

(19)



(11)

EP 3 285 618 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

08.01.2020 Bulletin 2020/02

(51) Int Cl.:

A47C 21/04 (2006.01)

A47C 27/15 (2006.01)

(86) International application number:

PCT/US2015/027262

(21) Application number: **15890095.1**

(22) Date of filing: **23.04.2015**

(87) International publication number:

WO 2016/171692 (27.10.2016 Gazette 2016/43)

(54) SUPPORT CUSHIONS WITH ACTIVE VENTILATION

STÜTZKISSEN MIT AKTIVER BELÜFTUNG

COUSSINS DE SUPPORT AVEC AÉRATION ACTIVE

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

• **BURTON, Leslie A.**

Lexington, KY 40514 (US)

• **NAVA, Mario A. G.**

Owensboro, KY 42301 (US)

(43) Date of publication of application:

28.02.2018 Bulletin 2018/09

(74) Representative: **Hoefer & Partner Patentanwälte mbB**

Pilgersheimer Straße 20

81543 München (DE)

(60) Divisional application:

19180957.3 / 3 560 389

(56) References cited:

EP-A1- 2 957 191

EP-B1- 1 804 616

WO-A2-2010/075230

JP-A- 2005 192 883

JP-A- 2006 042 985

JP-A- 2014 079 318

US-A1- 2002 096 915

US-A1- 2003 019 044

US-A1- 2003 084 510

US-A1- 2005 086 739

US-A1- 2011 258 778

(72) Inventors:

• **GRIESE, Paul E.**

Versailles, KY 40383 (US)

• **POWELL, Daniel S.**

Versailles, KY 40383 (US)

EP 3 285 618 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present invention relates to a support cushion according to the preamble part of claim 1. Such a support cushion is known from JP 2005 192883 A.

BACKGROUND

[0002] An aspect of successful and restful sleep is individual sleep comfort. Medical research suggests that sleep deprivation ("sleep debt") can have significant negative impacts on longevity, productivity, and overall mental, emotional, and physical health. Chronic sleep debt has been linked to weight gain and, more specifically, has been observed to not only affect the way the body processes and stores carbohydrates, but has also been observed to alter hormone levels that affect appetite. Moreover, sleep debt may result in irritability, impatience, inability to concentrate, and moodiness, which has led some researchers to suggest a link between sleep debt and worksite accidents, traffic incidents, and general afternoon inattentiveness. Furthermore, sleep disorders have been linked to hypertension, increased stress hormone levels, and irregular heartbeat, and additional research has recently suggested that a lack of sleep can affect immune function, resulting in increased susceptibility to illness and disease, e.g., cancer. In all, researchers have now suggested that sleep debt costs the United States \$63 billion annually in lost productivity due to these various effects. Accordingly, a support cushion that improves sleep comfort and lowers individual sleep debt would be both highly desirable and beneficial.

SUMMARY

[0003] The present invention relates to support cushions as claimed in claim 1. In particular, the present invention relates to support cushions, such as mattress assemblies, that make use of a fan located within the support cushion to draw and amount of air through and away from the support cushion. Thus, the support cushions of the present invention allow a user to increase his or her level of comfort, including sleep comfort, by actively ventilating the support cushions.

[0004] In one exemplary embodiment of the present invention, a support cushion in the form of a mattress assembly is provided that includes a body supporting layer having a first surface and a second surface. The body supporting layer of the mattress assembly includes a first porous foam insert that is positioned in a first side of the body supporting layer, and a second porous foam insert that is positioned in a second side of the body supporting layer opposite the first porous foam insert. Both the first porous foam insert and the second porous foam insert are generally sized to support a torso of a user lying on the mattress assembly. Thus, as a result of the size and

position of the first porous foam insert and the second porous foam insert, the first porous foam insert and the second porous foam insert are not only configured to support the torso of a user lying on the mattress assembly, but are also configured to assist in dissipating any heat generated by the torso of a user lying on the mattress assembly away from the body supporting layer and the remainder of the mattress assembly.

[0005] The body supporting layer of the mattress assembly is covered by a comfort portion or layer that is positioned atop the body supporting layer. The comfort layer defines a first plurality of channels and a second plurality of channels that extend through the comfort layer and that are positioned over the first porous foam insert and the second porous foam insert, respectively, of the body supporting layer. By positioning the channels over the first porous foam insert and the second porous foam insert, the channels of the comfort layer place the first porous foam insert and the second porous foam insert in fluid communication with not only the comfort layer, but also with the environment surrounding the mattress assembly and/or the body of a user lying on the mattress assembly. In addition to placing the first porous foam insert and the second porous foam insert in communication with the surrounding environment, however, the comfort layer also functions to provide a level of comfort to a body of a user or a portion of thereof that is resting on the mattress assembly.

[0006] Further included in the mattress assembly is an upper base layer that is positioned adjacent to the second surface of the body supporting layer. The upper base layer defines a first plurality of air conduits and a second plurality of air conduits that extend through the upper base layer and that are positioned below the first porous foam insert and the second porous foam insert, respectively, of the body supporting layer. By positioning the first plurality of air conduits and the second plurality of air conduits below the first porous foam insert and the second porous foam insert of the body supporting layer, the first plurality of air conduits and the second plurality of air conduits are thus placed in direct fluid communication with the first porous foam insert and the second porous foam insert, and create a pathway for air to flow from the body supporting layer and through the upper base layer.

[0007] In addition to the upper base layer, a lower base layer is also included in the exemplary mattress assembly and is positioned adjacent to the upper base layer opposite the body supporting layer. The lower base layer defines a first cavity and a second cavity, which both extend through the lower base layer. The first cavity of the lower base layer houses a fan assembly and is positioned below and is in fluid communication with the first plurality of air conduits in the upper base layer. Similarly, the second cavity houses a separate fan assembly and is positioned below and is in fluid communication with the second plurality of air conduits. In this regard, upon activation of the fan assemblies in the first cavity and the

second cavity defined by the lower base layer, the fan assemblies draw air through the channels in the comfort layer, through the porous foam inserts in the body supporting layer, through air conduits in the upper base layer, and then through the fan assemblies and the lower base layer, where it is then exhausted air into a bottom layer of the mattress assembly that is positioned adjacent to the lower base layer opposite the upper base layer.

[0008] With further respect to the fan assemblies included in the mattress assembly, as indicated above, the fan assemblies are housed within the cavities of the lower base layer with the upper base layer covering the fan assemblies from above and the bottom layer covering the fan assemblies from below. In this regard, each of the fan assemblies includes a fan that is mounted in a housing sized to fit within one of the cavities defined by the lower base layer and to be frictionally held in position within the cavities even when the mattress assembly is moved, tipped, or otherwise adjusted. To further promote the frictional connection between the housings and the cavities defined by the lower base layer, the fan assemblies each further include a sleeve that is positioned between each of the housings and the respective cavities and that is comprised of a material which promotes friction between the cavities and the respective housings.

[0009] To provide an amount of control over the amount of air being moved by the fan and the active ventilation of the mattress assembly, an exemplary mattress assembly also includes a power supply for supplying electrical current to the fan assemblies and a controller for controlling the electrical current supplied to the fan assemblies from the power supply. To provide an additional level of control over the movement of air through the mattress, an exemplary mattress assembly can further include several features that are operably connected to the body supporting layer and provide input to the controller. For example, in some embodiments, an exemplary mattress assembly includes temperature sensors that are operably connected to porous foam inserts included in the body supporting layer and that provide temperature feedback to the controller to thereby not only allow the controller to selectively provide power to the fan assemblies and adjust how quickly or how much air is moved through the mattress assembly in response to the received temperature feedback, but to also maintain a desired temperature at the first surface of the body supporting layer. As another example, in some embodiments, pressure sensors are also operably connected to the body supporting layer and provide pressure feedback to the controller in response to a user resting upon or adjacent to the first surface of the body supporting layer.

[0010] Each of the exemplary support cushions described herein can also be used as part of a method for actively ventilating a support cushion. In some implementations, a method for actively ventilating a support cushion includes first providing a support of the present invention. Power, in the form of electrical current, is then supplied to the fans in the support cushion, such that the

fan draws air from the first surface of the body supporting layer, through upper base layer and lower base layer, and into the bottom layer and away from the body supporting layer of the support cushion to thereby actively ventilate the support cushion and dissipate any heat away from the body supporting layer of the support cushion.

[0011] Further features and advantages of the present invention will become evident to those of ordinary skill in the art after a study of the description, figures, and non-limiting examples in this document.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a perspective view of an exemplary support cushion, in the form of a mattress assembly, made in accordance with the present invention;

FIG. 2 is an exploded, perspective view of the exemplary mattress assembly of FIG. 1;

FIG. 3 is a cross-sectional view of the exemplary mattress assembly of FIG. 1 taken along line 3-3 of FIG. 1;

FIG. 4 is an exploded perspective view of a fan assembly included in the exemplary mattress assembly of FIG. 1; and

FIG. 5 is a cross-sectional view of another exemplary support cushion, in the form of another mattress assembly, made in accordance with the present invention and showing the mattress assembly having an adjustable foundation.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0013] The present invention relates to support cushions. In particular, the present invention relates to support cushions, such as mattress assemblies, that make use of a fan located within the support cushion to draw an amount of air through and away from the support cushion. Thus, the support cushions of the present invention allow a user to increase his or her level of comfort, including sleep comfort, by actively ventilating the support cushions.

[0014] Referring first to FIGS. 1-3, in one exemplary embodiment of the present invention, a support cushion in the form of a mattress assembly 10 is provided that includes a body supporting layer 20 having a first surface 22, which is generally an upper surface of the body supporting layer 20, and a second surface 24, which is opposite the first surface 22 and is generally the lower surface of the body supporting layer 20. The body supporting layer 20 of the mattress assembly 10 includes a first porous foam insert 26a positioned in a first side 28 of the body supporting layer 20, and a second porous foam insert 26b that is positioned in a second side 29 of the body supporting layer 20 opposite the first porous foam insert 26a. Both the first porous foam insert 26a and the

second porous foam insert 26b are generally sized to support a torso of a user lying on the mattress assembly 10. Thus, as a result of the size and position of the first porous foam insert 26a and the second porous foam insert 26b, the first porous foam insert 26a and the second porous foam insert 26b are not only configured to support the torso of a user lying on the mattress assembly 10, but the first porous foam insert 26a and the second porous foam insert 26b are also configured to assist in dissipating any heat generated by the torso of a user lying on the mattress assembly 10 away from the body supporting layer 20 and the remainder of the mattress assembly 10, as described in further detail below.

[0015] The body supporting layer 20 of the mattress assembly 10 is generally comprised of a continuous layer of flexible foam for suitably distributing pressure from a user's body or portion thereof across the body supporting layer 20. Such flexible foams include, but are not limited to, latex foam, reticulated or non-reticulated visco-elastic foam (sometimes referred to as memory foam or low-resilience foam), reticulated or non-reticulated non-visco-elastic foam, polyurethane high-resilience foam, expanded polymer foams (e.g., expanded ethylene vinyl acetate, polypropylene, polystyrene, or polyethylene), and the like. In the embodiment shown in FIGS. 1-4, the body supporting layer 20 is comprised of a visco-elastic foam that has a low resilience as well as a sufficient density and hardness, which allows pressure to be absorbed uniformly and distributed evenly across the body supporting layer 20 of the mattress assembly 10. Generally, such visco-elastic foams have a hardness of at least about 10 N to no greater than about 80 N, as measured by exerting pressure from a plate against a sample of the material to a compression of at least 40% of an original thickness of the material at approximately room temperature (i.e., 21°C to 23°C), where the 40% compression is held for a set period of time as established by the International Organization of Standardization (ISO) 2439 hardness measuring standard. In some embodiments, the visco-elastic foam has a hardness of about 10 N, about 20 N, about 30 N, about 40 N, about 50 N, about 60 N, about 70 N, or about 80 N to provide a desired degree of comfort and body-conforming qualities.

[0016] The visco-elastic foam described herein for use in the mattress assembly 10 can also have a density that assists in providing a desired degree of comfort and body-conforming qualities, as well as an increased degree of material durability. In some embodiments, the density of the visco-elastic foam used in the body supporting layer 20 has a density of no less than about 30 kg/m³ to no greater than about 150 kg/m³. In some embodiments, the density of the visco-elastic foam used in the body supporting layer 20 of the mattress assembly 10 is about 30 kg/m³, about 40 kg/m³, about 50 kg/m³, about 60 kg/m³, about 70 kg/m³, about 80 kg/m³, about 90 kg/m³, about 100 kg/m³, about 110 kg/m³, about 120 kg/m³, about 130 kg/m³, about 140 kg/m³, or about 150 kg/m³. Of course, the selection of a visco-elastic foam having a

particular density will affect other characteristics of the foam, including its hardness, the manner in which the foam responds to pressure, and the overall feel of the foam, but it is appreciated that a visco-elastic foam having a desired density and hardness can readily be selected for a particular application or mattress assembly as desired. Additionally, it is appreciated that the body supporting layers of the mattress assemblies need not be comprised of a continuous layer of flexible foam at all, but can also take the form of more traditional mattresses, including spring-based mattresses.

[0017] With even further respect to the body supporting layer 20 of the mattress assembly 10 and, in particular, the porous foam inserts 26a, 26b included in the body supporting layer 20 of the mattress assembly 10, the porous foam inserts 26a, 26b are also comprised of a visco-elastic foam, but are generally comprised of a viscoelastic foam having a porosity greater than the visco-elastic foam included in the body supporting layer 20 to allow air to enter the porous foam inserts 26a, 26b more readily than the remainder of the body supporting layer 20. Of course, it is also contemplated that the porous foam inserts 26a, 26b need not be comprised of a visco-elastic foam at all, but that any number of porous flexible foams can be used to produce a porous foam insert having a porosity sufficient to allow for air to readily enter and move through. In this regard, the term "porous foam" or "porous flexible foam" (visco-elastic or otherwise) is used herein to generally refer to flexible foam having a cellular foam structure in which at least a portion of the cells of the foam are essentially skeletal. In other words, at least a portion of the cells of the foam are each defined by a plurality of apertured windows surrounded by cell struts, where the cell windows of the porous foam can be entirely absent (leaving only the cell struts) or substantially missing. In some embodiments, the foam is considered "porous" if at least 50% of the windows of the cells are missing (i.e., windows having apertures therethrough, or windows that are completely missing and therefore leaving only the cell struts). Such structures can be created by destruction or other removal of cell window material, by chemical or mechanical means, or by preventing the complete formation of cell windows during the manufacturing process of the foam. In some embodiments of the present invention, the term "porous" can thus be used interchangeably with the term "reticulated" when referring to flexible foam.

[0018] Referring still to FIGS. 1-3, the body supporting layer 20 of the mattress assembly 10 is further covered by a comfort portion or layer 62 that is positioned atop the body supporting layer 20. The comfort layer 62 defines a first plurality of channels 66a and a second plurality of channels 66b that extend through the comfort layer 62 and that are positioned over the first porous foam insert 26a and the second porous foam insert 26b, respectively. By positioning the channels 66a, 66b over the first porous foam insert 26a and the second porous foam insert 26b, the channels 66a, 66b of the comfort layer 62

place the first porous foam insert 26a and the second porous foam insert 26b in fluid communication with not only the comfort layer 62, but also with the environment surrounding the mattress assembly 10 and/or the body of a user lying on the mattress assembly 10. In addition to placing the first porous foam insert 26a and the second porous foam insert 26b in communication with the surrounding environment, however, the comfort layer 62 also functions to provide a level of comfort to a body of a user or a portion of thereof that is resting on the mattress assembly 10. In this regard, the comfort layer 62 can also be comprised of a visco-clastic foam, but typically has a density, hardness, or both that is less than that of the body supporting layer 20 of the mattress assembly 10 such that the comfort layer 62 provides a softer surface on which to rest the body of a user. For example, in certain embodiments, the mattress assembly 10 includes a body supporting layer 20 that is comprised of visco-elastic foam with a density of about 80 kg/m³ and a hardness of about 13 N, while the comfort layer is comprised of a visco-elastic foam with a density of about 35 kg/m³ and a hardness of about 10 N.

[0019] Regardless of the particular types of foam included in the body supporting layer 20, the porous foam inserts 26a, 26b, and the comfort layer 62, further included in the mattress assembly 10 is an upper base layer 30 that is positioned adjacent to the second surface 24 of the body supporting layer 20. The upper base layer 30 defines a first plurality of air conduits 32a and a second plurality of air conduits 32b that extend through the upper base layer 30 and that are positioned below the first porous foam insert 26a and the second porous foam insert 26b, respectively, of the body supporting layer 20. By positioning the first plurality of air conduits 32a and the second plurality of air conduits 32b below the first porous foam insert 26a and the second porous foam insert 26b of the body supporting layer 20, the first plurality of air conduits 32a and the second plurality of air conduits 32b are thus placed in direct fluid communication with the first porous foam insert 26b and the second porous foam insert 26b, and create a pathway for air to flow from the body supporting layer 20 and through the upper base layer 30, the importance of which is also described in further detail below. Of course, pathways for air to flow from the body supporting layer 20 and through the upper base layer 30 can also be created by using a variety of other means, such as porous foam inserts with or without air conduits and which may be positioned in an exemplary upper base layer.

[0020] In addition to the upper base layer 30, and referring still to FIGS. 1-3, a lower base layer 40 is also included in the exemplary mattress assembly 10 and is positioned adjacent to the upper base layer 30 opposite the body supporting layer 20. The lower base layer 40 defines a first cavity 42a and a second cavity 42b, which both extend through the lower base layer 40. The first cavity 42a of the lower base layer 40 houses a fan assembly 80a and is positioned below and is in fluid com-

munication with the first plurality of air conduits 32a in the upper base layer 30. Similarly, the second cavity 42b houses a separate fan assembly 80b and is positioned below and is in fluid communication with the second plurality of air conduits 32b. In this regard, upon activation of the fan assemblies 80a, 80b in the first cavity 42a and the second cavity 42b defined by the lower base layer 40, the fan assemblies 80a, 80b draw air through the channels 66a, 66b in the comfort layer 62, through the porous foam inserts 26a, 26b in the body supporting layer 20, through air conduits 32a, 32b in the upper base layer 30, and then through the fan assemblies 80a, 80b and the lower base layer 40, where it is then exhausted air into a bottom layer 50 of the mattress assembly 10 that is positioned adjacent to the lower base layer 40 opposite the upper base layer 30. In other words, by activating the fan assemblies 80a, 80b, any air and, consequently, any associated heat around or within the comfort layer 62 and the body supporting layer 20 that may be present as a result of a user lying on the mattress assembly 10 is drawn away from the comfort layer 62 and the body supporting layer 20 and is pulled through the mattress assembly 10 before being dissipated away from the mattress assembly 10 through the bottom layer 50.

[0021] With further regard to the upper base layer 30 and the lower base layer 40 of the mattress assembly 10, like the body supporting layer 20 and the comfort layer 62, the upper base layer 30 and the lower base layer 40 can also be comprised of a flexible foam, including any of the flexible foams described above with reference to the body supporting layer 20. The flexible foam comprising the body supporting layer 20, however, typically has a density less than that of the upper base layer 30 and the lower base layer 40, such that the upper base layer 30 and the lower base layer 40 have a density and hardness sufficient for supporting the body supporting layer 20 and the comfort layer 62 of the mattress assembly. For example, in the mattress assembly 10 shown in FIGS. 1-3, the upper base layer 30 and the lower base layer 40 are comprised of a higher density, porous polyurethane foam that provides sufficient support to the overlying body supporting layer 20 and the comfort layer, but that also provides an open environment in which air can move by virtue of its porous structure.

[0022] Similar to the upper base layer 30 and the lower base layer 40, the bottom layer 50 is further comprised of a breathable porous material that promotes the dispersion of the air, including the air exhausted into the bottom layer 50 by the fan assemblies 80a, 80b, but that also provides support to the remainder of the mattress assembly 10. In some embodiments, the porous materials included in the bottom layer 50 can be selected from a reticulated foam, knitted spacer fabric, textile, or a composite material. For instance, in some embodiments, it is contemplated that a knitted spacer fabric can be included that is generally comprised of two exterior mesh textile substrates and an insert material such as polyester monofilaments which are configured to keep the two ex-

terior mesh textile substrates separated. Such knitted spacer fabrics include, by way of example, the Wellcool™ 3D spacer fabric manufactured by Quanzhou Wellcool Cushion Technology Co., Ltd (Fujian, China).

[0023] Regardless of the particular materials used in the bottom layer 50, in the mattress assembly 10, the bottom layer 50 as well as the comfort layer 62, the body supporting layer 20, the upper base layer 30, and the lower base layer 40 are generally secured to one another to prevent the body supporting layer 20, the upper base layer 30, the lower base layer 40, the bottom layer 50, and the comfort layer 62 from moving relative to one another during use. Various means of securing one layer of material to another can be used in this regard, including tape, hook and loop fasteners, conventional fasteners, stitches, and the like. In one particular embodiment, the body supporting layer 20, the upper base layer 30, the lower base layer 40, the bottom layer 50, and the comfort layer 62 are bonded together by an adhesive or cohesive bonding material to create a substantially continuous assembly where the body supporting layer 20, the upper base layer 30, the lower base layer 40, the bottom layer 50, and the comfort layer 62 are fully adhered to one another. Such adhesive bonding materials include, for example, environmentally-friendly, water based adhesives, like SABA AQUABOND RSD, a two-component water-based adhesive product produced by SABA DINXPERLO BV, B-7090 AA, Dinxperlo, Belgium.

[0024] Turning now to the fan assemblies 80a, 80b included in the mattress assembly 10, as indicated above and referring now to FIGS. 1-4, the fan assemblies are housed internally within the mattress assembly 10. More specifically, the fan assemblies 80a, 80b are housed within the cavities 42a, 42b of the lower base layer 40 with the upper base layer 30 covering the fan assemblies 80a, 80b from above and the bottom layer 50 covering the fan assemblies 80a, 80b from below. In this regard, each of the fan assemblies 80a, 80b includes a fan 82a, 82b that is mounted in a housing 84a, 84b sized to fit within one of the cavities 42a, 42b defined by the lower base layer 40 and to be frictionally held in position within the cavities 42a, 42b even when the mattress assembly 10 is moved, tipped, or otherwise adjusted. To further promote the frictional connection between the housings 84a, 84b and the cavities 42a, 42b defined by the lower base layer 40, the fan assemblies 80a, 80b each further include a sleeve 88a, 88b that is positioned between each of the housings 84a, 84b and the respective cavities 42a, 42b and that is comprised of a material which promotes friction between the cavities 42a, 42b and the respective housings 84a, 84b, for example a textile. The sleeves 88a, 88b can also be comprised of a flame retardant material to provide a layer of fire suppression between the fan assemblies 80a, 80b and the rest of the mattress assembly 10. Furthermore, each of the sleeves 88a, 88b provide a means of securing and positioning an air filter 86a, 86b within each of the fan assemblies 80a, 80b.

[0025] Referring again to FIGS. 1-3, to provide an

amount of control over the amount of air being moved by the fan and the active ventilation of the mattress assembly 10, the mattress assembly 10 also includes a power supply 92 for supplying electrical current to the fan assemblies 80a, 80b and a controller 90 for controlling the electrical current supplied to the fan assemblies 80a, 80b from the power supply 92. By including the controller 90 in the mattress assembly 10, the amount of electrical current supplied to the fan assemblies 80a, 80b from the power supply 92 can be controlled to allow for a desired amount of air to move through the mattress assembly 10 and, consequently, a desired amount of heat to be dissipated away from the body supporting layer 20 of the mattress assembly 10. For example, the controller 90 can be used to simply turn the fan assemblies 80a, 80b on or off depending on whether the user wishes to ventilate the mattress assembly 10 and remove heat from the body supporting layer 20 of the mattress assembly 10, or can be used to operate the fan assemblies 80a, 80b at a particular speed depending on how quickly the user wishes to ventilate the mattress assembly 10 and remove heat from the body supporting layer 20 of the mattress assembly 10. Alternatively, the controller 90 can also be configured to automatically control the electrical current supplied to the fan assemblies 80a, 80b from the power supply 92, such that the electrical current can be supplied to the fan assemblies 80a, 80b when the first surface 22 of the body supporting layer 20 reaches a desired temperature. As another example, the controller 90 can be configured to allow the electrical current to be supplied to the fan assemblies 80a, 80b from the power supply 92 for a predetermined time period, such as for an 8-hour sleeping period or for a length of time a user usually spends in a specific stage of the sleep cycle (e.g., REM sleep) in order to increase the sleep comfort of a user.

[0026] To provide an additional level of control over the movement of air through the mattress assembly 10, the mattress assembly 10 also includes several features that are operably connected to the body supporting layer 20 and provide input to the controller 90. For example, as shown best in FIG. 2, the mattress assembly 10 includes temperature sensors 94a, 94b that are operably connected to porous foam inserts 26a, 26b included in the body supporting layer 20 and that provide temperature feedback to the controller 90 to thereby not only allow the controller 90 to selectively provide power to the fan assemblies 80a, 80b and adjust how quickly or how much air is moved through the mattress assembly 10 in response to the received temperature feedback, but to also maintain a desired temperature at the first surface 22 of the body supporting layer 20. As another example, and as also shown best in FIG. 2, pressure sensors 96a, 96b are also operably connected to the body supporting layer 20 and provide pressure feedback to the controller 90 in response to a user resting upon or adjacent to the first surface 22 of the body supporting layer 20, such that the controller 90 can automatically allow power to be provided

ed to the fan assemblies 80a, 80b air to be moved through the mattress assembly 10 as soon as the user lies on the mattress assembly 10 or otherwise places an amount of pressure on the mattress assembly 10. An additional benefit of the inclusion of the pressure sensors 96a, 96b is that the controller 90 can be configured to automatically shut off the fan assemblies 80a, 80b if a user is no longer lying on the mattress assembly 10. Of course, such desired temperature or pressure feedback settings can be directed, inputted or adjusted at the controller 90 itself, or in certain embodiments of the present invention, can be transmitted to the controller 90 from a remote control (not shown) that is also operably connected to the controller 90.

[0027] As a refinement to the support cushions of the present invention, and referring now to FIG. 5, in another exemplary embodiment of the present invention, another support cushion in the form of a mattress assembly 110 is provided that includes additional features to increase the comfort and convenience of the user of the mattress assembly 110. Like the support cushion shown in FIGS. 1-4, the mattress assembly 110 also includes: a comfort layer 162 defining a plurality of channels 166; a body supporting layer 120 including a porous foam insert 126; an upper base layer 130 positioned below the body supporting layer 120 and defining a plurality of air conduits 132 in fluid communication with the porous foam insert 126; a lower base layer 140 defining a cavity 142 with a fan assembly 180 located within the cavity 142; and a bottom layer 150 positioned below the lower base layer 140. Further included in the mattress assembly, however, is an adjustable foundation 170 that is positioned below the bottom layer 150 and allows a user to place the mattress assembly 110 into one or more desired ergonomic positions.

[0028] As a further refinement to the support cushions of the present invention, various covers can also be included and used to cover various portions of the support cushions. For example and referring still to FIG. 5, a cover 172 is included in the mattress assembly 110 and surrounds the comfort layer 162, the body supporting layer 120, the upper base layer 130, the lower base layer 140, and the bottom layer 150 of the mattress assembly 110. In the mattress assembly 110, the cover 172 in the form of a fire sock that surround the various layers is comprised of a flame retardant material. It is also contemplated, however, that an exemplary cover of the present invention can also be comprised of another textile, such as cotton that provide an exemplary support cushion with a unitary appearance, but that also provides a user with a sufficiently soft surface on which to rest while being sufficiently breathable to allow air to be drawn through the cover and the exemplary support cushion.

[0029] As yet another refinement to the present invention, although the support cushions shown in FIGS. 1-3 and 5 are in the form of mattress assemblies 10, 110 and are dimensionally-sized to support a user lying in a supine or prone position, it is contemplated that the features de-

scribed herein are equally applicable to other support cushions, such as head pillows, seat cushions, seat backs, neck pillows, leg spacer pillows, mattress toppers, overlays, and the like. As such, the phrase "body support" or "body supporting" is used herein to refer to any and all such objects having any size or shape, and that are capable of supporting, or are generally used to support, the body of a user or a portion thereof. Furthermore, although the body supporting layer 20 of the mattress assembly 10 shown in FIGS. 1-3, includes two removable inserts 26a, 26b, two sets of air conduits 32a, 32b, two cavities 42a, 42b, and two fan assemblies 80a, 80b, it is also contemplated other embodiments may include any number of removable portions, conduits, cavities, and fan assemblies depending on the size and shape of the particular support cushion.

[0030] Each of the exemplary support cushions described herein can also be used as part of a method for actively ventilating a support cushion. In some implementations, a method for actively ventilating a support cushion includes first providing a support cushion having: a body supporting layer having a first surface and a second surface opposite the first surface; an upper base layer positioned adjacent to the second surface of the body supporting layer and defining one or more air conduits extending through the upper base layer and in fluid communication with the body supporting layer; a lower base layer positioned adjacent to the upper base layer opposite the body supporting layer and defining a cavity extending through the lower base layer; a bottom layer positioned adjacent to the lower base layer opposite the upper base layer; and a fan located within the cavity define by the lower base layer. Power, in the form of electrical current, is then supplied to the fan, such that the fan draws air from the first surface of the body supporting layer, through upper base layer and lower base layer, and into the bottom layer and away from the body supporting layer of the support cushion to thereby actively ventilate the support cushion and dissipate any heat away from the body supporting layer of the support cushion.

[0031] Throughout this document, various references are mentioned, including the references set forth in the following list:

REFERENCES

[0032]

1. U.S. Patent No. 8,034,445 to Landvik, et al., issued Oct. 11, 2011, and entitled "Laminated Visco-Elastic Support."
2. U.S. Patent No. 8,025,964 to Landvik, et al., issued Sept. 27, 2011, and entitled "Laminated Visco-Elastic Support."
3. U.S. Patent No. 7,979,374 to Landvik, issued July 12, 2011, and entitled "Product Demonstration System and Method for Using the Same."

4. U.S. Patent No. 7,735,169 to Wassilefsky, issued Jun. 15, 2010, and entitled "Comfort Pillow."
5. U.S. Patent No. 7,707,670 to Fogg, issued May 4, 2010, and entitled "Pillow top for a Cushion."
6. U.S. Patent No. 7,555,615 to Landvik, issued June 30, 2009, and entitled "Product Demonstration System and Method for Using the Same."
7. U.S. Patent No. 7,507,468 to Landvik, et al., issued Mar. 24, 2009, and entitled "Laminated Visco-Elastic Support."
8. U.S. Patent No. 7,469,437 to Mikkelsen, et al., issued Dec. 30, 2008, and entitled "Reticulated Material Body Support and Method."
9. U.S. Patent No. 7,444,702 to Fogg, issued Nov. 4, 2008, and entitled "Pillow top for a Cushion."
10. U.S. Patent No. 7,415,742 to Wassilefsky, issued Aug. 26, 2008, and entitled "Comfort Pillow."
11. U.S. Design Patent No. D558,499 to Maarbjer, issued Jan. 1, 2008, and entitled "Pillow."
12. U.S. Patent No. 7,155,765 to Fogg, issued Jan. 2, 2007, and entitled "Pillow top for a Cushion."
13. U.S. Design Patent No. D529,325 to Maarbjer, issued Oct. 3, 2006, and entitled "Pillow."
14. United States Patent No. 7,082,633 to Maarbjer, issued Aug. 1, 2006, and entitled "Pillow."
15. U.S. Patent No. 7,051,389 to Wassilefsky, issued May 30, 2006, and entitled "Comfort Pillow."
16. U.S. Patent No. 6,866,915 to Landvik, issued Mar. 15, 2005, and entitled "Cushion."
17. U.S. Patent No. 6,764,502 to Bieberich, issued Jul. 20, 2004, and entitled "High-Efficiency Cooling Pads, Mattresses, and Sleeves."
18. U.S. Patent No. 6,602,579 to Landvik, issued Aug. 5, 2003, and entitled "Cushion."
19. U.S. Patent No. 6,578,218 to Wassilefsky, issued Jun. 17, 2003, and entitled "Leg Spacer Pillow."
20. U.S. Patent No. 6,541,094 to Landvik, et al., issued Apr. 1, 2003, and entitled "Laminated Visco-Elastic Support."
21. U.S. Patent No. 6,402,775 to Bierberich, issued June 11, 2002, and entitled "High-Efficiency Cooling Pads, Mattresses, and Sleeves."
22. U.S. Patent No. 6,253,401 to Boyd, issued Jul. 3, 2001, and entitled "Air Mattress System."
23. U.S. Patent No. 5,448,788 to Wu, issued Sep. 12, 1995, and entitled "Thermoelectric Cooling-Heating Mattress."
24. U.S. Design Patent No. D456,660 to Landvik, issued May 7, 2002, and entitled "Contoured Head Pillow."
25. U.S. Patent Application Publication No. 2011/0252562 by Mikkelsen, et al., published Oct. 20, 2011, and entitled "Adjustable-Firmness Body Support and Method."
26. U.S. Patent Application Publication No. 2008/0028536 by Hadden-Cook, published Feb. 7, 2008, and entitled "Mattress with cooling airflow."
27. U.S. Patent Application Publication No. 2007/0094803 by Fogg, published May 3, 2007, and entitled "Pillow top for a Cushion."
28. U.S. Patent Application Publication No. 2006/0288490 by Mikkelsen, et al., published Dec. 28, 2006, and entitled "Reticulated Material Body Support and Method."
29. U.S. Patent Application Publication No. 2006/0277684 by Wassilefsky, published Dec. 14, 2006, and entitled "Comfort Pillow."
30. U.S. Patent Application Publication No. 2006/0174414 by Maarbjer, published Aug. 10, 2006, and entitled "Pillow."
31. U.S. Patent Application Publication No. US2005/0202214 by Landvik, published Sep. 15, 2005, and entitled "Cushion."
32. U.S. Patent Application Publication No. 2005/0084667 by Landvik, et al., published Apr. 21, 2005, and entitled "Laminated Visco-Elastic Support."
33. U.S. Patent Application Publication No. 2005/0076446 by Fogg, published Apr. 14, 2005, and entitled "Pillow top for a Cushion."
34. U.S. Patent Application Publication No. 2004/0073931 by Trussel Jr., et al., published Apr. 15, 2004, and entitled "Interactive Bed Display."
35. U.S. Patent Application Publication No. 2004/0033351 by Landvik, et al., published Feb. 19, 2004, and entitled "Laminated Visco-Elastic Support."
36. U.S. Patent Application Publication No. 2003/0171954 by Guerin, et al., published Sep. 11, 2003, and entitled "Method of Managing the Provision of Healthcare and System for Effecting Same."
37. U.S. Patent Application Publication No. 2001/0021438 by Landvik, published Sep. 13, 2001, and entitled "Cushion."
38. International Patent Application Publication No. WO 2008/143467 by Ko, published Mar. 19, 2009, and entitled "Mattress Using Thermoelectric Module."
39. International Patent Application Publication No. WO 2012/160502 by Boersma, et al., published Nov. 29, 2012, and entitled "Temperature-Controlled Multi-Zone Mattress-Style Support."
40. U.S. Patent No. 5,730,120 to Yokers, issued Mar. 24, 1998, and entitled "Bed Ventilator System."
41. U.S. Patent No. 8,490,233 to Essers, issued Jul. 23, 2013, and entitled "Mattress, In Particular for Use in the Care and Hospital Sector."
42. U.S. Design Patent No. D686,723 to Gulae, et al., issued Jul. 23, 2013, and entitled "Bed Fan."
43. U.S. Patent Application Publication No. 2013/0025069 by Ruehlmann, et al., published Jan. 31, 2013, and entitled "Foam Mattress Assembly with Increased Airflow and Independent Suspension."

[0033] One of ordinary skill in the art will recognize that

additional embodiments are also possible without departing from the teachings of the present invention or the scope of the claims which follow. This detailed description, and particularly the specific details of the exemplary embodiments disclosed herein, is given primarily for clarity of understanding, and no unnecessary limitations are to be understood therefrom, for modifications will become apparent to those skilled in the art upon reading this disclosure and may be made without departing from the scope of the claimed invention.

Claims

1. A support cushion (10), comprising:

a body supporting layer (20) having a first surface (22) and a second surface (24) opposite the first surface (22);

an upper base layer (30) positioned adjacent to the second surface (24) of the body supporting layer (20), the upper base layer (30) defining one or more air conduits (32a, 32b) extending through the upper base layer (30);

a lower base layer (40) positioned adjacent to the upper base layer (30) opposite the body supporting layer (20), the lower base layer (40) defining a cavity (42a, 42b) extending through the lower base layer (40);

a bottom layer (50) positioned adjacent to the lower base layer (40) opposite the upper base layer (30); and

a fan (80a, 80b) positioned within the cavity (42a, 42b) defined by the lower base layer (40), **characterized in**

that the body supporting layer (20) includes one or more porous foam inserts (26a, 26b), and **that** the one or more air conduits (32a, 32b) are in fluid communication with the one or more porous foam inserts (26a, 26b).

2. The support cushion of claim 1, further comprising a comfort layer (62), especially being comprised of a visco-elastic foam, positioned adjacent to the first surface (22) of the body supporting layer (20), the comfort layer (62) including a top surface and a bottom surface opposite the top surface; wherein the comfort layer (62) in particular defines a plurality of channels (66a, 66b) extending from the top surface to the bottom surface of the comfort layer (62), the plurality of channels (66a, 66b) in fluid communication with the one or more porous foam inserts (26a, 26b).

3. The support cushion of claim 1, wherein the bottom layer (50) is comprised of a porous material, in particular being selected from the group consisting of porous foams, knitted spacer fabrics, textiles, and

composite materials.

4. The support cushion of claim 1, further comprising a housing (84a, 84b) for the fan (80a, 80b), the housing (84a, 84b) positioned within the cavity (42a, 42b) defined by the lower base layer (40).

5. The support cushion of claim 4, further comprising an air filter positioned within the housing (84a, 84b) and/or further comprising a sleeve positioned around the housing (84a, 84b) and within the cavity (42a, 42b) of the lower base layer (40).

6. The support cushion of claim 5, wherein the sleeve is comprised of a material configured to provide a frictional connection between the housing (84a, 84b) and the lower base layer (40), wherein the sleeve is in particular comprised of a flame retardant material.

7. The support cushion of claim 1, wherein the body supporting layer (20), the upper base layer (30), and the lower base layer (40) are comprised of a flexible foam, wherein the body supporting layer (20) is in particular comprised of a visco-elastic foam, and in particular comprising the body supporting layer (20) having a porosity less than that of the one or more porous foam inserts.

8. The support cushion of claim 1, wherein the body supporting layer (20) has a density less than that of the upper base layer (30), the lower base layer (40), or both.

9. The support cushion of claim 2, wherein the body supporting layer (20) is comprised of a visco-elastic foam, and wherein the comfort layer (62) has a density less than that of the body supporting layer (20).

10. The support cushion of claim 1, further comprising:
a power supply (92) for supplying electrical current to the fan (80a, 80b); and
a controller (90) for controlling the electrical current supplied to the fan (80a, 80b) from the power supply (92).

11. The support cushion of claim 10, wherein the controller (90) is configured to allow power to be supplied to the fan (80a, 80b) for a predetermined time period, in particular further comprising one or more temperature sensors (94a, 94b) for providing thermal feedback to the controller (90), the one or more temperature sensors (94a, 94b) operably connected to the body supporting layer (20), and in particular further comprising one or more pressure sensors (96a, 96b) for providing pressure feedback to the controller (90), the one or more pressure sensors (96a, 96b) operably connected to the body supporting layer (20).

12. The support cushion of claim 1, further comprising a cover configured to surround the body supporting layer (20), the upper base layer (30), the lower base layer (40), and the bottom layer (50), wherein the cover is in particular comprised of a flame retardant material, particularly a textile.

Patentansprüche

1. Stützkissen (10), umfassend:

eine Körperstützschicht (20) mit einer ersten Oberfläche (22) und einer zweiten Oberfläche (24) gegenüber der ersten Oberfläche (22);
eine obere Basisschicht (30), die angrenzend zur zweiten Oberfläche (24) der Körperstützschicht (20) positioniert ist, wobei die obere Basisschicht (30) eine oder mehrere Luftkanäle (32a, 32b) definiert, die sich durch die obere Basisschicht (30) erstrecken;
eine untere Basisschicht (40), die angrenzend zur oberen Basisschicht (30) gegenüber der Körperstützschicht (20) positioniert ist, wobei die untere Basisschicht (40) einen Hohlraum (42a, 42b) definiert, der sich durch die untere Basisschicht (40) erstreckt;
eine Bodenschicht (50), die angrenzend zur unteren Basisschicht (40) gegenüber der oberen Basisschicht (30) positioniert ist; und
einen Lüfter (80a, 80b), der in dem durch die untere Basisschicht (40) definierten Hohlraum (42a, 42b) positioniert ist, **dadurch gekennzeichnet, dass** die Körperstützschicht (20) eine oder mehrere poröse Schaumstoffeinsätze (26a, 26b) umfasst und **dass** die eine oder mehreren Luftkanäle (32a, 32b) in Fluidverbindung mit der einen oder mehreren porösen Schaumstoffeinsätzen (26a, 26b) stehen.

2. Stützkissen nach Anspruch 1, ferner umfassend eine Komfortschicht (62), die insbesondere aus viskoelastischem Schaum gebildet ist, der angrenzend zur ersten Oberfläche (22) der Körperstützschicht (20) positioniert ist, wobei die Komfortschicht (62) eine Oberseite und eine Unterseite gegenüber der Oberseite umfasst; wobei die Komfortschicht (62) insbesondere eine Vielzahl von Kanälen (66a, 66b) definiert, die sich von der Oberseite zur Unterseite der Komfortschicht (62) erstrecken, wobei die Vielzahl von Kanälen (66a, 66b) in Fluidverbindung mit dem einen oder mehreren porösen Schaumstoffeinsätzen (26a, 26b) steht.
3. Stützkissen nach Anspruch 1, wobei die Bodenschicht (50) aus einem porösen Material, insbeson-

dere ausgewählt aus der Gruppe bestehend aus porösen Schäumen, gestrickten Abstandsgeweben, Textilien und Verbundmaterialien, gebildet ist.

4. Stützkissen nach Anspruch 1, das ferner ein Gehäuse (84a, 84b) für den Lüfter (80a, 80b) umfasst, wobei das Gehäuse (84a, 84b) im Innern des durch die untere Basisschicht (40) gebildeten Hohlraums (42a, 42b) positioniert ist.

10

5. Stützkissen nach Anspruch 4, das ferner einen Luftfilter umfasst, der im Gehäuse (84a, 84b) positioniert ist, und/oder ferner eine Hülle umfasst, die um das Gehäuse (84a, 84b) und im Hohlraum (42a, 42b) der unteren Basisschicht (40) positioniert ist.

15

6. Stützkissen nach Anspruch 5, wobei die Hülle aus einem Material gebildet ist, das zum Bereitstellen einer reibschlüssigen Verbindung zwischen dem Gehäuse (84a, 84b) und der unteren Basisschicht (40) konfiguriert ist, wobei die Hülle insbesondere aus flammhemmendem Material gebildet ist.

20

7. Stützkissen nach Anspruch 1, wobei die Körperstützschicht (20), die obere Basisschicht (30) und die untere Basisschicht (40) aus flexiblem Schaum gebildet sind, wobei die Körperstützschicht (20) insbesondere aus viskoelastischem Schaum gebildet ist, und die Körperstützschicht (20) insbesondere eine geringere Porosität als jene der einen oder mehreren porösen Schaumeinlagen aufweist.

25

30

8. Stützkissen nach Anspruch 1, wobei die Körperstützschicht (20) eine geringere Dichte als jene der oberen Basisschicht (30), der unteren Basisschicht (40) oder beide aufweist.

35

9. Stützkissen nach Anspruch 2, wobei die Körperstützschicht (20) aus viskoelastischem Schaum gebildet ist, und wobei die Komfortschicht (62) eine geringere Dichte als jene der Körperstützschicht (20) aufweist.

40

10. Stützkissen nach Anspruch 1, ferner umfassend:

45

eine Stromversorgung (92) zum Zuführen von elektrischem Strom zum Lüfter (80a, 80b); und eine Steuereinheit (90) zum Steuern des dem Lüfter (80a, 80b) von der Stromversorgung (92) zugeführten elektrischen Stroms.

50

11. Stützkissen nach Anspruch 10, wobei die Steuereinheit (90) konfiguriert ist, eine Stromversorgung des Lüfters (80a, 80b) für eine vorgegebene Zeitdauer zu ermöglichen, der insbesondere zudem einen oder mehrere Temperatursensoren (94a, 94b) zum Bereitstellen einer thermischen Rückmeldung an die Steuereinheit (90) umfasst, wobei der eine oder

55

mehrere Temperatursensoren (94a, 94b) mit der Körperstützschicht (20) wirkverbunden sind, und insbesondere ferner einen oder mehrere Drucksensoren (96a, 96b) zum Bereitstellen einer Druckrückmeldung an die Steuereinheit (90) umfassen, wobei der eine oder mehrere Drucksensoren (96a, 96b) mit der Körperstützschicht (20) wirkverbunden ist/sind.

12. Stützkissen nach Anspruch 1, das ferner einen Bezug umfasst, der zum Umschließen der Körperstützschicht (20), der oberen Basisschicht (30), der unteren Basisschicht (40) und der Bodenschicht (50) konfiguriert ist, wobei der Bezug insbesondere aus flammhemmendem Material, insbesondere einem Textil, gebildet ist.

Revendications

1. Coussin de support (10) comprenant :

une couche de support de corps (20) ayant une première surface (22) et une deuxième surface (24) opposée à la première surface (22) ;

une couche de base supérieure (30) positionnée de manière adjacente à la deuxième surface (24) de la couche de support de corps (20), la couche de base supérieure (30) définissant un ou plusieurs conduit(s) d'air (32a, 32b) s'étendant à travers la couche de base supérieure (30) ;

une couche de base inférieure (40) positionnée de manière adjacente à la couche de base supérieure (30) opposée à la couche de support de corps (20), la couche de base inférieure (40) définissant une cavité (42a, 42b) s'étendant à travers la couche de base inférieure (40) ;

une couche de fond (50) positionnée de manière adjacente à la couche de base inférieure (40) opposée à la couche de base supérieure (30) ; et

un ventilateur (80a, 80b) positionné dans la cavité (42a, 42b) définie par la couche de base inférieure (40), **caractérisé**

en ce que la couche de support de corps (20) comporte un ou plusieurs insert(s) en mousse poreuse (26a, 26b), et

en ce que le ou les plusieurs conduit(s) d'air (32a, 32b) est/sont en communication fluide avec le ou les plusieurs insert(s) en mousse poreuse (26a, 26b).

2. Coussin de support de la revendication 1, comprenant en outre une couche de confort (62), qui est notamment constituée d'une mousse viscoélastique, positionnée de manière adjacente à la première surface (22) de la couche de support de corps (20), la couche de confort (62) comportant une surface de

dessus et une surface de fond opposée à la surface de dessus ; où la couche de confort (62) définit en particulier une pluralité de canaux (66a, 66b) s'étendant de la surface de dessus à la surface de fond de la couche de confort (62), la pluralité de canaux (66a, 66b) étant en communication fluide avec le ou les plusieurs insert(s) en mousse poreuse (26a, 26b).

3. Coussin de support de la revendication 1, dans lequel la couche de fond (50) est constituée d'un matériau poreux, qui est en particulier choisi dans le groupe constitué par des mousses poreuses, des tissus d'espacement tricotés, des textiles et des matériaux composites.

4. Coussin de support de la revendication 1, comprenant en outre un boîtier (84a, 84b) pour le ventilateur (80a, 80b), le boîtier (84a, 84b) étant positionné dans la cavité (42a, 42b) définie par la couche de base inférieure (40).

5. Coussin de support de la revendication 4, comprenant en outre un filtre à air positionné dans le boîtier (84a, 84b) et/ou comprenant en outre un manchon positionné autour du boîtier (84a, 84b) et dans la cavité (42a, 42b) de la couche de base inférieure (40).

6. Coussin de support de la revendication 5, dans lequel le manchon est constitué d'un matériau configuré pour fournir une liaison par friction entre le boîtier (84a, 84b) et la couche de base inférieure (40), où le manchon est en particulier constitué d'un matériau ignifuge.

7. Coussin de support de la revendication 1, dans lequel la couche de support de corps (20), la couche de base supérieure (30) et la couche de base inférieure (40) sont constituées d'une mousse souple, où la couche de support de corps (20) est en particulier constituée d'une mousse viscoélastique, et comprenant en particulier la couche de support de corps (20) ayant une porosité inférieure à celle du ou des plusieurs insert(s) en mousse poreuse.

8. Coussin de support de la revendication 1, dans lequel la couche de support de corps (20) a une densité inférieure à celle de la couche de base supérieure (30), de la couche de base inférieure (40), ou des deux.

9. Coussin de support de la revendication 2, dans lequel la couche de support de corps (20) est constituée d'une mousse viscoélastique, et dans lequel la couche de confort (62) a une densité inférieure à celle de la couche de support de corps (20).

10. Coussin de support de la revendication 1, compre-

nant en outre :

une alimentation électrique (92) pour fournir du courant électrique au ventilateur (80a, 80b) ; et une unité de commande (90) pour commander le courant électrique fourni au ventilateur (80a, 80b) à partir de l'alimentation électrique (92).

11. Coussin de support de la revendication 10, dans lequel l'unité de commande (90) est configurée pour permettre l'alimentation en puissance du ventilateur (80a, 80) pendant une durée prédéterminée, en particulier comprenant en outre un ou plusieurs capteur(s) de température (94a, 94b) pour fournir une rétroaction thermique à l'unité de commande (90), le ou les plusieurs capteur(s) de température (94a, 94b) étant relié(s) de manière fonctionnelle à la couche de support de corps (20), et en particulier comprenant en outre un ou plusieurs capteur(s) de pression (96a, 96b) pour fournir une rétroaction de pression à l'unité de commande (90), le ou les plusieurs capteur(s) de pression (96a, 96b) étant relié(s) de manière fonctionnelle à la couche de support de corps (20).
12. Coussin de support de la revendication 1, comprenant en outre un couvercle configuré pour entourer la couche de support de corps (20), la couche de base supérieure (30), la couche de base inférieure (40) et la couche de fond (50), dans lequel le couvercle est en particulier constitué d'un matériau ignifuge, en particulier d'un textile.

35

40

45

50

55

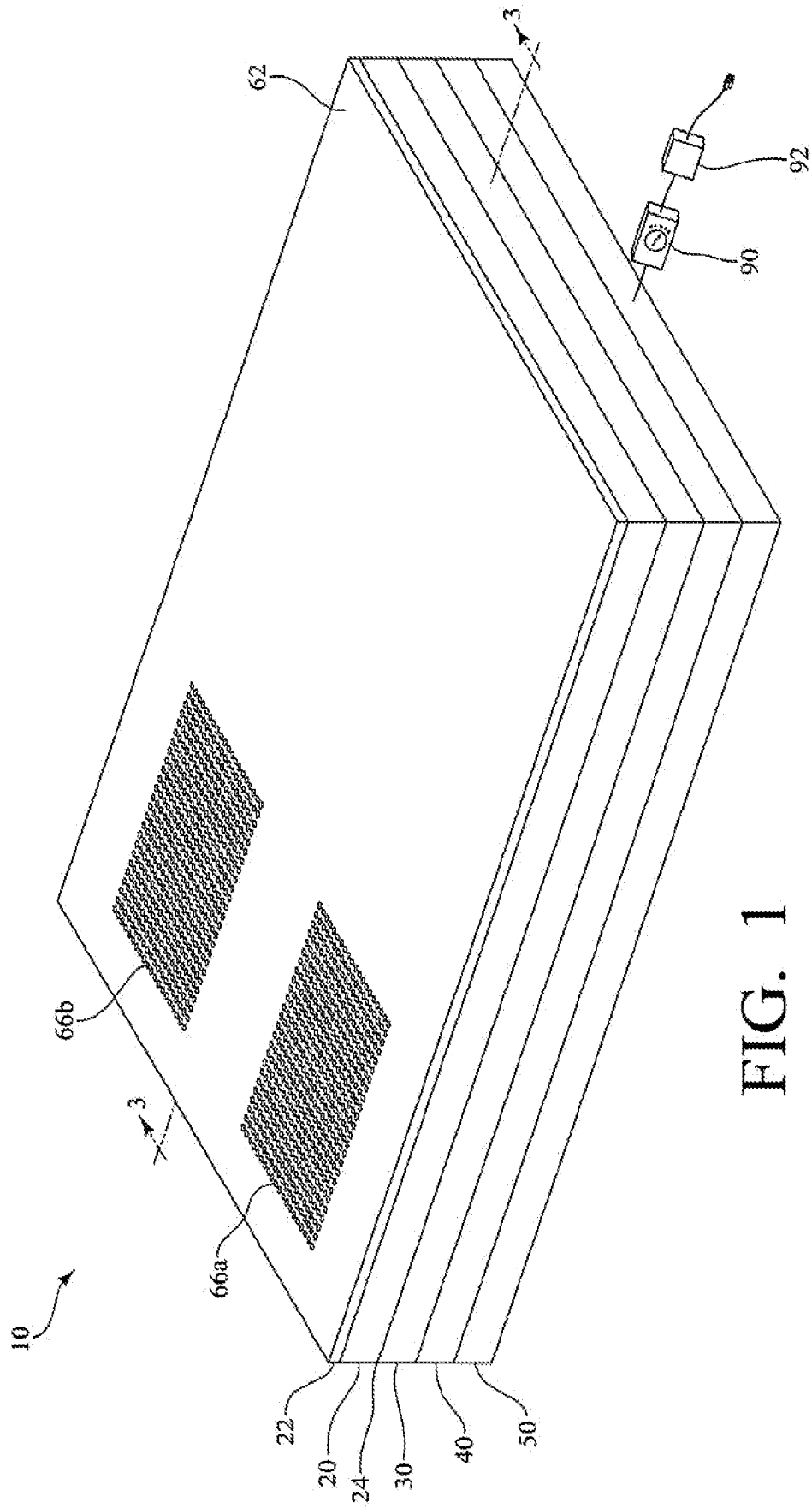


FIG. 1

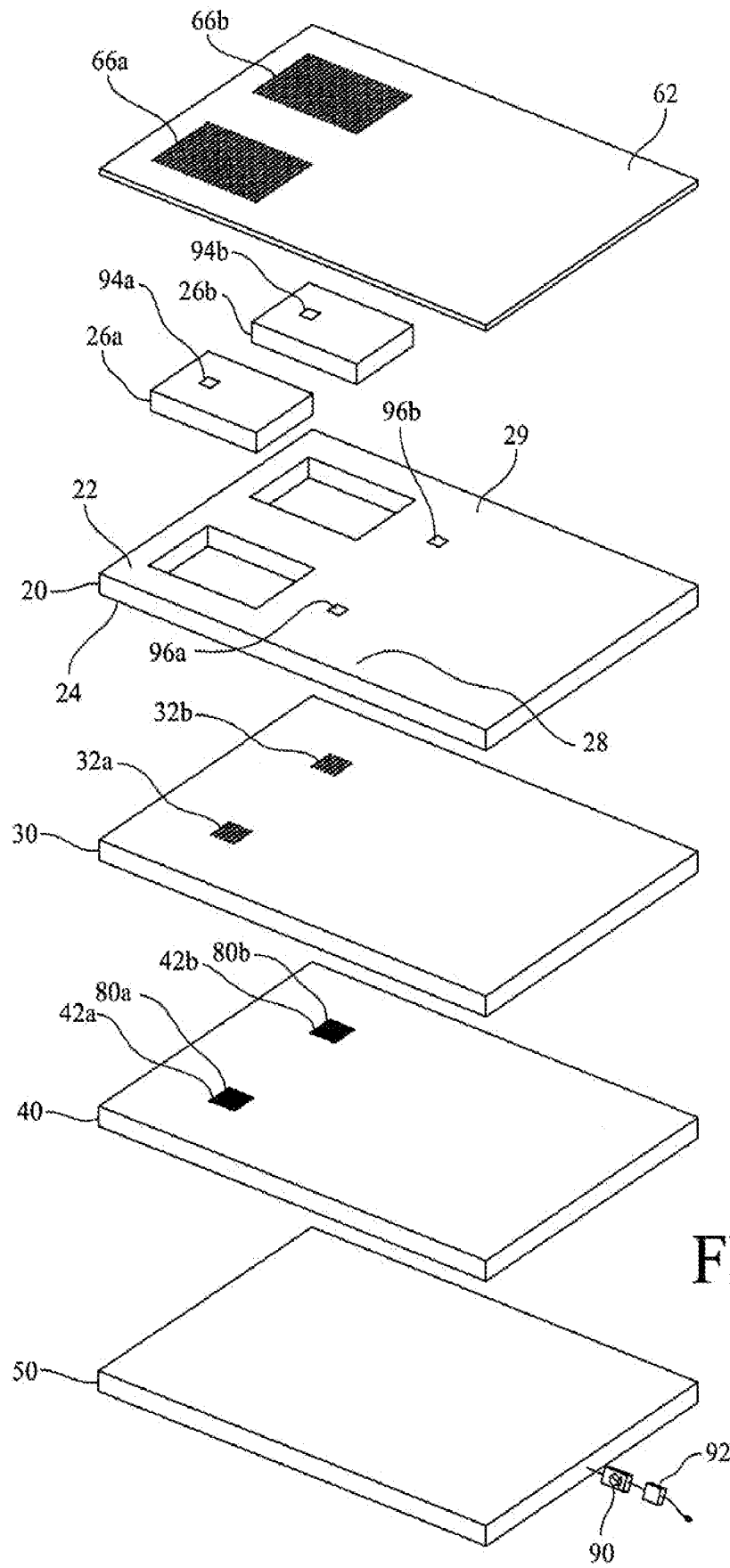


FIG. 2

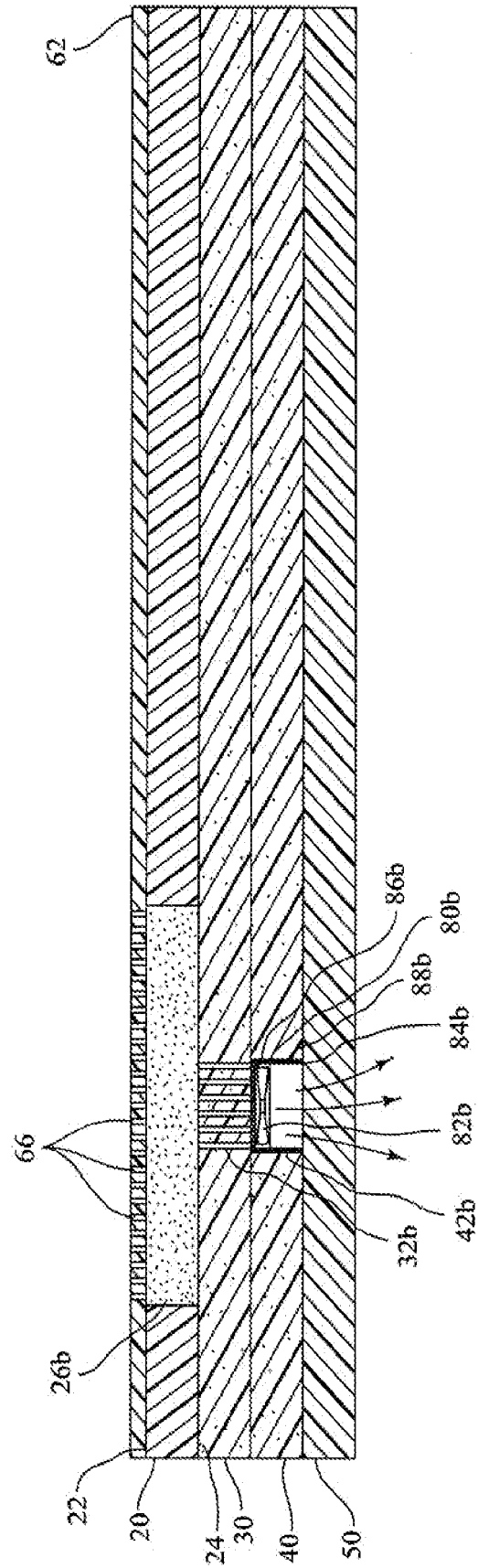


FIG. 3

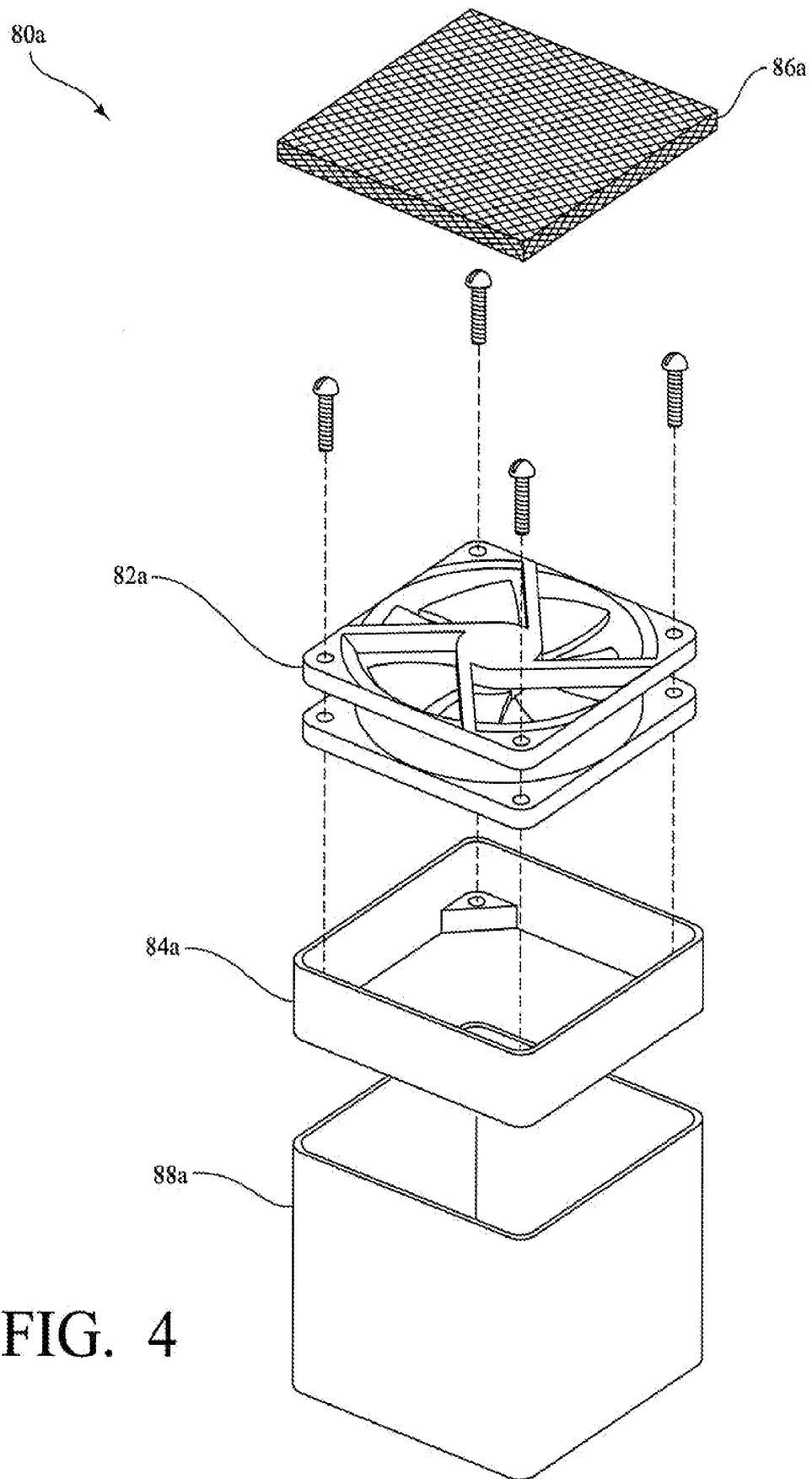


FIG. 4

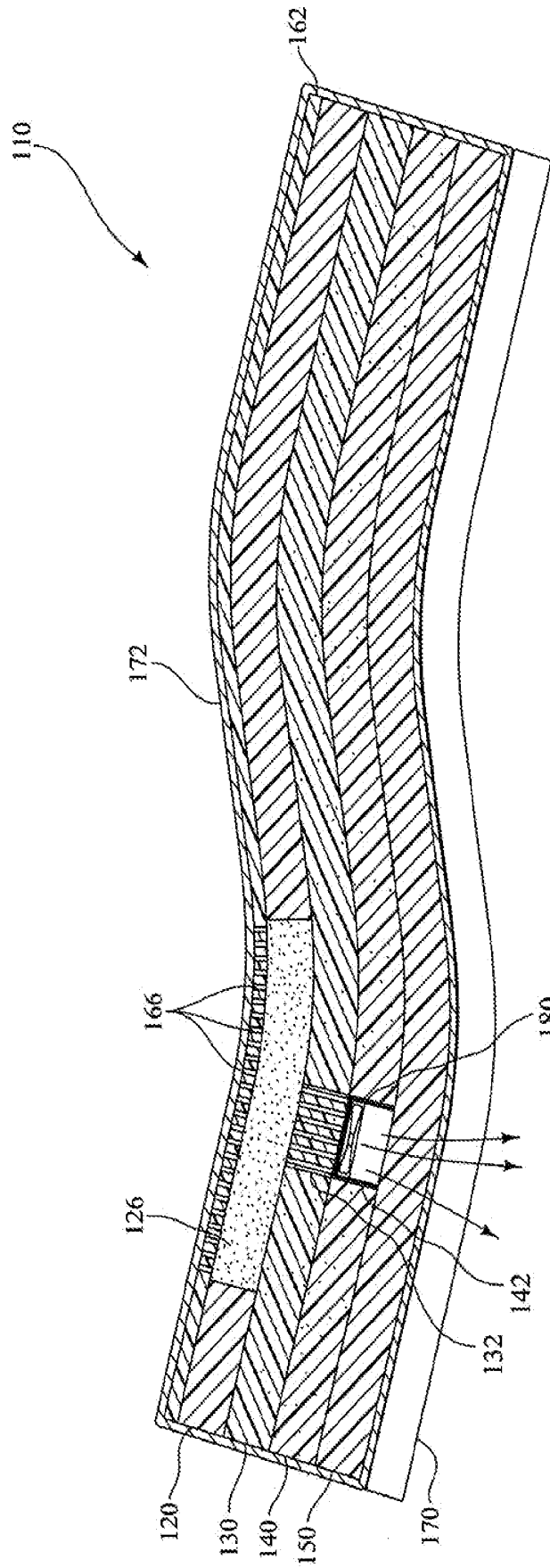


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2005192883 A [0001]
- US 8034445 B, Landvik [0032]
- US 8025964 B, Landvik [0032]
- US 7979374 B, Landvik [0032]
- US 7735169 B, Wassilefsky [0032]
- US 7707670 B, Fogg [0032]
- US 7555615 B, Landvik [0032]
- US 7507468 B, Landvik [0032]
- US 7469437 B, Mikkelsen [0032]
- US 7444702 B, Fogg [0032]
- US 7415742 B, Wassilefsky [0032]
- US D558499 S, Maarbjerger [0032]
- US 7155765 B, Fogg [0032]
- US D529325 S, Maarbjerger [0032]
- US 7082633 B, Maarbjerger [0032]
- US 7051389 B, Wassilefsky [0032]
- US 6866915 B, Landvik [0032]
- US 6764502 B, Bieberich [0032]
- US 6602579 B, Landvik [0032]
- US 6578218 B, Wassilefsky [0032]
- US 6541094 B, Landvik [0032]
- US 6402775 B, Bierberich [0032]
- US 6253401 B, Boyd [0032]
- US 5448788 A, Wu [0032]
- US D456660 S, Landvik [0032]
- US 20110252562, Mikkelsen [0032]
- US 20080028536, Hadden-Cook [0032]
- US 20070094803, Fogg [0032]
- US 20060288490, Mikkelsen [0032]
- US 20060277684, Wassilefsky [0032]
- US 20060174414, Maarbjerger [0032]
- US 20050202214 A, Landvik [0032]
- US 20050084667, Landvik [0032]
- US 20050076446, Fogg [0032]
- US 20040073931, Trussel Jr. [0032]
- US 20040033351, Landvik [0032]
- US 20030171954, Guerin [0032]
- US 20010021438, Landvik [0032]
- WO 2008143467 A, Ko [0032]
- WO 2012160502 A, Boersma [0032]
- US 5730120 A, Yokers [0032]
- US 8490233 B, Essers [0032]
- US D686723 S, Gulae [0032]
- US 20130025069, Ruehlmann [0032]