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2. I have over 25 years of experience translating thousands of technical, legal, and business documents from Korean to English submitted to, among others, various U.S. federal courts and the U.S. International Trade Commission (ITC).
3. I certify that the following translation of the corresponding source text is a true, correct, and complete translation to the best of my knowledge and ability.

Statements made herein are to the best of my knowledge true and are based on information that I believe to be true and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application in the United States of America or any patent issuing thereon

Executed this 28th day of March 2021 in the Contra Costa County of the State of California.

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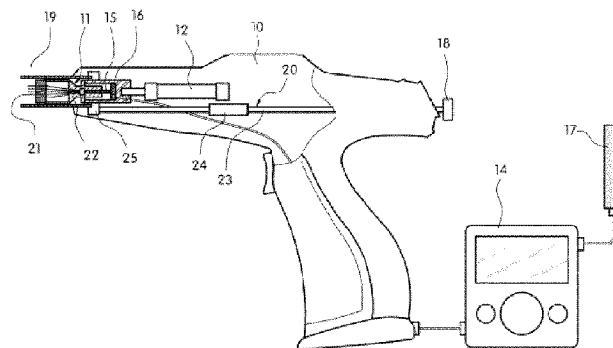
(54) A GUN TYPE MULTI-HOLE TREATMENT APPARATUS

(57) Abstract

The present invention relates to a multi-hole treatment apparatus for creating holes on the human skin with a plurality of needles using a gun operating method for performing multi-hole treatment such as skin care, hair loss treatment, obesity treatment, wrinkle removal, acne removal, callus removal, etc.

In case of a multi-hole treatment in which a plurality of needles create holes on the human skin using a gun operating method, the present invention provides a gun type multi-hole treatment apparatus that: (i) maximizes the effect of multi-hole treatment by implementing a new treatment apparatus that applies electric current after inserting the needles into the skin; and (ii) provides stable treatment by shortening the procedure time and reducing pain as a result of controlling needle speed and insertion depth.

Representative Drawing - FIG 1



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What is claimed is:

Claim 1

A gun type multi-hole treatment apparatus comprising: a gun body 10, a needle assembly 11 with needles mounted thereto, and an actuator 12 for operation of the needle assembly 11, further comprising:

a connector housing 13 installed inside the gun body 10, capable of being electrically connected to the needle assembly 11, and delivers electric current from an external device to the needle assembly 11; and a controller 14 connected to the connector housing 13 by a wire to provide electric current, wherein

when the needles are inserted into the skin by operating the gun, electric current flows to provide electric stimulus.

Claim 2

The gun type multi-hole treatment apparatus, according to claim 1, wherein the needle assembly 11 has a plurality of needles mounted thereto.

Claim 3

The gun type multi-hole treatment apparatus, according to claim 2, wherein the needle assembly 11, accommodated inside the connector housing 13, is formed in a detachable type that is electrically connected by the contact between an electrode rod 15 and an electrode plate 16.

Claim 4

The gun type multi-hole treatment apparatus, according to claim 2 or claim 3, wherein the controller 14 further comprises an earth member 17 for grounding.

Claim 5

The gun type multi-hole treatment apparatus, according to claim 2 or claim 3, wherein the needle assembly 11 receives "positive (+)" and "negative (-)" current, respectively, to form a pair and apply electric stimulus.

Claim 6

The gun type multi-hole treatment apparatus, according to claim 2, wherein said actuator 12 is a method using pneumatic pressure or a method using a speed adjustable motor.

Claim 7

The gun type multi-hole treatment apparatus, according to claim 2, further comprising a depth control device 20 that can control the depth of needle insertion by adjusting the position of the guide 19 back and forth by manipulation of an outside knob 18, wherein the depth control device 20 is installed inside the gun body 10 and the guide 19 is disposed on the perimeter of the needle assembly 11.

Specification

Description of the Invention

Field of the Art

- <1> The present invention relates to a gun type multi-hole treatment apparatus and, more particularly, to a multi-hole treatment apparatus for creating holes on the human skin with a plurality of needles using a gun operating method for performing multi-hole treatment such as skin care, hair loss treatment, obesity treatment, wrinkle removal, acne removal, callous removal, etc.

Background Art

- <2> Generally, multi-hole treatment is a method used mostly for skin care, healthy hair, and obesity treatment, etc., such as wrinkle treatment, removal of acne, removal of callus, treatment of hair loss. There is a method in which holes are created on the skin where drugs or cosmetics are applied to allow the drugs to permeate the skin extremely fast in a large amount, thereby maximizing the effect of drugs. There is also a method in which needles stimulate the skin, thereby inducing collagen production from the reaction of the human body. The main areas of treatment are the face and scalp.

- <3> In this method, for example, hundreds to tens of thousands of tiny holes are created on the human skin to regenerate tissues to heal the skin that is damaged in the process of making the tiny holes, by using its self-healing ability; and treatment drugs are applied on the area where tiny holes are created, allowing the drugs to quickly permeate the skin through the tiny holes, thereby maximizing the efficacy of treatment.
- <4> Unlike the existing treatment methods (lasers, dermabrasion, etc.) in which the skin is peeled off to treat wrinkles or hyperpigmentation using regeneration of the damaged skin, this multi-hole treatment method is a new concept of cell restoration method that induces endogenous production of collagen without removing or damaging the epidermis of the skin.
- <5> The multi-hole treatment method, which is simple and safe as well as free of side effects, newly reconstructs and rearranges dermal tissues by using a process of natural wound healing that occurs when a plurality of needles are inserted into the skin, thereby making scars thinner as well as tightening the skin. As a result, fine wrinkles decrease and hyperpigmentation improves, restoring healthy and clean skin.
- <6> In addition, hundreds of needles provide a huge number of paths, hundreds to tens of thousands of holes within a few minutes, to further maximize the efficacy of treatment by delivering effective substances such as active peptide and the like.
- <7> To form multi-holes on the human skin, there is a method of using multi-roller needles and there is a method of using lasers. Of recent, another method has been presented that can effectively create hundreds to tens of thousands of tiny holes on the human skin using a gun with microneedles mounted thereto.
- <8> Above-described multi-hole treatment using a gun is a method of creating holes on the skin by controlling the repetitive back-and-forth operation of the actuator by manipulating a gun switch.
- <9> Accordingly, the present invention provides a multi-hole treatment apparatus, which applies electrical stimulus together for performing a gun type multi-hole treatment as described above.

Description of the Drawings

Technical Problems to be Solved by the Present Invention

- <10> Accordingly, it is the object of the present invention to provide a gun type multi-hole treatment apparatus that: (i) maximizes the effect of multi-hole treatment by implementing a new treatment apparatus that applies electric current after inserting the needles into the skin; and (ii) provides stable treatment by shortening the procedure time and reducing pain by controlling needle speed and insertion depth.
- <11> The object of the present invention is not limited to the object described above. For other objects not described herein, those skilled in the art should be able to clearly understand from what is described below.

Means to Solve the Problems

- <12> To achieve the object, a gun type multi-hole treatment apparatus of the present invention comprises: a gun body, a needle assembly with a plurality of needles mounted thereto, an actuator for operation of said needle assembly, a connector housing installed inside said gun body, capable of being electrically connected to the needle assembly to deliver electric current from an external device to the needle assembly; and a controller connected to said connector housing with a wire to provide electric current, among others, wherein current flows to provide electrical stimulus when the needles are inserted into the skin as a result of gun operation.
- <13> Here, preferably, said needle assembly is formed in a detachable type accommodated inside the connector housing, electrically connected by the contact between an electrode rod and an electrode plate.

Effect of the Invention

- <14> The multi-hole treatment apparatus of the present invention provides advantages described below.
- <15> First, it is most effective to apply electrical stimulus when the needles reach the dermal layer underneath the epidermis of the skin. The depth of dermis varies depending upon the area of the body, such as the face, arm, thigh, and abdomen; and the body shape such as an obese body or a thin body. As a result, the multi-hole treatment apparatus of the present invention can apply electrical stimulus for each of the various depths, thereby maximizing the efficacy of treatment.
- <16> Second, this provides a method of automatically inserting needles into the skin with a gun that can control the needle speed, thereby eliminating the inconvenience of manual inserting as well as shortening procedure time.
- <17> Third, since the depths of the needles can be controlled, electric current can flow down to the exactly required depth. In addition, a safety guide is installed to prevent insertion that goes deeper than the required depth, providing stable treatment.

- <18> In other words, since the depths of the needles can be precisely controlled, stability and precision of the needle depths can be attained, which enables treatment to be customized for each patient.
- <19> Fourth, the patient feels less pain since the needles are quickly inserted into the skin by employing a certain method of operating a gun.
- <20> Fifth, the needles are easily attached/detached, which reduces costs.
- <21> As described herein, the speed can be controlled and several to tens of needles are automatically inserted into the skin to apply electric current to the desired depth, and the efficacy of treatment is thereby enhanced depending on the layer of the skin and it is possible to replace the needles alone for each patient. Thus, as compared to the conventional method of replacing the entirety, the costs are reduced. It is also convenient to use because it is easy to attach/detach needles.

Detailed Description for Practicing the Invention

- <22> Hereunder, many embodiments of the present invention will be explained in detail with reference to the accompanying drawings.
- <23> FIG. 1 is a schematic diagram illustrating the gun type multi-hole treatment apparatus according to one embodiment of the present invention. FIG. 2 is a perspective view illustrating the coupling relationship between the needle assembly and the connector housing in the gun type multi-hole treatment apparatus according to one embodiment of the present invention.
- <24> As illustrated in FIG. 1 and FIG. 2, said multi-hole treatment apparatus basically adopts a multi-hole treatment method in which the skin is stimulated with needles to induce generation of collagen by the reaction of the human body. After a needle assembly equipped with a plurality of microneedles is mounted to the gun, a force is applied to this needle assembly to the direction of a straight line, thereby allowing the plurality of microneedles to be inserted into the human skin at the same time. The present invention works with a mechanism that hundreds to tens of thousands of holes are created on the human skin, as the needle assembly repeats this linear motion.
- <25> In particular, this multi-hole treatment apparatus adopts a method that can remarkably increase the efficacy of treatment by applying electrical stimulus to the skin with the flow of electric current while the needles are being inserted into the skin.
- <26> For this, the gun body 10 comprises, among others: a needle assembly 11 with a plurality of needles 21 to create holes on the skin; an actuator 12 to move the needle assembly 11 back and forth repeatedly; a connector housing 13 as a means of providing electric current to said needle assembly 11 side; a controller 14 which is an external device.
- <27> Said needle assembly 11 is formed in a structure in which a plurality of needles 21 are mounted to the needle mount 22. The needles are mounted in such a manner that each needle is exposed to the front for a certain length and, at the same time, connected to the electrode rod 15 embedded in the back of the mount.
- <28> Here, said electrode rod 15 is shaped to be extended slightly more toward the back of the mount. The extended part may be used to connect to the electrode plate 16 to be described later.
- <29> As a result, when electric current flows to the electrode rod 15, electric current will likewise flow to each needle 21.
- <30> In another embodiment of the present invention, each needle 21 mounted to the needle mount 22 of the needle assembly 11 may be constructed in the shape that the needles adjacent to each other form a pair, each pair of needles 21 receiving "positive (+)," and "negative (-)" current, respectively.
- <31> Of course, a configuration of needles like this may be shaped such that the electric current is provided individually to the electrode and the electric plate or each pair thereof.
- <32> The connector housing 13 is supported at the actuator 12 to be described later. For example, a cylinder is supported as it is fitted into the rod and put together in a structure slidable back and forth on the holder 24 situated on the internal front end of the gun body 10, serving to provide electric current to the needle assembly 11 and supporting the needle assembly 11.
- <33> For this, the connector housing 13 has a groove structure for accommodating the rear end of the needle assembly 11 toward its front; and it is connected to the actuator 12 such as the cylinder toward its back to move back and forth with the needle assembly 11 when the actuator operates.
- <34> An electric plate 16 is mounted to the groove bottom of the connector housing 13. The electric plate 16 is connected by using a wire extended from outside.

- <35> As a result, when the rear end of the needle assembly 11 is inserted into the groove portion of the connector housing 13, the electrode rod 15 and the electric plate 16 electrically contact each other; and in the end, the electric current applied through the wire can flow all the way to the needles 21 via the electric plate 16 and the electrode rod 15.
- <36> Here, said needle assembly 11 and connector housing 13 are coupled in an easily attachable/detachable structure.
- <37> For example, when the rear portion of the needle mount 22 of the needle assembly 11 is inserted into the groove portion of the connector housing 13, the two members may be coupled, and at this time, each of the electrode rod 15 and the electrode plate 16 can be electrically connected as they come into contact, while the needle assembly 11 can be easily separated out by taking it out from the connector housing 13.
- <38> Since the needle assembly 11 can be easily inserted and taken out, it provides an advantage that the apparatus can be used by merely changing the needles for each patient.
- <39> In other words, the needle assembly alone can be newly replaced without having to replace the entire gun to treat another patient, which is advantageous in terms of cost.
- <40> In addition, the present invention provides a guide 19 which includes the needle assembly 11 inside and is disposed on the perimeter of the needle assembly 11 and detachably coupled to the holder 24.
- <41> Accordingly, stability can be achieved by preventing the needle from being inserted into the skin more than the depth thereof.
- <42> In other words, when the needles are inserted into the skin, the needles are inserted as the end of the guide 19 is placed on the skin, and thus the insertion depth of the needles can be effectively limited by properly adjusting the length of the guide 19 at this time.
- <43> The depth adjustment device 20 is responsible for the position adjustment of the guide 19.
- <44> The depth adjusting device 20 is installed as a structure wherein a support block 24 is installed in the interior of the gun body 10, and a support bar 23 having a knob 18 on the outside of the gun horizontally pierces through support block 24, and, at the same time, is assembled in the form of screwing.
- <45> The holder 24 including the guide 19 is supported at the tip of the support bar 23 installed as described above.
- <46> Accordingly, when the knob 18 is manipulated, the entire support bar 23 including the guide 19 and the holder 24 may move back and forth, and thus the position of the guide 19 may be adjusted by user's manipulation of the knob.
- <47> That is, if the guide is pulled out long to the front or pulled back short by manipulating the knob, the insertion depths of the needles moving according to a predetermined stroke may be precisely controlled while adjusting the depths of the needles as needed.
- <48> The controller 14, which provides electric current for electrical stimulation during treatment, is connected to itself or an external power supply. It is a type of control board equipped with an on/off switch, a display window, and the like.
- <49> The electric wire extending from said controller 14 is connected to the electrode plate 16 of the connector housing 13 through the inside of the gun body 10. As a result, when the controller 14 is operated, electric current may be applied to the electrode plate 16.
- <50> In addition, one side of the controller 14 is provided with an earth member 17, such as a hand piece.
- <51> Thus, after inserting needles into the skin, "positive (+)" current flows, and when the earth member 17 corresponding to "negative (-)" is held by hand, current flows to the patient.
- <52> To insert the needles into the skin, the actuator 12 moves back and forth the entirety of both the needle assembly 11 having a plurality of needles 21 and the connector housing 13.
- <53> Said actuator 12 may be supported by a bracket (not illustrated) on the gun body 10 and may be of a type using pneumatic pressure, such as an air cylinder, an air blower, an air motor, or a motor that can control speed such as a servo motor.
- <54> An embodiment of the present invention provides an example that uses an air cylinder type actuator.
- <55> In particular, in the case of applying a speed-adjustable motor method, it provides an advantage that the depth of needle insertion can be precisely controlled, and the precision and stability of needle insertion can be attained.
- <56> In other words, insertion of the needles into the skin is performed by a gun including a motor that can adjust the speed of the needles automatically; so, the needles can be quickly and precisely inserted into the skin without the inconvenience of manual insertion.

Therefore, it does not burden the patient with pain and allows electric current to flow exactly to the required depth by controlling the depths of the needles.

- <57> Of course, when applying a motor-type actuator, it may include a structure in which a screw bar driven by the motor and peripheral devices such as a linear motion device for linear guidance interworking with the connector housing.
- <58> Accordingly, the multi-hole treatment apparatus according to an embodiment of the present invention configured as described above is used as described hereunder.
- <59> FIGS. 3a to 3c are the schematic diagrams illustrating the state of using the multi-hole treatment apparatus according to an embodiment of the present invention.
- <60> As illustrated in FIGS. 3a to 3c, the multi-hole treatment using a gun proceeds with a process in which a needle assembly including a plurality of microneedles are mounted to a gun capable of repeating linear operation and the gun is operated in such a way as to vertically insert the microneedles of the needle assembly into the skin.
- <61> In this manner, the needles can be repeatedly inserted at a constant speed and at a constant depth, and the depths of the needles can be set to about 1 mm to 4 mm.
- <62> For starters, as a preparatory step, the power supply is connected to complete the preparation for operating the controller and the gun.
- <63> After the preparation step is completed, the guide 19 at the tip of the gun is placed on the skin area to be treated, and the gun switch (trigger) is pressed after that. Then, the needles 21 in the front of the needle assembly 11 are inserted into the skin and make holes by the operation of the actuator 12.
- <64> At this time, an electrical stimulus may be applied to the skin by way of the needles 21 through which electric current flows.
- <65> The current may be applied by operating the switch of the controller 14, but, preferably, applied simultaneously along with the operation of the gun switch.
- <66> As described, the process is repeated multiple times with the microneedles moving back and forth to create hundreds to tens of thousands of holes on the human skin; and at the same time electrical stimulus can be applied using the current flowing through the needles.
- <67> Here, the gun may be set such that the microneedles perform one reciprocating operation each time the gun switch is pressed; or may be set such that the microneedles perform multiple reciprocating operations while holding the gun switch pressed.
- <68> In case of multi-hole treatment using the gun while applying electrical stimulation, the needles can be repeatedly inserted at a constant speed and a constant depth, and the inserting depths of the needles can be easily controlled by controlling the microneedles. Also, the electrical stimulation can also be applied together, thereby maximizing the efficacy of treatment.
- <69> Embodiments of the present invention are described above with reference to the accompanying drawings; however, those skilled in the art would be able to understand that the present invention can be reduced to practice in other specific forms without departing from the technical idea or essential features thereof. Therefore, it must be understood that the embodiments described so far are merely exemplary in all respects and not restrictive.

Brief Description of the Drawings

- <70> FIG. 1 is a schematic diagram illustrating the gun type multi-hole treatment apparatus according to one embodiment of the present invention.
- <71> FIG. 2 is a perspective view illustrating the coupling relationship between the needle assembly and the connector housing in a gun type multi-hole treatment apparatus according to one embodiment of the present invention.
- <72> FIGS. 3a, 3b, and 3c are the schematic diagrams illustrating the state of the use of the gun type multi-hole treatment apparatus according to one embodiment of the present invention.
- <73> <Description of reference numerals>
- | | | | |
|----------|-------------------------|-----|-------------------|
| <74> 10: | Gun body | 11: | Needle assembly |
| <75> 12: | Actuator | 13: | Connector housing |
| <76> 14: | Controller | 15: | Electrode rod |
| <77> 16: | Electrode plate | 17: | Earth member |
| <78> 18: | Knob | 19: | Guide |
| <79> 20: | Depth adjustment device | 21: | Needles |

- | | | | | |
|------|-----|---------------|-----|-------------|
| <80> | 22: | Needle mount | 23: | Support bar |
| <81> | 24: | Support block | 25: | Holder |

Drawings

FIG. 1

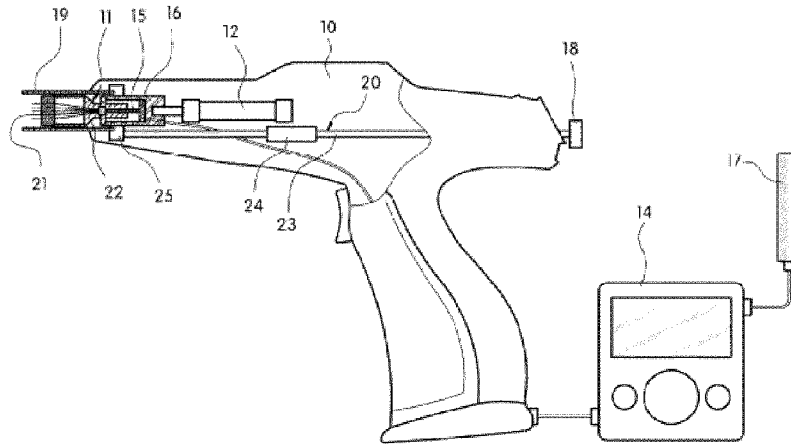


FIG. 2

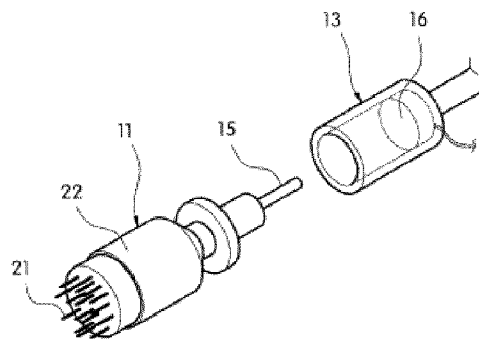


FIG. 3a

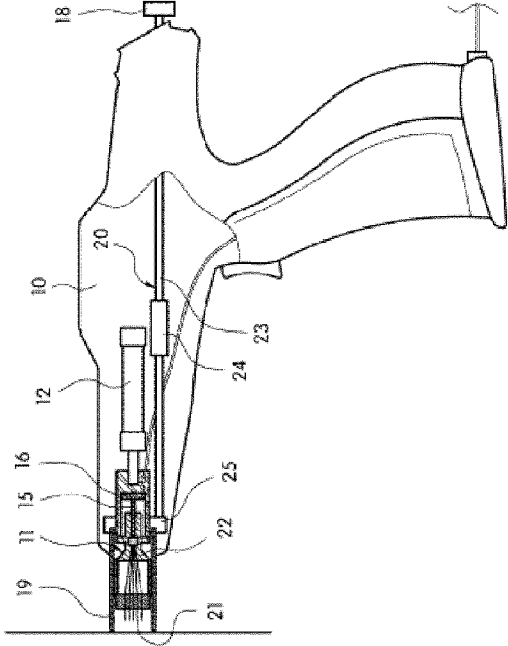


FIG. 3b

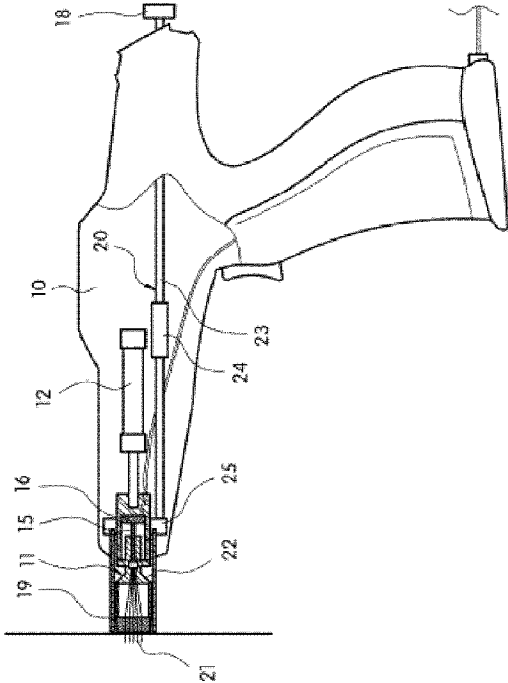


FIG. 3c

