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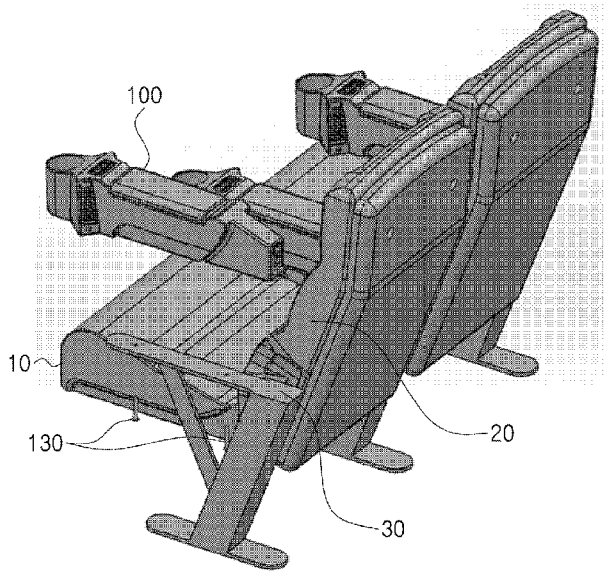
(54) Title: DEVICE, CHAIR AND SYSTEM FOR PROVIDING ENVIRONMENTAL EFFECT

[Fig. 5]



(57) Abstract: The present invention relates to a device for providing environmental effects, a chair having the device, and a system for controlling the device, and more particularly, to a device for providing environmental effects that includes a housing, one or more effect mechanisms disposed on the housing to provide the environmental effects according to control signals of an external device, and a communication unit disposed on the housing to receive the control signals of the external device, so that the device is detachably coupled to a portion of a chair to provide the environmental effects of the effect mechanisms. According to the present invention, the device for providing environmental effects is capable of providing uniform environment effects for theater customers, irrespective of the positions of chairs, and capable of providing the environmental effects even with an existing general chair, while being just detachably coupled to the chair.

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Description

Title of Invention: DEVICE, CHAIR AND SYSTEM FOR PROVIDING ENVIRONMENTAL EFFECT

Technical Field

[1] The present invention relates to a device for providing environmental effects, a chair having the device, and a system for controlling the device, and more particularly, to a device for providing environmental effects that includes a housing, one or more effect mechanisms disposed on the housing to provide the environmental effects according to control signals of an external device, and a communication unit disposed on the housing to receive the control signals of the external device, so that the device is detachably coupled to a portion of a chair to provide the environmental effects of the effect mechanisms.

Background Art

[2] As a variety of movie contents are recently proposed, theaters as spaces used to watch the movie contents have been greatly developed. Particularly, many operators of the theaters have increasingly introduced 4D theaters in which physical effects are combined with stereoscopic 3D video.

[3] In this case, 4D indicates 4D effects in which one element is added to 3D and thus provides physical effects (for example, vibrations and motions of theater chairs, strobe lights, odor dispersion, water drop injection and so on) together with movie, thereby delivering a high degree of reality to theater customers. The 4D effects do not necessarily accompany the stereoscopic 3D video, and the 4D movie is made with general video, not the stereoscopic 3D video. If the general video is played at 4D equipment, however, the 4D effects are provided by combining the physical effects with the general video. Accordingly, the biggest feature of the 4D technology is to provide a variety of physical effects as well as video for the theater customers.

[4] So as to provide the environments similar to the video played on the content of the theater, on the other hand, such 4D effects include fog injection, wind injection, smell injection, special lighting and the like, which are called 'environmental effects'.

[5] According to existing ways for providing environmental effects, as shown in FIG.1, battens are installed on the upper portions of both side wall surfaces of a theater, and effect mechanisms for providing the environmental effects are mounted on the battens to provide the environmental effects to chairs of the theater.

[6] When the environmental effects are provided by the existing effect mechanisms, however, there is a difference in sensible degrees according to the positions of the chairs, and since the effect mechanisms are located above the wall surfaces of the

theater, further, it is difficult that the states of the effect mechanisms are recognized and the maintenance for the effect mechanisms is carried out.

[7] The present invention is suggested to provide uniform environmental effects for the theater customers, while being miniaturized even though effect mechanisms providing various environmental effects are disposed thereon, and accordingly, the present invention is proposed to satisfy the above-mentioned technical demands and to provide additional technical elements not easily invented by a person skilled in the art.

Disclosure of Invention

Technical Problem

[8] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a device for providing environmental effects that is capable of providing uniform environment effects for theater customers, irrespective of the positions of chairs.

[9] It is another object of the present invention to provide a device for providing environmental effects that is capable of providing the environmental effects even with an existing general chair, while being just detachably coupled to the chair.

[10] It is yet another object of the present invention to provide a device for providing environmental effects that is capable of being easily removed from a chair when exchanged, thereby conducting maintenance in a simple manner.

[11] It is still another object of the present invention to provide a device for providing environmental effects that is capable of additionally providing a switch unit for effect mechanisms, thereby allowing a customer to directly control the environmental effects not desired by him or her.

[12] On the other hand, the technical problems to be solved by the present invention may be not limited as the above-mentioned problems, and various technical problems can be derived from the description as will be discussed hereinafter within the technical scope of the invention which is obvious to those skilled in the art.

Solution to Problem

[13] To accomplish the above-mentioned objects, according to a first aspect of the present invention, there is provided a device for providing environmental effects, including: a housing; one or more effect mechanisms disposed on the housing to provide the environmental effects according to control signals of an external device; and a communication unit disposed on the housing to receive the control signals of the external device, wherein the device is detachably coupled to a portion of a chair to provide the environmental effects of the effect mechanisms.

[14] According to the present invention, desirably, the device further includes coupling

members for coupling the housing to an arm rest of the chair. At this time, through the coupling members, the housing is coupled to the chair in such manner as to be rotatable around one end thereof.

[15] According to the present invention, desirably, through the coupling members, the housing is coupled to the chair in such manner as to allow one end and the other end thereof to be detachably coupled to the left and right arm rests of the chair.

[16] According to the present invention, desirably, the housing is coupled to the portion of the chair and serves as the arm rest for supporting a user's arm thereagainst.

[17] According to the present invention, desirably, when the device is coupled to the portion of the chair, power is supplied from the chair.

[18] According to the present invention, desirably, the device further includes a power unit for storing power, the power unit being charged from the outside to allow the device to be available while having no external power supply.

[19] According to the present invention, desirably, the effect mechanisms include at least one or more modules selected from fan modules, strobe modules, fog production module, and color lighting modules.

[20] According to the present invention, desirably, the device further includes a switch unit disposed on the housing to turn on/off the effect mechanisms.

[21] To accomplish the above-mentioned objects, according to a second aspect of the present invention, there is provided a chair for providing environmental effects, including: a seat in which a user sits; arm rests for supporting the user's arms; and a device for providing the environmental effects, the device having one or more effect mechanisms for providing the environmental effects according to control signals of an external device and a communication unit for receiving the control signals of the external device, wherein the device is disposed on each arm rest or detachably coupled to each arm rest to provide the environmental effects of the effect mechanisms.

[22] According to the present invention, desirably, the device for providing the environmental effects is coupled to each arm rest in such manner as to be rotatable around one end thereof.

[23] According to the present invention, desirably, the device for providing the environmental effects is coupled to the chair in such manner as to allow one end and the other end thereof to be detachably coupled to the left and right arm rests of the chair.

[24] According to the present invention, desirably, if the device for providing the environmental effects is disposed on the arm rest, the device serves as the arm rest for supporting the user's arm, while at the same time providing the environmental effects.

[25] According to the present invention, desirably, the chair further includes a first power unit for supplying power to the device for providing the environmental effects, so that if the device for providing the environmental effects is coupled to the arm rest, the

device receives the power from the first power unit.

[26] According to the present invention, desirably, the device for providing the environmental effects further includes a second power unit for storing power therein, the second power unit being charged from the outside to allow the device to be available while having no external power supply.

[27] According to the present invention, desirably, the effect mechanisms include at least one or more modules selected from fan modules, strobe modules, fog production module, and color lighting modules.

[28] According to the present invention, desirably, the device for providing the environmental effects further includes a switch unit disposed on the housing to turn on/off the effect mechanisms.

[29] To accomplish the above-mentioned objects, according to a third aspect of the present invention, there is provided a system for providing environmental effects, including: a device for providing the environmental effects, the device having a housing detachably coupled to a portion of a chair, one or more effect mechanisms for providing the environmental effects according to control signals of an external device, and a communication unit disposed on the housing to receive the control signals of the external device; and a theater server for producing the control signals controlling the effect mechanisms disposed on the device to transmit the control signals to the effect mechanisms.

[30] According to the present invention, desirably, the device for providing the environmental effects is formed as an arm rest of the chair or detachably coupled to the arm rest of the chair to provide the environmental effects of the effect mechanisms.

[31] According to the present invention, desirably, the theater server stores control data in which the control signals synchronized with the playing time of a special content are sequentially arranged and transmits the control signals synchronized with the playing time to the effect mechanisms as the content is played to control the whole or portion of the effect mechanisms.

Advantageous Effects of Invention

[32] According to the present invention, the device for providing environmental effects is capable of providing uniform environment effects for theater customers, irrespective of the positions of chairs.

[33] Further, the device for providing environmental effects is capable of providing the environmental effects even with an existing general chair, while being just detachably coupled to the chair.

[34] Furthermore, the device for providing environmental effects is capable of being easily removed from a chair when exchanged, thereby conducting maintenance in a

simple manner.

[35] Additionally, the device for providing environmental effects is capable of additionally providing a switch unit for effect mechanisms, thereby allowing a customer to directly control the environmental effects not desired by him or her.

[36] The effects of the present invention may be not limited as the above-mentioned effects, and various effects can be derived from the description as will be discussed hereinafter within the technical scope of the invention which is obvious to those skilled in the art.

[37]

Brief Description of Drawings

[38] FIG.1 is a schematic view showing effect mechanisms for providing environmental effects in an existing theater, wherein the effect mechanisms are mounted on battens to provide the environmental effects to chairs.

[39] FIGS.2 and 3 are back and front views showing the structure of a device for providing environmental effects according to the present invention.

[40] FIG.4 is a top view showing a switch unit of the device for providing environmental effects according to the present invention.

[41] FIGS.5 and 6 are side and front views showing a chair for providing environmental effects according to the present invention, wherein the chair is coupled to the device for providing environmental effects.

[42] FIG.7 is a front view showing the chair for providing environmental effects according to the present invention, wherein the device for providing environmental effects is rotatably coupled to the chair.

[43] FIG.8 is a front view showing the chair for providing environmental effects according to the present invention, wherein the device for providing environmental effects is coupled to both side arm rests of the chair.

Mode for the Invention

[44] The details of the objects and technical configurations of the present invention and acting effects thereof will be more clearly understood from the following detailed description based on the accompanying drawings. Hereinafter, embodiments of the present invention are described in detail with reference to the accompanying drawings.

[45] The embodiments disclosed in this specification should not be construed or used as limiting the scope of the present invention. It is evident to those skilled in the art that a description including the embodiments of this specification may have various applications. Accordingly, some embodiments described in the detailed description of the present invention are illustrative for better understanding, and the scope of the present invention is not intended to be restricted by the embodiments.

[46] Functional blocks illustrated in the drawings and described hereunder are only examples of possible implementations. In other implementations, other functional blocks may be used without departing from the spirit and scope of the detailed description. Furthermore, one or more functional blocks of the present invention are illustrated as separate blocks, but one or more of the functional blocks of the present invention may be a combination of various hardware and software elements for executing the same function.

[47] Furthermore, it should be understood that an expression that some elements are included is an expression of an open type and the expression simply denotes that the corresponding elements are present, but does not exclude additional elements.

[48] Furthermore, when one element is described as being connected or coupled to the other element, it should be understood that one element may be directly connected or coupled to the other element, but a third element may be interposed between the two elements.

[49] Furthermore, the expressions, such as "the first" and "the second", are used to only distinguish a plurality of elements and do not limit a sequence or other characteristics between the elements.

[50] FIG.1 is a schematic view showing effect mechanisms for providing environmental effects in an existing theater, wherein the effect mechanisms are mounted on battens to provide the environmental effects to chairs.

[51] Referring to FIG.1, battens are installed on the upper portions of both side wall surfaces of an existing theater, and effect mechanisms for providing environmental effects are mounted on the battens to provide the environmental effects to chairs of the theater.

[52] When the environmental effects are provided by the existing effect mechanisms, however, there is a difference in sensible degrees according to the positions of the chairs, and since the effect mechanisms are located above the wall surfaces of the theater, further, it is difficult that the states of the effect mechanisms are recognized and the maintenance for the effect mechanisms is carried out.

[53] The present invention is suggested to solve the above-mentioned problems. On the other hand, the term 'environmental effects' as used herein is for the purpose of providing a high degree of reality for theater customers so that environments similar to the video of the content played at the theater are built to stimulate the five senses of the customers. For example, the environmental effects include fog spraying, wind spraying, smell spraying, special lighting and so on. According to the present invention, one or more effect mechanisms for providing such environmental effects are disposed on portions of chairs disposed in the theater, thereby solving the above-mentioned problems in the existing theater.

[54] FIGS.2 and 3 are back and front views showing the structure of a device for providing environmental effects according to the present invention.

[55] Referring to FIGS.2 and 3, a device 100 for providing environmental effects according to the present invention includes a housing, one or more effect mechanisms for providing the environmental effects according to control signals of an external device, and a communication unit 120 disposed on the housing to receive the control signals of the external device, wherein the device 100 is detachably coupled to a portion of a chair to provide the environmental effects of the effect mechanisms.

[56] The housing is detachably coupled to a portion of the chair at the theater and includes the components of the device 100 in the interior, exterior, or outer surface thereof. In the existing theater, as shown in FIG.1, the effect mechanisms for providing environmental effects are disposed above the both side wall surface of the theater, so that the environmental effects cannot be uniformly provided for the customers and it is also difficult to exchange and repair the effect mechanisms. According to the present invention, however, the device 100 for providing the environment effects, which includes the effect mechanisms, is coupled to a portion of the chair, so that the environmental effects can be uniformly provided for each customer and the device can be easily coupled to a general chair. If the device 100 does not work, further, it is just removed from the chair and exchanged with new one, thereby allowing the operation of the theater to be efficiently kept, without stopping the operation of the chair.

[57] The effect mechanisms serve to provide effects for stimulating a user's five senses together with the content provided from the theater. That is, the effect mechanisms provide various effects such as fog spraying, wind spraying, smell spraying, special lighting and so on. Moreover, the effect mechanisms are desirably controlled synchronized with the playing time of the content of the theater. At this time, the control signals are received from the external device, and the external device has or stores control data in which the control signals synchronized with the playing time of a special content are sequentially arranged and transmits the control signals synchronized with the playing time to the effect mechanisms as the content is played. On the other hand, the external device is formed of various control means connected wiredly or wirelessly to the device 100 of the present invention and includes a theater server for controlling the playing of the content of the theater and controlling the effect mechanisms of the device 100 for providing the environmental effects.

[58] At this time, as shown in FIGS.2 and 3, the effect mechanisms of the device 100 according to the present invention include at least one or more modules selected from fan modules 111 for producing wind through air injection using a low noise motor fan and also providing smell effects through the injection of air together with smells, strobe modules 112 for producing regular flashes of light, fog production modules 113

provided by miniaturizing an existing fog machine to produce fog, and color lighting modules 114 for producing lighting effects operated cooperatively with the content using color LEDs.

[59] On the other hand, the fan modules 111, the strobe modules 112, the fog production modules 113 and the color lighting modules 114 are disposed on the housing of the device 100, without any limitation in their position, and they are located at various positions according to the structure of the device 100, thereby providing a variety of effects. For example, the color lighting modules 114 and the fog production modules 113 are at the same time used to produce color fog. At this time, the device 100 of the present invention further includes supply units for supplying water, smell, air pressure and so on, which are injected through the effect mechanisms.

[60] The communication unit 120 receives the control signals of the external device wiredly or wirelessly. Accordingly, the communication unit 120 receives the control signals of the external device and transmits the control signals to the effect mechanisms disposed on the housing, so that the communication unit 120 indirectly controls the effect mechanisms. At this time, the communication unit 120 may be disposed on a single special effect generation mechanism coupled to a backrest, or it may be separately disposed from the housing. Otherwise, while it is being connected to the effect mechanisms provided on at least one or more housings, it transmits the control signals to them. Accordingly, the present invention can have a component cost more reduced than the existing device in which communication units are provided for the respective effect mechanisms.

[61] On the other hand, the device 100 according to the present invention further includes a power unit (not shown) separately disposed from the housing to supply power to the effect mechanisms provided on at least one or more housings, so that the present invention can have a component cost more reduced than the existing structure in which power units are provided for the respective mechanisms.

[62] Further, the device 100 according to the present invention further includes a power unit 140 for storing power in the interior thereof, and the power unit 140 is charged from the outside to allow the device 100 to be available even when external power is not supplied.

[63] Further, the device 100 according to the present invention further includes coupling members 130 for coupling the housing to an arm rest 30 of a chair.

[64] The coupling members 130 are formed of coupling means like bolts and nuts, and in addition to the coupling means, they may be formed of various means capable of detachably coupling the housing to the arm rest 30 of the chair. If the device 100 of the present invention does not work, accordingly, it is removed from the arm rest 30 of the chair through the separation of the coupling members 130, thereby maintaining the

operation of the theater chair and further repairing the effect mechanisms with ease.

[65] According to the present invention, further, the device 100 of the present invention further includes a switch unit 150 for turning on/off the respective effect mechanisms, as shown in FIG.4. The formation of the switch unit 150 is needed because some special effects make a user feel unpleasant according to his or her preference. Accordingly, the user can turn off the special effects not desired by him or her through the switch unit 150, thereby enjoying the movie in more pleasant environments.

[66] FIGS.5 and 6 are side and front views showing a chair for providing environmental effects according to the present invention, wherein the chair is coupled to a device for providing environmental effects 100.

[67] Referring to FIGS.5 and 6, a chair for providing environmental effects according to the present invention includes a seat 10 in which a user sits, a backrest 20 for supporting the user's back, arm rests 30 for supporting the user's arms, and a device 100 for providing the environmental effects, the device 100 having one or more effect mechanisms for providing the environmental effects according to control signals of an external device and a communication unit 120 disposed on the housing to receive the control signals of the external device, wherein the device 100 is detachably coupled to each arm rest 30 to provide the environmental effects of the effect mechanisms.

[68] At this time, the effect mechanisms and the communication unit 120 of the device 100 for providing the environmental effects are desirably disposed on a housing. According to the present invention, coupling members 130 are disposed on the arm rests 30 of the chair so as to couple the housing to the arm rests 30, but the device 100 of the present invention may be coupled directly to each arm rest 30, without having any coupling members 130.

[69] Especially, as shown in FIG.7, the device 100 of the present invention can be shaft-coupled rotatably to the arm rest 30 around one end thereof. This can avoid the reduction of space caused by the coupling between the device 100 and the arm rest 30, thereby ensuring an appropriate seat space.

[70] Further, as shown in FIG.8, the device 100 of the present invention is configured to have one end and the other end detachably coupled to the left arm rest 30 and the right arm rest 30. Accordingly, the device 100 of the present invention is held directly by the customer before enters the theater, and after sitting, the device 100 is coupled to the left and right arm rests 30, respectively.

[71] On the other hand, the chair for providing the environmental effects further includes a power unit for supplying power to the device 100 for providing the environmental effects, and if the device 100 is coupled to a portion of the chair, accordingly, the power is supplied from the chair for providing the environmental effects. At this time, the device 100 for providing the environmental effects is coupled to the arm rest 30,

but may be coupled to other portions of the chair, while being not limited thereto. Further, the device 100 for providing the environmental effects includes a power unit 140 for storing power in the interior thereof, and the power unit 140 is charged from the outside to allow the device 100 to be available even when external power is not supplied.

[72] According to the present invention, a system for providing environmental effects includes a device 100 for providing the environmental effects, the device 100 having a housing detachably coupled to a portion of a chair, one or more effect mechanisms for providing the environmental effects according to control signals of an external device, and a communication unit 120 disposed on the housing to receive the control signals of the external device, and a theater server for producing the control signals controlling the effect mechanisms disposed on the device 100 to transmit the control signals to the effect mechanisms.

[73] At this time, the device 100 is detachably coupled to an arm rest 30 of the chair to provide the environmental effects of the effect mechanisms. Accordingly, the effect mechanisms of the device 100 of the present invention are coupled to a portion of the chair, so that the environmental effects can be uniformly provided for each customer and the device can be easily coupled even to a general chair. If the device 100 does not work, further, it is just removed from the chair and exchanged with new one, thereby allowing the operation of the theater to be efficiently kept, without stopping the operation of the chair.

[74] Further, the theater server controls playing of the content of the theater and also controls the effect mechanisms of the device 100 of the present invention. At this time, the theater server stores control data in which the control signals synchronized with the playing time of the special content are sequentially arranged and transmits the control signals synchronized with the playing time to the effect mechanisms as the content is played so as to control the whole or portion of the effect mechanisms. Accordingly, the effect mechanisms disposed on the device 100 of the present invention are controlled synchronized with the playing time of the content.

[75] Further, the theater server transmits the control signals synchronized with the playing time of the special content to a special effect generation mechanism coupled to the backrest, and at this time, the control signals can be transmitted through a wire or wireless network to the special effect generation mechanism coupled to the backrest. Otherwise, the control signals may be transmitted through the connection to a recording medium like a USB.

[76] It will be understood by those skilled in the art that the present invention may be embodied in other specific forms without departing from the spirit and essential characteristics thereof. Accordingly, it should be understood that the above-described em-

bodiments are only exemplary, but are not restrictive from any standpoint, that the scope of the present invention is defined by the accompanying claims, rather than the above detailed description, and that the meaning and scope of the claims and all changes and modifications derived from equivalents thereof should be interpreted as being included in the scope of the present invention.

Claims

[Claim 1] A device for providing environmental effects, comprising:
a housing;
one or more effect mechanisms disposed on the housing to provide the environmental effects according to control signals of an external device; and
a communication unit disposed on the housing to receive the control signals of the external device,
wherein the device is detachably coupled to a portion of a chair to provide the environmental effects of the effect mechanisms.

[Claim 2] The device according to claim 1, further comprising coupling members for coupling the housing to an arm rest of the chair.

[Claim 3] The device according to claim 2, wherein through the coupling members, the housing is coupled to the chair in such manner as to be rotatable around one end thereof.

[Claim 4] The device according to claim 2, wherein through the coupling members, the housing is coupled to the chair in such manner as to allow one end and the other end thereof to be detachably coupled to the left and right arm rests of the chair.

[Claim 5] The device according to claim 1, wherein the housing is coupled to the portion of the chair and serves as the arm rest for supporting a user's arm thereagainst.

[Claim 6] The device according to claim 1, wherein when the device is coupled to the portion of the chair, power is supplied from the chair.

[Claim 7] The device according to claim 1, further comprising a power unit for storing power, the power unit being charged from the outside to allow the device to be available while having no external power supply.

[Claim 8] The device according to claim 1, wherein the effect mechanisms comprise at least one or more modules selected from fan modules, strobe modules, fog production module, and color lighting modules.

[Claim 9] The device according to claim 1, further comprising a switch unit disposed on the housing to turn on/off the effect mechanisms.

[Claim 10] A chair for providing environmental effects, comprising:
a seat in which a user sits;
arm rests for supporting the user's arms; and
a device for providing the environmental effects, the device having one or more effect mechanisms for providing the environmental effects

according to control signals of an external device and a communication unit for receiving the control signals of the external device,
wherein the device is disposed on each arm rest or detachably coupled to each arm rest to provide the environmental effects of the effect mechanisms.

[Claim 11] The chair according to claim 10, wherein the device for providing the environmental effects is coupled to each arm rest in such manner as to be rotatable around one end thereof.

[Claim 12] The chair according to claim 10, wherein the device for providing the environmental effects is coupled to the chair in such manner as to allow one end and the other end thereof to be detachably coupled to the left and right arm rests of the chair.

[Claim 13] The chair according to claim 10, wherein if the device for providing the environmental effects is disposed on the arm rest, the device serves as the arm rest for supporting the user's arm, while at the same time providing the environmental effects.

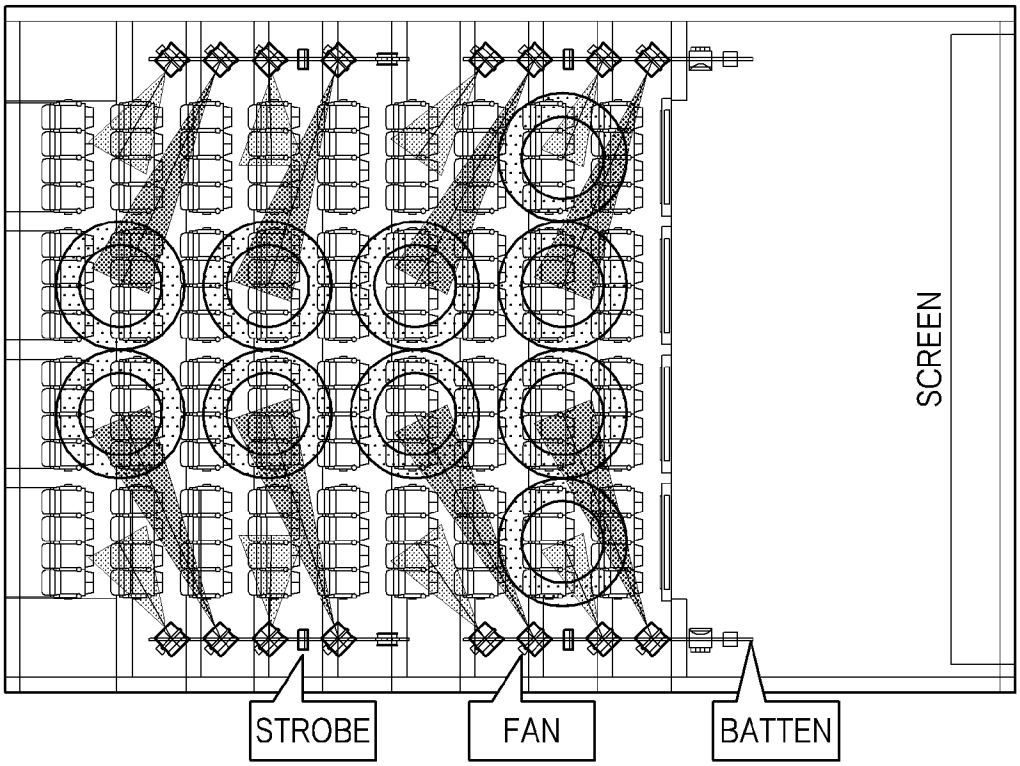
[Claim 14] The chair according to claim 10, further comprising a first power unit for supplying power to the device for providing the environmental effects, so that if the device for providing the environmental effects is coupled to the arm rest, the device receives the power from the first power unit.

[Claim 15] The chair according to claim 10, wherein the device for providing the environmental effects further comprises a second power unit for storing power therein, the second power unit being charged from the outside to allow the device to be available while having no external power supply.

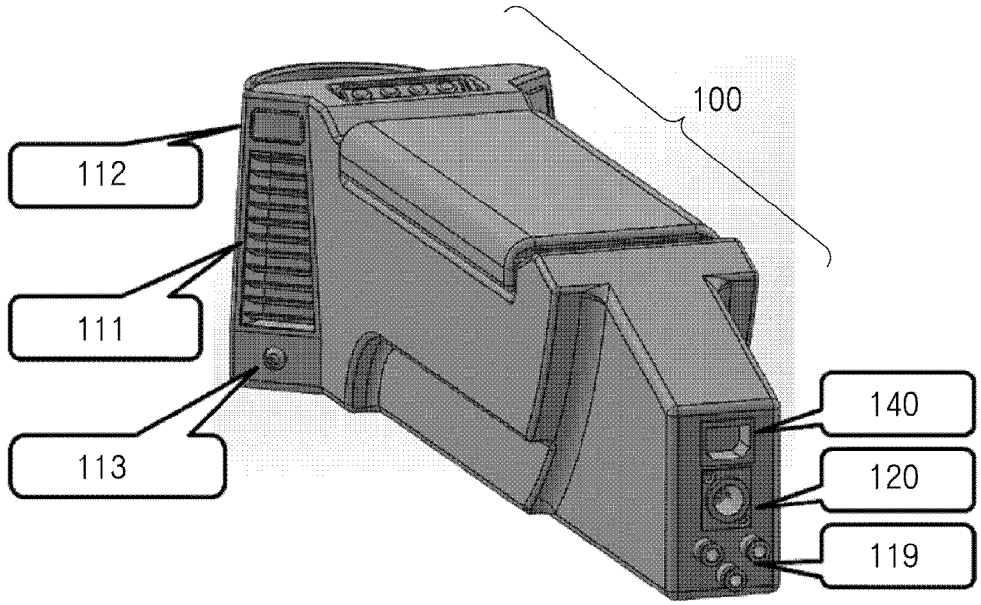
[Claim 16] The chair according to claim 10, wherein the effect mechanisms comprise at least one or more modules selected from fan modules, strobe modules, fog production module, and color lighting modules.

[Claim 17] The chair according to claim 10, wherein the device for providing the environmental effects further comprises a switch unit disposed on the housing to turn on/off the effect mechanisms.

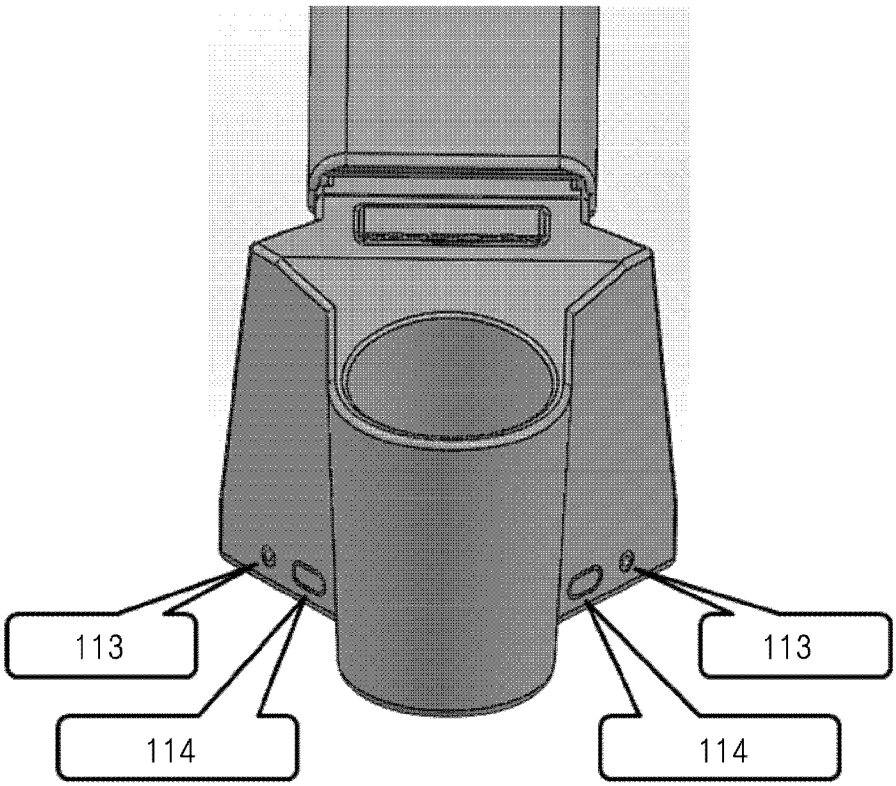
[Fig. 1]



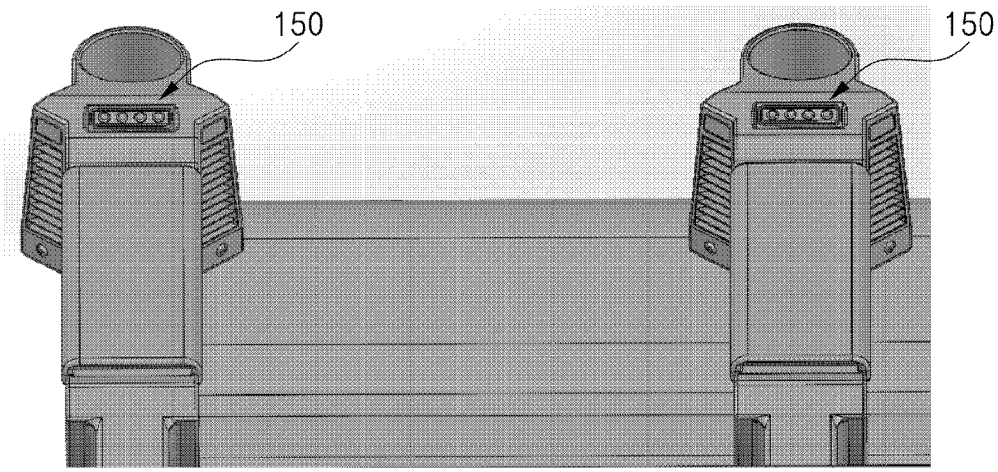
[Fig. 2]



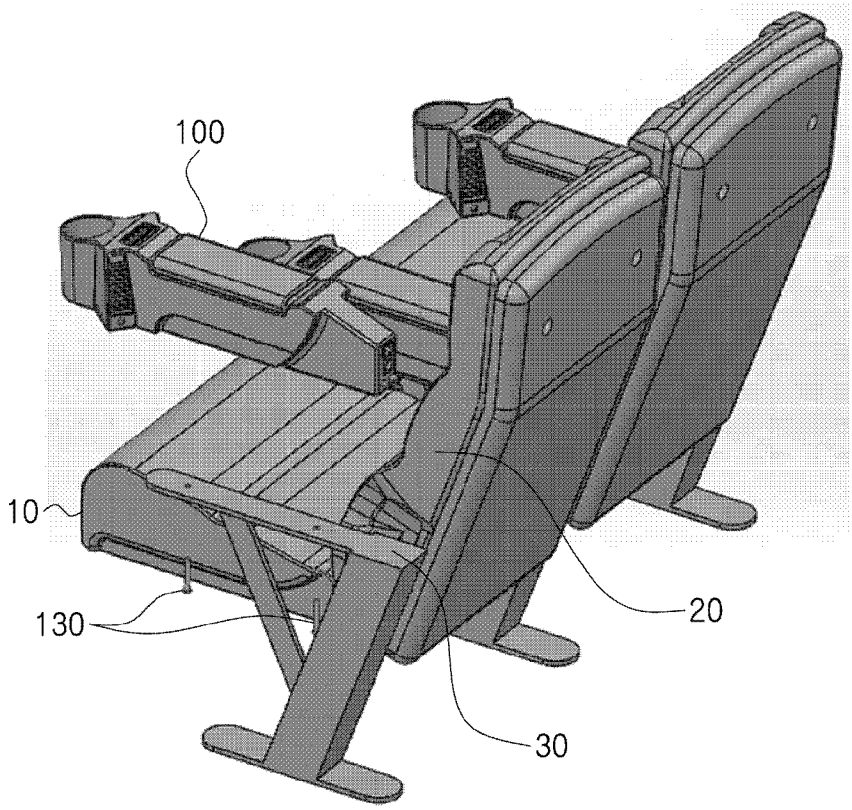
[Fig. 3]



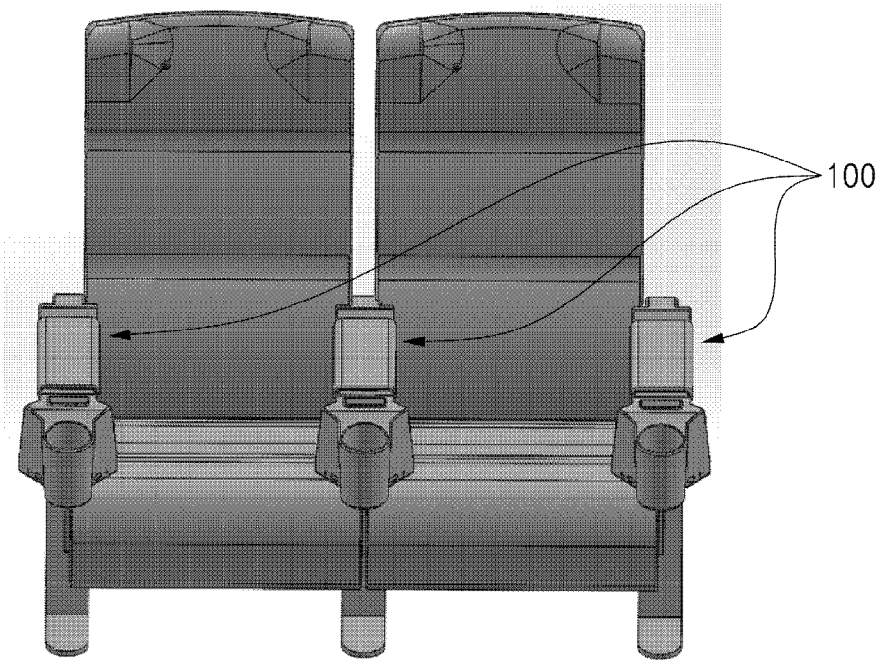
[Fig. 4]



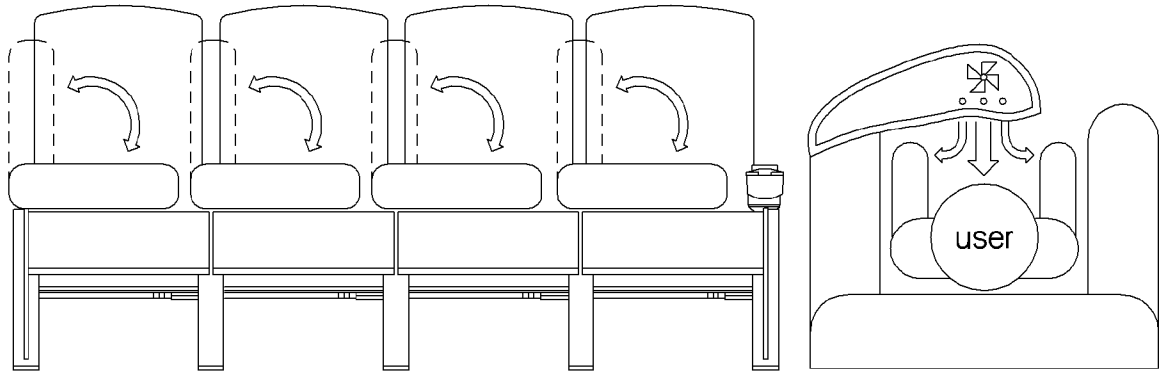
[Fig. 5]



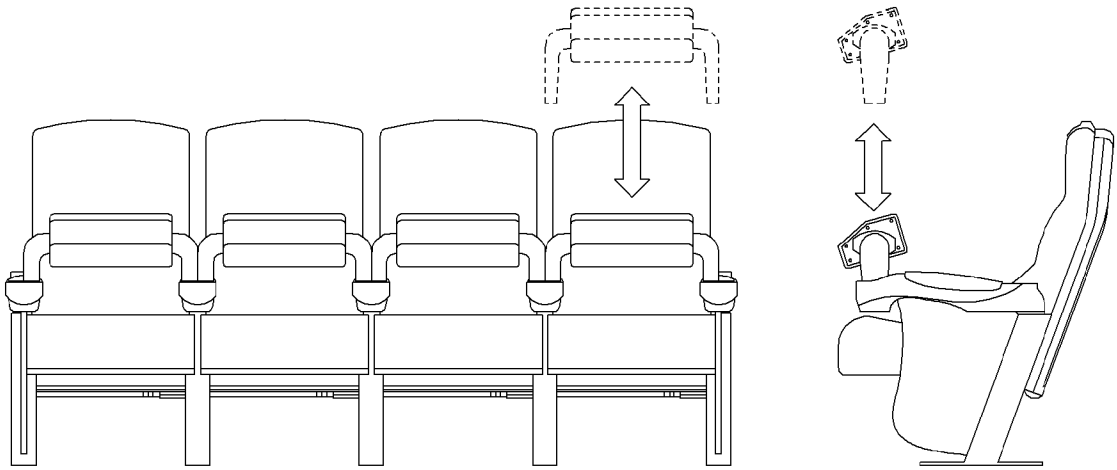
[Fig. 6]



[Fig. 7]



[Fig. 8]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2016/014915

A. CLASSIFICATION OF SUBJECT MATTER

A63J 25/00(2009.01)i, A47C 1/12(2006.01)i, A63J 5/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A63J 25/00; A47C 7/00; A47C 7/72; F25B 21/02; A47C 1/12; A47C 7/62; A63J 5/00

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) & Keywords: chair, 4D, arm rest, attach, detach, rotate, turn, effect, entertainment, virtual, power

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2015-076623 A1 (CJ 4DPLEX CO., LTD.) 28 May 2015 See paragraphs [0052]-[0058], [0065], [0069], [0111], [0112], claim 11, and figures 3, 4, 9, 10.	1,5-7
Y		2-4,8-17
Y	US 7857382 B2 (VITITO, CHRISTOPHER J.) 28 December 2010 See column 5, line 29 - column 6, line 25 and figures 2-4.	2-4,10-17
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2017 (23.03.2017)	**24 March 2017 (24.03.2017)**

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