

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 September 2002 (06.09.2002)

PCT

(10) International Publication Number
WO 02/067729 A2

(51) International Patent Classification⁷: **A47C 20/02**

(21) International Application Number: PCT/CA02/00254

(22) International Filing Date: 27 February 2002 (27.02.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0104774.5 27 February 2001 (27.02.2001) GB

(71) Applicant and

(72) Inventor: **AZOULAY, Daniel** [CA/CA]; 4524 Harris,
Laval, Québec H7T 2P1 (CA).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

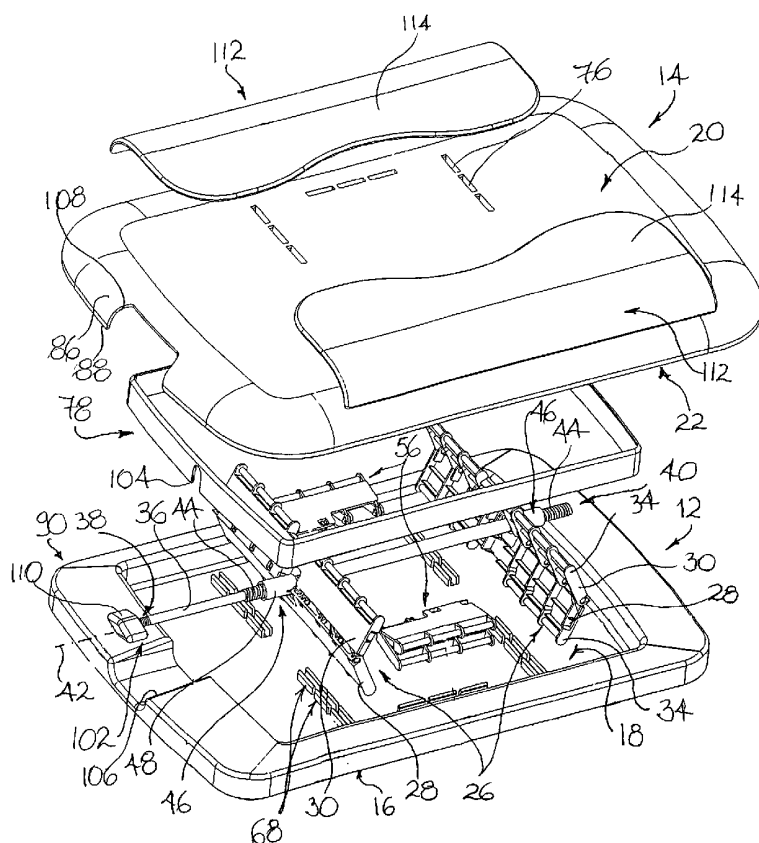
(74) Agent: **AZOULAY, Daniel**; 4524 Harris, Laval, Québec H7T 2P1 (CA).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: PILLOW HEIGHT ADJUSTMENT DEVICE



(57) Abstract: A pillow height adjusting device for adjusting the height of a pillow relative to a supporting surface such as a mattress. The device includes a base component for resting on the mattress and a supporting platform for supporting the pillow. A mechanism located between the base component and the supporting platform allows for selective adjustment of the height of the supporting platform and, hence, of the pillow relative to the mattress. The height adjustment structure includes jaw components threadably coupled to an actuating rod. The jaw components are pivotable between closed and open configurations for respectively bringing the platform in an adjacent and in a spaced relationship relative to the base component. An obstructing component is mounted between the supporting platform and base components for obstructing access to the height adjustment structure.

WO 02/067729 A2



Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

PILLOW HEIGHT ADJUSTMENT DEVICE

FIELD OF THE INVENTION:

The present invention relates to the general field of sleeping aids and is particularly concerned with a pillow height adjustment device.

BACKGROUND OF THE INVENTION:

It is sometimes estimated that approximately 1/3 of all human existence is spent in a supine position. In most industrial countries, people sleep on beds and use pillows to support the neck and head in the supine position, especially during sleep.

Entire industries have developed around the manufacture of various beds constructions, each of which offering various features aimed at providing a good night sleep. Posture beds, futons, water beds, spring beds and the like, all offer unique characteristics. User can select the type of bed construction which best complements their sleep preferences and anatomical builds.

Pillows are often considered, if not equally, even more important than the type of bed for procuring a comfortable sleep. Indeed, the cervical spine is much more fragile than the remaining of the spine and its anatomical characteristics are such that it requires customized ergonomic support.

The human cervical spine defines a lordotic curve imputable to the trapezoid shape of the 7 vertebrae and the associated inter-vertebral disks. The vertebrae are interconnected to provide protection for the spine while allowing a relatively large range of movements of the head.

Since the cervical vertebrae are designed to allow a relatively large range of motion, improper sleep postures can cause excessive flexion, rotation or extension of the fragile

cervical spine during sleep. These improper sleep postures may, in turn, lead to irritation of the cervical spine causing restlessness during sleep, neck stiffness and pain, headaches or radiated pain to the upper limbs.

Improper sleep postures can sometimes be attributed to a misfit between pillow size and the specific anatomical characteristics of a given individual. Indeed, many features of the cervical spine can vary greatly between individuals. For example, the length, thickness and width of the neck may vary greatly between individuals. Furthermore, the radius of curvature of the lordotic curve, the head size and the width of the shoulders can also vary greatly between individuals. Thus, a pillow which may prove to be adequate for some individuals may prove to be totally inadequate for others.

The problem of providing ergonomically customized pillows is further compounded by the fact that some users might want a pillow of a particular height part of the time and of a different height at other times. For example, individuals suffering from congestive heart failure often need to adjust the pillow height in order to be able to breathe properly. Also, the depending on whether the individual wishes to sleep in a lateral or dorsal decubitus position pillow height will need to be adjusted.

In order to obtain proper head and neck support, some people accommodate by adopting various sleep habits, such as doubling up a pillow, using multiple pillows or even extending an arm under the pillow. These solutions have proven to be unsatisfactory since doubled pillows or multiple pillows tend to become miss aligned. Also the supporting arms tends to move during sleep, resulting in improper head support.

The need for providing adequate head and neck support during sleep has been recognized in the past and, hence, numerous patents disclose various pillow constructions aimed at providing some sort of adjustability. However, most prior art pillows suffer from numerous drawbacks including ergonomically inadequate support, bulkiness, and overall complexity leading to increased costs and decreased reliability. Accordingly, there exists a need for an improved pillow height adjustment device.

Advantages of the present invention include that the proposed device is specifically designed to allow for relatively precise pillow height adjustment depending upon individual ergonomic characteristics and the comfort preferences of the user. For example, the proposed device allows horizontal alignment of the spine and head when the user is in the

lateral decubitus position and allows for the preservation of the cervical concavity when the user is in the dorsal decubitus position.

The proposed device is typically intended to be used in combination with a conventional pillow hence providing increased ergonomic characteristics to the widely used and available conventional pillow. The device is further designed so as to be relatively compact in its compact configuration so as to facilitate storage and transportation thereof when not in use. Also, the ability of the device to be relatively compact in its retracted configuration allows it to be positioned under a conventional pillow with minimal changes to the pillow height hence obviating the need for repeatedly placing and removing the device depending on the need to use it since.

Furthermore, the proposed device is specifically configured so as to reduce the risk of damage to the conventional pillow so that the latter can be used independently of the device when the latter is not needed. The proposed device is designed so as to be moved between extended and retracted configurations through a set of ergonomic steps without requiring special tooling or manual dexterity.³

The proposed device is designed so as to be relatively mechanically simple and manufacturable through conventional forms of manufacturing so as to provide a pillow height adjustment device that will be economically feasible, long-lasting and relatively trouble-free in operation. More specifically, the device is specifically designed so as to be manufacturable using a conventional polymeric resin through a conventional injection moulding process with minimal assembly steps.

The proposed device is designed so as to reduce slippage between the conventional pillow and the device pillow supporting surface. Also, the device provides for the possibility of inserting intermediate pads having various physical characteristics between the pillow and the pillow supporting device so as to further widen the range of ergonomic adjustability.

Furthermore, the device is provided with features for reducing the risks of injury to an intended user and and/or damage to the device as the latter is moved between its retracted and extended configurations for respectively decreasing and increasing the pillow height.

In accordance with an embodiment of the invention, there is provided a pillow height adjustment device for adjusting the height of a conventional pillow relative to a supporting surface, the conventional pillow defining a pillow base surface and a generally opposed pillow head contacting surface, the device comprising: a base component, the base component defining a base resting surface for resting on the supporting surface and a generally opposed base coupling surface; a supporting platform, the supporting platform defining a platform abutting surface for abuttingly contacting the pillow base surface and a generally opposed platform coupling surface; the base resting surface extending generally in a resting surface geometrical plane and the platform abutting surface extending in an abutting surface geometrical plane, the resting surface geometrical plane and the abutting surface geometrical plane being in a predetermined angular relationship relative to each other; a base-to-platform coupling means extending between the base and platform coupling surfaces for mechanically coupling the supporting platform to the base component and for allowing adjustment of the spacing between the base and platform coupling surfaces while maintaining the predetermined angular relationship between the base-to-platform coupling means; whereby the base-to-platform coupling means allows for adjustment of the spacing defined by the base and platform coupling surfaces between a proximate configuration wherein the base and platform coupling surfaces are in a generally proximate relationship relative to each other and a spaced configuration wherein the base and platform coupling surfaces are in a generally spaced relationship relative to each other. Conveniently, the resting surface geometrical plane and the abutting surface geometrical plane extend in a generally parallel relationship relative to each other. Alternatively, the resting surface geometrical plane and the abutting surface geometrical plane extend in another angular relationship relative to each other.

Preferably, the base-to-platform coupling means includes a pair of spacing jaws, each of the spacing jaws defining a spacing jaw first component and a spacing jaw second component, the spacing jaw first and second components each defining corresponding spacing jaw component proximal and distal ends, the spacing jaw first and second components being pivotally attached together adjacent their respective spacing jaw component proximal ends for pivotal movement relative to each other about a spacing jaw pivotal axis between a spacing jaw open configuration wherein the spacing jaw component distal ends are in a generally spaced relationship relative to each other and a spacing jaw closed configuration wherein the spacing jaw component distal ends are in a generally proximal relationship relative to each other; the spacing jaw component distal end of the spacing jaw first component being pivotally attached to the base coupling surface and the spacing jaw

component distal end of the spacing jaw second component being pivotally attached to the platform coupling surface so that pivotal movement between the spacing jaw first and second components changes the spacing between the base and platform coupling surfaces; a spacing jaw component pivoting means coupled to the spacing jaw for pivoting the spacing jaw first and second components relative to each other about the spacing jaw pivotal axis.

Conveniently, the spacing jaw component pivoting means includes an actuating rod, the actuating rod defining a rod first end, an opposed rod second end and a rod longitudinal axis, the actuating rod being provided with a rod threaded section; a pair of rod-to-jaw linkage components, each of the rod-to-jaw linkage components including a linkage sleeve and a linkage component attachment prong extending outwardly from the linkage sleeve, the linkage sleeve being provided with a sleeve internal thread for threaded engagement with the rod threaded section so as to allow for translational relative movement along the rod longitudinal axis between the rod threaded section and the linkage sleeve when the actuating rod is pivoted about the rod longitudinal axis; the linkage component attachment prong being attachable to one of the spacing jaw components so as to transform the translational relative movement along the rod longitudinal axis between the rod threaded section and the linkage sleeve into a pivotal relative movement between the spacing jaw first and second components about the spacing jaw pivotal axis.

Typically, the rod-to-jaw linkage components are positioned in a spaced relationship relative to each other along the actuating rod with the sleeve internal thread of opposed linkage sleeve threaded in opposite direction relative to each other and threadably engaged with correspondingly oriented rod threaded segments formed on the actuating rod, the spacing jaw components being positioned in an opposed relationship relative to each other with the spacing jaw component distal ends of opposed spacing jaw components facing towards each other and the spacing jaw component proximal ends of spacing jaw components facing away from each other .

Preferably, the device further includes a pair of stabilizing jaws, each of the stabilizing jaws defining a stabilizing jaw first component and a stabilizing jaw second component, the stabilizing jaw first and second components each defining corresponding stabilizing jaw component proximal and distal ends, the stabilizing jaw first and second components being pivotally attached together adjacent their respective stabilizing jaw component proximal ends for pivotal movement relative to each other about a stabilizing jaw pivotal axis between a stabilizing jaw open configuration wherein the stabilizing jaw components distal ends are in a generally spaced relationship relative to each other and a stabilizing jaw closed configuration

wherein the stabilizing jaw component distal ends are in a generally proximal relationship relative to each other; the stabilizing jaw component distal end of the stabilizing jaw first component being pivotally attached to the base coupling surface and the stabilizing jaw component distal end of the stabilizing jaw second component being pivotally attached to the platform coupling surface; the stabilizing jaw components being positioned in an opposed and spaced relationship relative to each other with the stabilizing jaw component distal ends of opposed stabilizing jaw components facing towards each other and the stabilizing jaw component proximal ends of stabilizing jaw components facing away from each other; the stabilizing jaw components being positioned generally between the spacing jaw components with the spacing jaw and stabilizing jaw pivotal axes in a generally perpendicular relationship relative to each other.

Conveniently, the spacing and stabilizing jaw first components are pivotally and releasably attached to corresponding first component attachment clips extending integrally from the base coupling surface; the spacing and stabilizing jaw second components are pivotally and releasably attached to corresponding second component attachment clips extending integrally from the platform coupling surface.

Preferably, the device further includes an obstructing component attached to the device intermediate the base and platform coupling surfaces, the obstructing component being configured, sized and positioned for blocking access to the base-to-platform coupling through the spacing between the base and platform coupling surfaces when the base component and supporting platform are in the spaced configuration.

Conveniently, the device further includes an attachment rim extending from the platform coupling surface, the obstructing component being slidably attached to the attachment rim for slidable movement relative thereto between a retracted configuration wherein the obstructing component is positioned generally adjacent the platform coupling surface and an extended configuration wherein the obstructing component extends from the attachment rim in a generally spaced relationship relative to the platform coupling surface.

Typically, the supporting platform has a generally concave configuration; the supporting platform being provided with a peripheral platform flange defining a platform flange peripheral edge, the platform flange peripheral edge being located in a platform edge geometrical plane, the platform edge geometrical plane being in a generally parallel and spaced relationship relative to the platform abutting surface; the base component having a generally concave configuration; the base component being provided with a peripheral base flange

defining a base flange peripheral edge, the base flange peripheral edge being located in a base edge geometrical plane, the base edge geometrical plane being in a generally parallel and spaced relationship relative to the base abutting surface; whereby the platform flange and the base flange are configured and sized so that when the base and platform coupling surfaces are in the proximate configuration, the base component and supporting platform form a generally hollow enclosure with their corresponding base and platform flange peripheral edges in abutting contact with each other for protectively enclosing the base-to-platform coupling means.

In accordance with one embodiment of the invention, a rod protruding segment of the actuating rod extends laterally out of the hollow enclosure through corresponding rod channels formed in the base and platform flanges, the rod protruding segment being provided with a rod handle for facilitating manual rotation of the actuating rod about the rod longitudinal axis. In accordance with another embodiment of the invention, the actuating rod is mechanically coupled to a motorized means for rotating the actuating rod about the rod longitudinal axis.

Preferably, the device further includes a friction pad mounted on the platform abutting surface, the friction pad defining a pad pillow contacting surface, the pad pillow contacting surface being provided with friction enhancing means for enhancing the frictional force between the pillow and the pad pillow contacting surface when the pillow is rested on the pad pillow contacting surface. Conveniently, the friction pad is releasably mounted on the platform abutting surface.

BRIEF DESCRIPTION OF THE DRAWINGS:

Embodiments of the invention will now be disclosed by way of example, in reference to the following drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS:

FIGURE 1: in a perspective view, illustrates a pillow height adjustment device in accordance with an embodiment of the present invention;

FIGURE 2: in a top view, illustrates the pillow height adjustment device shown in FIG. 1;

FIGURE 3: in a front view, illustrates the pillow height adjustment device shown in FIGS. 1 and 2;

FIGURE 4: in a side elevational view, illustrates the pillow height adjustment device shown in FIGS. 1 through 3;

FIGURE 5: in a side elevational view, illustrates the pillow height adjustment device shown in FIGS. 1 through 4 having a pillow and pillow membrane mounted thereon, the device being shown in a retracted configuration;

FIGURE 6: in a side elevational view, illustrates the pillow height adjustment device shown in FIGS. 1 through 4 having a pillow and pillow membrane mounted thereon, the device being shown in an extended configuration;

FIGURE 7: in a side elevational view, illustrates the pillow height adjustment device, in accordance with an embodiment of the present invention, in a retracted configuration;

FIGURE 8: in a side elevational view with a section indicated by arrows VIII-VIII in FIG. 1 removed, illustrates the pillow height adjustment device, in accordance with an embodiment of the present invention, in an extended configuration;

FIGURE 9: in a longitudinal cross sectional view taken along arrows IX-IX of FIG. 1, illustrates some of the internal components of a pillow height adjustment device, in accordance with an embodiment of the present invention; the device being shown in a retracted configuration;

FIGURE 10: in a longitudinal cross sectional view taken along arrows IX-IX of FIG. 1, illustrates some of the internal components of a pillow height adjustment device, in accordance with an embodiment of the present invention; the device being shown in an extended configuration;

FIGURE 11: in a side elevational view, illustrates a pillow height adjustment device in accordance with an alternative embodiment of the invention;

FIGURE 12: in an exploded view, illustrates some of the components of a pillow height adjustment device in accordance with an embodiment of the present invention;

FIGURE 13: in a partial transversal cross sectional view with sections taken out, illustrates a pillow height adjustment device in accordance with an embodiment of the present invention;

FIGURE 14: in a bottom view, illustrates a base component, part of a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 15a: in a perspective bottom view, illustrates a supporting platform, part of a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 15b: in a bottom view, illustrates a supporting platform, part of a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 16: in a perspective view, illustrates a spacing arm part of a spacing jaw component associated with a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 17: in a perspective view, illustrates a spacing jaw component part of a pillow height adjustment device, in accordance with an embodiment of the present invention, the spacing jaw component being shown in an open configuration;

FIGURE 18: in a perspective view, illustrates a stabilizing jaw component part of a pillow height adjustment device, in accordance with an embodiment of the present invention, the stabilizing jaw component being shown in an open configuration;

FIGURE 19: in a perspective view, illustrates a stabilizing arm, part of a stabilizing jaw component, associated with a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 20: in a perspective view, illustrates a rod-to-jaw linkage component, part of a pillow height adjustment device, in accordance with an embodiment of the present invention;

FIGURE 21: in a side view, illustrates the thread pattern of the rod-to-jaw linkage component shown in FIG. 20.

DETAILED DESCRIPTION

Referring to Figs. 5 and 6, there is shown, in a side elevational view, a pillow height adjustment device (10) in accordance with an embodiment of the present invention. The device (10) allows for adjustment of the height of a conventional pillow (11), such as a conventional bed pillow or the like relative to a supporting surface (13) such as a mattress. Typically, the conventional pillow (11) defines a pillow base surface (15) for contacting the supporting surface (13) and a generally opposed pillow head contacting surface (17) on which the head of an intended user (not shown) rests.

The device (10) includes a base component (12) and a supporting platform (14). The base component (12) defines a base resting surface (16) for resting on the supporting surface (13), typically, on the region of the supporting surface (13) on which the conventional pillow would normally rest. The base component (12) also defines a generally opposed base coupling surface (18).

The supporting platform (14) defines a platform abutting surface (20) for abuttingly supporting the pillow base surface (15) and a generally opposed platform coupling surface (22). The device (10) also includes a base-to-platform coupling means extending between the base and platform coupling surfaces (18), (22) for mechanically coupling the supporting platform (14) to the base component (12).

The base-to-platform coupling means also allows for adjustment of the spacing (24) between the base and platform coupling surfaces (18), (22). The base-to-platform coupling means allows for adjustment of the spacing (24) between a proximate configuration shown in Fig. 9 wherein the base and platform coupling surfaces (18), (22) are in a generally proximate relationship relative to each other and a spaced configuration shown in Fig. 10 wherein the base and platform coupling surfaces (18), (22) are in a generally spaced relationship relative to each other.

The base resting surface (16) extends generally in a resting surface geometrical plane while the platform abutting surface (20) similarly extends generally in an abutting surface geometrical plane. Although both the base resting surface (16) and the platform abutting surface (20) are shown throughout the FIGS., as having a generally flat and rectangular configuration, it should be understood that the base resting surface (16) and the platform abutting surface (20) could have other geometrical configurations without departing

from the scope of the present invention. For example, the base resting surface (16) and the platform abutting surface (20) could have generally disc or polygonal shaped configurations to accommodate similarly shaped pillows. Also, the base resting surface (16) and/or the platform abutting surface (20) could have a bent, warped or otherwise formed configuration other than flat without departing from the scope of the present invention.

The resting surface geometrical plane and the abutting surface geometrical plane typically extend in a predetermined angular relationship relative to each other. In the embodiments shown throughout the FIGS., the resting surface geometrical plane and the abutting surface geometrical plane extend in a generally parallel relationship relative to each other. However, the abutting surface geometrical plane and the resting surface geometrical plane could extend in other angular relationship relative to each other without departing from the scope of the present invention. For example, the abutting surface geometrical plane could be angled relative to the resting surface geometrical plane for providing an ergonomically angled head support.

Preferably, the base-to-platform coupling means allows for adjustment of the spacing (24) between the base and platform coupling surfaces (18), (22) while maintaining the predetermined angular relationship between the resting surface and abutting surface geometrical planes. For example, in the embodiments shown throughout the FIGS., the base-to-platform coupling means allows the base and platform coupling surfaces (18), (22) to remain in a generally parallel relationship relative to each other while the spacing therebetween is adjusted.

The base-to-platform coupling means includes at least one and preferably a pair of spacing jaws (26). Each spacing jaw (26) defines a corresponding spacing jaw first component (28) and a corresponding spacing jaw second component (30).

As illustrated more specifically in Figs. 16 and 17, the spacing jaw first and second components (28), (30) each define corresponding spacing jaw component proximal and distal ends (32), (34). The spacing jaw first and second components (28), (30) are pivotally attached together adjacent their respective spacing jaw component proximal ends (32) for pivotal movement relative to each other about a spacing jaw pivotal axis (36). The spacing jaw first and second components (28), (30) are pivotally attached so as to pivot between a spacing jaw opened configuration shown in FIGS. 10 and 12, wherein the spacing jaw component distal ends (34) are in a generally spaced relationship relative to each other and

a spacing jaw closed configuration shown in FIGS. 9, 13 and 17 wherein the spacing jaw component distal ends (34) are in a generally proximal relationship relative to each other.

As shown more specifically in FIGS 9, 10 and 13, the spacing jaw component distal end (34) of the spacing jaw first components (28) are pivotally attached to the base coupling surface (18). Similarly, the spacing jaw component distal end (34) of the spacing jaw second components (30) are pivotally attached to the platform coupling surface (22) so that pivotal movement between the spacing jaw first and second components (28), (30) changes the spacing (24) between the base and platform coupling surfaces (18), (22).

The base-to-platform coupling means typically also includes a spacing jaw component pivoting means coupled to the spacing jaws for pivoting the spacing jaws first and second components relative to each other about the spacing jaw pivotal axis. The spacing jaw component pivoting means may take any suitable form. In the embodiments shown throughout the FIGS., the spacing jaw component pivoting means includes an actuating rod (36) defining a rod first end (38), an opposed rod second end (40) and a rod longitudinal axis (42). The actuating rod (36) is provided with a pair of rod threaded sections (44).

The spacing jaw component pivoting means typically also includes a pair of rod-to-jaw linkage component (46), shown in greater details in FIGS 17, 20 and 21. Each of said rod-to-jaw linkage component (46) includes a linkage sleeve (48). The linkage sleeve (48) is provided with a sleeve internal thread (50) for threaded engagement with a corresponding rod threaded section (44).

The threaded engagement between the sleeve internal thread (50) and a corresponding rod threaded section (44), allows for translational relative movement indicated by arrows 52 in FIGS. 9 and 10 along the rod longitudinal axis (42) between the actuating rod (36) and the linkage component (46) when the actuating rod (36) is pivoted about the rod longitudinal axis (42).

Each rod-to-jaw linkage component (46) also includes at least one and preferably two linkage component attachment prongs (54) extending outwardly and generally radially from the outer surface of the linkage sleeve (48). The linkage component attachment prongs (54) are attachable to the jaw first and/or second components (28), (30) so as to transform the translational relative movement along the rod longitudinal axis (42) between the rod-to-jaw linkage sleeve (48) and the actuating rod (36) into a pivotal relative movement between

the spacing jaw first and second components (28), (30) about the spacing jaw pivotal axis (35).

Typically, each linkage component attachment prong (54) has a generally C-shaped cross sectional configuration for clipping and/or slidable engagement with a suitable section of a corresponding spacing jaw (56) as shown in FIG. 17. Also, preferably, both the sleeve internal thread (50) and the rod threaded sections (44) are provided with a double thread pattern in order to ergonomically increase the efficiency of the conversion between rotation of the actuating rod (36) about the rod longitudinal axis (42) into a pivotal relative movement between the spacing jaw first and second components (28), (30) about the spacing jaw pivotal axis (35).

As shown more specifically in FIGS. 10 and 12, the spacing jaw components (26) are typically positioned in an opposed and spaced relationship relative to each other with the spacing jaw component distal ends (34) of opposed spacing jaw components (26) facing towards each other and the spacing jaw component proximal ends (32) of opposed spacing jaw components (26) facing away from each other.

The rod-to-jaw linkage components (46) are, hence, typically positioned in a spaced relationship relative to each other along the actuating rod (36). In order to allow the spacing jaw components (26) to work in mirror-image relationship relative to each other between open and closed configurations, the sleeve internal threads (50) of opposed linkage sleeves (48) are threaded in opposite directions relative to each other and threadably engage with correspondingly oriented rod threaded sections (44) formed on the actuating rod (36).

The device (10) preferably further includes a stabilizing structure extending between the base and platform coupling surfaces (18), (22) for stabilizing the mechanical link between the base component (12) and the supporting platform (14) while allowing adjustment of the spacing (24) between the base and platform coupling surfaces (18), (22). Typically, the stabilizing structure includes at least one and preferably a pair of stabilizing jaws (56). As shown more specifically in FIG. 13, each stabilizing jaw (56) defines a corresponding stabilizing jaw first component (58) and a stabilizing jaw second component (60).

The stabilizing jaw first and second components (58), (60) each define corresponding stabilizing jaw component proximal and distal ends (62), (64). The stabilizing jaw first and second components (58), (60) are pivotally attached together adjacent their respective stabilizing jaw component proximal ends (62) for pivotal movement relative to each other

about a stabilizing jaw pivotal axis (66). The stabilizing jaw first and second components (58), (60) are pivotable relative to each other between a stabilizing jaw open configuration wherein the stabilizing jaw component distal ends (64) are in a generally spaced relationship relative to each other and a stabilizing jaw closed configuration wherein the stabilizing jaw component distal ends (64) are in a generally proximal relationship relative to each other.

The stabilizing jaw component distal end (64) of the stabilizing jaw first components (58) are pivotally attached to the base coupling surface (18) while the stabilizing jaw component distal end (64) of the stabilizing jaw second components (60) are pivotally attached to the platform coupling surface (22).

As shown more specifically in FIG. 12, the stabilizing jaw components (56) are typically positioned in an opposed and spaced relationship relative to each other, with the stabilizing jaw component distal ends (64) of opposed stabilizing jaw components (56) facing away from each other and the stabilizing jaw component proximal ends (62) of opposed stabilizing jaw components (56) facing towards each other. The stabilizing jaw components (56) are preferably positioned generally between the spacing jaw components (26) and with the stabilizing jaw pivotal axis (66) extending in a generally perpendicular relationship relative to the stabilizing jaw pivotal axis (35).

The spacing and stabilizing jaw first components (28), (58) are typically pivotally and releasably attached to corresponding first component attachment clips (68) extending from the base coupling surface (18). Similarly, the spacing and stabilizing jaw second components (30), (60) are typically pivotally and releasably attached to corresponding second component attachment clips (70) extending from the platform coupling surface (22).

As shown more specifically in FIGS. 9 and 10, the first and second component attachment clips (68), (70) each typically include a pair of opposed clip segments (72) in spaced apart relationship relative to each other and having distal tips (74) curving inwardly towards each other so as to provide a resilient clipping connection with a suitable section of the corresponding spacing or stabilizing jaw components (26), (56). The first and second component attachment clips (68), (70) may extend integrally from the corresponding base and platform coupling surfaces (18), (22) or, alternatively, may be releasably snapped into corresponding clip receiving apertures (76).

The device (10), typically further includes, an obstructing component (78) attached to the device (10) intermediate the base and platform coupling surfaces (18, (22)). The obstructing component (78) is configured, sized and positioned for blocking access to the base-to-platform coupling means through the spacing (24) between the base and platform coupling surfaces (18), (22) when the base component (12) and the supporting platform (14) are in the spaced configuration shown in FIGS. 6, 8 and 10.

Typically, the device (10) also include an attachment rim (80) extending from the platform coupling surface (22). As shown more specifically in FIGS. 8, 9 and 10, the obstructing component (78) is slidably attached to the attachment rim (80) for slidable movement relative thereto between a retracted configuration shown in FIG. 9 wherein the obstructing component (78) is positioned generally adjacent the platform coupling surface (22) and an extended configuration wherein the obstructing component (78) extends from the attachment rim (80) in a generally spaced relationship relative to the platform coupling surface (22).

Typically, the obstructing component (78) and attachment rim (80) are provided with abutment ledges (82), (84) extending respectively from adjacent peripheral edges thereof so as to limit the relative movement between the obstructing component (78) and the attachment rim (80) as the obstructing component (78) drops by the action of gravity when the base component (12) and supporting platform (14) are in the spaced configuration.

Movement of the obstructing component (78) towards the extended configuration is intended to prevent contact of the fingers or other body parts of a user with internal components of the device (10) such as the stabilizing and spacing jaw components (56), (36) so as to reduce the risks of injury. The obstructing component (78) also prevents foreign matters such as solid or granular objects from being introduced in the spacing (24) when the device (10) is in the spaced configuration so as to prevent foreign objects from interfering with proper functioning of the device (10) and/or from damaging the latter.

Typically, the supporting platform (14) has a generally concave configuration. The supporting platform (14) is typically provided with a peripheral platform flange (86) defining a platform flange peripheral edge (88). The platform flange peripheral edge (88) is located in a platform edge geometrical plane. Typically, the platform edge geometrical plane is in a generally parallel and spaced relationship relative to the platform abutting surface (20). Also, preferably, the platform flange (86) has a generally arcuate configuration.

Similarly, the base component (12) typically has a generally concave configuration. The base component (12) is provided with a peripheral base flange (90) defining a base flange peripheral edge (92). The base flange peripheral edge (92) is located in a base edge geometrical plane. The base edge geometrical plane typically extends in a generally parallel relationship relative to the base abutting surface (16).

The platform flange (86) and the base flange (90) are configured and sized so that when the base and platform coupling surfaces (18), (22) are in the proximate configuration shown in FIG. 9, the base component (12) and the supporting platform (14) together define a generally hollow enclosure (94) for protectively enclosing the base-to-platform coupling means.

As shown more specifically in FIGS 8 and 13, the base flange (90) typically has a generally inverted U-shaped configuration defining a base flange inner segment (96), a base flange outer segment (98) and a base flange spacing segment (100) extending therebetween. Typically, as shown in FIGS. 8 through 10, the attachment rim (80), the obstructing component (78), the base flange (90) and the platform flange (86) are configured and sized so that the attachment rim (80) is positioned inwardly relative to the obstructing component (78) and so that the obstructing component (78) is positioned inwardly relative to the base flange inner segment (96).

Also, the base flange outer segment (98) is preferably positioned inwardly relative to the platform flange peripheral edge (88). The use of jaw-type components combined with the concentric relationship between the hereinabove mentioned components, allows for compactness of the device (10) when the base and platform coupling surfaces (18), (22) are in the proximate configuration, shown in FIGS. 7 and 9.

As illustrated more specifically in FIGS. 10 and 12, a rod protruding segment (102) of the actuating rod (36) typically extends laterally out of the hollow enclosure (94) through corresponding rod channels (104), (106) and (108) formed in the obstructing component (78), the base flange (90) and the platform flange (86). The protruding segment (102) is provided with a rod handle (110) for facilitating manual rotation of the actuating rod (36) about the rod longitudinal axis (42).

In an alternative embodiment of the invention shown in FIG. 11, the actuating rod (36) is mechanically coupled to a motorized means (not shown) for rotating the actuating rod (32) about the rod longitudinal axis (42). The motorized means is, in turn, coupled to control means such as a control knob (116) and a control switch (118) respectively allowing for selection of the size of the spacing (24) and for actuation of the motorized means for adjusting the spacing (24).

As shown more specifically in FIGS. 1 and 12, the device (10) typically further includes at least one and preferably two friction pads (112) mounted on the platform abutting surface (20). Each friction pad (112) defines a pad pillow contacting surface (114). The pad pillow contacting surface (114) is provided with a contacting surface friction enhancing means for enhancing the frictional force between the pillow base surface 15 and the pad pillow contacting surface (114) when the pillow 11 is rested on the pad pillow contacting surface (114). The friction pads (112) are typically made out of a generally resilient material such as a suitable elastomeric resin.

The increased frictional force between the pillow and pad pillow contacting surface (112) reduces the risks of having the pillow slip off the supporting surface (20). Also, the friction pads (112) provide cushioning for the head of an intended user and may be used for selectively locally increasing the height or angle of the surface contacted by the pillow 11.

Furthermore, the friction pads (112) may be used for customizing the hardness or density of the support on which the pillow is rested. Optionally, the friction pads (112) are releasably mounted on the platform abutting surface (20) in order to allow an intended user to select between a variety of friction pads (112) having various characteristics such as size, thickness, angulation, resilience and density and so forth.

As shown more specifically in FIG. 14, the base resting surface (16) is typically provided with a base friction enhancing means for enhancing the frictional force between the base resting surface and the supporting surface (13). The base friction enhancing means typically includes a set of base protrusions (120) extending from the base resting surface (16). Each base protrusion (120) typically has a generally V-shaped configuration defining a pair of protrusion legs (122). The protrusion legs (122) are preferably angled by an angle (124) having a value of approximately 90 degrees in order to optimize the friction enhancing characteristics in various directions.

As shown more specifically in FIGS. 16 through 19, the spacing jaw first and second components (28, 30) and the stabilizing jaw first and second components (58, 60) are provided with generally disk-shaped hinge pins (13) and corresponding generally disk-shaped hinges recesses (132). The hinge pins (13) and disk-shaped hinges recesses (132) are adapted to cooperate for forming jaw hinges.

The spacing jaw first and second components (28, 30) and stabilizing jaw first and second components (58, 60) are also designed so as to reduce manufacturing cost by providing reversibly connectable components that may be used alternatively as jaw first or second components. The spacing and stabilizing jaw first and second components (28, 30; 58, 60) are provided with ribs (126) that are used both for structural reinforcement and as abutment range limiting means for limiting the range of pivotal movement between the jaw first and second components. The spacing and stabilizing jaw first and second components (28, 30; 58, 60) are typically provided with integral transversally extending hinge rods (128), configured and sized for cooperating with the clips (68, 70) in providing a pivotal connection.

The supporting platform (14) and other components of the device (10) are preferably provided with rounded edges and contours. As shown in FIGS. 5 and 6, the supporting platform (14) is preferably configured and sized so as to allow the pillow (11) to extend beyond its peripheral edges. In use, a pillow (11) is positioned on the pillow supporting surface (20). As shown in Figures 5 and 6, a generally stretchable membrane (134) is mounted around both the pillow (11) and the device (10). The membrane (134) allows the pillow (11) to bend over the edges of the device (10) and secures the pillow (11) to the device (10). The base resting surface (16) is rested on the supporting surface (13), typically, on the region of the supporting surface (13) on which the conventional pillow would normally rest. The height between the pillow (11) and the mattress (13) is adjusted by rotation of the actuating rod (36) about the rod longitudinal axis (42).

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A pillow height adjustment device for adjusting the height of a conventional pillow relative to a supporting surface, said conventional pillow defining a pillow base surface and a generally opposed pillow head contacting surface, said device comprising:

- a base component, said base component defining a base resting surface for resting on said supporting surface and a generally opposed base coupling surface;
- a supporting platform, said supporting platform defining a platform abutting surface for abuttingly contacting said pillow base surface and a generally opposed platform coupling surface;
- said base resting surface extending generally in a resting surface geometrical plane and said platform abutting surface extending in an abutting surface geometrical plane, said resting surface geometrical plane and said abutting surface geometrical plane being in a predetermined angular relationship relative to each other;
- a base-to-platform coupling means extending between said base and platform coupling surfaces for mechanically coupling said supporting platform to said base component and for allowing adjustment of the spacing between said base and platform coupling surfaces while maintaining said predetermined angular relationship between said base-to-platform coupling means; whereby said base-to-platform coupling means allows for adjustment of the spacing defined by said base and platform coupling surfaces between a proximate configuration wherein said base and platform coupling surfaces are in a generally proximate relationship relative to each other and a spaced configuration wherein said base and platform coupling surfaces are in a generally spaced relationship relative to each other.

2. A device as recited in claim 1 wherein said resting surface geometrical plane and said abutting surface geometrical plane extend in a generally parallel relationship relative to each other.

3. A device as recited in claim 1 wherein said base-to-platform coupling means includes

- a spacing jaw, said spacing jaw defining a spacing jaw first component and a spacing jaw second component, said spacing jaw first and second components each defining corresponding spacing jaw component proximal and distal ends, said spacing jaw first and second components being pivotally attached together adjacent their respective spacing jaw

component proximal ends for pivotal movement relative to each other about a spacing jaw pivotal axis between a spacing jaw open configuration wherein said spacing jaw components distal ends are in a generally spaced relationship relative to each other and a spacing jaw closed configuration wherein said spacing jaw component distal ends are in a generally proximal relationship relative to each other; said spacing jaw component distal end of said spacing jaw first component being pivotally attached to said base coupling surface and said spacing jaw component distal end of said spacing jaw second component being pivotally attached to said platform coupling surface so that pivotal movement between said spacing jaw first and second components changes the spacing between said base and platform coupling surfaces;

- a spacing jaw component pivoting means coupled to said spacing jaw for pivoting said spacing jaw first and second components relative to each other.

4. A device as recited in claim 3 wherein said spacing jaw component pivoting means includes

- an actuating rod, said actuating rod defining a rod first end, an opposed rod second end and a rod longitudinal axis, said actuating rod being provided with a rod threaded section;

- a rod-to-jaw linkage component, said rod-to-jaw linkage component including a linkage sleeve and a linkage component attachment prong extending outwardly from said linkage sleeve, said linkage sleeve being provided with a sleeve internal thread for threaded engagement with said rod threaded section so as to allow for translational relative movement along said rod longitudinal axis between said rod threaded section and said linkage sleeve when said actuating rod is pivoted about said rod longitudinal axis; said linkage component attachment prong being attachable to said spacing jaw component so as to transform the translational relative movement along said rod longitudinal axis between said rod threaded section and said linkage sleeve into a pivotal relative movement between said spacing jaw first and second components about said spacing jaw pivotal axis.

5. A device as recited in claim 1 wherein said base-to-platform coupling means includes

- a pair of spacing jaws, each of said spacing jaws defining a spacing jaw first component and a spacing jaw second component, said spacing jaw first and second components each defining corresponding spacing jaw component proximal and distal ends, said spacing jaw first and second components being pivotally attached together adjacent their respective spacing jaw component proximal ends for pivotal movement relative to each other about a spacing jaw pivotal axis between a spacing jaw open configuration wherein said

spacing jaw component distal ends are in a generally spaced relationship relative to each other and a spacing jaw closed configuration wherein said spacing jaw component distal ends are in a generally proximal relationship relative to each other; said spacing jaw component distal end of said spacing jaw first component being pivotally attached to said base coupling surface and said spacing jaw component distal end of said spacing jaw second component being pivotally attached to said platform coupling surface so that pivotal movement between said spacing jaw first and second components changes the spacing between said base and platform coupling surfaces;

- a spacing jaw component pivoting means coupled to said spacing jaw for pivoting said spacing jaw first and second components relative to each other about said spacing jaw pivotal axis.

6. A device as recited in claim 5 wherein said spacing jaw component pivoting means includes

- an actuating rod, said actuating rod defining a rod first end, an opposed rod second end and a rod longitudinal axis, said actuating rod being provided with a rod threaded section;

- a pair of rod-to-jaw linkage components, each of said rod-to-jaw linkage components including a linkage sleeve and a linkage component attachment prong extending outwardly from said linkage sleeve, said linkage sleeve being provided with a sleeve internal thread for threaded engagement with said rod threaded section so as to allow for translational relative movement along said rod longitudinal axis between said rod threaded section and said linkage sleeve when said actuating rod is pivoted about said rod longitudinal axis; said linkage component attachment prong being attachable to one of said spacing jaw components so as to transform the translational relative movement along said rod longitudinal axis between said rod threaded section and said linkage sleeve into a pivotal relative movement between said spacing jaw first and second components about said spacing jaw pivotal axis.

7. A device as recited in claim 6 wherein said rod-to-jaw linkage components are positioned in a spaced relationship relative to each other along said actuating rod with said sleeve internal thread of opposed linkage sleeve threaded in opposite direction relative to each other and threadably engaged with correspondingly oriented rod threaded segments formed on said actuating rod, said spacing jaw components being positioned in an opposed relationship relative to each other with said spacing jaw component distal ends of opposed spacing jaw components facing towards each other and said spacing jaw component proximal ends of spacing jaw components facing away from each other .

8. A device as recited in claim 7 further comprising a stabilizing structure extending between said base and platform coupling surfaces for stabilizing the link between said base component and said supporting platform while allowing adjustment of the spacing between said base and platform coupling surfaces.

9. A device as recited in claim 8 wherein said stabilizing structure includes a stabilizing jaw, said stabilizing jaw defining a stabilizing jaw first component and a stabilizing jaw second component, said stabilizing jaw first and second components each defining corresponding stabilizing jaw component proximal and distal ends, said stabilizing jaw first and second components being pivotally attached together adjacent their respective stabilizing jaw component proximal ends for pivotal movement relative to each other about a stabilizing jaw pivotal axis between a stabilizing jaw open configuration wherein said stabilizing jaw component distal ends are in a generally spaced relationship relative to each other and a stabilizing jaw closed configuration wherein said stabilizing jaw component distal ends are in a generally proximal relationship relative to each other; said stabilizing jaw component distal end of said stabilizing jaw first component being pivotally attached to said base coupling surface and said stabilizing jaw component distal end of said stabilizing jaw second component being pivotally attached to said platform coupling surface.

10. A device as recited in claim 8 wherein said stabilizing structure includes a pair of stabilizing jaws, each of said stabilizing jaws defining a stabilizing jaw first component and a stabilizing jaw second component, said stabilizing jaw first and second components each defining corresponding stabilizing jaw component proximal and distal ends, said stabilizing jaw first and second components being pivotally attached together adjacent their respective stabilizing jaw component proximal ends for pivotal movement relative to each other about a stabilizing jaw pivotal axis between a stabilizing jaw open configuration wherein said stabilizing jaw components distal ends are in a generally spaced relationship relative to each other and a stabilizing jaw closed configuration wherein said stabilizing jaw component distal ends are in a generally proximal relationship relative to each other; said stabilizing jaw component distal end of said stabilizing jaw first component being pivotally attached to said base coupling surface and said stabilizing jaw component distal end of said stabilizing jaw second component being pivotally attached to said platform coupling surface;

- said stabilizing jaw components being positioned in an opposed and spaced relationship relative to each other with said stabilizing jaw component distal ends of opposed stabilizing jaw components facing towards each other and said stabilizing jaw component proximal ends of stabilizing jaw components facing away from each other;

- said stabilizing jaw components being positioned generally between said spacing jaw components with said spacing jaw and stabilizing jaw pivotal axes in a generally perpendicular relationship relative to each other.

11. A device as recited in claim 10 wherein said spacing and stabilizing jaw first components are pivotally and releasably attached to corresponding first component attachment clips extending integrally from said base coupling surface; said spacing and stabilizing jaw second components are pivotally and releasably attached to corresponding second component attachment clips extending integrally from said platform coupling surface.

12. A device as recited in claim 1 further comprising an obstructing component attached to said device intermediate said base and platform coupling surfaces, said obstructing component being configured, sized and positioned for blocking access to said base-to-platform coupling through the spacing between said base and platform coupling surfaces when said base component and supporting platform are in the spaced configuration.

13. A device as recited in claim 12 further comprising an attachment rim extending from said platform coupling surface, said obstructing component being slidably attached to said attachment rim for slidable movement relative thereto between a retracted configuration wherein said obstructing component is positioned generally adjacent said platform coupling surface and an extended configuration wherein said obstructing component extends from said attachment rim in a generally spaced relationship relative to said platform coupling surface.

14. A device as recited in claim 13 wherein said supporting platform has a generally concave configuration; said supporting platform being provided with a peripheral platform flange defining a platform flange peripheral edge, said platform flange peripheral edge being located in a platform edge geometrical plane, said platform edge geometrical plane being in a generally parallel and spaced relationship relative to said platform abutting surface; said base component having a generally concave configuration; said base component being provided with a peripheral base flange defining a base flange peripheral edge, said base flange peripheral edge being located in a base edge geometrical plane, said base edge geometrical plane being in a generally parallel and spaced relationship relative to said base abutting surface; whereby said platform flange and said base flange are configured and sized so that when said base and platform coupling surfaces are in said proximate configuration, said base component and supporting platform form a generally hollow enclosure with their

corresponding base and platform flange peripheral edges in abutting contact with each other for protectively enclosing said base-to-platform coupling means.

15. A device as recited in claim 14 wherein a rod protruding segment of said actuating rod extends laterally out of said hollow enclosure through corresponding rod channels formed in said base and platform flanges, said rod protruding segment being provided with a rod handle for facilitating manual rotation of said actuating rod about said rod longitudinal axis.

16. A device as recited in claim 4 wherein said actuating rod is mechanically coupled to a motorized means for rotating said actuating rod about said rod longitudinal axis.

17. A device as recited in claim 1 further comprising a friction pad mounted on said platform abutting surface, said friction pad defining a pad pillow contacting surface, said pad pillow contacting surface being provided with friction enhancing means for enhancing the frictional force between said pillow and said pad pillow contacting surface when said pillow is rested on said pad pillow contacting surface.

18. A device as recited in claim 17 wherein said friction pad is releasably mounted on said platform abutting surface.

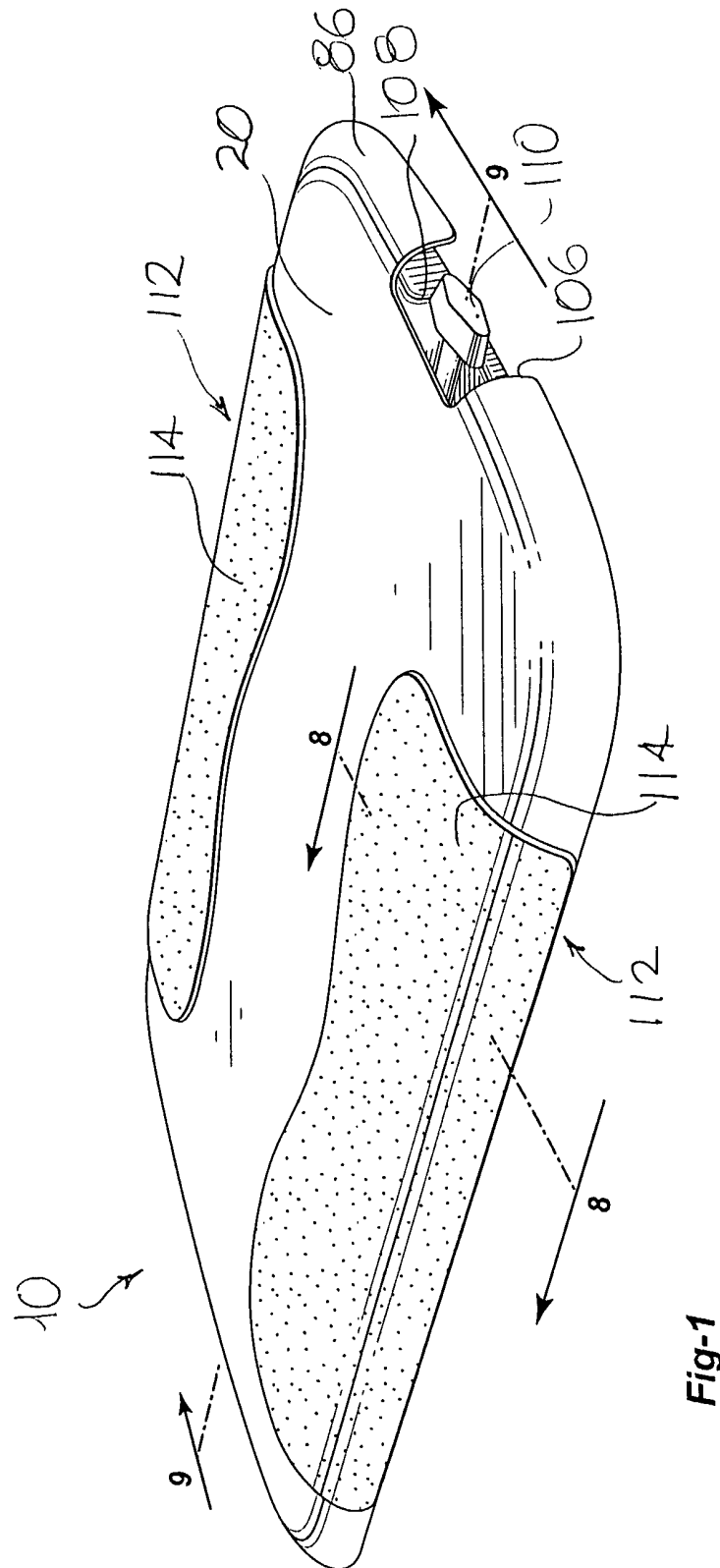
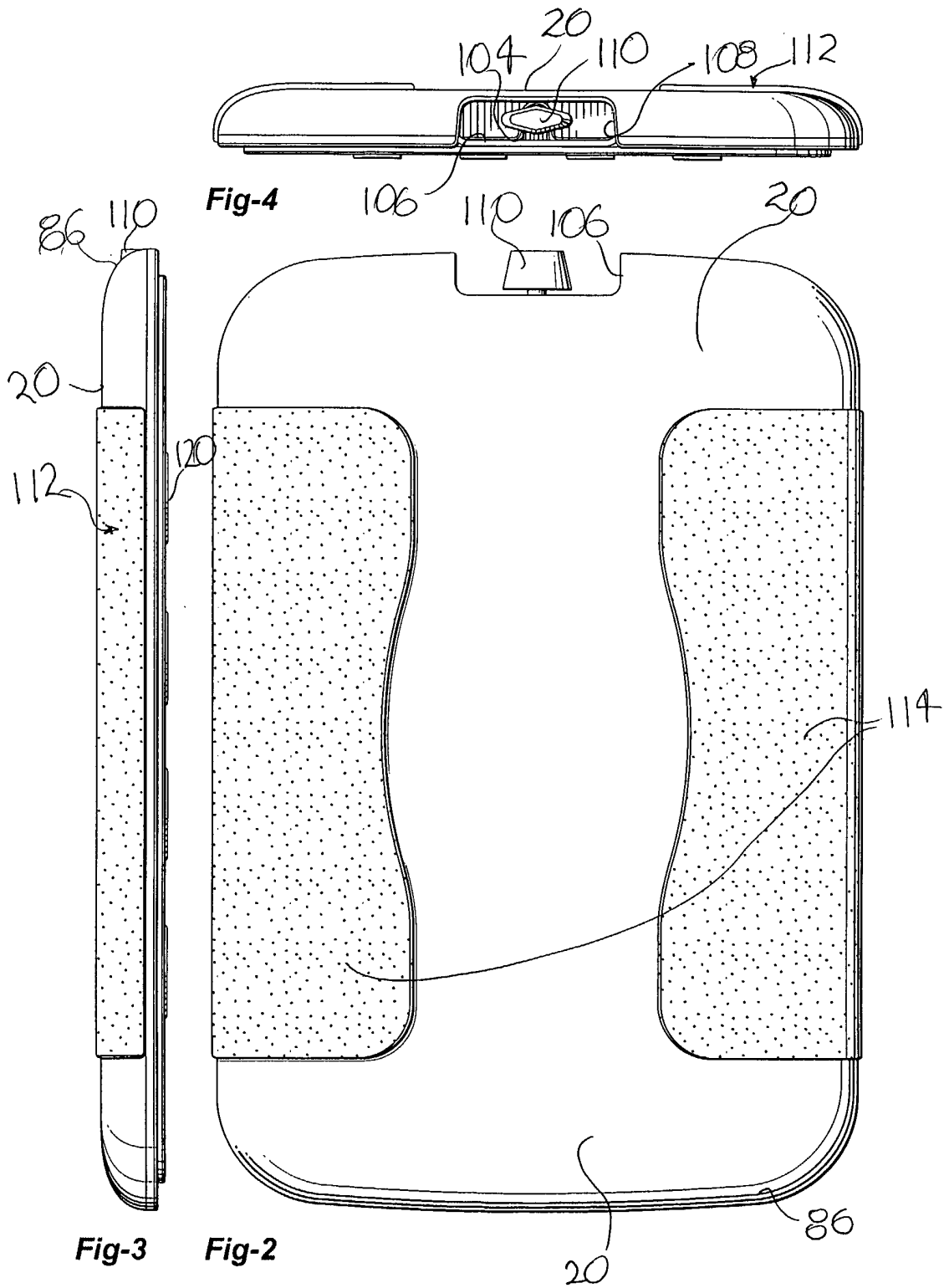
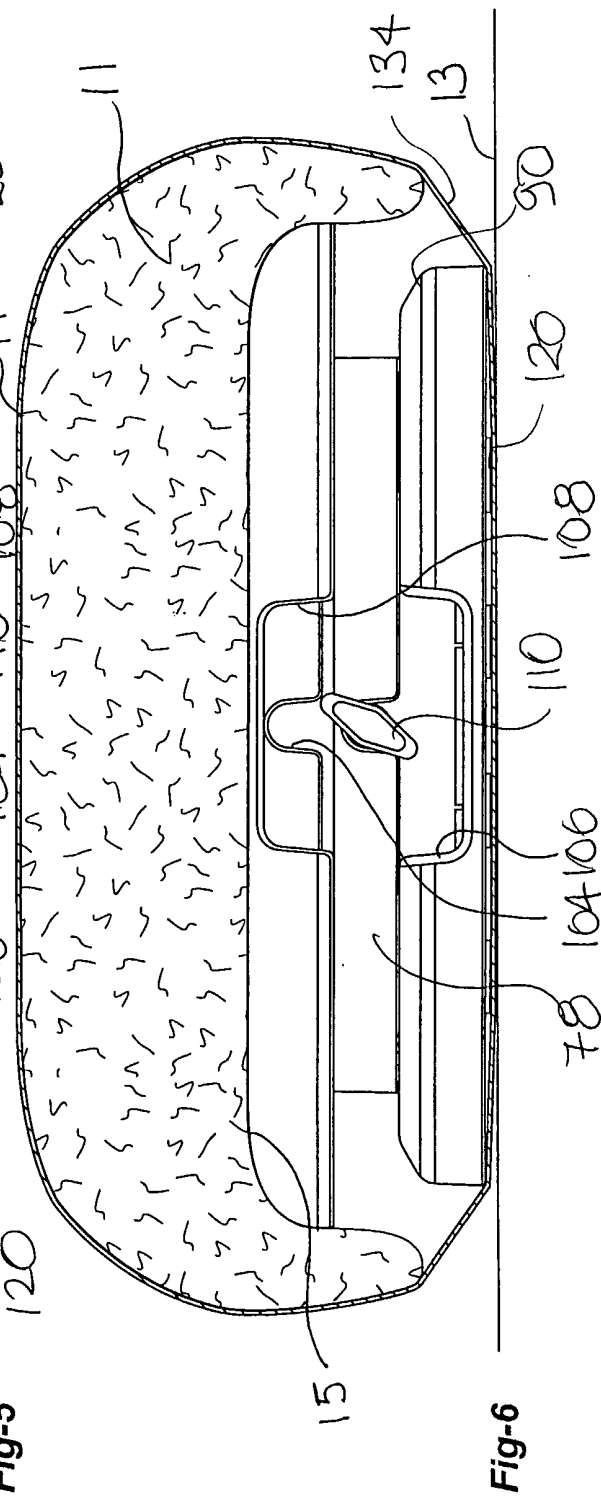
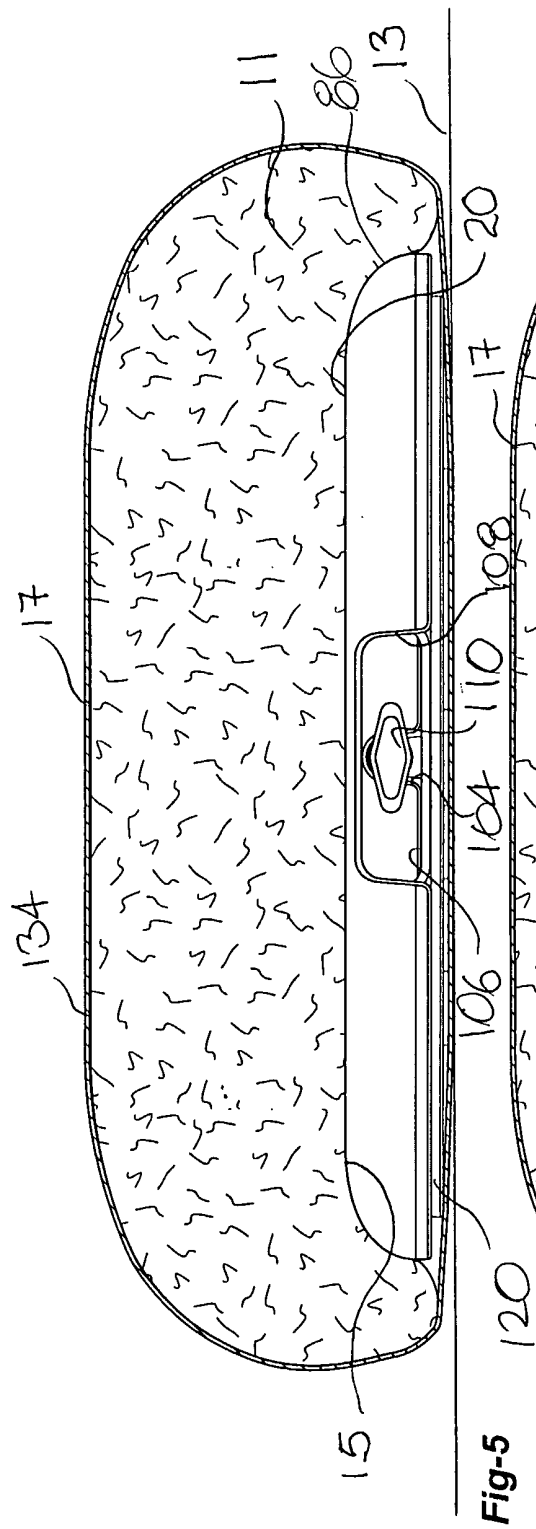
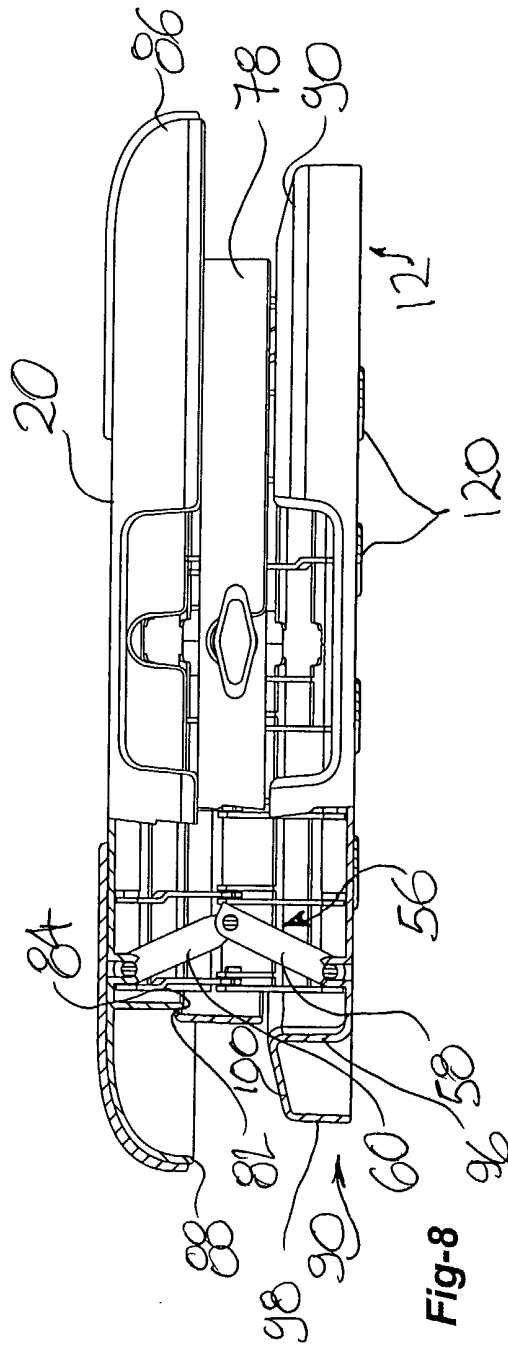
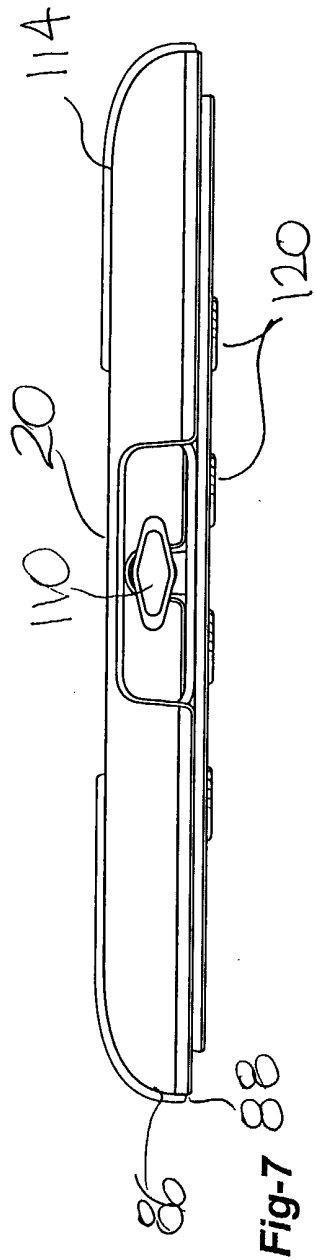
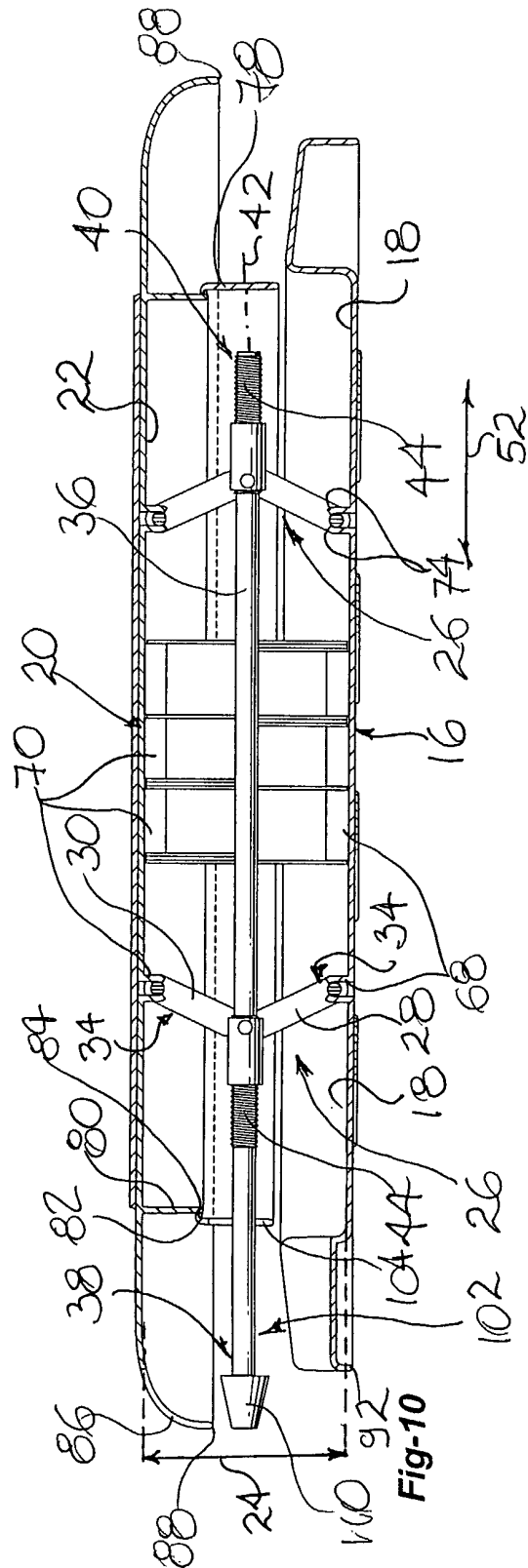
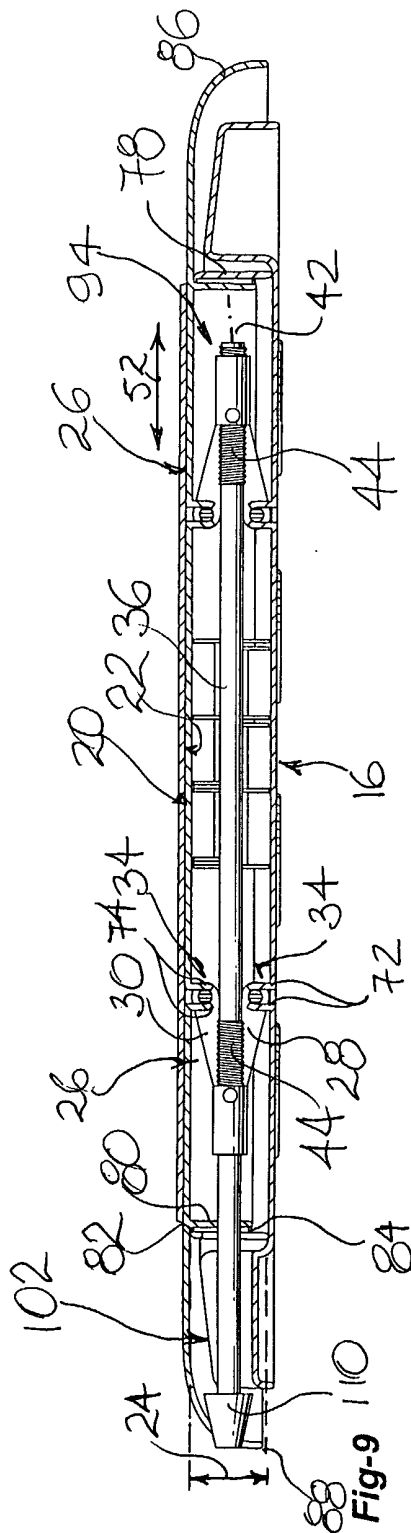


Fig-1









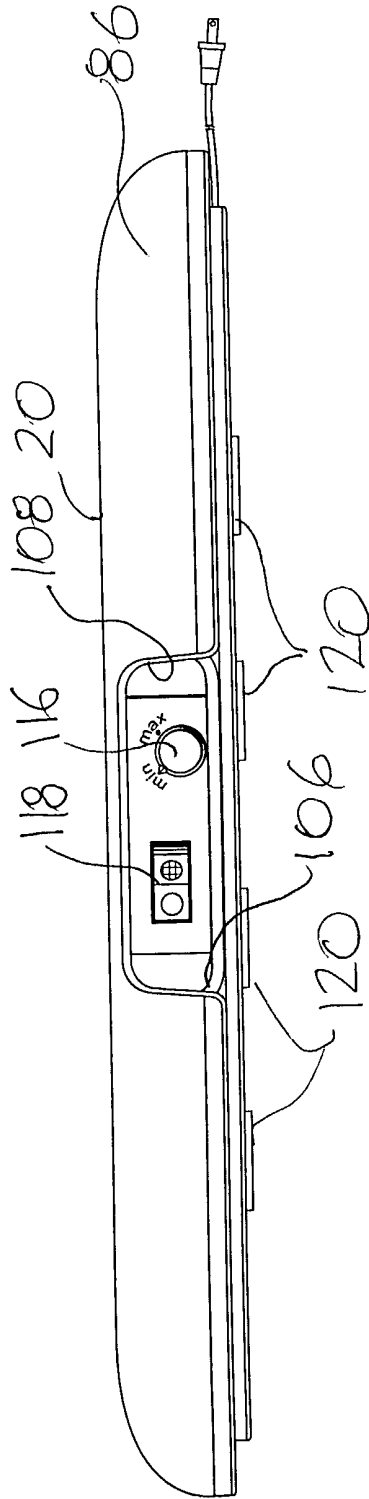


Fig-11

