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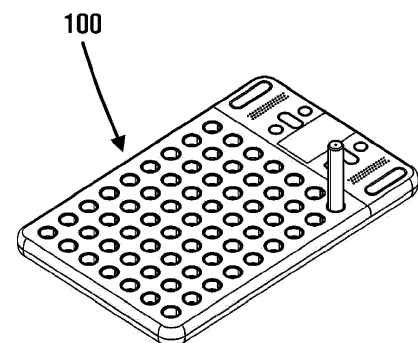
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(54) **PEGBOARD TYPE REHABILITATION TRAINING SYSTEM**

(57) Disclosed is a rehabilitation training apparatus that is used when a stroke patient or the like performs rehabilitation training. A rehabilitation training system includes a main device in which a plurality of unit modules are disposed on a plane at a specific interval; a board plate inserted into or coupled to the main device and including a plurality of holes; and a plurality of pegs that are inserted into the holes of the board plate, wherein each of the unit modules includes a sensor module configured to detect insertion of a peg into the hole, and a light source module configured to output light of a specific color, and if the board plate is inserted into the main device, the light source module provides output light to the outside through the hole of the board plate.

**【FIG. 1】**



## Description

### BACKGROUND

**[0001]** Embodiments of the inventive concept described herein relate to a rehabilitation training system, and more particularly, to a rehabilitation training apparatus that is used when a stroke patient or the like performs rehabilitation training.

**[0002]** In general, a patient whose brain is damaged, for example, due to a stroke requires a tool for gradually recovering the basic perception and exercise functions to return to a normal life.

**[0003]** To achieve this, conventionally, the patient gets a rehabilitation treatment by using a simple tool, such as a pegboard, and the pegboard is configured such that a plurality of blocks are generally inserted into a fixed board to finish a specific pattern or shape.

**[0004]** Meanwhile, in order to provide the most effective treatment method to the patients based on accumulated data while performing a rehabilitation treatment, records and analyses of a process of performing training by using a rehabilitation treatment tool, such as a pegboard, and a result of the training process are thoroughly required.

**[0005]** The configuration form of the conventional pegboard is limited and the rehabilitation training methods of the patients whose brains are damaged is not sufficiently considered, and accordingly, it is insufficient in developing various senses of the patients.

### SUMMARY

**[0006]** Embodiments of the inventive concept provide a rehabilitation training system that is made to be more suitable for the rehabilitation training of the brain damage patients by allowing the user to recognize a location of a hole that outputs a light source and inserting a peg having a shape corresponding to the hole.

**[0007]** The technical objects of the inventive concept are not limited to the above-mentioned ones, and the other unmentioned technical objects will become apparent to those skilled in the art from the following description.

**[0008]** In accordance with an aspect of the inventive concept, there is provided a rehabilitation training system including a main device in which a plurality of unit modules are disposed on a plane at a specific interval; a board plate inserted into or coupled to the main device and including a plurality of holes; and a plurality of pegs that are inserted into the holes of the board plate, wherein each of the unit modules includes a sensor module configured to detect insertion of a peg into the hole, and a light source module configured to output light of a specific color, and if the board plate is inserted into the main device, the light source module provides output light to the outside through the hole of the board plate.

## BRIEF DESCRIPTION OF THE FIGURES

**[0009]** The above and other objects and features will become apparent from the following description with reference to the following figures, wherein like reference numerals refer to like parts throughout the various figures unless otherwise specified, and wherein:

FIG. 1 is a perspective view of a rehabilitation training system according to an embodiment of the inventive concept;

FIG. 2 is an exploded perspective view of the rehabilitation training system according to the embodiment of the inventive concept;

FIG. 3 is a view schematically illustrating a method for performing rehabilitation training by using a board plate and pegs by a user according to an embodiment of the inventive concept;

FIG. 4 is a block diagram illustrating a configuration of a main device according to an embodiment;

FIG. 5 is a flowchart illustrating a process of performing rehabilitation training by a user according to an embodiment of the inventive concept;

FIG. 6 is a view schematically illustrating that a plurality of selected unit modules output light according to another embodiment of the inventive concept; and

FIG. 7 is a view schematically illustrating that a plurality of unit modules output light to provide a hint to a user according to another embodiment of the inventive concept.

## DETAILED DESCRIPTION

**[0010]** In accordance with an aspect of the inventive concept, there is provided a rehabilitation training system including a main device in which a plurality of unit modules are disposed on a plane at a specific interval, a board plate inserted into or coupled to the main device and including a plurality of holes, and a plurality of pegs that are inserted into the holes of the board plate, wherein each of the unit modules includes a sensor module configured to detect insertion of a peg into the hole, and a light source module configured to output light of a specific color, and wherein if the board plate is inserted into the main device, the light source module provides output light to the outside through the hole of the board plate.

**[0011]** The board plate includes a plurality of holes having different shape or sizes, and the plurality of pegs have insertion parts corresponding to the shapes or sizes of the holes.

**[0012]** The holes of the board plate are sized such that, when the board plate is inserted into the main device,

the plurality of unit modules are disposed in the holes, and the plurality of unit modules are controlled to sense only one of the unit modules disposed in the interior of one hole and provides the same sensing condition to all of the unit modules disposed in the interior of the one hole.

**[0013]** The sensor module includes a Hall sensor.

**[0014]** The rehabilitation training system further includes a control unit configured to determine an evaluation condition for calculating a training result based on a light output condition of the light source module and sensing data received from the sensor module.

**[0015]** When an application that is installed or included in a mobile terminal corresponds to the control unit, the application sets a training mode according to a request of a user, transmits the light output condition corresponding to a training mode to the main device, receives sensing data of the plurality of sensing modules from the main device, and evaluates a training result by applying the evaluation condition according to the training mode.

**[0016]** The rehabilitation training system further includes a display unit configured to provide a user interface for setting at least one of a training mode, a level of difficulty, a type of a game, a type of the pegs, and a type of the board plate, and the control unit sets the light output condition and the evaluation condition based on input data received through the user interface.

**[0017]** The control unit calculates a time period that is consumed to insert the peg after the light source module at a specific location outputs a light source, and calculates the time period by applying the time period to the evaluation condition.

**[0018]** The control unit requests output of light from a plurality of selected unit modules, and if all of the selected unit modules detect the pegs, determines that the training is achieved, and the selected unit modules are unit modules disposed at specific locations for forming a specific shape.

**[0019]** The control unit determines whether the sensing data is received from the unit modules when the training is started to request removal of the pegs.

**[0020]** The other detailed items of the inventive concept are included in the detailed description and the drawings.

**[0021]** The above and other aspects, features and advantages of the invention will become apparent from the following description of the following embodiments given in conjunction with the accompanying drawings. However, the inventive concept is not limited to the embodiments disclosed below, but may be implemented in various forms. The embodiments of the inventive concept is provided to make the disclosure of the inventive concept complete and fully inform those skilled in the art to which the inventive concept pertains of the scope of the inventive concept.

**[0022]** The terms used herein are provided to describe the embodiments but not to limit the inventive concept. In the specification, the singular forms include plural forms unless particularly mentioned. The terms "com-

prises" and/or "comprising" used herein does not exclude presence or addition of one or more other elements, in addition to the aforementioned elements. Throughout the specification, the same reference numerals denote the same elements, and "and/or" includes the respective elements and all combinations of the elements. Although "first", "second" and the like are used to describe various elements, the elements are not limited by the terms. The terms are used simply to distinguish one element from other elements. Accordingly, it is apparent that a first element mentioned in the following may be a second element without departing from the spirit of the inventive concept.

**[0023]** Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by those skilled in the art to which the inventive concept pertains. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the specification and relevant art and should not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

**[0024]** The terms, such as "below", "beneath", "lower", "above", and "upper", which are spatially relative may be used to easily describe a correlation between one element and other elements as illustrated in the drawings. The spatially relative terms have to be understood as terms including different directions of the elements during use or an operation, in addition to the direction illustrated in the drawings. For example, the elements illustrated in the drawings are overturned, the elements "below" or "beneath" another element may be positioned "above" the other element. Accordingly, the term "below" or "beneath" may include "below" or "beneath" and "above". The element may be oriented in different directions, and accordingly, the spatially relative terms may be construed according to the orientation.

**[0025]** Hereinafter, exemplary embodiments of the inventive concept will be described in detail with reference to the accompanying drawings.

**[0026]** FIG. 1 is a perspective view of a rehabilitation training system according to an embodiment of the inventive concept. FIG. 2 is an exploded perspective view of the rehabilitation training system according to the embodiment of the inventive concept.

**[0027]** Referring to FIGS. 1 and 2, the rehabilitation training system according to the embodiment of the inventive concept includes a main device 110, a board plate 120, and a plurality of pegs 130.

**[0028]** A plurality of unit modules are disposed on a plane of the main device 110 at a specific interval. The unit module may include a sensor module configured to detect insertion of a peg 130 into a hole and a light source module configured to output light of a specific color.

**[0029]** According to another embodiment of the inventive concept, the sensor module and the light source module may be disposed adjacent to each other or vertically.

For example, the sensor module and the light source module are disposed vertically, the sensor module may be located on the upper side and the light source module may be disposed on the lower side so that the plurality of modules may be spaced apart from each other at a specific interval and disposed to be integrated according to the area and the height of the main device 110.

**[0030]** In another embodiment of the inventive concept, because the light source module may include a plurality of colored LEDs, and output light having a plurality of colors may be identified sequentially or simultaneously from the outside through the holes of the board plate 120.

**[0031]** As an embodiment, the unit modules may be disposed on the plane of the main device 110 in a form of gratings at a specific interval, and the shape and size of the plurality of holes formed in the board plate 120 are not limited as long as the output light of the light source modules may be identified through the holes of the board plate 120 when the board plate is inserted into the main device.

**[0032]** Further, the unit modules are sized to be disposed in the interiors of the respective holes 122 constituting the board plate 120 when the board plate 120 is inserted into the main device 110. In another embodiment of the inventive concept, when a plurality of unit modules are provided, the plurality of unit modules may be sized to be disposed in the interiors of the respective holes 122 constituting the board plate 120. Accordingly, in order to recognize insertion of the pegs 130 into the holes 122, the plurality of unit modules may be controlled to sense only one of the plurality of unit modules disposed in one hole 122 or such that all of the plurality of unit modules provide the same sensing condition.

**[0033]** The board plate 120 has a structure that may be inserted into or coupled to the main device 110, and includes a plurality of holes. The holes 122 may have the same shape or different shapes. For example, the plurality of holes 122 may have the same form and the same size, may have the same form but have different sizes, or may have different forms and sizes.

**[0034]** In another embodiment of the inventive concept, the board plate 120 may include holes 122 of various sizes or shapes according the level of difficulty, and the level of difficulty of training may be increased or decreased by exchanging the board plate 120.

**[0035]** The plurality of pegs 130 may be inserted into the holes of the board plate 120. The user (for example, the patient) may grip a peg 130 with a hand, and through this, the peg 130 may be inserted into the hole of the board plate 120. Because the pegs 130 may have various sizes and shapes, the user may achieve different training effects according to the sizes and forms of the pegs 130. For example, if the peg 130 includes an asymmetric insertion part and has a size that is smaller than that of the other pegs 130, the user who performs training of inserting the peg 130 into the hole 122 may feel a high level of difficulty of training. Accordingly, the user may perform training of a level of difficulty that is suitable for the state

of the user through the training of inserting the pegs 130 corresponding to the different forms of the holes. In another embodiment of the inventive concept, the pegs 130 may have the same long sectional shape, and may include a knob part and an insertion part.

**[0036]** FIG. 3 is a view schematically illustrating a method for performing rehabilitation training by using a board plate and pegs by a user according to an embodiment of the inventive concept.

**[0037]** First, the user (for example, the patient who requires rehabilitation training) identifies output light output through the plurality of holes 122, and recognizes the shapes or sizes of the holes 122 through which the output light is output to the outside. Next, the user may perform training by selecting a peg 130 corresponding to the hole and inserting the peg 130 only into the holes 122 that outputs the output light to the outside.

**[0038]** Further, as another embodiment, the rehabilitation training system further includes a control unit. The control unit functions to determine an evaluation condition for calculating a training result based on a light output condition of the light source module and sensing data received from the sensor module.

**[0039]** FIG. 4 is a block diagram illustrating a configuration of a main device according to an embodiment.

**[0040]** The control unit 111 may be provided in the interior of the main device 110. When the control unit 111 is provided in the interior of the main device 110, the user may input information related to a training mode by using a user input unit 113 provided in the main device 110. The training mode refers to the type of a game, the level of difficulty of the game, and a condition (for example, an output time point of light, an output period of light, and the number of light source modules that output light simultaneously) for outputting light by the light source modules, and the user may perform training that is suitable for a state of the patient by inputting information related to the training mode.

**[0041]** In another embodiment of the inventive concept, the control unit 111 may be included in a mobile terminal of the user. For example, an application interworking with the main device 110 is installed in the mobile terminal, and accordingly, the user may transmit information on a training mode set in the application to the main device 110 by using a short range wireless communication scheme. The main device 110 may further include a wireless communication unit 114 for receiving information on the training mode, and the short range communication scheme may include Bluetooth, Bluetooth low energy (BLE), Beacon, radio frequency identification (RFID), near field communication (NFC), infrared data association (IrDA), and ultra-wideband (UWB), Zig-Bee.

**[0042]** In another embodiment of the inventive concept, the user may adjust the speed at which the light source module outputs a light source or adjust a time at which the sensor module recognizes the peg 130 by using the user input unit 113 of the main device 110 or the

mobile terminal of the user, to adjust the level of difficulty of training.

**[0043]** In another embodiment of the present invention, the rehabilitation training system may include a plurality of control units. For example, a first control unit may be provided in the main device 110, and the second control unit may be constituted by an application installed in the mobile terminal. Accordingly, the first control unit and the second control unit may perform the functions that have been performed by an existing control unit in an associated or distributed way. For example, when the first control unit and the second control unit perform the functions that have been performed by the existing control unit in an associated way, the first control unit in the main device 110 may function to convert data transmitted by the application into a form that is suitable to provide the data to the unit modules. Further, for example, when the first control unit and the second control unit perform the functions that have been performed by the existing control unit in a distributed way, the first control unit may function to set a light output condition of the light source module and the second control unit may function to calculate a training result based on data sensed by the sensor module.

**[0044]** FIG. 5 is a flowchart illustrating a process of performing rehabilitation training by a user according to an embodiment of the inventive concept.

**[0045]** First, in operation S202, the user may set a training mode that is suitable for rehabilitation training.

**[0046]** In operation S204, the light source module included in the unit module 117 may output the output light that is suitable for the training mode through the hole 122.

**[0047]** In operation S206, the user may identify output light output through the plurality of holes 122 and recognizes the shape and size of the hole 122, through which the output light is output to the outside to select a peg 130 corresponding to the hole 122, and accordingly, may insert the peg 130 only into the hole 122 that outputs the output light to the outside.

**[0048]** In operation S208, the sensor module included in the unit module 117 may detect sensing data that is information on whether the peg 130 is inserted into the hole 122 of the board plate 120. In another embodiment of the inventive concept, the sensor module may include a Hall sensor. For example, because the Hall sensor generates an output signal if a magnet approaches the Hall sensor as the peg 130 is inserted into a hole when the magnet is included in the interior or on one side of the peg 130, the sensor module may detect the insertion of the peg 130. Further, the sensor module may include an infrared ray sensor, a photo sensor, a light sensor, and a pressure sensor, and the type of the sensor module is not limited as long as the sensor module may detect insertion of the peg 130.

**[0049]** In another embodiment of the inventive concept, the control unit 111 may determine whether sensing data is received from the unit modules when the training is started, and may request for removal of the peg 130

from the user. That is, training cannot be performed properly if the peg 130 is inserted in an initial situation in which the training is started, the control unit 111 may request removal of the peg 130 from the specific hole from which the sensing data is received, from the user. The request for removal may be visually provided to the user through a display unit 115 of the main device 110 or a screen of the mobile terminal, and the request for removal of the peg 130 may be guided to the user through a speaker unit 116 of the main device 110 or a voice output unit of the mobile terminal. In another embodiment of the inventive concept, the control unit performs a control such that light is output from the light source module around the peg 130, which has not been removed, to guide the request for the removal of the peg 130 to the user.

**[0050]** In operation S210, the control unit 111 may calculate a training result based on the sensing data. In an embodiment of the inventive concept, the control unit 111 may calculate a time period that is consumed to insert a peg 130 after a light source module at a specific location outputs a light source, and may apply the time period to the evaluation condition. For example, when a mole game is performed by using the rehabilitation training system, the control unit may detect a time period during which the sensor module senses the peg 130 after the light source module outputs a light source, and determine whether an operation required in the game is successful.

**[0051]** In another embodiment of the inventive concept, when the application of the mobile terminal corresponds to the control unit 111, the control unit 111 may receive a plurality of sensing data from the main device 110 and evaluate a training result by applying the evaluation condition according to the training mode.

**[0052]** In another embodiment of the inventive concept, the main device 110 may further include a memory unit 112. The memory unit 112 may record location information matched with the shape of the hole 122 of the board plate 120 and difficulty level information corresponding to the shape, and accordingly, may output the output light that is suitable for the training mode through the hole 122 when the user sets the training mode.

**[0053]** In another embodiment of the inventive concept, the main device 110 may further include a display unit 115. The display unit 115 may provide a user interface for setting at least one of a training mode, a level of difficulty, a type of a game, a type of a peg, and a type of a board plate to the user. Accordingly, the control unit may set an evaluation condition for calculating a light output condition of the light source module and a training result based on the input data of the user received through the user interface. Further, the input data of the user may be input through the user input unit 113 of the main device 110, or when the display unit 115 is a touchscreen, may be directly input through the display unit 115. In another embodiment of the inventive concept, the user interface provided by the display unit 115 may be displayed on a screen of the mobile terminal of the user in an associated way.

**[0054]** In another embodiment of the inventive concept, the control unit may control output of the light source module to realize various types of games for the users. Accordingly, the users may participate in the rehabilitation training with fun and actively and accordingly, the effect of treatment may be improved. For example, the control unit 111 may request output of light from a plurality of selected unit modules, and if all of the plurality of selected unit modules detects the pegs 130, may determine that the training is achieved. Referring to FIG. 6, the control unit may request output of light from the unit modules 117 located in the holes 324 hatched among the plurality of holes 322. Accordingly, the user may identify a light source that is output to the outside of the hatched holes 324 to visually identify the shape of a heart formed by the light sources. The shape of a heart has been described as an example of the shape for convenience of description, the control unit 111 may control the plurality of unit modules 117 to form various shapes. Next, the control unit may calculate a time period that is consumed to insert the pegs 130 into all the holes 324 constituting the shape of a heart by the user to reflect the calculated time period on the training result.

**[0055]** In another embodiment of the inventive concept, referring to FIG. 7, the user may memorize the location of the hole 326 that outputs a light source, and if the light source is off, may perform training corresponding to a method for inserting the peg to the location. In another embodiment of the inventive concept, when not memorizing the location of the hole that outputs the light source, the user may request provision of a hint from the control unit 111 by using the user input unit 113 of the main device 110 or the mobile terminal of the user. If receiving a request for provision of a hint from the user, the control unit 111 operates a light source module located in, among the holes constituting the outermost side of the board plate 320, the hole 328 related to the training of memory. In another embodiment of the inventive concept, the control unit may provide only one of column information or row information to the hole 328 related to the training of the memory according to the level of difficulty set by the user.

**[0056]** In another embodiment of the inventive concept, if the control unit 111 switches on or off the output of the plurality of light source modules sequentially, the user feels as if the hole that visually outputs light moved, and accordingly, the user may perform training of the method of inserting a peg in a hole, from which the output of light is predicted, by predicting the motion of the hole that outputs the light. For example, the control unit 111 sequentially controls outputs of the four light source modules at the initial stage, and if the user accurately inserts the peg into the hole in which the output of light is predicted, sequentially controls the outputs of the three light source modules. That is, whenever the user inserts the pegs into accurate predicted points, the number of the light source modules that are output simultaneously may be decreased.

**[0057]** In another embodiment of the inventive concept, the control unit 111 may set a limit time according to the training mode, the level of difficulty, the type of the game, the type of the pegs, and the type of the board plate, and may provide information related to the limit time to the user through the display unit 115 of the main device 110 or the screen of the mobile terminal. In another embodiment of the inventive concept, the information related to the limit time may be delivered to the user through the speaker unit 116 of the main device 110 or the voice output unit of the mobile terminal.

**[0058]** The steps of a method or an algorithm that have been described in relation to the embodiments of the inventive concept may be directly implemented by hardware, may be implemented by a software module executed by hardware, or may be implemented by a combination thereof. The software module may reside in a random access memory (RAM), a read only memory (ROM), an erasable programmable ROM (EPROM), an electrically erasable programmable ROM (EEPROM), a flash memory, a hard disk, a detachable disk, a CD-ROM, or a computer readable recording medium in an arbitrary form, which is well known in the art to which the inventive concept pertains.

**[0059]** According to the inventive concept, the user may perform rehabilitation training with fun and actively, by inserting pegs having various shapes and sizes into the locations of the holes that outputs a light source.

**[0060]** Further, the patients may perform rehabilitation training without feeling bored by performing the rehabilitation training using pegs as a game.

**[0061]** Further, the user may perform the rehabilitation training in more detail by selecting by selecting the mode of the training, the level of difficulty, and the type of the game.

**[0062]** Moreover, the user may effectively identify the degree of rehabilitation training of the user by receiving the training result.

**[0063]** The aspect of the inventive concept is not limited thereto, and other unmentioned aspects of the inventive concept may be clearly appreciated by those skilled in the art from the following descriptions.

**[0064]** Although the exemplary embodiments of the inventive concept have been described with reference to the accompanying drawings, it will be understood by those skilled in the art to which the inventive concept pertains that the inventive concept can be carried out in other detailed forms without changing the technical spirits and essential features thereof. Therefore, the above-described embodiments are exemplary in all aspects, and should be construed not to be restrictive.

**[0065]** The present application discloses the following items:

Item 1. A rehabilitation training system comprising:

a main device in which a plurality of unit modules are disposed on a plane at a specific interval;

a board plate inserted into or coupled to the main device and including a plurality of holes; and

a plurality of pegs that are inserted into the holes of the board plate,

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wherein each of the unit modules includes:

a sensor module configured to detect insertion of a peg into the hole; and

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a light source module configured to output light of a specific color, and

wherein if the board plate is inserted into the main device, the light source module provides output light to the outside through the hole of the board plate.

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Item 2. The rehabilitation training system of item 1, wherein the board plate includes a plurality of holes having different shape or sizes, and wherein the plurality of pegs have insertion parts corresponding to the shapes or sizes of the holes.

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Item 3. The rehabilitation training system of item 1, wherein the holes of the board plate are sized such that, when the board plate is inserted into the main device, the plurality of unit modules are disposed in the holes, and

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wherein the plurality of unit modules are controlled to sense only one of the unit modules disposed in the interior of one hole and provides the same sensing condition to all of the unit modules disposed in the interior of the one hole.

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Item 4. The rehabilitation training system of item 1, wherein the sensor module includes a Hall sensor.

Item 5. The rehabilitation training system of item 1, further comprising:

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a control unit configured to determine an evaluation condition for calculating a training result based on a light output condition of the light source module and sensing data received from the sensor module.

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Item 6. The rehabilitation training system of item 5, wherein when an application that is installed or included in a mobile terminal corresponds to the control unit, the application sets a training mode according to a request of a user, transmits the light output condition corresponding to a training mode to the main device, receives sensing data of the plurality of sensing modules from the main device, and evaluates a training result by applying the evaluation condition according to the training mode.

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Item 7. The rehabilitation training system of item 5,

further comprising:

a display unit configured to provide a user interface for setting at least one of a training mode, a level of difficulty, a type of a game, a type of the pegs, and a type of the board plate,

wherein the control unit sets the light output condition and the evaluation condition based on input data received through the user interface.

Item 8. The rehabilitation training system of item 5, wherein the control unit calculates a time period that is consumed to insert the peg after the light source module at a specific location outputs a light source, and calculates the time period by applying the time period to the evaluation condition.

Item 9. The rehabilitation training system of item 5, wherein the control unit requests output of light from a plurality of selected unit modules, and if all of the selected unit modules detect the pegs, determines that the training is achieved, and wherein the selected unit modules are unit modules disposed at specific locations for forming a specific shape.

Item 10. The rehabilitation training system of item 5, wherein the control unit determines whether the sensing data is received from the unit modules when the training is started to request removal of the pegs.

## Claims

1. A rehabilitation training system comprising:

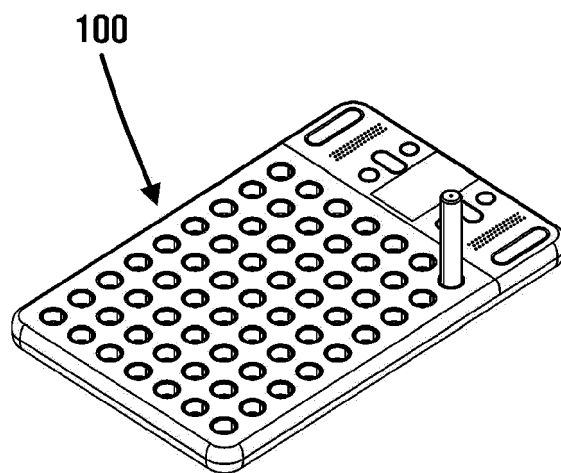
a plurality of holes (122);  
a plurality of unit modules (117) corresponding to the plurality of holes respectively;  
a plurality of pegs (130); and  
a control unit configured to determine a light output condition of each of the unit modules, wherein each of the unit modules includes a light source module for outputting light out of a corresponding hole and a sensor module for detecting a corresponding peg,  
wherein the control unit is configured:

to allow a light source module of each of one or more selected unit modules to output light for a predetermined time duration, and then stop the light output; and  
when a sensor module of each of the selected unit modules detects a corresponding peg after the light output is stopped, to determine that training has been achieved.

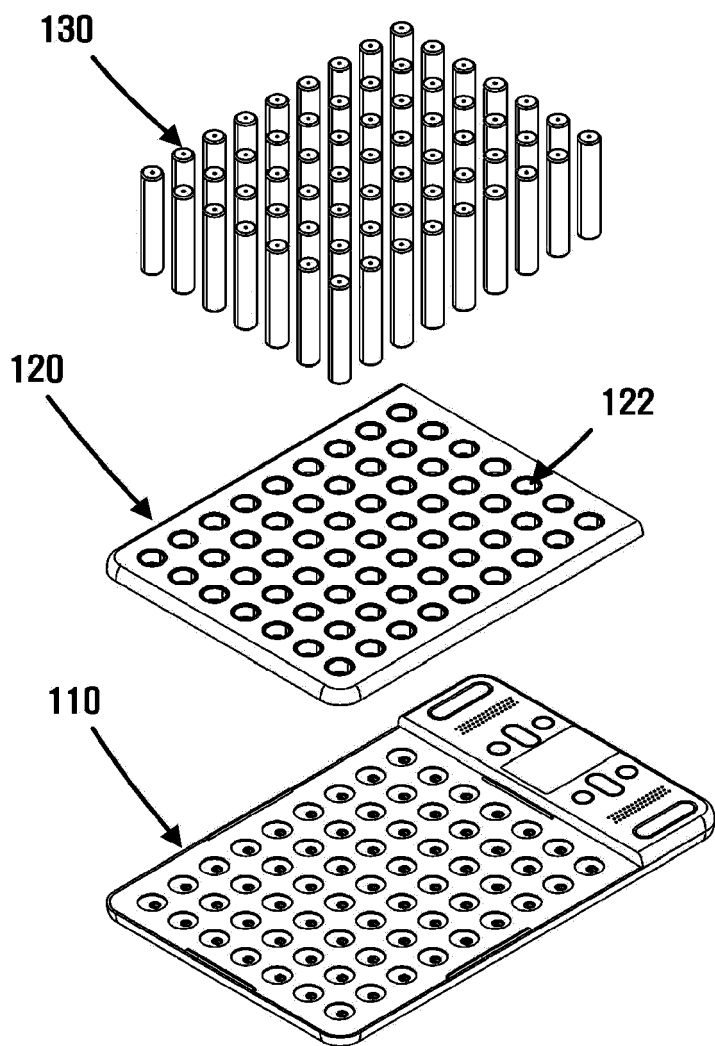
2. The rehabilitation training system of claim 1, wherein when the sensor module detects the corresponding peg, the corresponding sensor module detects insertion of the corresponding peg into a corresponding hole. 5
3. The rehabilitation training system of claim 1, wherein upon receiving a hint providing request from a user, the control unit is configured to allow a light source module of each of one or more hint unit modules related to the at least one selected unit modules to output light. 10
4. The rehabilitation training system of claim 3, wherein the at least one hint unit modules include at least one of a plurality of unit modules located at an outermost row or column of the selected unit modules. 15
5. The rehabilitation training system of claim 4, wherein the control unit is configured to determine a number of the hint unit modules based on a difficulty level of the training. 20
6. A rehabilitation training system comprising: 25
  - a plurality of holes (122);
  - a plurality of unit modules (117) corresponding to the plurality of holes respectively;
  - a plurality of pegs (130); and
  - a control unit configured to determine a light output condition of each of the unit modules, wherein each of the unit modules includes a light source module for outputting light out of a corresponding hole and a sensor module for detecting a corresponding peg, wherein the control unit is configured: 30
    - to turn on and off a plurality of selected unit modules in a sequential manner; and
    - when a correct answer unit module detects a corresponding peg, to determine that the training has been achieved, wherein the correct answer unit module is a unit module that is predicted to output light after the plurality of selected unit modules output light. 40
7. The rehabilitation training system of claim 6, wherein the control unit is configured to determine a number of the selected unit modules based on a difficulty level of the training. 50
8. A rehabilitation training system comprising: 55
  - a plurality of holes (122);
  - a plurality of unit modules (117) corresponding to the plurality of holes respectively;
  - a plurality of pegs (130); and
- a control unit configured to determine a light output condition of each of the unit modules, wherein each of the unit modules includes a light source module for outputting light out of a corresponding hole and a sensor module for detecting a corresponding peg, wherein the control unit is configured:
  - allow a light source module of each of a plurality of selected unit modules to output light; when sensor modules of all of the plurality of selected unit modules detect all of corresponding pegs, to determine that training has been achieved, wherein the plurality of selected unit modules include unit modules selected such that the selected unit modules define a predefined shape.
9. The rehabilitation training system of claim 1, 6 or 8, wherein the control unit is an application installed or included in a mobile terminal, wherein the application is configured to:
  - set a training mode in response to a request from a user;
  - transmit a light output condition corresponding to the training mode to the plurality of unit modules;
  - receive sensed data from the plurality of unit modules; and
  - apply an evaluation condition based on the training mode to the sensed data to evaluate a training result.
10. The rehabilitation training system of claim 1, 6 or 8, wherein the control unit is configured to:
  - at a beginning of the training, determine whether sensed data is received from each of the unit modules; and
  - when it is determined that the sensed data is received from each of the unit modules, guide the user to remove an inserted peg corresponding to the sensed data.



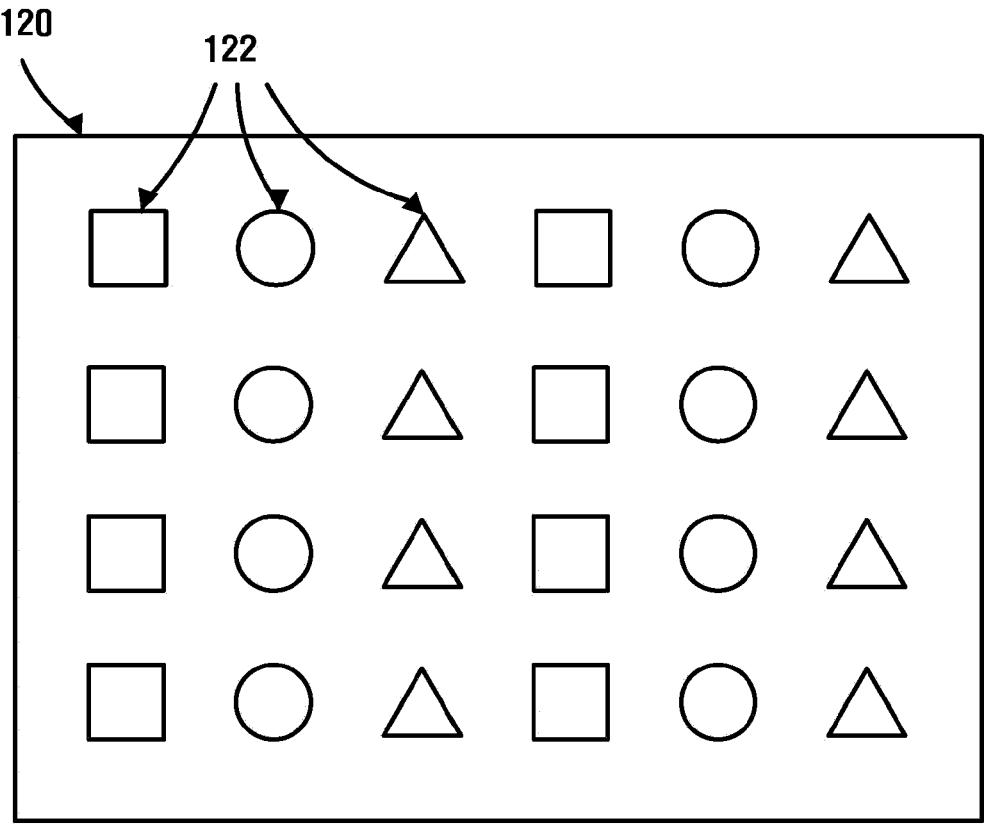
【FIG. 1】



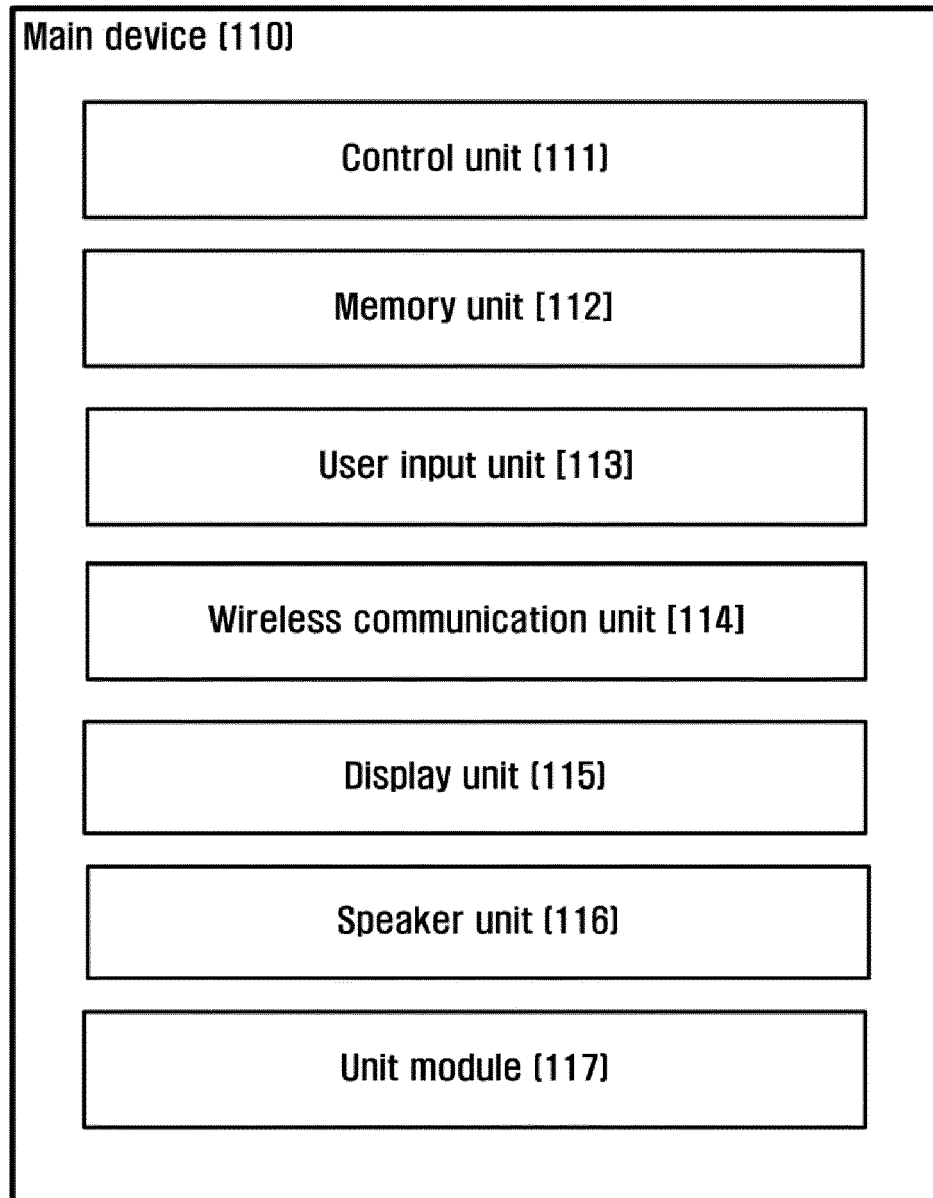
【FIG. 2】



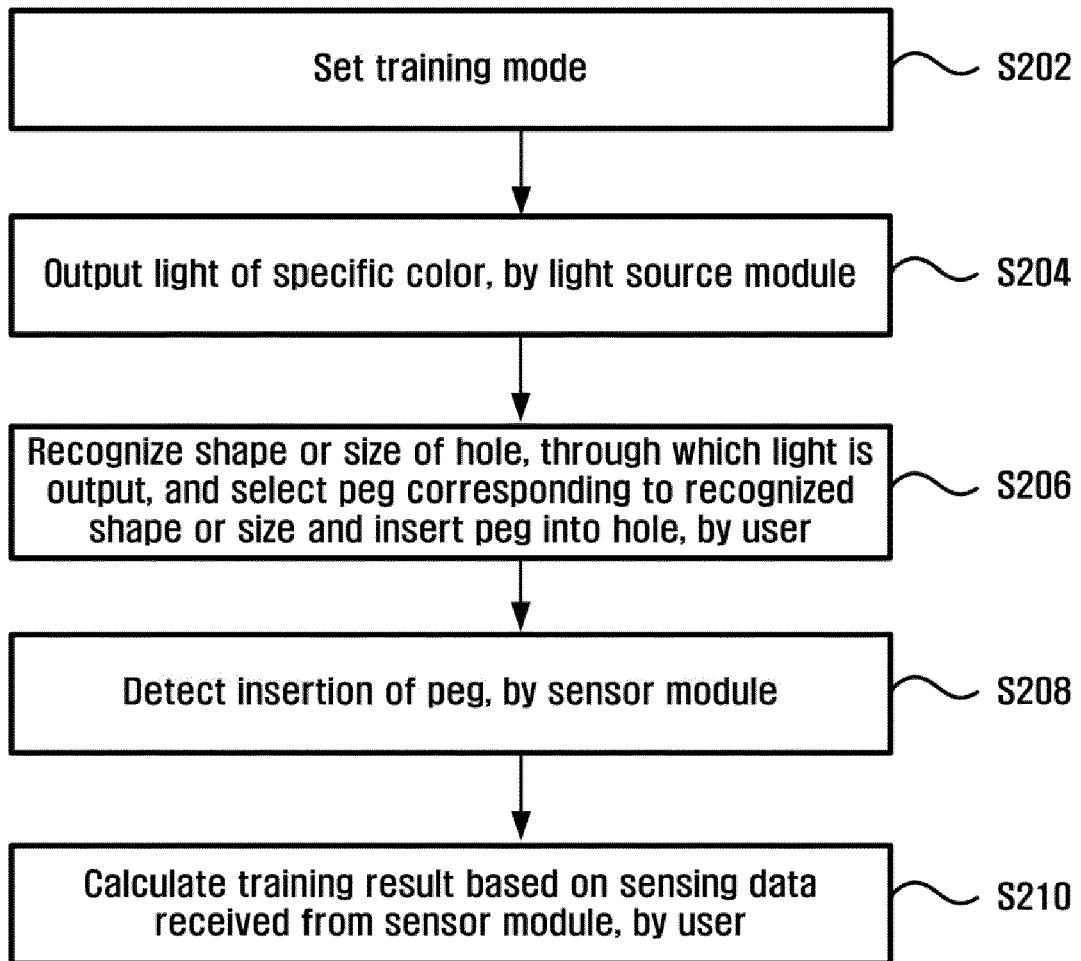
【FIG. 3】



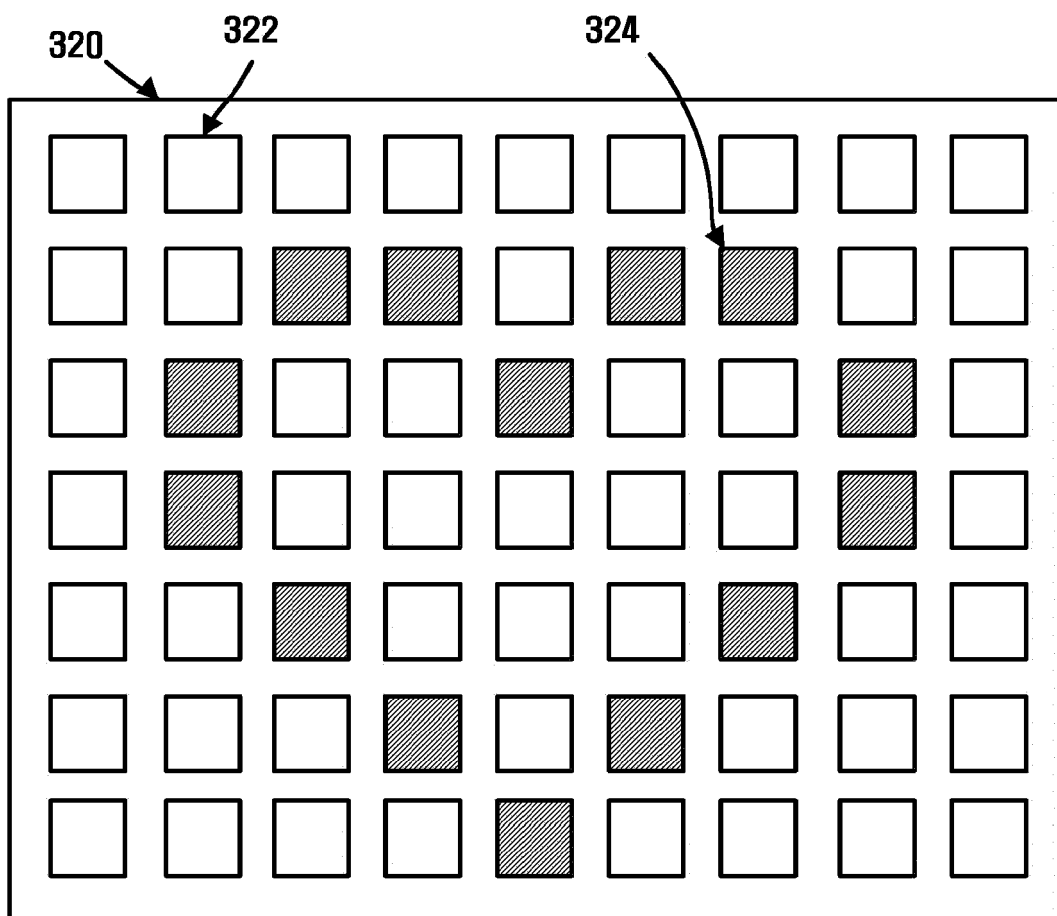
【FIG. 4】



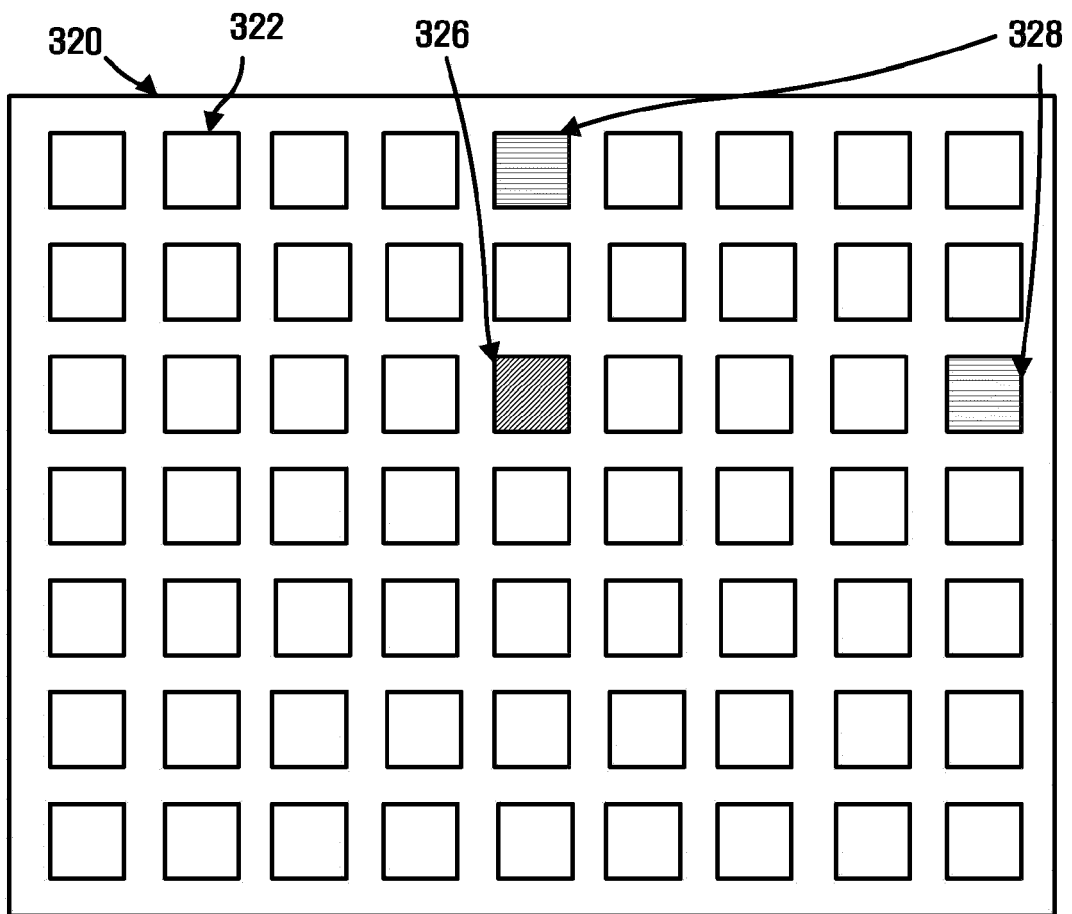
【FIG. 5】



【FIG. 6】



【FIG. 7】





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			A63F
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>13 April 2021</b>	Examiner <b>Pisseloup, Arnaud</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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