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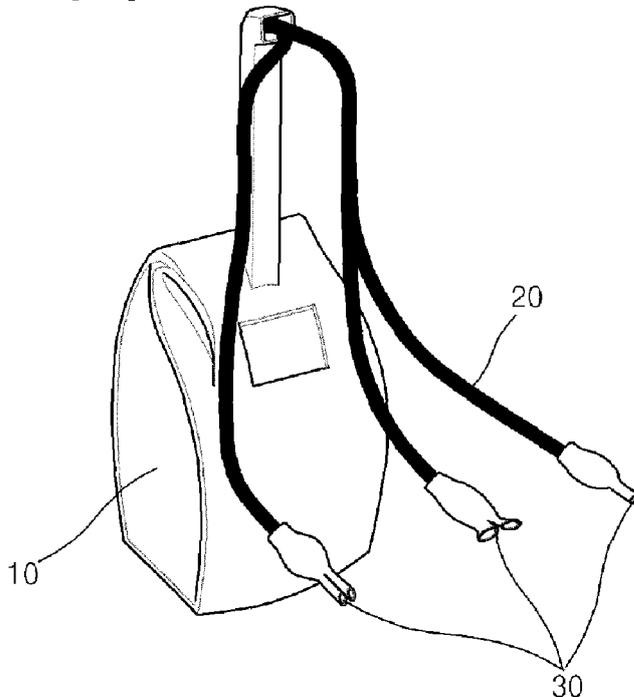
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(54) Title: NON-CONTACT APPARATUS WITH PAIN MANAGEMENT AND CORRECTING BODY SHAPE

[Fig. 1]



(57) Abstract: A non-contact apparatus for pain management and body reshaping is provided. The non-contact apparatus may apply electrical stimulation by spraying air pressure in a non-contact manner, thereby providing finger-pressure and massage effects on a skin, and stimulating touch receptors to activate the skin. Particularly, the non-contact electrical stimulation may promote the ion transmission of nerve potentials while preventing changes in a threshold value of currents on a human body. Moreover, the non-contact apparatus may improve the convenience of use for easy relief of muscle pain, body shaping and obesity treatment while allowing activating or delaying of the production of acetylcholine.

## Description

### Title of Invention: NON-CONTACT APPARATUS WITH PAIN MANAGEMENT AND CORRECTING BODY SHAPE

#### Technical Field

- [1] The following description relates to a non-contact apparatus for pain management and body reshaping, and more particularly, to a non-contact apparatus which provides finger pressure and massage effects by air-pressure emitted from a number of spraying tubes and activates the skin by stimulating touch receptors with the air-pressure, and thereafter promotes transmission of ions of nerve potentials by means of contactless electrical stimulation in order to avoid changes in a threshold value of currents such that effects of both muscle pain relief and body reshaping can be achieved.

#### Background Art

- [2] As an increase in the standards of living and the development of the Internet have dramatically changed the working environment in modern industrial society, physical activities have declined and thus lack of exercise has arisen as a serious concern. Accordingly, physical strength is decreased compared with the past, so that the incidence of diseases is increased, and it is obesity that is one of the most common diseases found in such industrialized society.
- [3] Obesity is a condition in which an individual has an excess amount of body fat in relation to muscle tissues and thus is overweight based on body mass index (BMI). Obesity becomes the most significant cause of adult diseases, and is therefore considered as one of the most serious public health problems.
- [4] In most conventional methods for treating obesity, patients are examined to figure out the health problems, and based on the examination, exercise, diet, liposuction, and the like are prescribed as treatment.
- [5] Moreover, with the economic growth, the quality of living rises, which leads to an increase in free time for leisure activities.
- [6] Therefore, many individuals utilize their free time for personal hobbies and interests, and sports are one of the most popular activities.
- [7] However, while performing sport as a physical activity, injury is likely to occur even by a small mistake. Thus during playing sport for a leisure time, people often experience slight or severe injuries, which usually result in pain.
- [8] To treat such pain from injury, patients get treatment by medical centers or sport rehabilitation facilities.
- [9] Exercise therapy is one of the most common treatment methods for obesity and pain management. In exercise therapy, generally a practitioner examines the state of a

patient and simply delivers suitable exercise prescription verbally or as a written form.

[10] Hence, various types of devices for pain management and body contour reshaping have been developed for use by anyone who is involved in treatment, and such devices typically use low-frequency and high-frequency waves.

[11] The conventional devices using low-frequency waves and high-frequency waves have electrode paddles to be in direct contact with the skin of a patient. The direct contact of the electrode paddle may cause burn injury, muscle rupture, and skin tissue damage due to excessive flow of currents to the human body by overuse, missing operation, or malfunction of the devices. Additionally, there may be a serious side effect such as electric shock to the human body due to high currents.

[12] Furthermore, the conventional devices for pain management and body contour reshaping using low-frequency and high-frequency waves lead to changes in a threshold value of currents on the human body, and thus cannot provide a function of activating the human body by diverse stimulation methods such as stimulation on neuromuscular activities or stimulation on touch receptors.

## **Disclosure of Invention**

### **Technical Problem**

[13] The following description relates to a non-contact apparatus for pain management and body reshaping by spraying air pressure, which provides finger-pressure and massage effects on the skin and activates the skin by stimulating touch receptors. In particular, contactless electrical stimulation may promote ion transmission of nerve potentials, thereby avoiding changes in a threshold value of currents on the human body. Moreover, the contactless electrical stimulation may activate or delay the production of acetylcholine while achieving simultaneously pain relief, body reshaping, and obesity treatment.

### **Solution to Problem**

[14] In one general aspect, there is provided a non-contact apparatus for pain management and body reshaping including: a body; a plurality of spraying tubes each configured to extend from the body to a predefined length; a blower configured to be included in the body, and to discharge air at a predefined pressure through the spraying tubes so as to activate a skin by stimulating touch receptors and provide finger-pressure and massage effects to a human body; an ionizer configured to, when the air is discharged at the predefined pressure by the blower, apply electrical stimulation to the skin by sequentially applying positive (+) ions and negative (-) ions to a surface of the skin that is activated by the discharged air so as to promote ion transmission of nerve potentials while avoiding changes in a threshold value of currents on the human body; and a control module configured to control the blower and the ionizer.

- [15] The non-contact apparatus may further include a heater configured to heat up the air of the predefined pressure discharged from the blower to a predefined temperature.
- [16] The non-contact apparatus may further include a cooler configured to cool down the air of the predefined pressure discharged from the blower to a predefined temperature.
- [17] A plurality of the spraying tubes may have air nozzles respectively connected thereto, the air nozzles having different discharge-diameters.

[18]

### **Brief Description of Drawings**

- [19] FIG. 1 is an illustration of an example of a non-contact apparatus for pain management and body reshaping according to an exemplary embodiment of the present invention.
- [20] FIG. 2 is a block diagram of an example of the non-contact apparatus for pain management and body reshaping shown in the example illustrated in FIG. 1.
- [21] Throughout the drawings and the detailed description, unless otherwise described, the same drawing reference numerals will be understood to refer to the same elements, features, and structures. The relative size and depiction of these elements may be exaggerated for clarity, illustration, and convenience.

### **Mode for the Invention**

- [22] The following description is provided to assist the reader in gaining a comprehensive understanding of the methods, apparatuses, and/or systems described herein. Accordingly, various changes, modifications, and equivalents of the methods, apparatuses, and/or systems described herein will be suggested to those of ordinary skill in the art. Also, descriptions of well-known functions and constructions may be omitted for increased clarity and conciseness.
- [23] FIG. 1 is an illustration of an example of a non-contact apparatus for pain management and body reshaping according to an exemplary embodiment of the present invention, and FIG. 2 illustrates a block diagram of an example of the non-contact apparatus for pain management and body reshaping shown in the example illustrated in FIG. 1.
- [24] As shown in FIGS. 1 and 2, the apparatus may include a body 10, a spraying tube 20, an air nozzle 30, a blower 40, an ionizer 50, a hitter 60, a cooler 70, and a control module 80.
- [25] The body 10 has an inner space which accommodates both the vent 40 and the control module 80, and has a manipulation unit 100 on an outer surface.
- [26] The manipulation unit 100 may generate a signal for controlling the operation of the apparatus and output the signal to the control module 80. The manipulation unit 100 may be configured to include a plurality of operation keys 101 to turn on/off the

blower 40, the ionizer 50, the heater 60, and the cooler 70, and a power supply key 102.

[27] The spraying tube 20 is connected to the air nozzle 30, and extends from the body 10 to a predefined length. The spraying tube 20 may vary in length and angle such that the air nozzle 30 can be installed close to a human body.

[28] The apparatus may include a plurality of the spraying tubes 20 to eject air with various pressures to a number of parts of the human body, thereby maximizing finger-pressure and massage effects.

[29] The air nozzle 30 may be detachably connected to each of the spraying tubes 20. Thus, there may be a plurality of the air nozzles 30 that have the same or different diameters to cause thereby air pressures from the spraying tubes 20 to be the same or different from one another, and the diameters may vary depending on conditions of use.

[30] The blower 40 may be included in the body 10 and operate under control of the control module 80 to discharge air at a predefined pressure or to apply positively-ionized air and negatively-ionized air which are produced by the ionizer 50 to the human body in a non-contact manner such that a threshold value with respect to currents on the human body does not change.

[31] The ionizer 50 may be configured to apply electrical stimulation to skin of the user in a non-contact manner such that the positively-ionized air and the negatively-ionized air are sequentially applied to the surface of the skin that is activated by the discharged air and thus ion transmission of nerve potentials is promoted when the air nozzles 30 connected to the spraying tubes 20 discharge air at a predefined pressure. Accordingly, a change in a threshold value of currents on the human body does not occur.

[32] The heater 60 may be included in the body 10, and operate under control of the control module 80. In addition, the heater 60 may heat up the air discharged from the blower 40 at a predefined pressure so as to more activate the skin by stimulating touch receptors, as well as to maximize the finger-pressure and massage effects on the human body.

[33] The cooler 70 may be included in the body 10 and cool down the air discharged through the blower 40 to a predefined temperature under control of the control module 80 such that the air nozzles 30 can discharge cooled air.

[34] In this case, the cooler 70 is driven to provide finger-pressure and massage effects to the torso of the user and to stimulate the touch receptors.

[35] The control module 80 may be configured to turn on/off the blower 40, the ionizer 50, the heater 60, and the cooler 70 according to a manipulation signal from the manipulation unit 100.

[36] As shown in the examples illustrated in FIGS. 1 and 2, the apparatus for pain

management and body reshaping may generate an operation signal through the operation keys 101 while the power is supplied through the power supply key 102 in the manipulation unit 100 disposed on the body 10.

- [37] The operation signal generated from the operation keys 101 may be output to the control module 80, and the control module 80 preliminarily controls the operation of the blower 40, and accordingly the blower 40 ejects air at a predefined pressure, which is discharged to the outside through the spraying tubes 20 and the air nozzles 30.
- [38] The control module 80 may control the heater 60 and the ionizer 50. The heater 60 may heat up the air that is discharged at a predefined pressure through the spraying tubes 20, so that the air discharged to the outside is heated up to a predefined temperature and applied to the human body. Thus, by the air pressure at a predefined temperature, the human body may be primarily provided with finger-pressure and massage effects, and the skin may be activated by stimulating the touch receptors.
- [39] The finger-pressure and massage effects and the stimulation on the touch receptors by the heater 60 are provided to body parts except for a torso of the user, and if the finger-pressure and massage effects and the stimulation on touch receptors are to be provided to the torso, the cooler 70 is operated under control of the control module 80.
- [40] More specifically, while the air nozzles 30 are placed to face the torso of the user, the cooler 70 is driven under control of the control module 80. Accordingly, the air produced by the blower 40 is cooled down to a predefined temperature by the cooler 70, and then the cooled air is sprayed to the user's torso, thereby providing the finger-pressure and massage effects and stimulating the touch receptors of the torso.
- [41] While the skin is activated by the heated or cooled air pressure discharged from the blower 40, the ionizer 50 may apply positive (+) charges and negative (-) charges sequentially to the surface of the skin in a non-contact manner under control of the control module 80.
- [42] Consequently, the heated air at the predefined pressure may be changed into positively-ionized air and negatively ionized air by the positive (+) charges and the negative (-) charges applied on the surface of the skin. Thus, due to the positively ionized air and the negatively ionized air, ion transmission of nerve potentials is promoted without changes in a threshold value of currents on the human body, so that various effects such as activating or delaying of the production of acetylcholine can be obtained, as well as body reshaping, obesity treatment, and pain relief.
- [43] A number of examples have been described above. Nevertheless, it should be understood that various modifications may be made. For example, suitable results may be achieved if the described techniques are performed in a different order and/or if components in a described system, architecture, device, or circuit are combined in a different manner and/or replaced or supplemented by other components or their

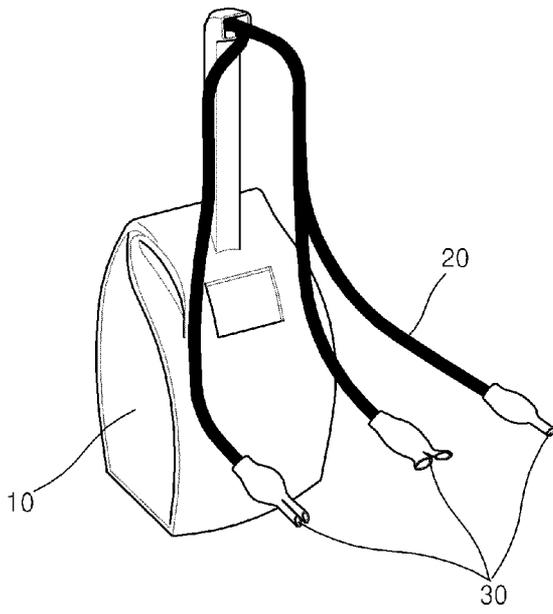
equivalents. Accordingly, other implementations are within the scope of the following claims.

[44]

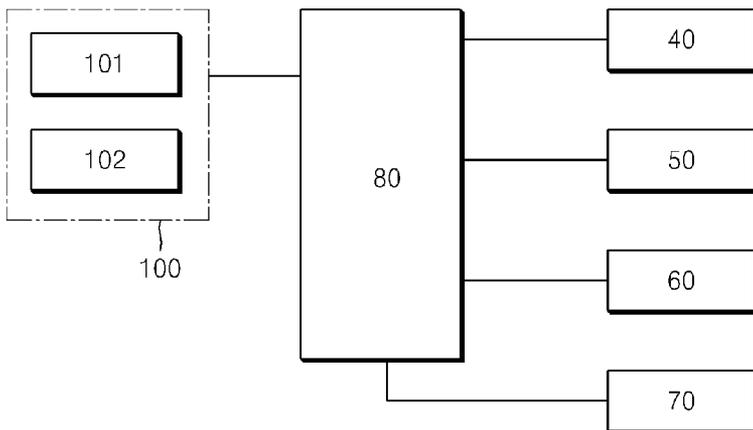
## Claims

- [Claim 1] A non-contact apparatus for pain management and body reshaping comprising:  
a body;  
a plurality of spraying tubes each configured to extend from the body to a predefined length;  
a blower configured to be included in the body, and to discharge air at a predefined pressure through the spraying tubes so as to activate a skin by stimulating touch receptors and provide finger-pressure and massage effects to a human body;  
an ionizer configured to, when the air is discharged at the predefined pressure by the blower, apply electrical stimulation to the skin by sequentially applying positive (+) ions and negative (-) ions to a surface of the skin that is activated by the discharged air so as to promote ion transmission of nerve potentials while avoiding changes in a threshold value of currents on the human body; and  
a control module configured to control the blower and the ionizer.
- [Claim 2] The non-contact apparatus of claim 1, further comprising:  
a heater configured to heat up the air of the predefined pressure discharged from the blower to a predefined temperature.
- [Claim 3] The non-contact apparatus of claim 1, further comprising:  
a cooler configured to cool down the air of the predefined pressure discharged from the blower to a predefined temperature.
- [Claim 4] The non-contact apparatus of claim 1, wherein a plurality of the spraying tubes have air nozzles respectively connected thereto, the air nozzles having different discharge-diameters.

[Fig. 1]



[Fig. 2]



## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/KR2011/004671****A. CLASSIFICATION OF SUBJECT MATTER***A61H 9/00(2006.01)i, A61H 23/04(2006.01)i, A61N 1/36(2006.01)i, A61F 7/00(2006.01)i*

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

**B. FIELDS SEARCHED**

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A61H 9/00; A61H 23/02; A61H 15/02; A61H 33/10; A61N 1/44; A61H 15/00; A61H 7/00; A61H 23/04

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: massage, ionizer, air, discharge, heater, cooler, nozzle, tube

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2003-319992 A (MATSUSHITA ELECTRIC WORKS LTD.) 11 November 2003 See the whole document	1-3 4
Y A	KR 10-1997-0020075 A (LEE, SEUNGJIN) 28 May 1997 See claim 1, abstract, and figure 1	1-3 4
Y A	KR 10-2001-0009071 A (KIM, KYUSUNG) 05 February 2001 See claim 1, abstract, figure 1	2,3 4
A	JP 2006-149616 A (TIARA:KK) 15 June 2006 See claim 1, abstract, figure 2	1-4
A	KR 10-0931819 B1 (KIM, YONG) 14 December 2009 See claims 1, 5, 6, abstract, figures 1-4	1-4
A	KR 20-0422173 Y1 (PSI CO., LTD.) 25 July 2006 See claim 1, abstract, figure 5	1-4

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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**PCT/KR2011/004671**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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KR 10-1997-0020075 A	28.05.1997	None	
KR 10-2001-0009071 A	05.02.2001	None	
JP 2006-149616 A	15.06.2006	None	
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