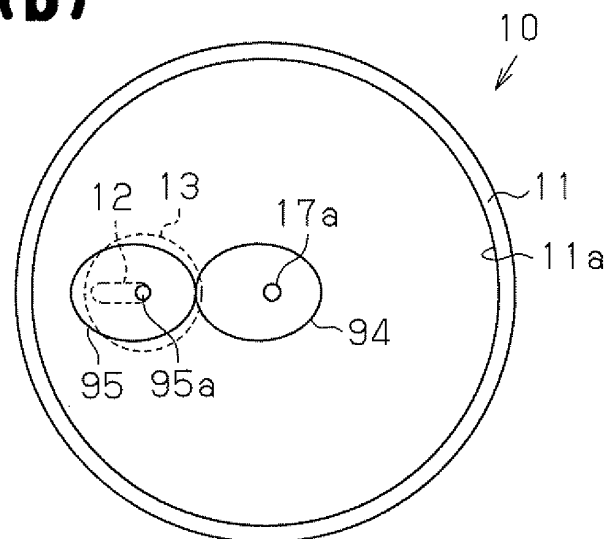


Fig.12(c)

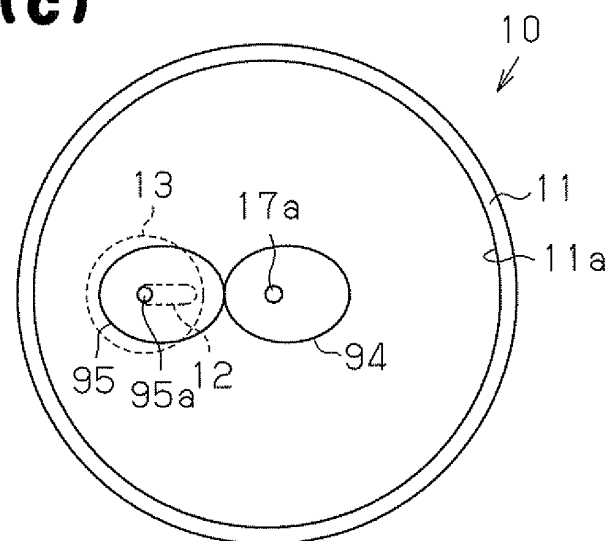


Fig.13

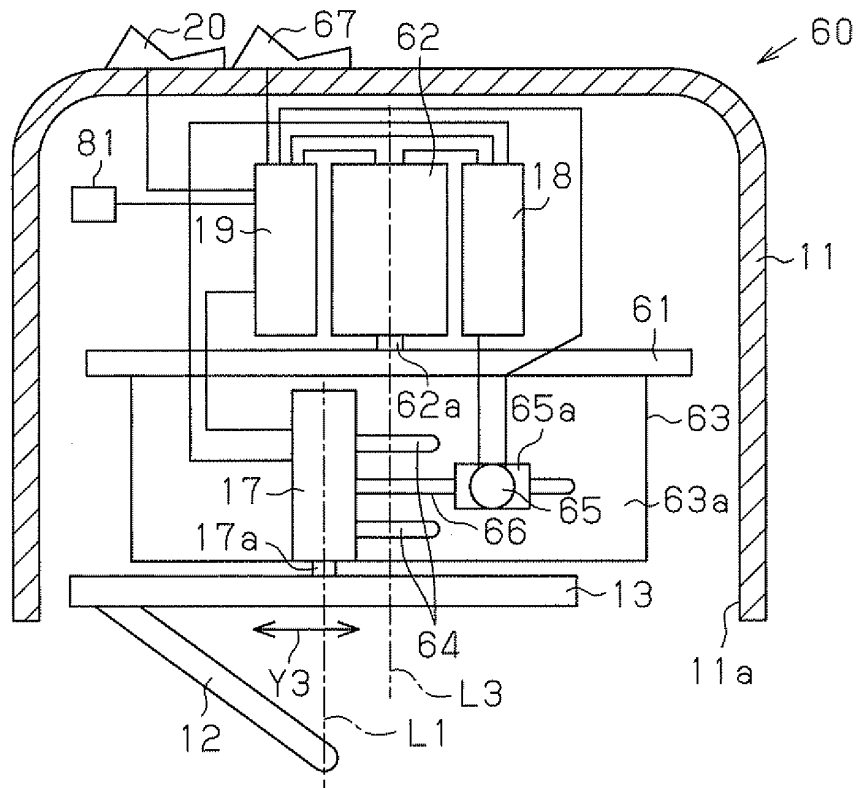


Fig.14 (a)

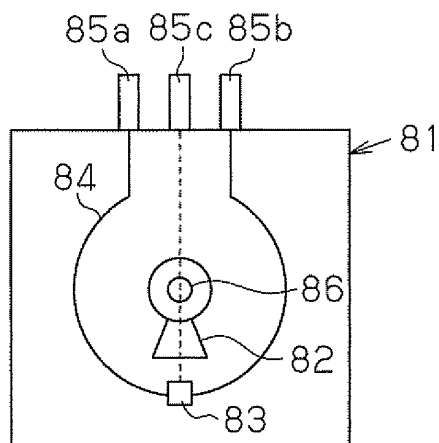


Fig.14 (b)

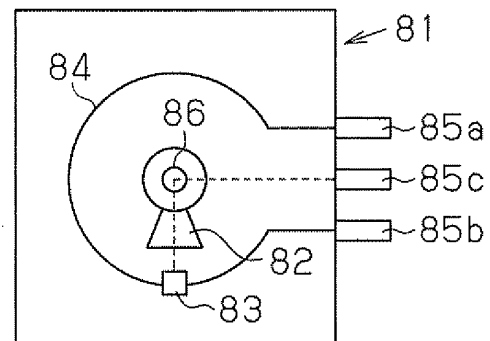


Fig.15(a)

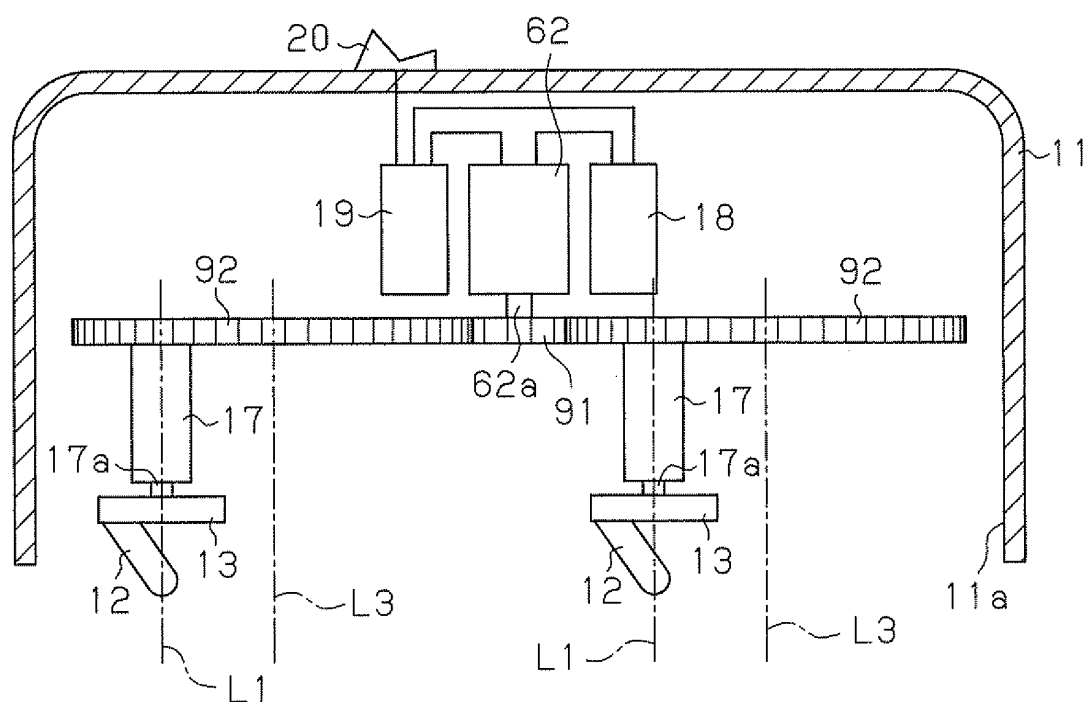


Fig.15(b)

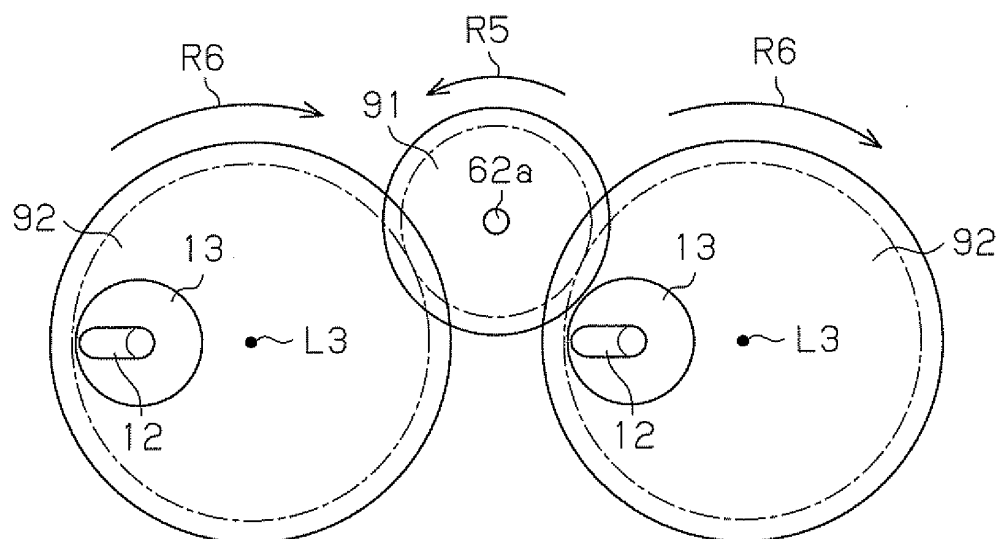


Fig.16(a)

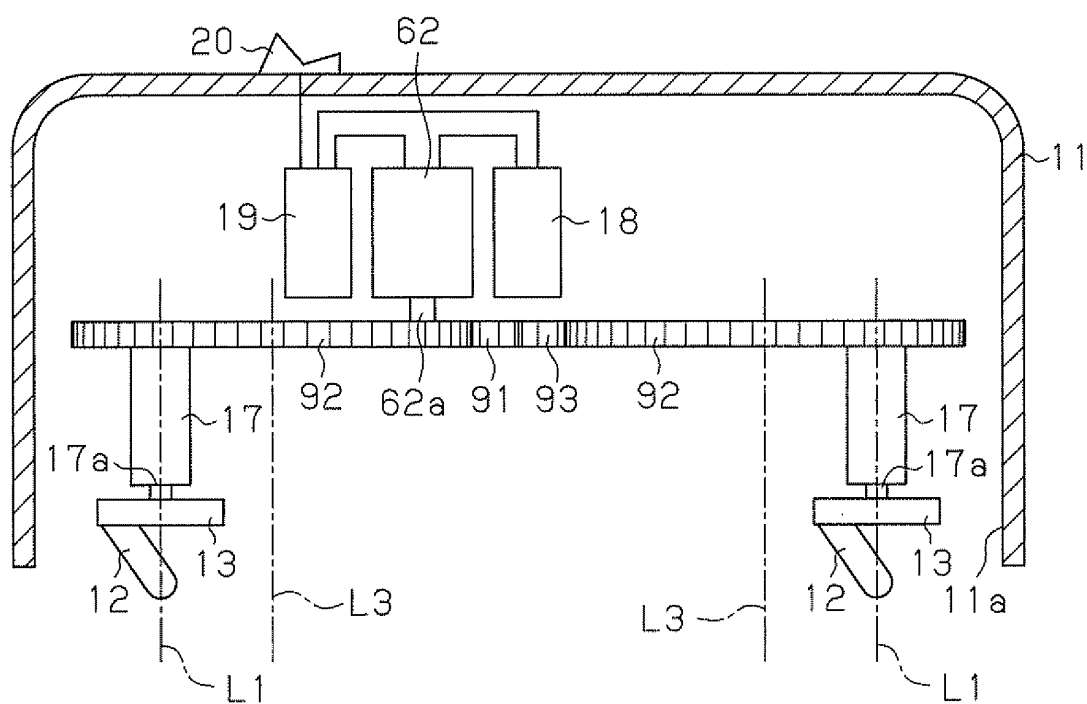


Fig.16(b)

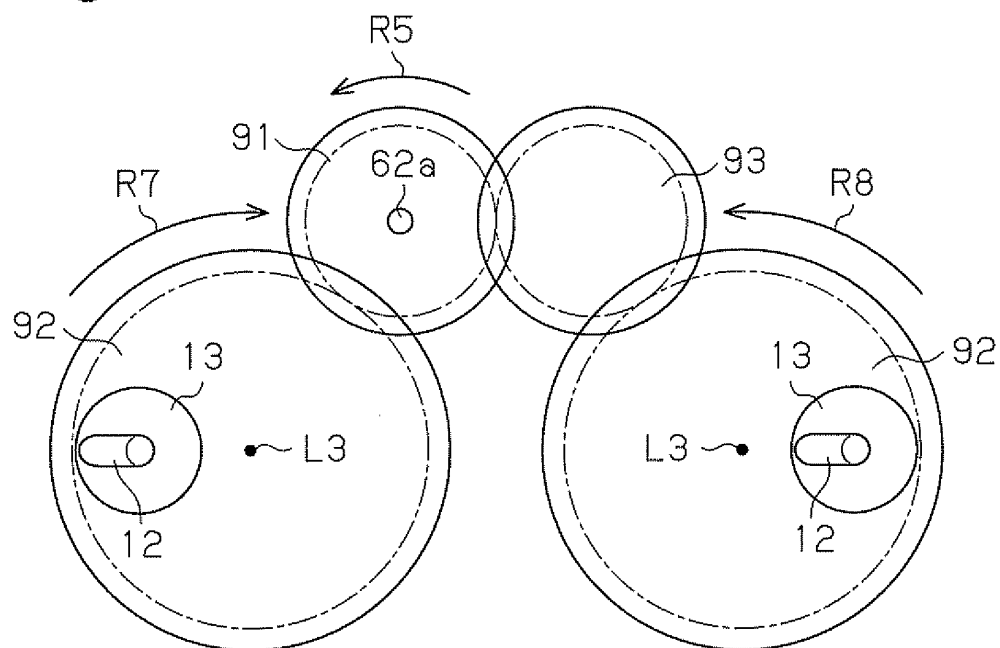
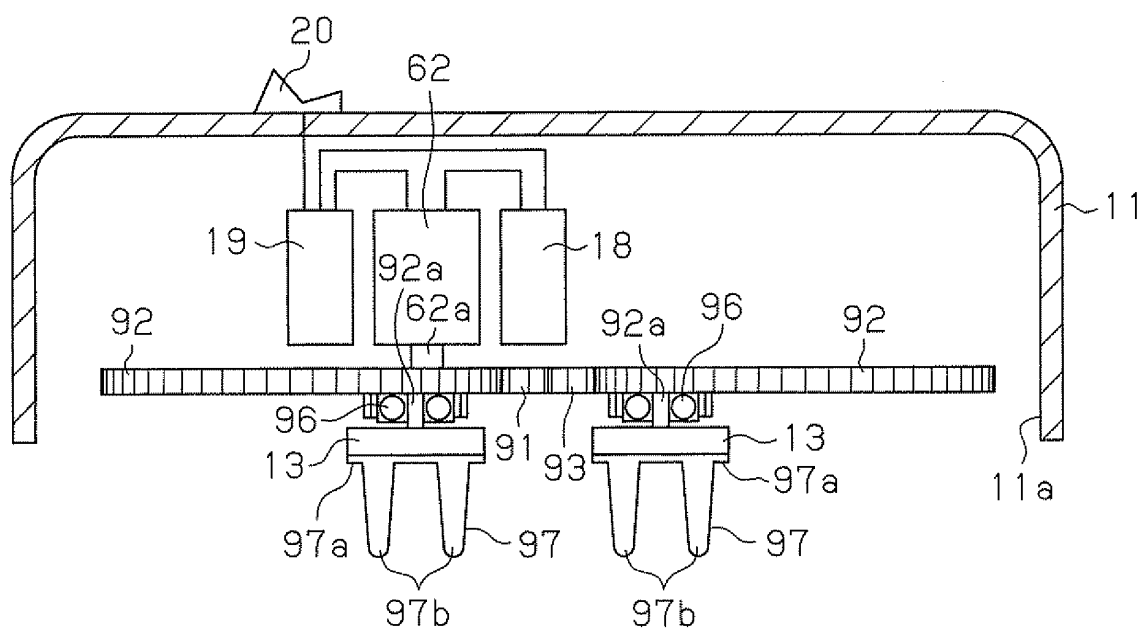
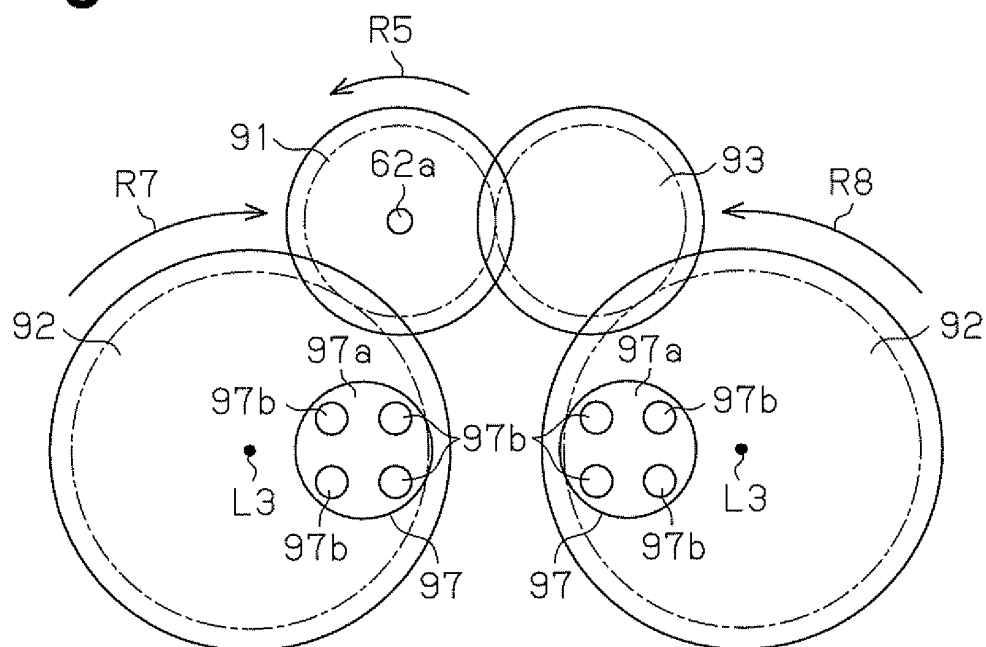


Fig.17 (a)**Fig.17 (b)**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/056752

A. CLASSIFICATION OF SUBJECT MATTER

A61H7/00(2006.01) i, A61H23/02(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)

A61H7/00, A61H23/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 60-227758 A (Matsushita Electric Works, Ltd.), 13 November 1985 (13.11.1985), page 2, lower left column, 9th line from the bottom to page 4, upper left column, line 11; fig. 1 to 7 (Family: none)	1, 3
Y	JP 2006-94906 A (Toshiba Tec Corp.), 13 April 2006 (13.04.2006), claim 1; paragraphs [0013], [0018], [0024]; fig. 2 (Family: none)	1-2, 4-8, 10, 12-13
A		9, 11

☒ 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

"I" 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
12 July, 2010 (12.07.10)Date of mailing of the international search report
20 July, 2010 (20.07.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/056752

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 4-341266 A (Yukio YOSHIDA), 27 November 1992 (27.11.1992), paragraph [0008]; fig. 1 to 4 (Family: none)	1-2, 4-8, 10, 12-15 9, 11
Y	JP 2-32287 Y2 (Kabushiki Kaisha Teranishi Denki Seisakusho), 03 September 1990 (03.09.1990), column 2, lines 8 to 13; fig. 1 (Family: none)	2, 7-8, 10, 15
Y A	JP 2007-209404 A (Matsushita Electric Works, Ltd.), 23 August 2007 (23.08.2007), paragraphs [0028] to [0029]; fig. 9 to 10 (Family: none)	1, 4-5, 12-14 9, 11
Y A	JP 4046064 B2 (Matsushita Electric Works, Ltd.), 13 February 2008 (13.02.2008), paragraphs [0036] to [0037]; fig. 6 to 7 (Family: none)	7-8, 10, 15 9, 11
Y A	JP 2003-305098 A (Family Co., Ltd.), 28 October 2003 (28.10.2003), paragraphs [0002], [0006], [0008]; fig. 1 to 7 (Family: none)	7-8, 10, 15 9, 11
Y	JP 56-18103 Y2 (Matsushita Electric Works, Ltd.), 27 April 1981 (27.04.1981), column 1, line 25 to column 2, line 28; fig. 1 to 3 (Family: none)	1, 5, 14
A	JP 3347143 B2 (Daito Electric Machine Industry Co., Ltd.), 20 November 2002 (20.11.2002), claim 1; fig. 2 to 3 (Family: none)	9, 11
A	JP 61-33653 A (Matsushita Electric Works, Ltd.), 17 February 1986 (17.02.1986), page 3, lower left column, line 10 to lower right column, line 5; fig. 1, 9 (Family: none)	11

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/056752

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/056752

Continuation of Box No.III of continuation of first sheet(2)

In document 1 (JP 60-227758 A (Matsushita Electric Works, Ltd.)), 13 November 1985 (13.11.1985), there are described (9th line from the bottom of lower left column, page 2 to line 11, upper left column, page 4, fig. 1-7): a head massage machine (or a scalp caring machine) comprising a massage element (or a treatment element) for treating a scalp in contact, a motor 3 (or a first rotation drive unit) for driving the massage element rotationally, and a timer for stopping the motor 3 after a predetermined time period (or a control unit for controlling to change the action mode on the rotation drive of the treatment element); and a head massage machine further comprising an eccentric pin 8 (a first support member) having the massage element mounted thereon and rotated by the motor 3, wherein the timer (or the control unit) stops (or controls) the motor 3 after a predetermined time period, thereby to stop the eccentric pin 8 (or to switch the rotation speed). Hence, the inventions of claims 1 and 3 are not admitted to involve any novelty to and any special technical feature over the invention disclosed in document 1. Therefore, it is admitted that the claims contain the four inventions (or groups) which have the following individual special technical features, if the special technical features are judged with respect to the claims dependent on claim 1.

Here, the inventions of claims 1 and 3 having no special technical feature are grouped into invention 1.

(Invention 1) Invention of claims 1-3, 7-11 and 15

A scalp caring machine comprising a treatment element for treating a scalp in contact, a first rotation drive unit for driving the treatment element rotationally, and a control unit for controlling to change the action mode on the rotation drive of the treatment element, further comprising a first support member supporting the treatment element and rotated by the first rotation drive unit, wherein the control unit controls the first rotation drive unit thereby to switch the rotation direction of the first support member.

(Invention 2) Invention of claims 4 and 12-13

A scalp caring machine comprising a treatment element for treating a scalp in contact, a first rotation drive unit for driving the treatment element rotationally, and a control unit for controlling to change the action mode on the rotation drive of the treatment element, further comprising a first support member supporting the treatment element and rotated by said first rotation drive unit, and a first radius adjusting mechanism for changing the rotational locus line of the base end of the treatment element, wherein the control unit controls the first radius adjusting mechanism thereby to change the rotation locus line of the base end in the treatment element.

(Invention 3) Invention of claims 5 and 14

A scalp caring machine comprising a treatment element for treating a scalp in contact, a first rotation drive unit for driving the treatment element rotationally, and a control unit for controlling to change the action mode on the rotation drive of the treatment element, further comprising a first support member supporting the treatment element and rotated by said first rotation drive unit, and a swing mechanism for swinging the first support member, wherein the control unit controls the swing mechanism thereby to swing the first support member.

(Continued to next extra sheet)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/056752

(Invention 4) Invention of claim 6

A scalp caring machine comprising a treatment element for treating a scalp in contact, a first rotation drive unit for driving the treatment element rotationally, and a control unit for controlling to change the action mode on the rotation drive of the treatment element, further comprising a first support member supporting the treatment element and rotated by said first rotation drive unit, and a protrusion adjusting mechanism for changing the protrusion of the treatment element, wherein the control unit controls the protrusion adjusting mechanism thereby to change the protrusion of the treatment element.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 200525478 A [0004]