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(54) **RELIEF PLATE OR STAND ON WHICH A PERSON MAY STAND, IN PARTICULAR IN A WORK SITUATION**

RELIEFPLATTE ODER STÄNDER FÜR AUFRECHT STEHENDE PERSON, INSBESONDERE IN EINER ARBEITSPOSITION

PLAQUE DE RELIEF OU SUPPORT SUR LESQUELS UNE PERSONNE PEUT SE TENIR DEBOUT, EN PARTICULIER DANS UNE SITUATION DE TRAVAIL

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(56) References cited:
WO-A1-2016/176363 DE-U1- 20 200 585
US-A- 2 950 120 US-A1- 2008 039 304

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Description

Field of the Invention

[0001] The present invention relates to a relief plate or stand on which a person may stand, in particular in a work situation.

Background

[0002] During work, many people have to spend a large part of the day in static work positions, sometimes on a hard support. Several work operations are performed sitting, standing or walking on plane, hard surfaces and within small areas, for example in cashier positions.

[0003] Within the bureau sector the problem is acute as persons are sitting a large part of the working day. With time, many will experience difficulties with the back and balance. However, in this sector it has become more common with motorized work desks of the raising/lowering type providing the possibility of choosing a standing work position at proper intervals.

[0004] However, standing on a flat support is wearisome at length. Within the industry it is therefore known to use supports in the form of an elastic plate, which a worker may stand on, for example in front of a work bench, in order to ease the strain on the feet and back from a hard concrete floor. However, it is wearisome to stand still in the same position over a longer period. The plate is inactive and does not stimulate the user to move.

[0005] There are also so-called training mats available commercially. These are to be regarded as pillows filled with a very elastic material. This may work for training purposes but cannot be used in a work situation. Such mats will not provide the required stability for the user when he/she stands at a work bench and will also become wearisome in length.

[0006] The problems experienced at the workplace are partly due to the body being under-stimulated elsewhere in daily life. For many, both children and adults, a modern life means that we commonly spend more time sitting than before. Thus, the legs are less loaded, and when we are standing and walking, the surfaces we are moving across are without the challenges offered by uneven supports. This also provides less quantitative loading on one side. On the other hand the requirements for quality of movement are also reduced: The «degree of difficulty» is small and without the challenges met by previous generations in uncultivated land, rock screes, and on steppes.

[0007] If some «basic training» may be covered by planning at the workplace, this will provide the opportunity to counteract modern under-stimulation. A solution is needed to provide both the necessary stability for the user while the body's muscles may be stimulated.

[0008] WO 2016/176363 A1 discloses a relief plate or stand on which a person may stand, in particular in a work situation, with a short and long axis, the plate being

arcuate along the long axis, the arc opening towards the upper side of the plate, such that the plate may be given a rolling movement along the long axis when placed on a support, wherein the plate includes at least two layers, wherein the first layer has an exposed upper surface and a lower surface, the second layer has an upper surface which is attached to the first layer and a lower surface which is turned towards a support, wherein the upper surface of the first layer is cylindrical with a first radius, the lower surface of the second layer is cylindrical with a second radius, wherein the first and upper layer is formed by a soft and elastic material, and the second layer being formed by a stiffer material which defines the shape of the plate.

Summary of the Invention

[0009] It is an object of the present invention to provide a device which may stimulate the ability of own movement and the muscles in legs, back and stomach by modern humans with a sedentary life. The device consists of a relief plate such as covered by the following claims.

Brief Description of the Drawings

[0010] The invention is will now be described in detail with reference to the appended drawings, wherein:

Fig. 1 is a perspective view of a device according to the invention,

Fig. 2a is a sectional drawing along the longitudinal axis through the device in Fig. 1, while Fig. 2b is a section through the transverse, short axis.

Detailed Description

[0011] The invention consists of a plate 1 of a rectangular shape, with arcuate edges and rounded corners providing an approximate lens shape as seen from above, Fig. 1. However, this is only an example of a possible and preferred shape; the plate may also be shaped purely rectangular, square, round or elliptic. The plate has a long and a short axis, wherein the plate has a cylindrical curvature along the longer axis, i.e. it forms a shallow arc, Fig. 2a, while the short axis is flat.

[0012] It is to be understood that the user shall stand on the plate and move (like a pendulum) from side to side, while the plate is rolling on the support along the curved axis. The movement activates the so-called core muscles in the back, as the body will stress the muscles when moving to one side, and the body will automatically strive to return to a balanced position. When the body passes the vertical or plumb line on its way back, the muscles will become relaxed before they again are stressed as the movement continues to the other side. In other words, the plate provides a directional provocation of the muscles in the body.

[0013] The user will sway within an angle of 3 - 4 degrees each way. Within this range the body will automatically try to re-establish balance and be able to do so. To avoid the user exceeding the point where it is possible for the body to re-establish balance, the curvature along the longest axis may be a compound of a central cylindrical part surrounded by straight parts at the ends. An alternative is to shape the plate with a purely cylindrical curvature with stoppers at the ends.

[0014] If the plate is designed such that it is about one stride broad, i.e. along the long axis, which will be approximately 60 cm, the plate will tilt upwards about 5 cm in each end. This corresponds approximately to the height of lifting the foot in each stride, and may be felt as a natural movement.

[0015] The plate consists of three layers, Fig. 2a, an upper soft layer 1, a middle stiff layer 2 and a lower layer 3 facing the support and which also is soft.

[0016] The upper layer 1 is made of a rubber or foam material which is to provide softness and friction against the foot. This layer may also be provided with lugs on the upper side. If the user does not wear shoes the feet will be stimulated by the uneven parts.

[0017] The layer 2 is curved as explained earlier and should additionally have a certain resilience or stiffness making the plate yield as a spring when the user steps thereon. An optimum resilience is important for the user's feeling of comfort. The resilience is dependent on the weight of the user, as a plate which is suitable for an ordinary light person may be squeezed flat by a heavy person. The plate should keep adequate curvature when the user is standing thereon so it may both yield a little and transfer movement, i.e. roll along the curved side. The stiffness of the plate is determined both by the material and the thickness of the plate. The middle layer 2 is preferably produced (casted) in a plastic material, but may in principle be made of any material with the desired physical properties, such as plywood, fibre-reinforced polymer or metal.

[0018] The lower layer 3 is optional. On a soft support such as a carpeted floor, this layer may be unnecessary. On a hard support it will provide softness and friction against the floor. It may be made of the same type of material as the upper layer 1, but preferably with some more hardness.

[0019] The three layers may be laminated together. In case the layers are produced by casting, each layer will have a front side and a back side. The front side is usually nicer and more even than the back side, as the front side often exhibits an outer film which is more abrasion resistant than the surface of the back side, which often has a more coarse structure with pores and grooves from the casting process. It is therefore preferred to laminate the layers together such that the outer sides are turned outwards and the back sides are joined and hidden. There will then be no visual traces from the casting process. When the layers are laminated together they will also cooperate and increase the strength and resilience of the

middle layer 2.

[0020] The stiffness of the second layer 2 is also affected by the raised rim shown in Fig. 2a and 2b.

[0021] Ideally, the plate should be adapted to the size and weight of the individual user. However, the plate may be adapted to the weight of an average user between 60 and 90 kg. For such a range it may be suitable with a stiffness/softness of the top layer 1 of 10-30 Shore, while the middle layer 2 is within 65-85 Shore and the lower layer 3 is within 25-45 Shore. The values for the different layers are to some degree dependent on each other, i.e. that the stiffness in the different layers has some influence on each other. A preferred compromise gives values of 20 Shore for layer 1, 75 Shore for layer 2 and 35 Shore for layer 3.

[0022] The middle layer 2 has a cylindrical curvature, at least in the central part. The curvature of the plate is defined by the circle which the arc is a part of, i.e. the radius of the circle and the position of the centre of the circle. The arc should initially correspond to the distance from the user's hip down, i.e. a radius vector going from the hip height to the support. When the user is standing on the plate, the feet will meet the plate at an angle of 90 degrees and the user is in many ways standing as in Leonardo's famous drawing, i.e. inscribed in a circle. However, potential users have rather different hip height, but one has arrived at a radius that seems to be accepted by a large number of (adult) users, and this is between 75 and 95 cm, preferably 85 cm. If a shorter radius is used, i.e. a sharper curvature, the rolling becomes too choppy for tall users, but a longer radius makes the plate too flat to engage shorter users.

[0023] Already Michelangelo discovered that Leonardo's drawing gives a somewhat simplified picture of reality. The legs are hinged somewhat further up on the body than shown on the drawing and at a distance from the middle axis. To provide for this, the top layer 1 is made thicker in the middle, and with decreasing thickness towards the sides. The purpose of this is to give the surface the user is standing on less curvature than the middle layer 2 which defines the rolling curvature of the plate. This is to give a more correct angle against the floor when the user is standing with the feet positioned at the ends of the plate. We are of the opinion that an optimum curvature of the upper surface is defined by a circle centre which is about 20 cm above hip height, i.e. with a radius of 95-115 cm, and preferably 105 cm, which again is an average value suitable for an average adult user. An alternative solution would be to make the upper side of the upper layer 1 completely flat. Then, the upper layer 1 must be produced in a softer material, a material that is so soft that the feet may sink somewhat therein and adapt to a correct angle. However, this is regarded as a much inferior solution to the one mentioned above with a certain curvature of the upper surface.

[0024] The plate is meant to train the balance and core muscles, which to some degree should correspond to the effect obtained when walking in uneven terrain. When

the user steps down on the plate, this will mimic walking or cycling by lifting the opposite foot. The movement will normally amount to 5-10 cm. This movement is dynamic and prevents stress in the muscles which occurs when standing static at a table. It has been said that humans should walk a minimum of 10 000 steps a day in order to maintain muscles and balance. Measurements with step counters have shown that one in average is moving corresponding to about 3 000 steps per hour if standing on the inventive plate, but the user is determining the tempo himself and may take breaks as wished. For a user standing at a (high) writing desk or work table, the relief plate provides the possibility to change position often and in this way lower the static stress on the body. The movement has also a secondary effect in that the so-called vein pump (the peripheral heart) is activated and improves the blood circulation in the legs.

Claims

1. A relief plate or stand on which a person may stand, in particular in a work situation, with a short and long axis, the plate being arcuate along the long axis, the arc opening towards the upper side of the plate, such that the plate may be given a rolling movement along the long axis when placed on a support, wherein the plate includes at least two layers, wherein the first layer (1) has an exposed upper surface and a lower surface, the second layer (2) has an upper surface which is attached to the first layer and a lower surface which is turned towards a support, wherein the upper surface of the first layer is cylindrical with a first radius, the lower surface of the second layer is cylindrical with a second radius, wherein the first radius is longer than the second radius, wherein the first and upper layer (1) is formed by a soft and elastic material with hardness 10-30 Shore, and the second layer (2) being formed by a stiffer material which defines the shape of the plate and has a hardness of 70-80 Shore.
2. A relief plate according to claim 1, wherein the first layer has a hardness of 20 Shore and the second layer has a hardness of 75 Shore.
3. A relief plate according to claim 1 or 2, further including a third layer (3) on the underside of the second layer (2), wherein the third layer is evenly thick and is formed by a soft or elastic material of hardness 25-45 Shore.
4. A relief plate according to claim 3, wherein the third layer has a hardness of 35 Shore.
5. A relief plate according to claim 1, wherein the second radius is equal to the distance between a user's hip and the support.

6. A relief plate according to claim 1, wherein the first radius is 95-115 cm and the second radius is 75-95 cm.
7. A relief plate according to claim 1, wherein the first radius is 105 cm and the second radius is 85 cm.
8. A relief plate according to any of the previous claims, wherein the layers (1, 2, 3) are formed in a casting process such that each layer has a front side and a back side, and wherein the layers are laminated together such that the back sides are facing each other and only the outer sides are visible.

Patentansprüche

1. Reliefplatte oder -standplatz, auf der bzw. dem eine Person stehen kann, insbesondere in einem Arbeitsumfeld, mit einer kurzen und einer langen Achse, wobei die Platte entlang der langen Achse bogenförmig ist, wobei der Bogen zu der oberen Seite der Platte hin offen ist, so dass der Platte eine Rollbewegung entlang der langen Achse verliehen werden kann, wenn sie auf einer Stütze platziert ist, wobei die Platte mindestens zwei Schichten aufweist, wobei die erste Schicht (1) eine freiliegende obere Fläche und eine untere Fläche hat, die zweite Schicht (2) eine an der ersten Schicht angebrachte obere Fläche und eine einer Stütze zugewandte untere Fläche hat, wobei die obere Fläche der ersten Schicht zylindrisch mit einem ersten Radius ist und die untere Fläche der zweiten Schicht zylindrisch mit einem zweiten Radius ist, wobei der erste Radius länger als der zweite Radius ist, wobei die erste und obere Schicht (1) aus einem weichen und elastischen Material mit einer Härte 10 - 30 Shore gebildet ist und die zweite Schicht (2) durch ein steiferes Material gebildet ist, das die Form der Platte definiert und eine Härte von 70 - 80 Shore hat.
2. Reliefplatte nach Anspruch 1, wobei die erste Schicht eine Härte von 20 Shore hat und die zweite Schicht eine Härte von 75 Shore hat.
3. Reliefplatte nach Anspruch 1 oder 2, ferner aufweisend eine dritte Schicht (3) auf der Unterseite der zweiten Schicht (2), wobei die dritte Schicht gleichmäßig dick ist und aus einem weichen oder elastischen Material mit einer Härte 25 - 45 Shore gebildet ist.
4. Reliefplatte nach Anspruch 3, wobei die dritte Schicht eine Härte von 35 Shore hat.
5. Reliefplatte nach Anspruch 1, wobei der zweite Radius gleich dem Abstand zwischen der Hüfte eines Benutzers und der Stütze ist.

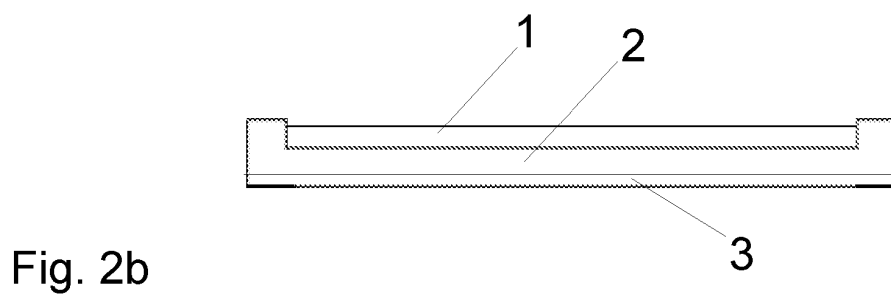
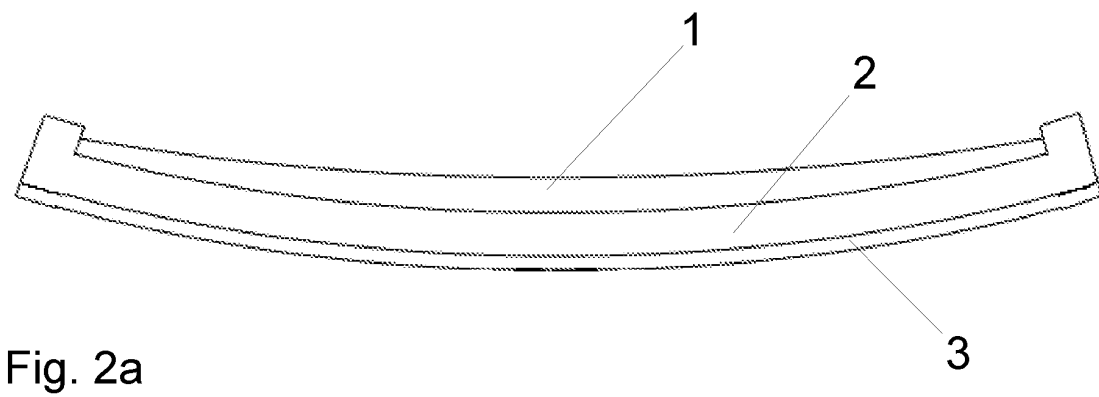
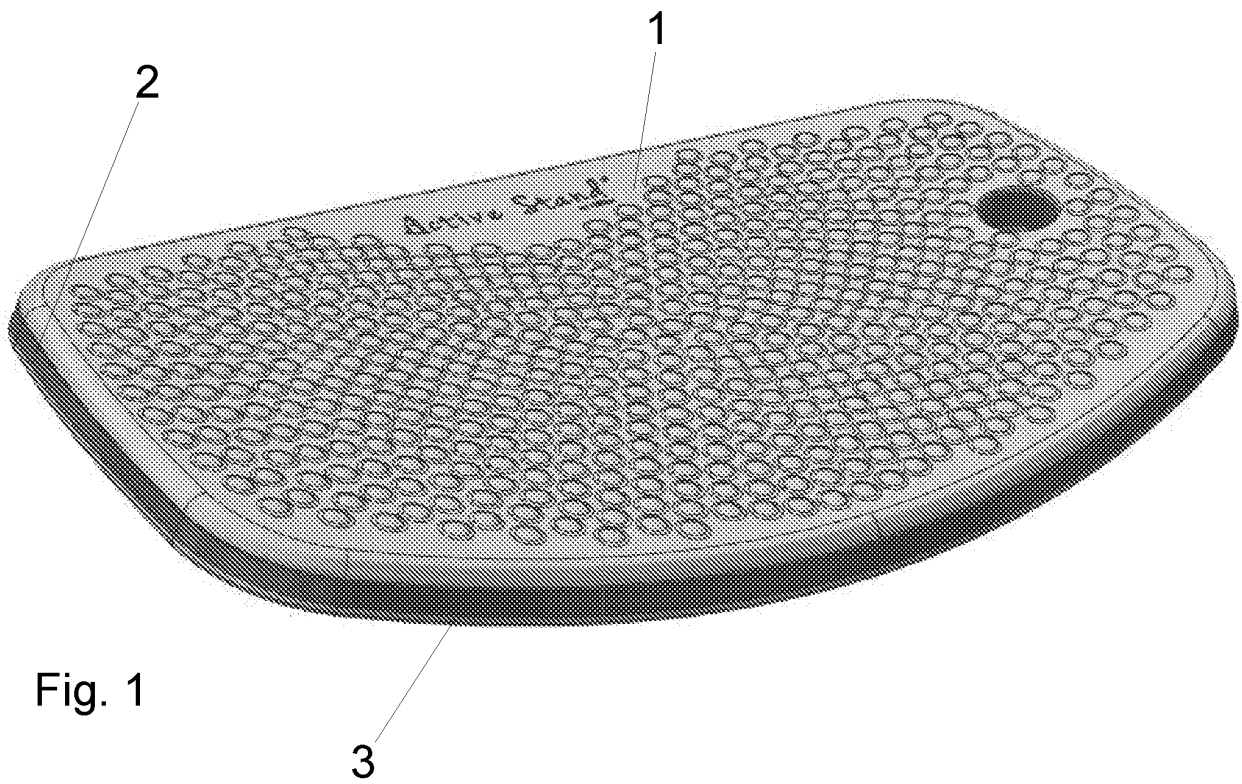
6. Reliefplatte nach Anspruch 1, wobei der erste Radius 95 - 115 cm beträgt und der zweite Radius 75 - 95 cm beträgt.
7. Reliefplatte nach Anspruch 1, wobei der erste Radius 105 cm beträgt und der zweite Radius 85 cm beträgt.
8. Reliefplatte nach einem der vorhergehenden Ansprüche, wobei die Schichten (1, 2, 3) in einem Gießverfahren gebildet werden, so dass jede Schicht eine Vorderseite und eine Rückseite hat, und wobei die Schichten aneinander laminiert sind, so dass die Rückseiten einander zugewandt sind und nur die Außenseiten sichtbar sind.

Revendications

1. Plaque ou support de soulagement sur laquelle/lequel une personne peut se tenir, en particulier dans une situation de travail, dotée d'un axe court et d'un axe long, la plaque étant arquée le long de l'axe long, l'arc s'ouvrant vers le côté supérieur de la plaque, de telle sorte que la plaque puisse recevoir un mouvement de roulement le long de l'axe long lorsqu'elle est placée sur un support, dans laquelle la plaque comprend au moins deux couches, dans laquelle la première couche (1) a une surface supérieure exposée et une surface inférieure, la deuxième couche (2) a une surface supérieure qui est attachée à la première couche et une surface inférieure qui est tournée vers un support, dans laquelle la surface supérieure de la première couche est cylindrique avec un premier rayon, la surface inférieure de la deuxième couche est cylindrique avec un second rayon, dans laquelle le premier rayon est plus long que le second rayon, dans laquelle la première couche supérieure (1) est formée par un matériau mou et élastique avec une dureté de 10 à 30 Shore, et la deuxième couche (2) étant formée par un matériau plus rigide qui définit la forme de la plaque et a une dureté de 70 à 80 Shore.
2. Plaque de soulagement selon la revendication 1, dans laquelle la première couche a une dureté de 20 Shore et la deuxième couche a une dureté de 75 Shore.
3. Plaque de soulagement selon la revendication 1 ou 2, comprenant en outre une troisième couche (3) sur la face inférieure de la deuxième couche (2), dans laquelle la troisième couche est uniformément épaisse et est formée par un matériau mou ou élastique d'une dureté de 25 à 45 Shore.
4. Plaque de soulagement selon la revendication 3, dans laquelle la troisième couche a une dureté de

35 Shore.

5. Plaque de soulagement selon la revendication 1, dans laquelle le second rayon est égal à la distance entre la hanche d'un utilisateur et le support.
6. Plaque de soulagement selon la revendication 1, dans laquelle le premier rayon est de 95 à 115 cm et le second rayon est de 75 à 95 cm.
7. Plaque de soulagement selon la revendication 1, dans laquelle le premier rayon est de 105 cm et le second rayon est de 85 cm.
8. Plaque de soulagement selon l'une quelconque des revendications précédentes, dans laquelle les couches (1, 2, 3) sont formées dans un procédé de coulage de telle sorte que chaque couche ait une face avant et une face arrière, et dans laquelle les couches sont stratifiées ensemble de telle sorte que les faces arrière soient face les unes aux autres et que seules les faces externes soient visibles.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2016176363 A1 [0008]