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CLIMATE CONTROLLED RESTING UNIT FOR USE INSIDE A CAB OF A VEHICLE

(57)

A climate controlled resting unit for use inside a cab of a vehicle, such as a truck, is described. The resting unit comprises a mattress and a control unit configured to control the climate inside the mattress. The mattress is built up by an upper comfort layer with a top surface and a bottom surface, the comfort layer being provided with air passage channels extending from the bottom surface to the top surface in selected areas of the comfort layer; and a lower support layer, configured to support the upper comfort layer and comprising at least one air collection space and entrance channels giving access to the at least one air collection space. The control unit is powered by vehicle battery power, and comprises a thermoelectric device configured to thermally condition air, an air transfer device configured to transfer the conditioned air into the entrance channels, and a controller configured to control the operation of the thermoelectric device and the transfer device.

CLIMATE CONTROLLED RESTING UNIT FOR USE INSIDE A CAB OF A VEHICLE

FIELD OF THE INVENTION

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The invention relates to a climate controlled resting unit for use inside a cab of a vehicle, in particular the cab of a truck. The invention also relates to a cab of a vehicle, in particular a cab of a truck, comprising the resting unit.

10 BACKGROUND OF THE INVENTION

Drivers of a vehicle having a cab configured for prolonged resting, for instance an overnight sleep, need comfort to be able to take their rest efficiently, i.e. achieving a maximum level of fitness within a shortest possible time. A factor influencing the resting or sleeping quality is the climate within the cab, and this climate within the cab should preferably be able to promote an efficient rest. The temperature within the cab for instance may be held within given boundaries, which boundaries may at least partly depend on the sensibility of the driver. One driver will soon find the climate within the cab too warm, while another driver may experience difficulties in getting sleep because the climate is too chilly for him. Besides temperature, other climate factors like humidity for instance may also have an influence on the ability to take an efficient rest.

There is a need therefore for a driver to be able to control the climate within the vehicle's cab, and adjust this climate according to his or her needs. The available power in a vehicle is limited however, and state of the art solutions aiming to control the cab's climate tend to require too much energy. A typical battery of a vehicle for instance may provide 500 to 1200 amps at 12 volt which equals 6 to 14,4kW. This may be too low for a sustained climate control during a nights sleep. Other solutions, such as those requiring fuel are often found undesirable for cost reasons and are typically used for heating only.

It is an aim of the invention to provide for an efficient climate control within a cab of a vehicle, in particular the cab of a truck, achieving the comfort beneficial to an efficient rest of the driver of the vehicle, or other person present in the cab.

BRIEF SUMMARY OF THE INVENTION

The invention thereto provides a climate controlled resting unit according to claim 1.

5 The climate controlled resting unit in accordance with the invention is configured for use inside a cab of a vehicle, such as a truck, and comprises a mattress and a control unit configured to control the climate inside the mattress, wherein the mattress comprises an upper comfort layer with a top surface and a bottom surface, the comfort layer being provided with air passage channels extending from the bottom surface to the
10 top surface in selected areas of the comfort layer; and a lower support layer, configured to support the upper comfort layer and comprising at least one air collection space and entrance channels giving access to the at least one air collection space; wherein the control unit is powered by vehicle battery power, and comprises a thermoelectric device configured to thermally condition air, an air transfer device configured to transfer the
15 conditioned air into the entrance channels, and a controller configured to control the operation of the thermoelectric device and the transfer device.

By providing climate control within the resting unit itself, power requirements are reduced considerably. Further, the claimed resting unit provides the desired climate
20 right where it is needed, i.e. relatively close to the person's body laying on the mattress of the resting unit. The upper comfort layer in addition may be designed for maximum comfort to the person residing on the mattress.

It has further been established that the at least one air collection space provided within
25 the lower support layer is instrumental in providing an efficient and comfortable climate control in that it acts as a kind of buffering space for the conditioned air. The buffered air is able, at least for a short amount of time, to interact with the environment, which also comprises the person's body on the mattress. Any fluctuations in the temperature of the conditioned air for instance may be levelled out somewhat, which adds to the level
30 of comfort experienced by the person.

An embodiment of the invention relates to a resting unit wherein the mattress further comprises an air conveying layer interposed between the comfort layer and the support layer, the air conveying layer having a top surface and a bottom surface, and comprising

air passage channels extending from its bottom surface to its top surface in selected areas of the air conveying layer. The air conveying layer of the mattress helps in increasing the mattresses comfort level, and provides an efficient climate control inside the mattress.

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The layers of the mattress may be permeable to conditioned air to some degree. Such permeability allows to fluid communication between the at least one air collection space and the comfort layer and/or of the air conveying layer. A particularly useful embodiment of the resting unit according to the invention provides that the air passage
10 channels of the comfort layer and/or of the air conveying layer are positioned in direct fluid communication with the at least one air collection space.

The at least one air collection space may be one air collection space provided in the support layer. However, the support layer may also be provided with two or more of
15 said air collection spaces. The at least one air collection space may be void but may also be filled with material, permeable to conditioned air. In an embodiment of the resting unit according to the invention, the at least one air collection space is provided with a spacer fabric. Such a spacer fabric has proven to provide a particularly efficient transfer of conditioned air in that an optimum combination may be achieved between the
20 buffering of conditioned air and the easy release of such air towards the air conveying layer and/or upper comfort layer. Furthermore, the spacer fabric provides a stable air space which both gives comfort and does not collapse easily due to the weight of the user. A spacer fabric is also known as a 3D fabric or a 3D textile. Such a spacer fabric may have a 3D fiber structure, such as a 3D knitted structure. Said 3D fiber structure
25 provides an elastic behavior towards pressure loads.

Preferably the spacer fabric has a thickness in the range between 3 mm and 30 mm.

In a resting unit according to a preferred embodiment, the at least one air collection space is provided with a perforated cover bag, comprising the spacer fabric.
30 The perforated cover bag may be made of flexible materials with low air permeability, such as plastics, non-woven materials or other types of fabric. The size of the bag in combination with the size of the spacer fabric shall be large enough to not collapse under the weight of the user, preferably 300 mm x 300mm minimum, more preferably larger than the width of the body of the user, even more preferably extending

substantially up to a full size of the mattress.

The perforations in the perforated cover bag are arranged for allowing air to escape at certain positions while supporting a pressure build-up inside the perforated cover bag.

In this way, the pressure inside the perforated cover bag is substantially uniform. A

5 person skilled in the art may suitably select the number, size and shape of the perforations to support a substantially uniform pressure inside the perforated cover bag.

The perforations are located at zones at a top surface of the lower support layer where the escaping air from the perforations is directed into air passage channels of the layers

of the mattress towards the body of the user. In particular, the perforations of the cover
10 bag are located at the top surface of the lower support layer in positions which at least partially overlap with air passage channels of the contacting upper comfort layer or of the air conveying layer, which contacts the lower support layer.

In a particular example, an opening of the air passage channels of the upper comfort layer or the air conveying layer, respectively, is selected larger than an opening of the

15 perforations. In this way, a considerable overlap between the perforations and the air passage channels is easily supported.

The support layer is configured to support at least the upper comfort layer and preferably further layers provided on top of it, such as the optional air conveying layer.

20 According to a practical embodiment of the invented resting unit, the support layer comprises a structural foam in which the entrance channels and/or the at least one air collection space have been removed or excised. Removal may have been performed by any method known in the art, such as by cutting, sawing, hot wire cutting, milling, molding, and the like.

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A structural foam in the context of the present application may be a flexible polyurethane foam, may be a viscoelastic foam and may be a spacer fabric. Flexible polyurethane foams according to the present application preferably have a density between 30 and 80 kg/m³.

30 The hardness of the structural foam results in a high comfort for the user and provides sufficient strength to prevent collapsing of the entrance channels. Preferably the hardness of the structural foam is between 2,5 kPa and 6,0 kPa (measured as CLD - compression load deflection- hardness at 40% load according to ISO3386-1).

In an embodiment, the upper comfort layer comprises a structural foam, which is a relatively softer type, wherein the support layer and / or the air conveying layer comprises a structural foam, which is a relatively harder type. Thus, the hardness of the comfort layer is lower than the hardness of the support layer and / or the air conveying layer.

The use of structural foam in the support layer may provide entrance channels with walls that are stiff enough to carry the loads on the support layer, including a person's weight. In a useful embodiment of the resting unit, the entrance channels are provided with a wall stiffening insert in order to at least avoid partial collapse of the walls of the entrance channels.

The structural foam may in an embodiment be a reticulated foam exhibiting a skin-core structure in which the skins are relatively solid and in which the core is foamed and contains air pockets. The skins may also contain air pockets but the porosity of the skins in structural foam is less than the porosity of the core. Structural foam may be made by a low pressure injection molding process where an inert gas is introduced into melted polymer in a mold. As the polymer flows through the mold, the surface cells collapse and solid skins are formed against the walls of the mold, while the core of the part remains structurally foamed.

The comfort layer may be made of any material suitable for its use. A particularly useful embodiment is provided by a resting unit wherein the comfort layer comprises viscoelastic foam.

The optional air conveying layer may also be made of any material suitable for its use. Yet a useful embodiment of the invention provides a resting unit wherein the air conveying layer comprises structural foam, such as a reticulated foam. Structural foams are known per se, and comprise a relatively porous, low density solid foam. Structural foam is an open foam and comprises few, if any, intact air pockets or cell windows. Most air pockets in a structural foam are open and it is substantially only the lineal boundaries where the air pockets meet (also referred to as Plateau borders) that remain.

Although not essential to the invention, an embodiment of the resting unit according to the invention has an air conveying layer that further comprises pocket springs.

5 The entrance channels in the support layer of the resting unit may extend in any direction needed for the purpose of introducing conditioned air in the air collection space or spaces. For instance, the lower support layer may have a top surface and a bottom surface, whereas the entrance channels may extend from the bottom surface towards or to the top surface in selected areas of the support layer. A useful embodiment that *inter alia* saves space provides a lower support layer with a top surface
10 and a bottom surface, wherein the entrance channels extend substantially parallel to its bottom surface in selected areas of the support layer.

The wording substantially in the context of the present application is meant to denote a possible deviation of the value of a given entity of at most 20% of the value, more
15 preferably of at most 15%, even more preferably of at most 10%, even more preferably of at most 5%, and most preferably of at most 1% of the value.

An embodiment of the resting unit that provides increased comfort to a person making use of it comprises a comfort layer that is further provided with air passage channels
20 extending substantially parallel to its bottom surface in selected areas of the comfort layer. Such channels provide for a more even distribution of the conditioned air within the comfort layer and towards the person resting on top of the mattress.

In a preferred embodiment of the resting unit the parallel air passage channels extend
25 substantially parallel to a head edge of the mattress.

Further improvement of the comfort level is achieved in an embodiment of the resting unit wherein the selected area of the comfort layer and/or of the air conveying layer is located in a shoulder and/or lower back area of the mattress. The surficial area not
30 covered by the selected area does not transfer or emit conditioned air towards the resting person to any substantial degree.

The control unit may be provided as a collection of separate items, at least comprising the claimed and powered thermoelectric device, the air transfer device, and the

controller, as well as air transfer channels that connect to the entrance channels of the mattress. Some or all of the items may be incorporated in parts of the cab, such as spaces behind the walls of the cab, or under seats for instance. A preferred embodiment however provides a resting unit wherein the control unit items are accommodated in a housing. The housing for the control unit is in another preferred embodiment positioned
5 against a head edge or against a foot edge of the mattress.

In a space-saving embodiment of the resting unit according to the invention, the housing extends over a height substantially higher than the height of the mattress. Preferably the height of the housing extends at least 5 cm higher than the height of the mattress. In this
10 way it is prevented or at least discouraged that a part of the housing's upper side is covered by a pillow or for by the feet of a person resting on the mattress.

Another embodiment of the invention provides a resting unit wherein a side wall of the housing is provided with a surplus air outlet for excessive air. When the housing of the control unit has the shape of a box with a long side extending along the head or foot
15 edge of the resting unit and side walls extending substantially perpendicular to the long side, the surplus air outlet directs the excessive air in a direction substantially perpendicular to a side edge of the resting unit. This is beneficial in an embodiment wherein the resting unit is positioned within the cab between two walls (a head side wall and a foot side wall) of the cab, since the excessive air is then blown towards the inner
20 space of the cab.

In a particular embodiment, at least one air intake opening is arranged at a side of the housing different from a side of a location of a surplus air outlet for excessive air. For
25 example, said at least one air intake opening is arranged at one of an upper side and a side wall of the housing and the surplus air outlet for excessive air is arranged at another one of the upper side and a side wall of the housing. In this way, recirculation of the expelled excessive air, which is optionally heated or cooled by the thermoelectric device, such as a Peltier element, and expelled by the surplus air outlet, is prevented or
30 at least minimized by the separated air flow.

The mattress of the resting unit according to an embodiment of the invention is provided within a cover. The cover is preferably permeable to air at the top side of the mattress. The cover may also be applied around part of the mattresses layers, such as

around the comfort layer, around the support layer, around the optional air conveying layer, or around any combination of these layers.

5 The resting unit according to the invention is particularly useful for accommodating in relatively small spaces, such as provided by a cab of a vehicle or truck in particular, which spaces may also be subject to large climatic variations and mechanical solicitations, such as vibrations. Besides in truck, such spaces may also be present in other vehicles, such as in passenger cars or vans, but also in train compartments, in tramways or busses. The resting unit may be any resting unit configured for use in such
10 vehicles, such as a bed, a seat, a chair, a couch, a bench, a sofa, and the like. A resting unit is configured for use in a cab of a vehicle if its dimensions are such that the resting unit can be accommodated in the space of the cab allocated for such use.

An embodiment of the invention provides a resting unit that comprises a mattress
15 having a thickness of between 10 and 25 cm. The layered structure of the mattress comprising the claimed support layer allows for such relatively limited dimensions, and yet provides the desired level of comfort to a person resting on the mattress.

It is expressly stated that the embodiments of the invention described in this patent
20 application can be combined in any possible combination of these embodiments, and that each embodiment can individually form the subject-matter of a divisional patent application.

BRIEF DESCRIPTION OF DRAWINGS

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The invention will now be elucidated with reference to the following figures, without however being limited thereto. In the figures:

Fig. 1 is a schematic perspective view of a cab of a vehicle comprising a climate
30 controlled resting unit according to an embodiment of the invention;

Fig. 2 is a schematic perspective view of a climate controlled resting unit according to an embodiment of the invention;

Fig. 3 is a schematic perspective view of a mattress of a climate controlled resting unit according to an embodiment of the invention;

Fig. 4 is a schematic perspective view of a control unit of a climate controlled resting unit according to an embodiment of the invention; and

Fig. 5 is a schematic perspective view of a climate controlled resting unit according to an embodiment of the invention.

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DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows a schematic perspective view of a cab of a vehicle comprising a climate controlled resting unit according to an embodiment of the invention. The cab 20 of the vehicle 10, such as a truck, comprises the climate controlled resting unit 100. The climate controlled resting unit 100 comprises a mattress 120 and a control unit (not shown) configured to control the climate inside the mattress. The control unit is powered by vehicle battery power carried by the vehicle 10, which vehicle battery power is preferably accommodated outside the cab 20.

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The climate controlled resting unit 100 including the mattress 120 may be arranged inside the cab 20 as a lower bed 100a and/or may be arranged inside the cab 20 as an upper bed 100b. Each of the lower bed 100a and upper bed 100b may be movably arranged individually to be pivotable about an axis between a horizontal operational resting position and a standby position, which is substantially vertical. In the operational resting position the climate controlled resting unit 100 functions as bed for resting. In the vertical standby position the climate controlled resting unit 100 occupies less foot print, thereby leaving more living space for personal of the cab 20 of the vehicle 10. The vehicle battery power may be typically in the range of 12V, 24V or alike voltage levels.

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Fig. 2 is a schematic perspective view of a climate controlled resting unit according to an embodiment of the invention. The climate controlled resting unit 100 comprises a mattress 120 and a control unit 140. The mattress 120 has a top surface 121 being shaped substantially rectangular, wherein the mattress 120 has a head edge and a foot edge arranged at each end, respectively, of the top surface 121 along a length direction L of the mattress 120. The control unit 140 is arranged against the head edge or the foot edge of the mattress 120. The control unit 140 comprises a housing 144, which extends over a height in a direction as indicated by arrow h, which is substantially equal to a

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height of the mattress 120 in the direction h. The housing 144 further comprises at least one air intake opening 142 arranged for allowing taking in air into the control unit 140. Other components of the control unit 140 are further shown in relation to Figure 4.

5 Fig. 3 is a schematic perspective view of a mattress of a climate controlled resting unit according to an embodiment of the invention. The climate controlled resting unit 100 comprises the mattress 120. The mattress 120 comprises an upper comfort layer 122 with a top surface 121 and a bottom surface 123, the comfort layer 122 being provided with air passage channels 124 extending from the bottom surface 123 to the top surface
10 121 in selected areas 125a, 125b, 125c of the comfort layer 122. Additionally the mattress 120 comprises a lower support layer 130, configured to support the upper comfort layer 122 and comprising one air collection space 132 and at least one entrance channel 150 giving access to the one air collection space 132 from outside the support layer 130. The conditioned air is supplied by the control unit 140 as shown in Figure 4
15 towards the one air collection space 132 using the entrance channels 150. In an embodiment, using two entrance channels 150 instead of one entrance channel 150 improves the uniformity of the temperature of the conditioned air inside the air collection space 132. The air collection space 132 is shaped to connect to a major part of the bottom surface 123 of the comfort layer 122. In this way the conditioned air
20 contained inside the air collection space 132 may be easily fed into the air passage channels 124 extending from the bottom surface 123 to the top surface 121 in the selected areas 125a, 125b, 125c of the comfort layer 122. As such, the air passage channels 124 of the comfort layer 122 are positioned in direct fluid communication with the one air collection space 132.

25 It has been established that the at least one air collection space 132 provided within the lower support layer 130 is instrumental in providing an efficient and comfortable climate control in that it acts as a kind of buffering space for the conditioned air. The buffered air is able, at least for a short amount of time, to interact with the environment,
30 which also comprises the person's body on the mattress. Any fluctuations in the temperature of the conditioned air for instance may be levelled out somewhat, which adds to the level of comfort experienced by the person.

By providing climate control within the resting unit 100 itself, power requirements are

reduced considerably. Further, the resting unit 100 provides the desired climate right where it is needed, i.e. relatively close to the person's body laying on the mattress 120 of the resting unit 100. The upper comfort layer 122 in addition may be designed for maximum comfort to the person residing on the mattress 120.

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The selected areas (125a, 125b, 125c) of the comfort layer 122 are located in a head area, back area and foot area of the mattress, respectively. The surficial area not covered by the selected areas (125a, 125b, 125c) does not transfer or emit conditioned air towards the resting person to any substantial degree.

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Alternatively, the selected area of the comfort layer 122 may be located in a shoulder and/or lower back area of the mattress 120.

The air collection space 132 in the embodiment shown in figure 3 is provided with a
15 spacer fabric 133, which substantially fills the air collection space 132. Such a fabric 133 has proven to provide a particularly efficient transfer of conditioned air in that an optimum combination may be achieved between the buffering of conditioned air and the easy release of such air towards the upper comfort layer 122. In an example, the spacer fabric is shaped as a layer having a thickness of about 10 mm, but other thicknesses are
20 also possible. The air collection space 132 in this example has a height of about 10 mm and is substantially completely filled by the spacer fabric.

Additionally, the air collection space 132 may be provided with a perforated cover bag 133, comprising the spacer fabric. The spacer fabric provides a stable air space which
25 both gives comfort but does not collapse easily due to the weight of the user.

The perforated cover bag may be made of flexible materials with low air permeability, such as plastics, non-woven materials or other types of fabric. The size of the bag shall be large enough to not collapse under the weight of the user, preferably 300 mm x 300mm minimum, more preferably larger than the width of the body of the user, even
30 more preferably extending substantially up to a full size of the mattress.

The perforations in the perforated cover bag are arranged for allowing air to escape at certain positions while supporting a pressure build-up inside the perforated cover bag. In this way, the pressure inside the perforated cover bag is substantially uniform. A person skilled in the art may suitably select the number, size and shape of the

perforations to support a substantially uniform pressure inside the perforated cover bag. The perforations are located at zones at a top surface of the lower support layer 130 where the escaping air from the perforations is directed into air passage channels 124 of the comfort layer 122 of the mattress 100 towards the body of the user. In particular, the perforations of the cover bag are located at the top surface of the lower support layer 130 in positions which at least partially overlap with air passage channels 124 of the contacting upper comfort layer 122, which contacts the lower support layer 130. In a particular example, an opening of the air passage channels of the upper comfort layer 124 is selected larger than an opening of the perforations. In this way, a considerable overlap between the perforations and the air passage channels 124 is easily supported.

The support layer 130 is configured to support at least the upper comfort layer 122 and preferably further layers provided on top of it, such as an optional air conveying layer. The support layer 130 comprises a structural foam in which the entrance channels 150 and the air collection space 132 have been removed or molded.

A suitable structural foam to be used in the support layer 130 is a flexible polyurethane foam having a density between 30 and 80 kg/m³.

The use of structural foam in the support layer 130 may provide entrance channels 150 with walls that are stiff enough to carry the loads on the support layer 130, including a person's weight. In an alternative embodiment of the resting unit 100, the entrance channels 150 are provided with a wall stiffening insert in order to at least avoid partial collapse of the walls of the entrance channels 150.

In an example the comfort layer 122 of any of the embodiments shown in figures 1-5 comprises viscoelastic foam.

Fig. 4 is a schematic perspective view of a control unit of a climate controlled resting unit according to an embodiment of the invention. The control unit may be used in combination with the mattress 120 shown in Figure 3 or the mattress 220 shown in Figure 5. The control unit 140 comprises a housing 144. In the perspective view of Figure 4 a part of the housing 144 is not shown in order to show other components of

the control unit 140. The housing 144 is arranged to accommodate an air conditioning unit comprising at least one thermoelectric device 146a, 146b and at least one air transfer device 148a, 148b in the form of blowers, and a controller (not shown). The at least one thermoelectric device 146a, 146b, such as a Peltier element unit, is configured to thermally condition air, including heating or cooling the air on demand. Each air transfer device 148a, 148b, such as a fan, is connected to a corresponding thermoelectric device 146a, 146b and configured to transfer air through the corresponding thermoelectric device 146a, 146b and to transfer conditioned air into one of the entrance channels 150a, 150b. Additionally, each of the at least one air transfer device 148a, 148b is connected to an air outlet channel 149 having an surplus air outlet arranged at a side wall of the housing 144 for expelling excessive air from the control unit 140, as is also shown in Figures 2 and 5.

The housing 144 provides additional benefits including sound reduction of the air transfer device 148a, 148b and thermal insulation of the conditioned air between the thermoelectric device 146a, and 146b and the entrance channels 150a and 150b.

Additionally, as shown in Figure 4, the housing 144 may be arranged to enclose air channels, which connect the thermoelectric device 146a, 146b to the corresponding entrance channels 150a and 150b.

The housing 144 of the control unit 140 has the shape of a box with a long side extending along the head or foot edge of the resting unit and side walls extending substantially perpendicular to the long side. The surplus air outlet directs the excessive air in a direction substantially perpendicular to a side edge of the resting unit 100. This is beneficial in an embodiment wherein the resting unit is positioned within the cab between two walls (a head side wall and a foot side wall) of the cab, since the excessive air is then blown towards the inner space of the cab.

The controller is configured to control the operation of the thermoelectric device 146a, 146b and the air transfer device 148a, 148b.

In alternative embodiments, other forms of air conditioning units, such as an air compressor system, may be used to condition the air delivered to the mattress 120, 220 shown in Figures 2 – 3 and 5.

The housing 144 may further accommodate a user interface for receiving an input from

a user to the controller for controlling the control unit. Alternatively, the user may use a mobile device to provide an input to the controller for controlling the control unit 140. The housing 144 may further accommodate at least one low power outlet, such as an USB outlet.

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Fig. 5 is a schematic perspective view of a climate controlled resting unit according to an embodiment of the invention. The climate controlled resting unit 200 comprises a mattress 220 and a control unit 140. The mattress 220 has a top surface 221 being shaped substantially rectangular, wherein the mattress 220 has a head edge and a foot edge arranged at each end, respectively, of the top surface 221 along a length direction L of the mattress 220. The control unit 140 is arranged against the head edge or the foot edge of the mattress 220. The control unit 140 comprises a housing 144, which extends over a height in a direction as indicated by arrow h, which is substantially higher than a height of the mattress 220 in the direction h. Preferably the height of the housing extends at least 5 cm higher than the height of the mattress. In this way it is prevented or at least discouraged that a part of the housing's upper side is covered, for instance for by a pillow, blanket or by the feet of a person resting on the mattress.

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The housing 144 further comprises at least one air intake opening 142 arranged for allowing taking in air into the control unit 140. The at least one air intake opening 142 is arranged at an upper side of the housing 144.

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Due to the height of the housing 144 with respect to the mattress 220, the at least one air intake opening 142 is not covered, for instance by a pillow, blanket or by the feet of a person resting on the mattress.

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In exemplary embodiments, the at least one air intake opening 142 may include a replaceable or washable filter.

Other components of the control unit 140 are further shown in relation to Figure 4.

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The mattress 220 comprises an upper comfort layer 222 with a top surface 221 and a bottom surface 223, the comfort layer 222 being provided with air passage channels 224 extending from the bottom surface 223 to the top surface 221 in selected areas 225a, 225b of the comfort layer 222.

Additionally, the mattress 220 comprises a lower support layer 230, configured to support the upper comfort layer 222 and comprising two air collection spaces 232a,

232b and at two entrance channels 250a, 250b, each giving access to one of the two air collection spaces 232a, 232b from outside the support layer 130. The conditioned air is supplied by the control unit 140 as shown in Figure 4 towards each of the air collection spaces 232a, 232b individually using the entrance channels 250a, 250b, respectively.

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Additionally, the mattress 220 further comprises an air conveying layer 240 interposed between the comfort layer 222 and the support layer 230, the air conveying layer 240 having a top surface 241 and a bottom surface 243, and comprising air passage channels 244 extending from its bottom surface 243 to its top surface 241 in selected areas 245a, 245b of the air conveying layer 240. The air conveying layer 240 of the mattress 220 helps in increasing the mattresses 220 comfort level, and provides an efficient climate control inside the mattress 220.

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The comfort layer 222 and air conveying layer 240 of the mattress 220 may be permeable to conditioned air to some degree. Such permeability allows fluid communication between the at least one air collection space 232a, 232b and the comfort layer 222 and/or of the air conveying layer 240. The air passage channels 224 of the comfort layer and the air passage channels 244 of the air conveying layer are positioned in direct fluid communication with the at least one air collection space 232a, 232b, respectively.

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Additionally, each of the air collection spaces 232a, 232b may be provided with a perforated cover bag, comprising a spacer fabric. The spacer fabric provides a stable air space which both gives comfort but does not collapse easily due to the weight of the user.

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In an example, the spacer fabric may be a 3Mesh® product available from Mueller Textil Group. The skilled person may suitably select other spacer fabrics.

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The perforated cover bag may be made of flexible materials with low air permeability, such as plastics, non-woven materials or other types of fabric. The size of the bag shall be large enough to not collapse under the weight of the user, preferably 300 mm x 300mm minimum, more preferably larger than the width of the body of the user, even more preferably extending substantially up to a full size of the mattress.

The perforations in the perforated cover bag are arranged for allowing air to escape at certain positions while supporting a pressure build-up inside the perforated cover bag.

In this way, the pressure inside the perforated cover bag is substantially uniform. A person skilled in the art may suitably select the number, size and shape of the perforations to support a substantially uniform pressure inside the perforated cover bag. The perforations are located at zones at a top surface of the lower support layer 130

5 where the escaping air from the perforations is directed into air passage channels 244 of the air conveying layer 240 of the mattress 100 towards the body of the user. In particular, the perforations of the cover bag are located at the top surface of the lower support layer 230 in positions which at least partially overlap with air passage channels 244 of the contacting air conveying layer 240, which contacts the lower support layer
10 230.

In a particular example, an opening of the air passage channels 244 of the contacting air conveying layer 240 is selected larger than an opening of the perforations. In this way, a considerable overlap between the perforations and the air passage channels 244 is easily supported.

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The air conveying layer 240 may also be made of any material suitable for its use. For example, the air conveying layer comprises reticulated foam. The air conveying layer 240 may further comprise pocket springs.

20 Additionally, in this embodiment the entrance channels 250a, 250b extend substantially parallel to the length direction L of the mattress in selected areas of the support layer 230 from the head edge of the mattress 220 towards the at least one air collection space 232a, 232b, respectively. In particular, the lower support layer 230 has a top surface and a bottom surface, whereas the entrance channels 250a, 250b extends from the bottom
25 surface towards or to the top surface in selected areas of the support layer 230. As such, the design of the mattress inter alia saves space.

Additionally, the comfort layer 222 is further provided with air passage channels 226 arranged at the top surface 221, which extend substantially parallel to its top or bottom
30 surface 221, 223 in the selected areas 225a, 225b of the comfort layer. Such channels 226 provide for a more even distribution of the conditioned air within the comfort layer 222 and towards the person resting on top of the mattress. In the shown embodiment the parallel air passage channels 226 extend substantially parallel to the head edge of the mattress 220, which is arranged in a width direction substantially perpendicular to the

length direction L.

In exemplary embodiments, the entrance channels 150a, 150b and 250a, 250b shown in Figure 3 and Figure 5, respectively, are configured to provide thermal insulation of the conditioned air along the entrance channels 150a, 150b and 250a, 250b when moving the conditioned air to the corresponding air collection space 132, 232a, 232b.

In all of the embodiments shown in figures 1-5, the mattress may be provided with a cover. The cover may be a knitted textile at the contact surfaces with the user; mainly the top and the sides of the mattress. This knitted fabric on the top of the mattress can be a circular knitted but also a flat knitted, a non-woven or other product. Preferably the cover is air permeable (should not block the air flow). Furthermore, the micro climate features of the fabric may result in a high comfort layer supporting the air flow and climate for the user.

The sides can be identical to the top surface but can also be a more cost efficient solution such as non-woven or woven fabric. Such fabric does not have to have good air permeability properties.

CONCLUSIES

1. Een klimaatgestuurde rusteenheid voor gebruik in een cabine van een voertuig,
 5 zoals een vrachtwagen, de rusteenheid omvattende een matras en een regeleenheid die is ingericht om het klimaat in het matras te regelen, waarin het matras omvat:
 - een bovenste comfortlaag met een toppoppervlak en een bodemoppervlak,
 waarbij de comfortlaag is voorzien van luchtdoorvoerkanalen die zich vanaf het
 bodemoppervlak tot het toppoppervlak uitstrekken in gekozen gebieden van de
 10 comfortlaag; en
 - een lagere steunlaag, ingericht om de bovenste comfortlaag te
 ondersteunen en omvattende ten minste één luchtverzamelingsruimte en ten
 minste één ingangskanaal dat toegang geeft tot de ten minste één
 luchtverzamelingsruimte;
- 15 waarin de regeleenheid wordt gevoed door voertuigbatterijvermogen, een thermo-
 elektrische inrichting omvat die is ingericht om lucht thermisch te conditioneren, en
 verder een luchtverplaatsingsinrichting die is ingericht om de geconditioneerde lucht in
 het ten minste één ingangskanaal te voeren, en een regelaar die is ingericht om de
 werking van de thermo-elektrische inrichting en de verplaatsingsinrichting te regelen.
 20
2. Rusteenheid volgens conclusie 1, waarin het matras verder een
 luchttransportlaag omvat die tussen de comfortlaag en de steunlaag is aangebracht,
 waarbij de luchttransportlaag een toppoppervlak en een bodemoppervlak heeft, en
 luchtdoorvoerkanalen omvat die zich uitstrekken vanaf het bodemoppervlak tot het
 25 toppoppervlak in gekozen gebieden van de luchttransportlaag.
3. Rusteenheid volgens conclusie 1 of 2, waarin de luchtdoorvoerkanalen van de
 comfortlaag en/of van de luchttransportlaag in onmiddellijk vloeistofcontact met de ten
 minste één luchtverzamelingsruimte zijn gepositioneerd.
 30
4. Rusteenheid volgens één der voorgaande conclusies, waarin de ten minste één
 luchtverzamelingsruimte is voorzien van een afstandsweeftel.

5. Rusteenheid volgens conclusie 4, waarin de ten minste één luchtverzamelingsruimte is voorzien van een geperforeerde overtrekzak, die het afstandsweeftel omvat.
- 5 6. Rusteenheid volgens één der voorgaande conclusies, waarin de steunlaag een structuurschuim omvat waarin de ingangskanalen en/of de ten minste één luchtverzamelingsruimte zijn verwijderd of uitgesneden.
7. Rusteenheid volgens conclusie 6, waarin de ingangskanalen zijn voorzien van
10 een wandversterkende inzet.
8. Rusteenheid volgens één der voorgaande conclusies, waarin de comfortlaag een visco-elastisch schuim omvat.
- 15 9. Rusteenheid volgens één der voorgaande conclusies, waarin de luchttransportlaag gereticuleerd schuim omvat.
10. Rusteenheid volgens conclusie 9, waarin de luchttransportlaag verder pocketveren omvat.
20
11. Rusteenheid volgens één der voorgaande conclusies, waarin de comfortlaag verder is voorzien van luchtdoorvoerkanalen die zich in hoofdzaak evenwijdig aan haar bodemoppervlak uitstrekken in gekozen gebieden van de comfortlaag.
- 25 12. Rusteenheid volgens conclusie 11, waarin de evenwijdige luchtdoorvoerkanalen zich in hoofdzaak evenwijdig aan een hoofdrand van het matras uitstrekken.
13. Rusteenheid volgens één der voorgaande conclusies, waarin het gekozen gebied van de comfortlaag en/of van de luchttransportlaag zich in een schouder en/of onderrug
30 gebied van het matras bevinden.
14. Rusteenheid volgens één der voorgaande conclusies, waarin behuizing voor de regeleenheid tegen een hoofdrand of tegen een voetrand van het matras is gepositioneerd.

15. Rusteenheid volgens conclusie 14, waarin de behuizing zich over een hoogte die in hoofdzaak hoger is dan de hoogte van het matras uitstrekt.

5 16. Rusteenheid volgens conclusie 14 of 15, waarin een zijwand van de behuizing is voorzien van een overloopluchttuitlaat voor overdadige lucht.

17. Rusteenheid volgens één der voorgaande conclusies, waarin ten minste één luchtinname-opening voor het toelaten van luchtinname in de regeleenheid aan een zijde
10 van de behuizing is gelokaliseerd die verschilt van een zijde waar een locatie voor een overloopluchttuitlaat voor overdadige lucht is voorzien.

18. Rusteenheid volgens één der voorgaande conclusies, waarin het matras is voorzien in een overtrek.
15

19. Rusteenheid volgens één der voorgaande conclusies, omvattende een matras met een dikte tussen 10 en 25 cm.

20. Cabine van een voertuig, zoals een vrachtwagen, omvattende een rusteenheid
20 volgens één der voorgaande conclusies.

1/3

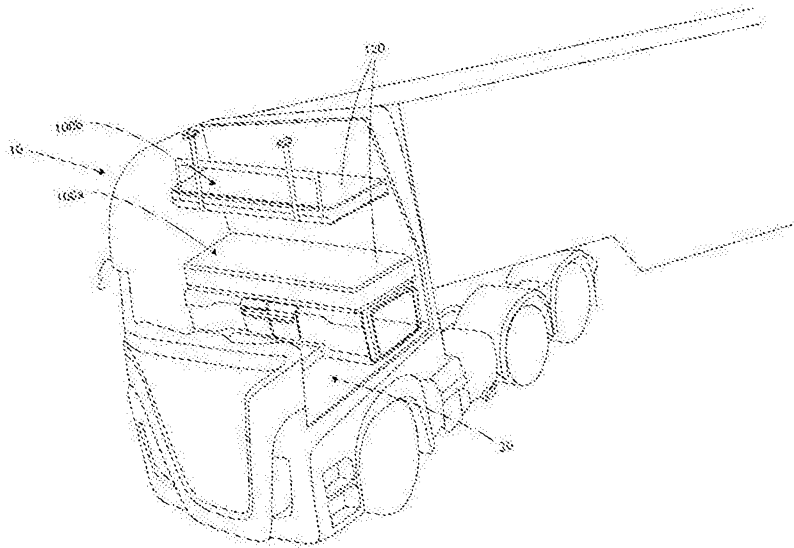


Figure 1

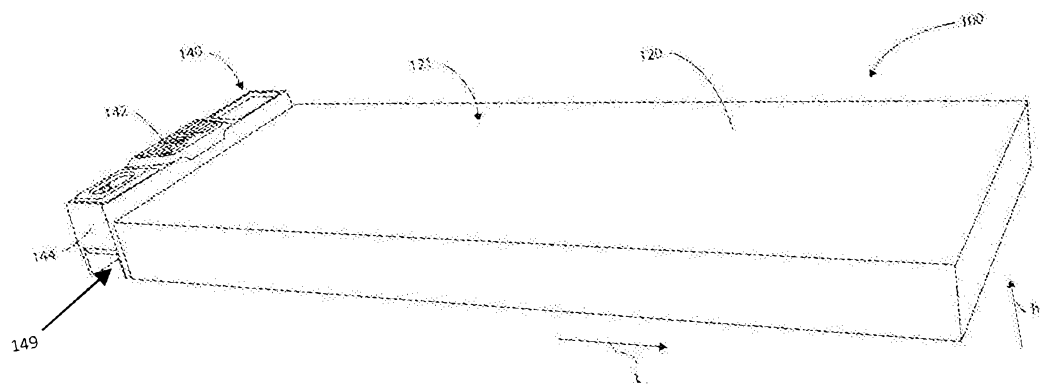


Figure 2

2/3

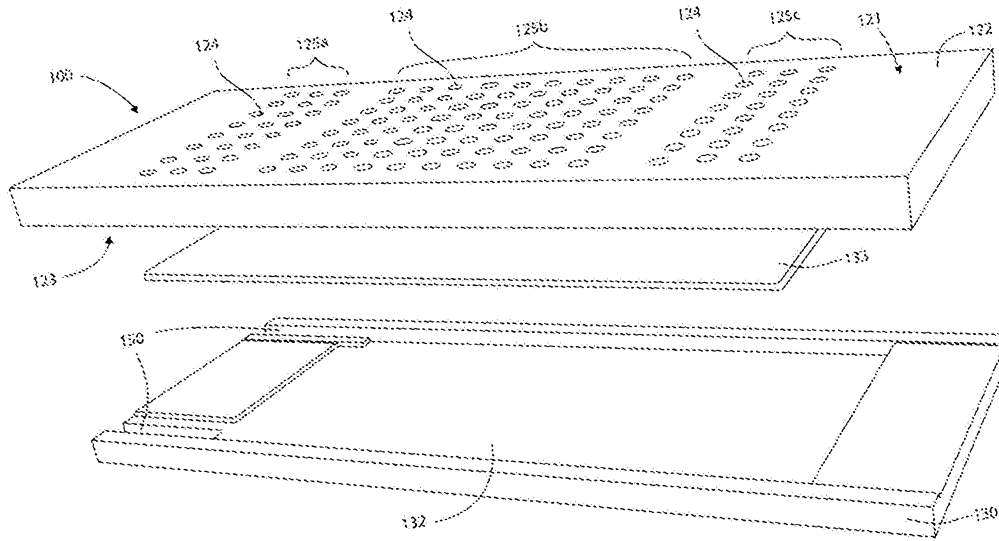


Figure 3

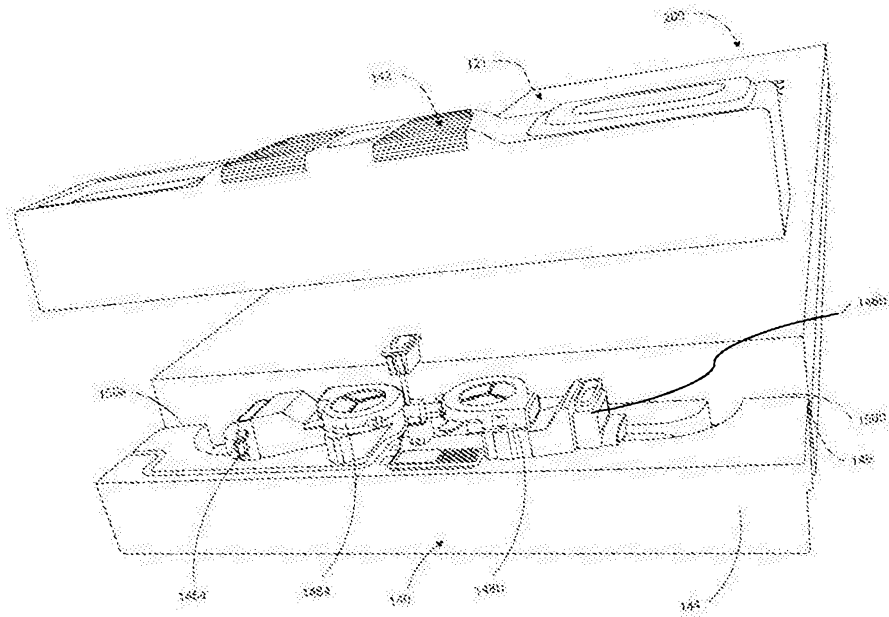


Figure 4

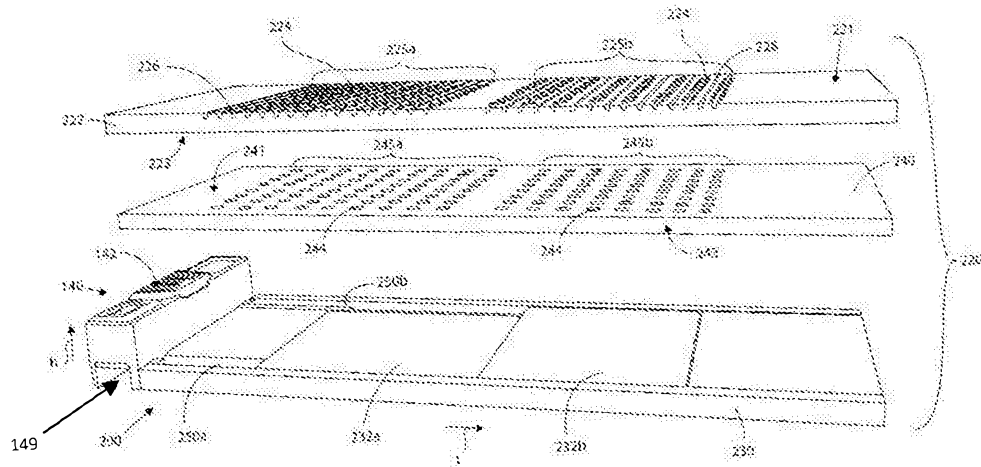


Figure 5

ABSTRACT

A climate controlled resting unit for use inside a cab of a vehicle, such as a truck, is described. The resting unit comprises a mattress and a control unit configured to control the climate inside the mattress. The mattress is built up by an upper comfort layer with a top surface and a bottom surface, the comfort layer being provided with air passage channels extending from the bottom surface to the top surface in selected areas of the comfort layer; and a lower support layer, configured to support the upper comfort layer and comprising at least one air collection space and entrance channels giving access to the at least one air collection space. The control unit is powered by vehicle battery power, and comprises a thermoelectric device configured to thermally condition air, an air transfer device configured to transfer the conditioned air into the entrance channels, and a controller configured to control the operation of the thermoelectric device and the transfer device.

15

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE 	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE <div style="text-align: center;">4Q/2VC34/1</div>
Nederlands aanvraag nr. <div style="text-align: center;">2019946</div>	Indieningsdatum <div style="text-align: center;">21-11-2017</div>
	Ingeroepen voorrangsdatum
Aanvrager (Naam) <div style="text-align: center;">Berco Truck Components B.V., et al</div>	
Datum van het verzoek voor een onderzoek van internationaal type <div style="text-align: center;">17-02-2018</div>	Door de instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. <div style="text-align: center;">SN70699</div>
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven) Volgens de internationale classificatie (IPC) <div style="text-align: center;">A47C17/80;A47C21/04;B62D33/06;B60H1/00;A47C27/14;A47C27/15</div>	
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	A47C;B62D;B60H
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen 	
III.	<input type="checkbox"/> GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV.	<input type="checkbox"/> GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2019946

A. CLASSIFICATIE VAN HET ONDERWERP		
INV.	A47C17/80 A47C21/04 B62D33/06 B60H1/00 A47C27/14	
ADD.	A47C27/15	
Volgens de internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.		
B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK		
Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)		
A47C B62D B60H		
Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen		
Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)		
EPO-Internal, WPI Data		
C. VAN BELANG GEACHTE DOCUMENTEN		
Categorie *	Geopteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	US 9 756 952 B2 (BEDGEAR LLC [US]) 12 september 2017 (2017-09-12)	1-3,8, 10-14, 16,18-20
Y	* kolom 2, regel 39 - kolom 12, regel 38; figuren 1-19 *	20
X	US 2017/164757 A1 (THOMAS PETER M [US] ET AL) 15 juni 2017 (2017-06-15)	1-3,6, 11-14, 16-19
Y	* alineaas [0048], [0049]; conclusies 19-21; figuur 14 *	20
X	US 2010/011502 A1 (BRYKALSKI MICHAEL J [US] ET AL) 21 januari 2010 (2010-01-21)	1-14,18, 19
Y	* alinea [0091] - alinea [0308]; figuren 1-32 *	20
	-/--	
<input checked="" type="checkbox"/> Verdere documenten worden vermeld in het vervolg van vak C. <input checked="" type="checkbox"/> Leden van dezelfde octrooifamilie zijn vermeld in een bijlage		
* Speciale categorieën van aangehaalde documenten "A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft "D" in de octrooiaanvraag vermeld "E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven "L" om andere redenen vermelde literatuur "O" niet-schriftelijke stand van de techniek "P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur "T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding "X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur "Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geopteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht "Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie		
Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid		Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
11 mei 2018		
Naam en adres van de instantie		De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016		Kus, Slawomir

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2019946

C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
Y	JP H07 3403 U (-) 20 januari 1995 (1995-01-20) * alineas [0014], [0016]; figuren 1,2 * -----	20

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2019946

In het rapport genoemd octrooigecchrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 9756952	B2 12-09-2017	AU 2015204480 A1 CA 2936688 A1 CL 2016001782 A1 CN 106102520 A CR 20160356 A EP 3094213 A1 JP 2017501858 A KR 20160114060 A RU 2644101 C1 US 2015208814 A1 US 2017150823 A1 US 2018042393 A1 WO 2015106258 A1	28-07-2016 16-07-2015 18-08-2017 09-11-2016 16-12-2016 23-11-2016 19-01-2017 04-10-2016 07-02-2018 30-07-2015 01-06-2017 15-02-2018 16-07-2015
US 2017164757	A1 15-06-2017	US 2017164757 A1 WO 2017066244 A1	15-06-2017 20-04-2017
US 2010011502	A1 21-01-2010	AU 2009270757 A1 CA 2731001 A1 CN 102098947 A CN 104523071 A EP 2341800 A1 JP 5997899 B2 JP 6008931 B2 JP 2011528579 A JP 2014147836 A JP 2015077438 A US 2010011502 A1 US 2012227182 A1 US 2013227783 A1 US 2014310874 A1 US 2017290437 A1 WO 2010009422 A1	21-01-2010 21-01-2010 15-06-2011 22-04-2015 13-07-2011 28-09-2016 19-10-2016 24-11-2011 21-08-2014 23-04-2015 21-01-2010 13-09-2012 05-09-2013 23-10-2014 12-10-2017 21-01-2010
JP H073403	U 20-01-1995	GEEN	

WRITTEN OPINION

File No. SN70699	Filing date (day/month/year) 21.11.2017	Priority date (day/month/year)	Application No. NL2019946
International Patent Classification (IPC) INV. A47C17/80 A47C21/04 B62D33/06 B60H1/00 A47C27/14 A47C27/15			
Applicant Berco Truck Components B.V., et al			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

	Examiner Kus, Slawomir
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WRITTEN OPINION

Application number

NL2019946

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	9, 10, 15, 19, 20
	No: Claims	1-8, 11-14, 16-18
Inventive step	Yes: Claims	15
	No: Claims	1-14, 16-20
Industrial applicability	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number

NL2019946

Box No. VII Certain defects in the application

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.0. Reference is made to the following documents:

- D1 US 9 756 952 B2
- D2 US 2017/164757 A1
- D3 US 2010/011502 A1
- D4 JP H07 3403 U

2.0. The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new.

2.1. The document D1 (col. 2, line 39 - col. 12, line 38; fig. 1-19) discloses (the references in parentheses applying to this document):

een klimaatgestuurde rusteenheid (20) (see fig. 1,3, 16-19) voor (suitable for) gebruik in een cabine van een voertuig, zoals een vrachtwagen, de rusteenheid (20) omvattende een matras (26,24) en een regeleenheid (32,52,74) die is ingericht om het klimaat in het matras te regelen, waarin het matras (26,24) omvat:

een bovenste comfortlaag (26) met een topoppervlak (28) en een bodemoppervlak (see fig. 3,16-19), waarbij de comfortlaag (26) is voorzien van luchtdoorvoerkanalen (60,62) die zich vanaf het bodemoppervlak (see fig. 3,16-19) tot het topoppervlak (28) uitstrekken in gekozen gebieden van de comfortlaag (26); en

een lagere steunlaag (24), ingericht om de bovenste comfortlaag (26) te ondersteunen en omvattende ten minste één luchtverzamelingsruimte (48) en ten minste één ingangskanaal (42) dat toegang geeft tot de ten minste één luchtverzamelingsruimte (48);

waarin de regeleenheid (20) wordt gevoed door voertuigbatterijvermogen (see item VIII, 1.1), een thermo-elektrische inrichting (74) omvat die is ingericht om lucht thermisch te conditioneren (see col. 9, line 34 - col. 10, line 67), en verder een luchtverplaatsingsinrichting (32) die is ingericht om de geconditioneerde lucht in het ten minste één ingangskanaal (60,62) te voeren, en een regelaar (52) die is ingericht om de werking van de thermo-elektrische inrichting (74) en de verplaatsingsinrichting (32) te regelen (cf. claim 1).

2.2. Furthermore the documents D2 (par. [0048], [0049]; claims 19-21; fig. 14) and D3 (par. [0091] - par. [0308]; fig. 1-32) show the characteristics of claim 1.

3.0. Dependent claims 2-14, 16-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty (see claims 2-8, 11-14, 16-18) and an inventive step (see claims 9, 10, 19, 20) (see below the corresponding passages of documents **D1- D4**) :

- a)** D1 (see col. 2, line 39 - col. 12, line 38; fig. 1-19),
- b)** D2 (see par. [0048], [0049]; claims 19-21; fig. 14),
- c)** D3 (see par. [0091] - par. [0308]; fig. 1-32),
- d)** D4 (see par. [0014], [0016]; fig. 1, 2).

Furthermore these features concern only constructional developments solving independent problems without producing any surprising effect which would result from their combination.

Re Item VII

Certain defects in the application

1.0. The features of claims 1-20 are not provided with reference signs placed in parentheses.

2.0. Independent claim 1 is not in the two-part form, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble and the remaining features being included in the characterising part. In the present case, the following features are known in combination from D1 and belong in the preamble of such a claim :

3.0. The relevant background art disclosed in D1 is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the international application

1.0. The claim 1 is not clear.

1.1. Claim 1 defines "een klimaatgestuurde rusteenheid" by reference to "een voertuig". In such case these claims do not only define "een klimaatgestuurde rusteenheid" itself but also relates to the elements of "een voertuig" namely "voertuigbatterijvermogen", which is not part of the claimed "een klimaatgestuurde rusteenheid", thereby rendering the definition of the subject-matter of said claims unclear.

Therefore this "een voertuig" feature can not be seen as limiting the extent of the matter protected by said claim.