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## **MATTRESS WITH ADJUSTABLE STRUCTURE**

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### **FIELD OF INVENTION**



The present invention relates to a mattress having an adjustable structure to enable a head section of the mattress to be elevated from a horizontal position to an inclined position. More particularly, the invention relates to a mattress having a tiltable rectangular frame and a stabilizing frame to prevent foot section of the mattress being lifting off when a user lying on the mattress after the head section is inclined.

### **BACKGROUND OF THE INVENTION**

A mattress is a mat or pad which put on top of a bed to allow a user to lie or sleep thereon. Normally, a user lying on the mattress to read a book or watch television. In this situation, the user can read or watch in a more comfortable position if the head is elevated at an angle away from a horizontal position to an inclined position. Furthermore, many medical experts also recommended that elevating the head section of mattress during sleep to open airways can reduce certain health symptoms. However, using extra pillows to elevate his/her head does not work because pillows cause he/she to bend at their waist, which could worsen the health symptoms.

Although adjustable beds are very common in certain environment such as hospital's rooms. However, it is uncommon in residential environments due to its complicated structure and mechanism. Moreover, the existing mattress used in residential rooms cannot keep the user's head in the elevated state. Thus, it is essential for the user to input a pillow or cushion in order to elevate the head in a higher position which is not practical. Therefore, there is a need for a special designed mattress having adjustable structure to enable the head section of the mattress to be elevated from a horizontal position to an inclined position to overcome the above drawbacks.

## SUMMARY OF INVENTION

Accordingly, it is a primary object of the invention to provide a special designed mattress having an adjustable structure to enable head section of the mattress to be  
5 elevated from a horizontal position to an inclined position.

It is another object of the invention to provide a stabilizing frame fixedly connected to the body frame of the mattress to prevent foot section of the mattress being lifting off when a user lying on the mattress after head section of the mattress is elevated to an inclined position.

10 It is another object of the invention to provide an angle adjusting gear assembly comprises a pair of ratchet gears which are capable to adjust the predetermined inclining angles of the head section relative to lower body section of the mattress step by step per an inclining angle with a raising force, the ratchet gear having a releasing mechanism that is capable to release the head section to initial horizontal position  
15 directly with a final raising force after the inclining angle of head section in the inclining direction reached the maximum inclining angle.

It still another object of the invention to provide a pair of U-shaped brackets which coupled to one end of the angle adjusting gear assembly to the head section of the body frame and the other end of the angle adjusting gear assembly to the lower body  
20 section of the body frame.

To fulfill the aforementioned objectives, a mattress having an adjustable structure is utilised. The mattress comprises a body frame having a head section and a lower body section, the head section is pivotally connected to the lower body section by an angle adjusting gear assembly which connects the head section to the lower body section of  
25 the body frame, wherein the angle adjusting gear assembly is configured to elevate the head section relative to the lower body section and hold the head section in an

inclined position at an angle away from horizontal position, and mattress material enclosing the head section and the lower body section of the body frame with a resilient compressible section which is disposed between the mattress material on the head section and the lower body section.

- 5 The present preferred embodiments of the invention consists of novel features and a combination of parts hereinafter fully described and illustrated in the accompanying drawings and particularly pointed out in the appended claims; it being understood that various changes in the details may be effected by those skilled in the arts but without departing from the scope of the invention or sacrificing any of the advantages of the  
10 present invention.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

These and other features, aspects and advantages of the present invention will be more fully understood when considered with respect to the following detailed descriptions, appended claims and accompanying drawings wherein:

- 15 Fig 1 is a perspective view of a mattress having an adjustable structure of the present invention;

Fig 2 is a perspective view of a tiltable body frame of a mattress having an adjustable structure of the present invention;

- Fig 3 is a side view of a mattress having an adjustable structure with a angle adjusting  
20 gear assembly of the present invention;

Fig 4 is a perspective view of a mattress having an adjustable structure in a horizontal position of the present invention;

Fig 5 is a perspective view of a mattress having an adjustable structure which its head section is in an inclined position of the present invention; and

Fig 6 is a perspective view of a mattress having an adjustable structure which its head section in an inclined position with a stabilizing frame extending under the head  
5 section of the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a mattress. Hereinafter, the invention shall be described according to the preferred embodiments of the present invention and by referring to the accompanying description and drawings. However, it is to be  
10 understood that limiting the description to the preferred embodiments of the invention and to the drawings is merely to facilitate discussion of the present invention and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claim.

15 Referring now to Fig. 1, there is shown a perspective view of a mattress (100) having adjustable structure. The mattress (100) comprises a body frame (10) having a head section (12) and a lower body section (14), the head section (12) is pivotally connected to the lower body section (14) by an angle adjusting gear assembly (20). The head section (12) is a moveable section of the mattress (100) where the user's  
20 head lying thereon. The lower body section (14) is the non-movable section where the user's body and foot lying thereon. Mattress material (25) preferably high density resilient material (25a) placed on the top and the bottom of the head and lower body sections (12, 14) to enclose the body frame (10). This means that the body frame (10) is enclosed inside the high density resilient material (25a) and acts as an adjustable  
25 frame to allow the user to adjust the head section (12) of the mattress in a certain inclining angle. Preferably, the mattress material (30) is foam, latex, memory foam, coconut husk fiber or any combination thereof.

A resilient compressible section (30) is disposed between the mattress material on the head section (12) and the lower body section (14). The resilient compressible section (30) is preferably made from low density resilient material (25b) which is placed on the top and the bottom of the angle adjusting gear assembly (20) to allow the movement of the angle adjusting gear assembly (20) during the elevation of the head section (12). The angle adjusting gear assembly (20) comprises a pair of ratchet gears (22) positioned at both sides of pivot section between the head and lower body sections (12, 14). Thus, the resilient compressible section (30) as a pivot point which has less resistance againsts bending force, allows the upward movement of the ratchet gears (22) to elevate the head section (12).

As shown in Figure 2, a tiltable body frame (10) of a mattress (100) having adjustable structure. The body frame (10) comprises an head section (12) and a lower body section (14). Preferably, the head and lower body sections (12, 14) are rectangular frames formed of rectangular bars. The lower body section (14) has a bigger dimension than the head section (12). The rectangular frame of the lower body section (14) having a plurality of elongate bars transversely connected in between the rectangular frame to strengthen the structure of the rectangular frame to support the weight of a user when he/she lying on it. A stabilizing frame (50) fixedly connected to the elongate bars at the upper end of the head section (12) to prevent the foot section of the lower body section (14) being lifting off by a force of a user lying on the mattress (100) after the head section (12) of the mattress (100) is inclined. When the user's head lying on the inclined head section (12) which provides a force to push down the inclined head section (12), this force will create a tendency to lift off the foot section of the lower body section (14) of the body frame (10) due to unbalancing forces. Thus, the stabilizing frame (50) as a balancing support to hold the weight of the user's head to prevent the unbalancing forces between the head and lower body sections (12, 14) which will lift off the foot section of the lower body section (14) and create uncomfortable condition for the user's foot. A pair of U-shaped brackets (60) are utilized to couple one end of the angle adjusting gear assembly (20) to the head

section (12) of the body frame (10) and the other end of the angle adjusting gear assembly (20) to the lower body section (14) of the body frame (10). Preferably, the ends of the U-shaped brackets (60) are welded or riveted to the head section (12) and lower body section (14) of the body frame (10).

- 5 The angle adjusting gear assembly (20) comprises a pair of ratchet gears (22) which are capable to adjust the predetermined inclining angles of the head section (12) relative to lower body section (14) of the mattress (100) step by step per an inclining angle with a raising force. Each ratchet gear (22) is coupled to each side of the body frame (10). The ratchet gear (22) having a pair of arms (24a, 24b), one arm (24a) coupled to the lower body section (14) of the body frame (10) and the other arm (24b) coupled to the head section (12) of the body frame (10).

Referring now to Figure 3, there is shown a side view of a mattress (100) having adjustable structure with an angle adjusting gear assembly (20) having a pair of ratchet gears (22) to enable the head section (12) of the mattress (100) elevated to an inclination position. One arm (24a) of the ratchet gear (22) coupled to the lower body section (14) of the mattress (100), the arm (24a) is not movable with the high density resilient material (25a) positioning on top of the arm (24a). The other arm (24b) of the ratchet gear (22) coupled to the head section (12) of the mattress (100), the arm (24b) is movable with the low density resilient material (30a) positioning on top of the arm (24b). The ratchet gears (22) are capable to adjust the predetermined inclining angles of the head section (12) relative to lower body section (14) of the mattress (100) step by step per an inclining angle. In one embodiment, a first raising force (first step) from the back of the head section (12) will able to elevate the head section (12) at a first predetermined inclining angle (first inclination). A second raising force (second step) will able to elevate the head section (12) at a second predetermined inclining angle which has a higher degree of inclination than the first predetermined inclining angle (second inclination). A subsequent raising force (subsequent step) will elevate the head section (12) at a higher predetermined inclining angle with a higher degree

of inclination (subsequent inclination). Preferably, the head section (12) achieved the highest degree of inclination by seven steps. Preferably, highest degree of inclination is 90 degrees. Furthermore, the ratchet gear (22) having a releasing mechanism that capable to release the head section (12) to initial horizontal position directly with a

5 final raising force after the inclining angle of head section (12) in the inclining direction reached the maximum inclining angle, preferably 90 degrees. In another embodiment, the ratchet gear (22) having releasing mechanism that capable to release the head section (12) to its previous step of inclination among the steps of inclination, for example, from 3<sup>rd</sup> step to 2<sup>nd</sup> step. The user needs to raise the head section up to

10 the middle point between the 3<sup>rd</sup> step and 4<sup>th</sup> step. Then, the user needs to push down the head section (12) to the middle point between the 2<sup>nd</sup> step and 1<sup>st</sup> step. Finally, the user needs to raise the head section (12) up a little toward the 2<sup>nd</sup> step. The position of second inclination of the head section (12) will then be fixed after a locking sound is heard. If a user would like to change the head section (12) from 7<sup>th</sup> step (90 degrees)

15 to 6<sup>th</sup> step. The user needs to raise the head section (12) a little more than 90 degrees, then push down the head section to the middle point of 5<sup>th</sup> step and 6<sup>th</sup> step. Finally, the user needs to raise the head section (12) up a little toward the 6<sup>th</sup> step. The position of sixth inclination of the head section (12) will then be fixed after a locking sound is heard.

20 Figure 4 shows the outer appearance of a mattress (100) having an adjustable structure in a horizontal position. Figure 5 shows the outer appearance of a mattress (100) having an adjustable structure which its head section (12) in an inclined position. Figure 6 shows the outer appearance of a mattress (100) having an adjustable structure which its head section (12) in an inclined position with a stabilizing frame (50)

25 extending under the head section (12).

Although this disclosure has described and illustrated certain preferred embodiments of the invention, it is to be understood that the invention is not restricted to those particular embodiments. Rather, the invention include all embodiments which are functional or mechanical equivalence of the specific embodiments and features that

5 have been described and illustrated.

## CLAIMS

1. A mattress (100) having an adjustable structure comprising:  
a body frame (10) having a head section (12) and a lower body section (14), the head  
section (12) is pivotally connected to the lower body section (14) by an angle  
5 adjusting gear assembly (20) which connects the head section (12) to the lower body  
section (14) of the body frame (10), wherein the angle adjusting gear assembly (20) is  
configured to elevate the head section (12) relative to the lower body section (14) and  
hold the head section (12) in an inclined position at an angle away from horizontal  
position; and  
10 mattress material supported on the head section (12) and the lower body section (14)  
of the body frame (10) with a resilient compressible section (30) which is disposed  
between the mattress material on the head section (12) and the lower body section  
(14).
2. A mattress (100) according to claim 1, further comprising a stabilizing frame (50)  
15 fixedly connected to the upper end of the lower body section (14) and extending under  
the head section (12).
3. A mattress (100) according to claim 2, further comprising a pair of U-shaped  
brackets (60) for coupling one end of the angle adjusting gear assembly (20) to the  
head section (12) of the body frame (10) and the other end of the angle adjusting gear  
20 assembly (20) to the lower body section (14) of the body frame (10).
4. A mattress (100) according to claim 2 or 3, wherein the head and lower body  
sections (12, 14) of the body frame (10) are rectangular frames formed of rectangular  
bars.

5. A mattress (100) according to claim 2 or 3, wherein the mattress material (30) is selected from the group consisting of foam, latex, memory foam, coconut husk fiber or any combination thereof.
6. A mattress (100) according to claim 2 or 3, wherein the stabilizing frame (50) is a square frame formed of rectangular bars.
7. A mattress (100) according to claim 2 or 3, wherein the angle adjusting gear assembly (20) comprises a pair of ratchet gears (22) which are capable to adjust the inclining angles of the head section (12) relative to lower body section (14) of the mattress step by step per an inclining angle with a raising force.
8. A mattress (100) according to claim 7, wherein the ratchet gear (22) having a releasing mechanism that capable to release the head section (12) to initial horizontal position directly with a final raising force after the inclining angle of head section (12) in the inclining direction reached the maximum inclining angle.
9. A mattress (100) according to claim 7, wherein the ratchet gear (22) having a releasing mechanism that capable to release the head section (12) to its previous step of inclination among the steps of inclination.