

MASSAGE HEAD AND MASSAGE APPARATUS USING SUCH A HEAD

FIELD OF THE INVENTION

5 The present invention relates to an advanced massage head, generally intended for mobilizing the skin tissue.

It also relates to a massage apparatus using such a head.

10 The object of the present invention mainly is to enable to multiply the possible actions of such a massage head according to the result desired by the practitioner. To achieve this, the massage head according to the invention comprises two modules capable of being reversibly fastened to each other, each of the modules integrating a functional element.

15 **BACKGROUND**

Different massaging techniques are known, their implementation depending on the treatments to be performed. Generally, such techniques aim at exerting on the patient's skin actions using pressure and/or pinching phenomena on skin tissue.

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A large number of devices have been provided to make the practitioner's action easier. Among such devices, the use of devices using a simple mechanical action, for example, by means of assemblies comprises balls assembled on a support casing, possibly enabling to distribute or to simultaneously apply a treatment product of cream or gel type such as for example described
25 in document FR A 1 225 094, have first been provided.

It has also been provided to replace this mechanical treatment with a treatment of suction of the patient's skin. To achieve this, the concerned massaging apparatuses use a treatment head connected to a suction circuit, said treatment head being formed of a casing defining an internal
30 chamber having the suction circuit emerging into it. When the massage head is applied against the patient's body, and due to the suction generated by the suction circuit, a skinfold forms within the internal chamber. The mechanical action may be exerted by rollers or balls which enable to exert, simultaneously to the suction on the patient's body, a pressure and/or displacement and/or friction action, particularly by vibrations.

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Massage apparatuses capable of simply reproducing subdermal-tissue-type massages, that is, exerting a continuous action on the patient, causing not only a local pinching of the skin tissue, but also a progressive displacement of the pinched area to cause a rolling of said skinfold and, this, while exerting a pressure (see, for example, EP-A-0 224 422), have already been provided.

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The apparatuses described, for example, in this document, comprise a manually-actuatable casing having two parallel rollers, assembled to freely rotate or positively rotated within the casing, assembled therein. The rollers may be assembled on the casing with a fixed center-to-center distance, or are conversely capable of automatically moving away and coming closer to each other during the massage operation, said casing being itself connected to suctions means enabling to create a depression between said rollers when the head provided between these different elements is applied against the patient's body, to form a skinfold bearing against the roller surface.

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In document EP 0 917 452, it has been provided to replace the rollers with two partition walls placed inside of the casing, hinged inside thereof to be able to have a pivoting motion. Said casing is, here again, connected to a suction source. Under the action of the suction, a skinfold is created, which inserts between the two partition walls inside of the casing. Due to the progress in one direction or the other of the massage head fitted with such a device against the patient's skin, the skinfold thus formed is submitted to a jerky pinching.

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In the absence of action, the two partition walls are maintained spaced apart from each other, for example, by means of springs or of magnets, the pivoting of said partition walls and thus their coming together resulting from the effect of vacuum and/or of the depression generated inside of the casing.

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These different devices provide quite satisfactory results. However, usage demonstrates that they do not enable, as such, to have the entire equipment necessary for the different treatments that a practitioner may wish to apply to a patient. Indeed, either such devices comprise two motor-driven or freely-rotating rollers, with a fixed center-to-center distance or capable of drawing away or of coming closer to each other, or partition walls or flaps carrying out a massaging-pinching action, but none of them enables to simultaneously obtain a subdermal tissue massaging action with a massaging-pinching action, unless the massage heads are interchanged, which thus requires having a plurality of such heads.

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The present invention thus aims at optimizing the possible treatment types, and particularly at

providing a hybrid head to meet this need.

BRIEF DESCRIPTION OF THE INVENTION

5 For this purpose, the present invention aims at a massage head comprising a casing forming an internal chamber defined by a back wall, two lateral walls, and two transverse walls, and open on its surface opposite to the back wall, and where a skinfold is formed when the head is applied to a patient's skin.

10 According to the invention, the massage head is formed of two modules fitted with means capable of enabling them to be reversibly fastened to each other, each of said modules integrating a functional element, defining one of the transverse walls of the internal chamber.

15 In other words, the invention comprises providing a massage head formed of two independent modules, their association with each other defining the internal chamber within which the skinfold is formed, and providing each of the modules with an identical or different functional element, thus capable of optimizing the carrying out of the treatment on the patient's skin.

20 According to the invention, one at least of the functional elements fitting each of the modules is active. "Active" means that said element is animated by a movement, either pivoting or rotating, and is in the case in point either a flap, or a roller.

25 When it is a flap, it may be motor-driven, said flap being hinged in the vicinity of its upper end on the lateral walls of the module and its pivoting movement is obtained by means of a geared reducer fixedly assembled within said flap, and having its output shaft rotating a cam, received in a cam race fastened to one of said lateral walls of the module.

30 When it is a roller, it is motor-driven, that is, the roller is positively rotated, the rotation being here again obtained by means of a geared motor fixedly assembled inside of the roller and having its output shaft comprising means of coupling to said roller.

According to the invention, one of the functional elements may be a fixed flap or wall, in that it has not pivoting movement within the module, and thus within the internal chamber that it defines when it is fastened to another module.

- 5 According to the invention, one of the functional elements may be made of a roller simply assembled to freely rotate, with a fixed center-to-center distance.

According to an advantageous feature of the invention, said modules define, when they are reversibly fastened to each other, the back wall of the internal chamber and form an opening
10 into which a suction circuit, connected to the massage apparatus having the massage head of the invention assembled thereon, emerges.

The invention also relates to a massage device using a massage head according to the foregoing description, comprising an electric power source capable of actuating the functional elements
15 when they are active, and advantageously comprising a vacuum or depression source associated with the massage head and emerging into it.

BRIEF DESCRIPTION OF THE DRAWINGS

- 20 The way in which the invention may be implemented and the resulting advantages will better appear from the following non-limiting embodiments, in relation with the accompanying drawings.

Figures 1 to 5 schematically illustrate the general principle underlying the present invention.
25 Figures 6 and 7 are simplified sagittal section views of a first embodiment of the massage head according to the invention using motor-driven flaps, respectively at rest and in action.

Figures 8 and 9 are simplified sagittal section views of a second embodiment of the massage head according to the invention using respectively a motor-driven flap and a fixed wall, respectively in static position and in active position.

- 30 Figures 10 and 11 are simplified sagittal section views of a third embodiment of the invention using, on the one hand, a motor-driven flap and, on the other hand, a motor-driven roller, respectively in static position and in operating position.

Figures 12 and 13 are simplified sagittal section views of a fourth embodiment of the massage head according to the invention using two motor-driven rollers, respectively in static and
35 functional position.

Figures 14 and 15 are simplified sagittal section views of a fifth embodiment of the massage head according to the invention using two motor-driven rollers, one of which is hinged.

Figures 16 and 17 are simplified sagittal section views of a sixth embodiment of the massage head according to the invention using two hinged motor-driven rollers.

5 Figures 18 to 21 schematically illustrate a motor-driven flap, such as used by the present invention.

Figures 22 to 25 schematically illustrate a motor-driven roller, such as used by the present invention, and respectively showing exploded perspective views showing the general structure of a motor-driven roller usable to form a massage head according to the invention, an end view
10 of such a massage roller, and a cross-section view along plane AA crossing the rotation shaft of said roller lengthwise.

DETAILED DESCRIPTION OF THE INVENTION

15 Figures 1 to 5 illustrate the general principle of the present invention. In the case in point, they describe a massage head **1** formed of two modules **50, 51**, substantially symmetrical to each other with respect to a median plane, to within the functional element integrated in each of the modules.

20 To ensure such a reversible fastening of a module **50, 51** with the other, each of them has, at the level of its front surface **4**, protruding members or lugs **6, 7** and recessed members **5, 8** intended to cooperate two-by-two with one another.

Further, each module **50, 51** is provided with a locking device or flap **2, 3**, hinged in the vicinity
25 of the upper end of said modules. Each of the locking devices or flaps is itself provided with two tabs **9**, capable of snapping into a housing or locking area **40** provided for this purpose at the level of base **41** of upper portion **42** of the massage head (see Figure 3).

When the two modules **50, 51** are desired to be assembled together, according to the nature of
30 the functional element (see below) integrated in each of them, the lugs **7** fitting each of them are inserted into the corresponding housing **8** (Figure 2), after which the two front surfaces **4** of the two modules are pressed against each other (Figure 3), the alignment lugs **6** of each of said modules lodging themselves into the corresponding recess **5**.

Said front surfaces **4** being provided with a sealing gasket **44**, this provides some tightness in the internal chamber defined by the assembly of the two modules together.

Base **41** of upper portion **42** of the massage head is then positioned on the upper surface defined by the two upper surfaces of the modules thus assembled. Said base **41** is locked on the modules thus assembled, by pivoting and locking of locking flaps or hoods **2, 3** in locking areas **40** of base **41** (Figures 4 et 5). The lower surface of base **41** is provided with a sealing gasket **45**, which positions at the periphery of opening **52** defined by recesses **46** formed at the level of the upper surfaces of the modules when they are assembled together. This opening is intended to enable to place the internal chamber defined by said modules under a low pressure, by connection with a depression source relayed by a pipe **47** fitting the upper portion of the massage chamber, said depression source being integrated in the massage device using this massage head.

The depression source is capable of generating a suction within the internal chamber thus defined when the massage head is applied to a patient's skin.

Thus, when the two modules are assembled, they form an internal chamber of the massage head according to the invention. The internal chamber is defined by two lateral walls, two transverse walls, and a back wall. The surface opposite to the back wall is open, and is meant to come into contact with a patient's skin.

According to the invention, each of the modules integrates an active or passive functional element.

This functional element actually forms one of the transverse walls of the internal chamber. In the case in point, the functional element may be formed:

- of a flap, fixed **53** or motor-driven **10**;
- of a roller formed at the lower end of a transverse wall, said roller being freely rotating or motor-driven **100**.

Thereby, it becomes possible to form all sorts of possible configurations of the massage head.

Figures 6 and 7 show a first embodiment of the invention where each of the two modules **50**, **51** uses a motor-driven flap **10**. This flap will be described in further detail hereafter. The flap has a swivel axis **14** formed substantially in the vicinity of the back wall of the internal chamber, said axis being parallel to the back wall of the internal chamber. The swiveling provides a tangential mechanization of the skin tissue, and may further be coupled with a vertical stimulation of said tissue due to the suction thereof into the internal chamber, when the massage head is connected to a depression source, the suction being shown by the upward arrow in Figure 7.

According to a second embodiment of the invention shown in relation with Figures 8 and 9, one of the functional elements is a motor-driven flap **10**, and the other is simply a fixed flap or wall **53**. This also provides a tangential mechanization of the skin. However, the use of such a wall enables to precisely target the skin tissue area to be mobilized, for example, the edge of a scar, the fixed wall being then positioned at the level of the area that the practitioner does not wish to mobilize.

In this embodiment, such a tangential mechanization may also be accompanied by a vertical stimulation in relation with the suction when the massage head is connected to a depression source, as described in relation with Figure 3.

A third embodiment of the invention has been shown in relation with Figures 10 and 11, where the first functional element here again is a motor-driven flap **10**, and the second functional element is a fixed motor-driven roller **100**, that is, having a rotation axis which is not likely to vary, said roller being assembled at the lower end of a wall **54**.

Thus, as shown in Figure 11, in functional mode, a tangential mechanization is carried out while simultaneously ensuring the forming of the skinfold and promoting the displacement of the massage head on the patient's skin due to the rotation of motor-driven roller **100**, the latter coming into contact with the patient's skin. Here again, this double action may be accompanied by a vertical stimulation by the depression created in the internal chamber of the massage head when it is connected to a depression source.

A fourth embodiment of this technology has been shown in relation with Figures 12 and 13. In this embodiment, the functional elements both are a fixed motor-driven roller **100**, that is, as reminded hereabove, having a fixed rotation axis with respect to the internal chamber of the massage head. Figure 13 shows the functional elements in motion, and particularly the rotation of the two motor-driven rollers **100** which promote the forming of the skinfold and the displacement of the massage head when the latter is in contact with the patient's skin. Here again, it is possible to optimize the vertical stimulation by the creating of a depression within the internal massage chamber when it is connected to a depression source.

Although the described example illustrates the rotation of two rollers in the same direction, it is quite possible for said rollers to also rotate in the same direction, but the opposite way around, or even for both rollers to have antagonistic rotations. Actually, and since each of the rollers has an independent motorization, allowing a different rotation speed of said rollers with respect to each other, all sorts of possible skin treatments may be carried out, including in-depth tissue mobilization, in addition to the possibility of treating fragile or severely damaged skins (persons burned to the third degree), by providing a controlled management of the forming of the skinfold in combination with a mild suction.

The following treatments can thus be carried out:

- so-called "*peeling*" treatments, promoting skin exfoliation operations (the two rollers then rotate the opposite way around),
- skin "*stretching*" treatments (the two rollers rotate the same way around and tend to oppose the forming of the skinfold);
- amplified skin exercise treatments (the two rollers rotate the same way around, but with different rotation speeds, the upstream roller rotating with a greater rotation speed than the downstream roller).

A fifth embodiment of the invention has been shown in relation with Figures 14 and 15, where:

- the first functional element is formed of a mobile motor-driven roller, that is, assembled at the lower end of a wall **55**, the latter being capable of pivoting around a swivel axis **57** formed in the vicinity of the bottom of said internal chamber and parallel to said bottom, and
- the second functional element is a fixed motor-driven roller **100**.

The pivoting of the mobile motor-driven roller occurs only due to the depression generated within the internal chamber. The wall having said roller mounted at its end is provided at the level of its swivel axis with a spring **56**, generating, by default, that is, in the absence of suction, the returning of said wall to its initial position, such as shown in Figure 14, where it extends substantially perpendicularly to the back wall of the internal chamber.

In this embodiment, in operation, in addition to the skinfold forming, the tangential stimulation is provided simultaneously to the displacement of the massage head on the patient's skin. At the same time, a vertical stimulation is exerted when the depression is created within the internal chamber.

Finally, a sixth embodiment of the invention where the functional elements are both formed of a mobile motor-driven roller enabling to carry out the so-called subdermal massage technique has been shown in relation avec Figures 16 and 17.

Motor-driven flap **10** implemented in the first three above-described embodiments will be briefly described in relation with Figures 18 to 21, it being reminded that the massage head using such a flap is the object of a patent application filed at the same time as the present application.

Thus, flap **10** is hinged in the vicinity of its upper end on lateral walls **12** and **13** defining the massage head, in the case in point belonging to the modules. To achieve this, flap **10** comprises a swivel axis **14**, having its two ends received in a housing **15** formed at the level of each of the two lateral walls **12** and **13**.

Flap **10** has a height substantially corresponding to that of the internal chamber defined by the massage head. It however slightly protrudes beyond the lower end of the lateral walls to optimize the pinching action.

Flap **10** has a rounded lower edge **16**, advantageously coated with a material capable of optimizing the friction and, as a corollary, the pinching action when the massage head is in contact with the patient's skin.

Lateral walls **12** and **13** have an internal volume enabling to receive, in particular, a cam race as illustrated in Figures 19 and 20. This volume is closed by a plate **17** (see Figure 19) to protect the elements contained in said volumes.

Figure 20 shows an exploded view of flap **10**. It has a race-track shaped transverse cross-section. The volume thus defined receives a motor **20** actuating a gear reducer **21**, reference **22** designating the output shaft of reducer **21**. Actually, the couple formed of motor **20** and reducer **21** is fastened to a lateral plate **23**, for example secured by means of screws **24** to one of the walls of flap **10**. Another plate **25** closes the other wall of the flap, also fastened thereto by means of screws **26**.

Figure 19 shows a first view of lateral wall **12** integrating mechanical elements capable of allowing, in cooperation with geared motor **20, 21**, the pivoting of flap **10**. More specifically, Figure 19 shows a cam race **30** here formed of a rectilinear port **31**.

Figure 20 more specifically shows the different mechanical elements allowing the pivoting of said flap **10**. Thus, output shaft **22** of reducer **21**, in the case in point having a triangular cross-section, is received in an opening of matching shape **33** formed within a cam **32**. Cam **32** is actually formed of two cylinders, respectively **34** and **36**, separated from each other by a linear portion.

Cylinder **36** cooperates with previously-described rectilinear port **31**.

It should thus be understood that when reducer **21**, actuated by motor **20**, rotates output shaft **22**, it generates the rotation of cam **32**. Due to the cooperation thereof with cam race **31**, the rotation of cam **32** causes the relative displacement of the lower end of flap **10**, in the form of a pivoting thereof around its swivel axis **14**. This thus ensures the mobilizing of flap **10** which pivots around its swivel axis **14** in motor-driven fashion.

As a corollary, the electric power supply of motor **20** is provided by means of an electronic board, advantageously integrated in the volume defined by lateral wall **13**. This power supply may however be achieved by any known means.

The motor-driven roller described hereabove in relation with Figures 22 to 25 is described in document EP 1 286 642. Mostly, the positive rotating of the roller is obtained via a geared reducer fixedly assembled within said roller and having its output shaft comprising means of coupling to said roller.

The roller designated with general reference numeral **100** is essentially formed of a cylindrical sleeve **102**, which forms the active element in contact with the patient to be treated. The diameter and the length of cylindrical sleeve **102** are a function of the type of apparatus which is desired to be formed.

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As an indication, sleeve **102** may have an outer diameter in the range from 20 to 30 millimeters for a length which may be in the range from 60 to 70 millimeters.

Of course, it may be envisaged to form rollers having smaller or greater dimensions, and this, according to the surface of the areas to be treated. It may be envisaged to have rollers of different diameters, or even to form apparatuses comprising more than two rollers, for example, a central motor-driven roller having two rollers of smaller diameter or of equal diameter arranged on either side thereof, to form two skinfolds.

Sleeve **102** may have a smooth external surface or, on the contrary, have a surface which may exhibit asperities or a relief according to the treatments to be performed.

Such a sleeve may be covered with a removable sheath, having a hygienic function and/or used as a support for a treatment product.

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The rotating of sleeve **102** is obtained via a motor **103** – reducer **104**, fixedly assembled coaxially inside of said sleeve **102**.

A conventional geared motor, powered with low-voltage D.C. current, 6 volts, for example, or also a brushless motor provided with an encoder to make the rotation speed control more accurate, may be used as a geared motor.

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Output shaft **105** of the geared motor supports means of coupling with said sleeve **102**, which means are formed of a disk or plate **106** fastened to shaft **105**, the fastening being for example obtained by gluing. Disk **106** comprises two diametrically opposite lugs **107**, **108**, which lugs fit into corresponding recesses **109** (a single one being shown in Figure 22), formed in an internal ring **110** of sleeve **102**.

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Accordingly, when geared motor **103**, **104** is powered, output shaft **105** rotates disk **106**, which, in turn, rotates sleeve **102**.

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The rotating of sleeve **102** around the geared motor assembly is obtained by mounting it on roller bearings **111a, 111b, 111c**.

Roller bearings **111a, 111b** are assembled on either side of the geared motor on fixed bearings **113, 114**. To ensure the insulation, geared motor assembly **103, 104** is surrounded with a tube **112**, for example, made of aluminum, rigidly attached to the motor body **103**. The end bearing **113** is in this case formed by a seating formed at the end of tube **112**, said tube thus forming not only an insulating cage, but being used as a support for end peripheral roller bearing **111a**.

Roller bearing **111b** is mounted on a bearing **114** formed by a flange fixed via screws **115** to the casing of reducer **104**, thus immobilizing the latter and allowing the passage of shaft **105** of the reducer.

Finally, third roller bearing **111c** is mounted against internal ring **110** of driving plate **106** supporting studs **107, 108**, and this, via a fixed bearing **116**.

Such a design provides an assembly having its end surfaces comprising no raised element, the outermost edges of sleeve **102**, which thus appear in the form of a smooth planar ring, being capable of coming in sliding bearing relation against the internal surfaces of the lateral walls of the internal chamber of the massage head.

According to the invention, the fastening of the roller between the lateral walls of the chamber is obtained via removable connection blocks, designated with general reference numerals **117, 118**. Each block comprises a proper connection guide **119, 120**, of oblong shape, capable of passing through ports **121, 122** provided on each lateral wall to fit into complementary areas provided at each end of bearings **113, 116** of roller **100**.

Each bearing connection guide **119, 120** is associated, for example, via screws, with two blocks **151, 152** bearing against outer surface **123, 124** of each lateral wall **P1, P2**.

Block **118** is secured by means of two screws **V1** arranged on either side of the rotation shaft and, for block **119**, via a single screw **V2** secured in the rotation shaft.

Block **117** supports electric connections **125** to connection tabs **126** provided on the motor, as well as to the additional means enabling to control the different functions provided by the apparatus, that is, particularly:

- setting the speed and the rotation direction of the motor-driven roller;
- 5 - periodically and temporarily inverting the rotation direction of the roller;
- controlling the pressure exerted by the roller against the formed skinfold.

Electric connections **125** are connected to the general control circuit by means of flexible connections capable of following the possible displacements that the roller can receive.

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The advantages of the present invention in terms of modularity, on the one hand, and of multiplicity of the treatments capable of being applied to a patient's skin, on the other hand have thus been demonstrated. These advantages are further enhanced by the very simple character of the modularity of the massage head according to the invention, which enables the practitioner to choose the tool that he/she intends to use by simple change of modules instead of the multiplicity of massage heads which had to be available to date.

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This results in a simplicity of use and in a cost reduction.

CLAIMS

1. A massage head comprising a casing forming an internal chamber defined by a back wall, two lateral walls, and two transverse walls, and open on its surface opposite to the back wall, and having a skinfold formed therein when the head is applied to a patient's skin,
5 ***characterized in that:***
 - it is formed of two modules (50, 51) fitted with means capable of enabling to reversibly fasten them to each other,
 - each of said modules (50, 51) integrates a functional element (10, 53, 54, 55, 100), defining one of the transverse walls of the internal chamber.
- 10 2. The massage head of claim 1, ***characterized in that*** at least one of the functional elements fitting each of the modules is active.
- 15 3. The massage head of claim 2, ***characterized in that*** the functional element is a flap (10), said flap being hinged in the vicinity of its upper end on the lateral walls fitting the module and its pivoting movement being obtained by means of a geared motor (20, 21) fixedly assembled within said flap, and having its output shaft (22) rotating a cam (32), received in a cam race (31) fastened to one of said lateral walls of the module.
- 20 4. The massage head of claim 2, ***characterized in that*** the functional element is a motor-driven roller (100), positively rotated, the rotating being obtained by means of a geared motor (103, 104) fixedly assembled inside of the roller, and having its output shaft (105) comprising means of coupling to said roller.
- 25 5. The massage head of any of claims 1 to 4, ***characterized in that*** one of the functional elements is a fixed flap or wall (53).
- 30 6. The massage head of any of claims 1 to 5, ***characterized in that*** one of the functional elements is formed of a roller simply assembly to freely rotate, with a fixed center-to-center distance.
- 35 7. The massage head of any of claims 1 to 6, ***characterized in that*** said modules define, when they are reversibly fastened to each other, the back wall of the internal chamber and form an opening (52) into which a suction circuit, connected to the massage device having the massage head assembled thereon, emerges.

8. A massage device using the massage head of any of claims 2 to 7, and comprising an electric power source capable of actuating a geared motor of at least one of the functional elements.
- 5 9. The massage device of claim 8, ***characterized in that*** it comprises a vacuum or depression source associated with the massage head, and emerging into it.