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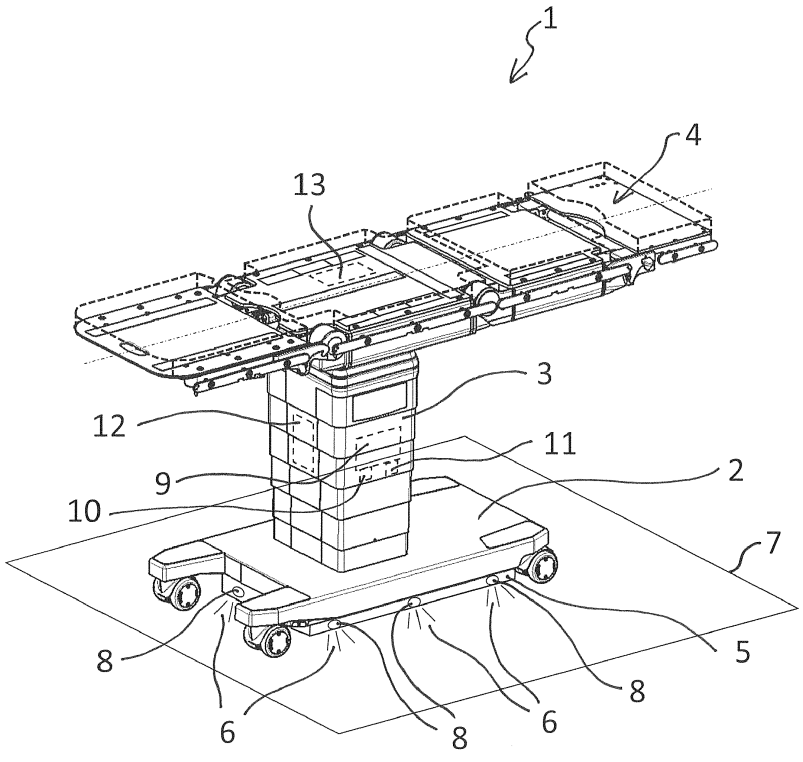
(54) OPERATING TABLE

(57) An operating table (1) is provided. The operating table (1) comprises an illuminant (5) attached to a component of the operating table (1) such that the illuminant (5) emits downwardly directed visible light signals(6), wherein the illuminant (5) is configured to emit light signals (6) having different characteristics. The operating table (1) further comprises a controller (9) configured to control the illuminant (5) to emit the light signals (6) having the different characteristics according to a specific state of the operating table (1).

Fig.1



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Description

[0001] The invention relates to an operating table, in particular to an integrated light messaging system of the operating table.

[0002] In an operating theatre, most of apparatuses of an equipment are emitting acoustic signals and warnings. In particular, an electrocardiogram, a device for measuring oxygen saturation, and anesthesia machines are almost constantly emitting such acoustic signals and warnings.

[0003] Due to such an overwhelming acoustic white noise, the operating personnel can suffer from a kind of signal and warning fatigue with the risk of ignored warnings and related possible patient safety issues.

[0004] Therefore, the object underlying the invention is to reduce the acoustic burden of the operating personnel in the operating theater and to provide an operating table enabled to signal operating states in a silent manner.

[0005] The object is achieved by an operating table according to claim 1 and a method according to claim 11. Advantages further developments are subject-matter of the dependent claims.

[0006] According to an aspect of the present invention, an operating table comprises an illuminant attached to a component of the operating table such that the illuminant emits downwardly directed visible light signals, wherein the illuminant is configured to emit light signals having different characteristics, and a controller configured to control the illuminant to emit the light signals having the different characteristics according to a specific state of the operating table.

[0007] By such a configuration of the operating table, operating states can be signaled optically in an obvious manner on a floor of the operating theater around the operating table. Therefore, signaling is not disturbed and covered by any other equipment, even if the patient is sterilely draped. Thus, the signaling is performed in a safe manner without generating noise and aggravating the acoustic situation in the operating theater.

[0008] In an advantageous implementation of the operating table, the different characteristics comprise different colors of the light signals.

[0009] When using different colors, the different colors can be associated with different meanings. For example, red color indicates a warning, blue color indicates approaching a load limit, and green color indicates repositioning of the patient.

[0010] In a further advantageous implementation of the operating table, the different characteristics comprise different continuities of the light signals.

[0011] A duration of the light signals can vary for signaling various severity levels of a state. E.g., a state which shall not exceed a predetermined time of duration can be signaled by steady light signals after the predetermined time had been elapsed and, if the state has not been altered afterwards, after a second predetermined time, the signals, e.g., blink at a certain frequency.

[0012] In a further advantageous implementation of the operating table, the different characteristics comprise combinations of different colors and different continuities of the light signals.

[0013] By using combinations of different colors and/or different continuities of the light signals, a variety of different states of the operating table can be signaled in a comprehensible manner by a specific color code, e.g., over a passage of time of a state, by changing a blinking frequency and afterwards by changing the color of the light signals.

[0014] In a further advantageous implementation of the operating table, the illuminant is attached to a bottom side of a patient support plate.

[0015] By providing the illuminant at the bottom side of a patient support plate, the illuminant is attached in a safe manner without the risk of being damaged by fallen objects and without being soiled by liquids.

[0016] In a further advantageous implementation of the operating table, the illuminant is attached to a base of the operating table.

[0017] Due to the position of the illuminant at the base of the operating table, a performance of the illuminant, and, therefore, a power consumption and procurement costs, can be reduced since a distance to the floor reflecting the light signals is small.

[0018] In a further advantageous implementation of the operating table, the illuminant comprises several light sources.

[0019] By providing several light sources, the light sources can be arranged such that the light signals are visible from different sides of the operating table.

[0020] In a further advantageous implementation of the operating table, the operating table comprises a load sensing device for determining a specific load state of the operating table, and the controller is configured to control the light signals depending on an output of the load sensing device.

[0021] When providing the load sensing device for the operating table, specific load conditions can be detected and, therefore, states associated with the load conditions, e.g. overload or approaching a position of the tabletop bringing the risk of tilting of the operating table, can be signaled.

[0022] In a further advantageous implementation of the operating table, the operating table comprises a position detection device for determining a specific positional state of the operating table, and the controller is configured to control the light signals depending on an output of the position detection device.

[0023] When providing the position detection device, specific patient positions which must not exceed a predetermined term can be monitored. For example, a patient position in more than 30 degrees Trendelenburg position without brakes must not exceed one hour, therefore, when signaling this positional state by a light signal, the condition of the patient can be monitored without gen-

erating additional noise.

[0024] In a further advantageous implementation of the operating table, the controller comprises an output terminal for controlling the illuminant and a further output terminal configured to control further illuminants attached to an apparatus other than the operating table.

[0025] Due to the output terminal for controlling the illuminant and also the further output terminal of the controller, there is an option for signaling the state of the operating table not only close to the operating table but, also, e.g., by framing a pendant, i.e. a medical support system, or by illuminating a wall with the same color code as emitted by the illuminant of the operating table.

[0026] According to a further advantages aspect of the invention, a method for messaging a specific state of an operating table includes the steps: determining the specific state of the operating table, controlling the illuminant by the controller according to the specific state of the operating table, and emitting light signals by the illuminant according to the control.

[0027] By such a method, operating states can be signaled optically in an obvious manner on a floor of the operating theater around the operating table. Therefore, signaling is not disturbed and covered by any other equipment, even if the patient is sterilely draped. Thus, the signaling is performed in a safe manner without generating noise and aggravating the acoustic situation in the operating theater.

[0028] In an advantageous implementation of the method, the specific state of the operating table is determined by detecting a specific load by the load sensing device.

[0029] When detecting the specific load of the operating table, states associated with the load conditions, e.g. overload or the risk of tilting of the operating table, can be signaled.

[0030] In a further advantageous implementation of the method, the specific load is a torque exerted on a tabletop of the operating table.

[0031] When detecting the torque exerted on the tabletop of the operating table, approaching a position of the tabletop bringing the risk of tilting of the operating table can be signaled.

[0032] In a further advantageous implementation of the method, the specific state is determined by detecting a specific position of the operating table by the position detection device.

[0033] When detecting the specific position of the operating table, specific patient positions which must not exceed a predetermined term can be monitored and signaled without generating additional noise.

[0034] In a further advantageous implementation of the method, the specific position is a Trendelenburg position and the Trendelenburg position is taken for a specific period of time.

[0035] When monitoring the Trendelenburg position without brakes, the condition of the patient can be monitored and signaled without generating additional noise.

[0036] The invention is now elucidated in detail by means of an embodiment referring to the attached drawings.

[0037] In particular,

Fig. 1 shows an embodiment of an operating table according to the invention provided with an integrated light messaging system; and

Fig. 2 shows a flowchart of a method according to the invention.

[0038] Fig. 1 shows an embodiment of an operating table 1 according to the invention provided with an integrated light messaging system.

[0039] The operating table 1 comprises a base 2, a column 3 and a tabletop 4.

[0040] The operating table 1 further comprises an illuminant 5 attached to a component of the operating table 1 such that the illuminant 5 emits downwardly directed visible light signals 6. In this embodiment, the component is the base 2 of the operating table 1.

[0041] The illuminant 5 is attached to a bottom side of the base 2. In alternative embodiments, the illuminant 5 can be attached to a bottom side of the tabletop 4 or to a lateral portion of any component of the operating table 1 as long as the emitted light is downwardly directed and a light emitting face of the illuminant 5 is not covered by e.g. a drape. By the downwardly directed light signals 6, a floor 7 is illuminated by the light signals 6 and the floor 7 reflects the light signals 6 such that they are visible for the operating personnel.

[0042] The illuminant 5 is configured to emit light signals 6 having different characteristics. The different characteristics comprise different colors of the light signals 6 and different continuities of the light signals 6. The different continuities cause e.g. a steady illumination or blinking of the illuminant 5. The operating table 1 comprises combinations of the different colors of the light signals 6 and of the different continuities. One of the combinations causes, e.g., a change of the color of steady light signals 6 after elapse of a first predetermined time and blinking of the light signals after a second predetermined time. In alternative embodiments, merely one of the color and the continuity is different, or the illuminant 5 merely emits light having one color and only one continuity.

[0043] The illuminant 5 comprises several light sources 8. The light sources 8 are respectively configured to emit light signals 6 having a specific color. The specific colors of the single light sources 8 can be identical or different such that operating the light sources 8 emitting the light having one of the specific colors results in the light signals 6 of the illuminant 5 having this specific color. The light sources 8 are arranged in the illuminant 5 such that they illuminate regions of the floor 7 adjacent to the base 2 of the operating table 1 on every side. Alternatively, not every side of the floor 7 adjacent to the base

2 of the operating table 1 is illuminated.

[0044] The operating table 1 further comprises a controller 9. The controller 9 is configured to control the illuminant 5 to emit the light signals 6 having the different characteristics according to a specific state of the operating table 1. The specific state of the operating table 1 comprises a specific load state and/or a specific positional state. The controller 9 comprises an output terminal 10 for controlling the illuminant 5. Optionally, the controller 9 comprises a further output terminal 11 configured to control further illuminants attached to an apparatus other than the operating table, e.g., at a medical supply unit or at a wall.

[0045] As also to be seen in Fig. 1, the operating table 1 comprises a load sensing device 12. The load sensing device 12 is configured to determine the specific load state of the operating table 1. The load state is a total load of the table top 4 or, alternatively, also a load on several components of the tabletop 4. The load sensing device 12 is provided with sensors arranged in the column 3, however, in an alternative embodiment, the sensors can also be arranged in the tabletop 4 and/or at the interface between the column 3 and the tabletop 4.

[0046] The operating table 1 is further provided with a position detection device 13. The position detection device 13 is configured to determine the specific positional state of the operating table 1. The positional state is a position of the entire table top 4 with respect to the column or, alternatively, also positions of several components of the tabletop 4. The position detection device 12 is provided with sensors arranged in the column 3, however, in an alternative embodiment, the sensors can also be arranged in the tabletop 4 and/or at the interface between the column 3 and the tabletop 4.

[0047] In use, in a method for messaging the specific state of the operating table 1, in Step S1, the specific state of the operating table 1 is determined. This is performed by detecting a specific load by the load sensing device 12 and/or by detecting a specific position by the position detection device 13. The specific load is a torque exerted on a table top of the operating table; however, alternatively, the specific load can also be, e.g., a total load due to a weight of a patient. One of the specific positions is a Trendelenburg position. In particular, it is detected whether the Trendelenburg position is taken for a specific period of time. Furthermore, alternatively, further states, as e.g. temperatures of motors by temperature sensors, can be detected.

[0048] In Step S2, the illuminant 5 is controlled according to the specific state of the operating table 1 by the controller 9 and, in Step S3, the light signals 6 are emitted by the illuminant 5 according to the control. Hereby, the color and the continuities of the emitted light signals 6 are controlled according to the specific state.

[0049] After Step S3, the course returns to Step S1 until the operation of the operating table 1 is stopped.

[0050] While the invention has been illustrated and described in detail in the drawings and the foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. The invention is not limited to the disclosed embodiment. From reading the present disclosure, other modifications will be apparent to a person skilled in the art. Such modifications may involve other features, which are already known in the art and may be used instead of or in addition to features already described herein.

[0051] The invention has been described in conjunction with an embodiment herein. However, other variations to the disclosed embodiment can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality.

Claims

1. An operating table (1) comprising
an illuminant (5) attached to a component of the operating table (1) such that the illuminant (5) emits downwardly directed visible light signals (6),
wherein the illuminant (5) is configured to emit the light signals (6) having different characteristics, and
a controller (9) configured to control the illuminant (5) to emit the light signals (6) having the different characteristics according to a specific state of the operating table (1).

2. The operating table (1) of claim 1, wherein
the different characteristics comprise different colors of the light signals (6).

3. The operating table (1) of claim 1 or 2, wherein
the different characteristics comprise different continuities of the light signals (6).

4. The operating table (1) of claim 2 or 3, wherein
the different characteristics comprise combinations of the different colors and the different continuities of the light signals (6).

5. The operating table (1) of any preceding claim, wherein
the illuminant (5) is attached to a table top (4).

6. The operating table (1) of anyone of claims 1 to 4, wherein
the illuminant (5) is attached to a base (2) of the operating table (1).

7. The operating table (1) of any preceding claim, wherein
the illuminant (5) comprises several light sources (8).

8. The operating table (1) of any preceding claim, wherein
the operating table (1) comprises a load sensing device (12) for determining a specific load state of the operating table (1), and
the controller (9) is configured to control the light signals (6) depending on an output of the load sensing device (12).

9. The operating table (1) of any preceding claim, wherein
the operating table (1) comprises a position detection device (13) for determining a specific positional state of the operating table (1), and
the controller (9) is configured to control the light signals (6) depending on an output of the position detection device (13).

10. The operating table (1) of any preceding claim, wherein
the controller (9) comprises an output terminal (10) for controlling the illuminant (5) and a further output terminal (11) configured to control further illuminants attached to an apparatus other than the operating table (1).

11. A method for messaging a specific state of an operating table (1) according to any preceding claim including the steps:

- determining the specific state of the operating table (1);
- controlling the illuminant (5) by the controller (9) according to the specific state of the operating table (1); and
- emitting light signals (6) by the illuminant (5) according to the control.

12. The method of claim 11, wherein the specific state of the operating table (1) is determined by detecting a specific load by the load sensing device (12).

13. The method of claim 12, wherein the specific load is a torque exerted on a table top (4) of the operating table (1).

14. The method of anyone of claims 11 to 13, wherein the specific state of the operating table (1) is determined by detecting a specific position of the operating table (1) by the position detection device (13).

15. The method of claim 14, wherein
the specific position is a Trendelenburg position and the Trendelenburg position is taken for a specific period of time.

Fig.1

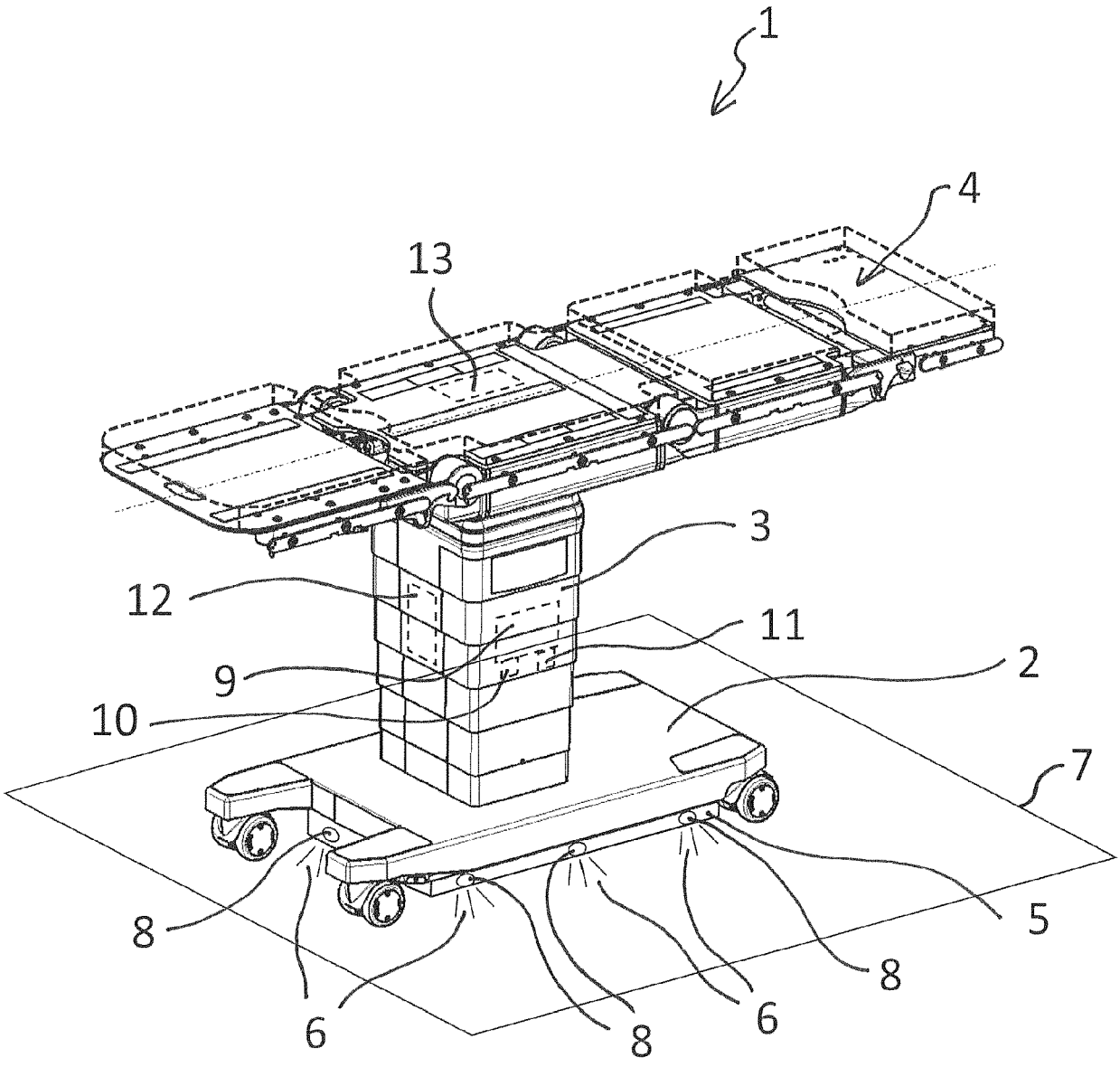
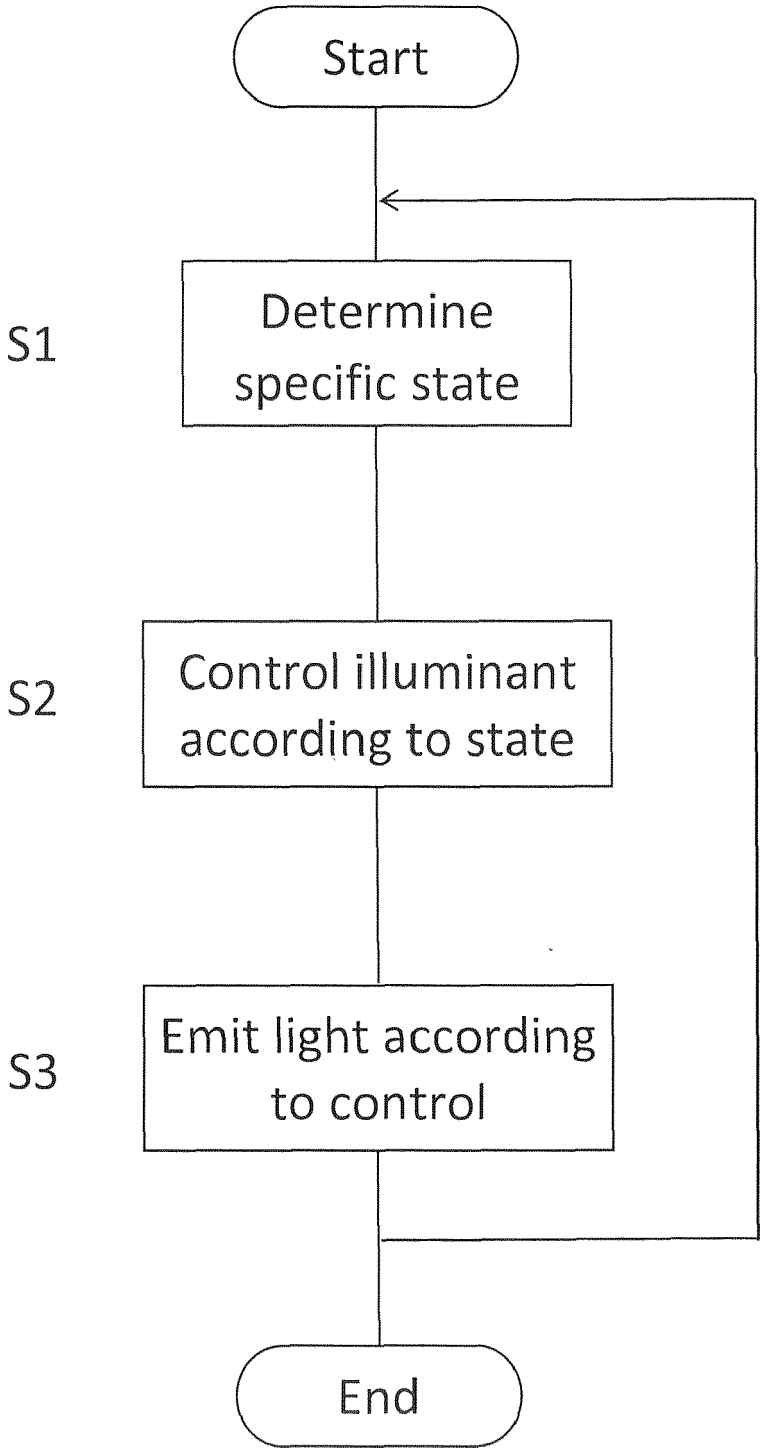


Fig.2


Start
S1
Determine specific state
S2
Control illuminant according to state
S3
Emit light according to control
End

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 0816

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	US 2015/257952 A1 (ZERHUSEN ROBERT M [US] ET AL) 17 September 2015 (2015-09-17) * paragraphs [0393], [0398]; figure 183 * -----	1,2,5-9, 11-15	
X	US 2008/094589 A1 (PANITZ GERALD [DE]) 24 April 2008 (2008-04-24) * paragraph [0026]; figure 1 * -----	1,5,10, 11	
			TECHNICAL FIELDS SEARCHED (IPC) A61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 October 2018	Kroeders, Marleen

CATEGORY OF CITED DOCUMENTS

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18-10-2018

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