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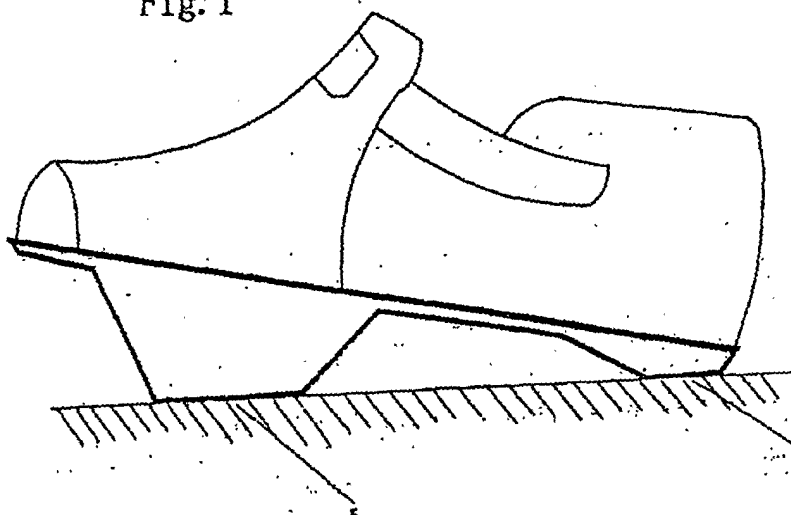
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(54) **A FOOTWEAR FOR HEALTH**

(57) This invention relates to health care shoes characterized in that the sole is higher in the front and lower in the rear, higher in the outer and lower in the inner. When a user wearing the shoes stands on a horizontal floor, the half sole of the foot is higher than the heel of the foot, so that the barycenter of the body is forced to move backward to the inner-rear end of the foot. Consequently, the tension of the lumbar muscles and the dorsal muscles may be adjusted, so that the

backbone will stretch straight naturally. Wearing often the shoes may help rectify unhealthy standing or walking posture, strengthen the lumbar and dorsal muscles, prevent, omit and cure the chronic lumbago and cervical spondylopathy, with the curative effects stable, and the disease not recurrent. The shoes also have some effects to the weight reduction of adults, and have more remarkable effects in the matter of postpartum restoring of bodily form and teenager's bodily form rectification.

Fig. 1



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Description

Technical Field

[0001] The present invention relates to health care shoes, particularly shoes with variable relative mean bearing height between the halfsole portion and the rear end portion of the sole.

Background Art

[0002] For the convenience of description, the area of the sole is divided, according to the weight to be supported, into seven parallel portions. They are, from the front to the rear, a tip portion of a fore-and-aft length occupying 12% of the total fore-and-aft length of the sole, a pre-halfsole portion of a length occupying 12% of the total length, a halfsole portion, 16%; a post-halfsole portion, 10%, a waist portion, 25%, a rear portion, 13%, and a rear end portion, 12%.

[0003] In known shoes, the mean height of the rear end portion is generally greater than that of the halfsole portion. Even in flatties, the two heights are just same, and in most flatties, the rear end portion is still higher than the halfsole portion. So far, there have been no such shoes with, when bearing or not bearing the body weight, the mean height of the halfsole portion greater than that of the rear end portion. There have been no reports, either, on shoes that help correct the standing or walking postures, or cure or prevent chronic lumbago or cervical spondylopathy.

[0004] Therefore, the object of the invention is to provide health care shoes, which is capable of effectively correcting the standing and walking postures, and helpful to curing and preventing chronic lumbago or cervical spondylopathy. The definitions of the terms used in the description is as follows:

"The mean bearing height of the halfsole portion (HH)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the halfsole portion of the sole, when the surface bears 1.5 kilograms per square centimeters and when the shoes are placed on a horizontal floor;

"The mean bearing height of the rear end portion (HRE)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the rear end portion of the sole, when the surface bears 3 kilograms per square centimeters and when the shoes are placed on a horizontal floor;

The inner and the outer portions of the halfsole portion mean the left and right portions of the halfsole

portion separated by the perpendicular bisector of the boundary between the pre-halfsole portion and the halfsole portion;

The inner and the outer portions of the rear end portion mean the left and right portions of the rear end portion separated by the perpendicular bisector of the boundary between the rear end portion and the rear portion;

Thus, the outer portion means the portion on the right side of the right foot or on the left side of the left foot, and the inner portion means the portion on the left side of the right foot or on the right side of the left foot. In other words, the inner portion is the portion on the side where the thumb of the foot is, and the outer portion is the portion on the side where the fifth finger is.

"The mean bearing height of the inner portion of the halfsole portion (HIH)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the inner portion of the halfsole portion of the sole, when the surface bears 1.5 kilograms per square centimeters and when the shoes are placed on a horizontal floor.

"The mean bearing height of the outer portion of the halfsole portion (HOH)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the outer portion of the halfsole portion of the sole, when the surface bears 1.5 kilograms per square centimeters and when the shoes are placed on a horizontal floor.

"The mean bearing height of the inner portion of the rear end portion (HIRE)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the inner portion of the rear end portion of the sole, when the surface bears 3 kilograms per square centimeters and when the shoes are placed on a horizontal floor;

"The mean bearing height of the outer portion of the rear end portion (HORE)" is the mean value of the heights in millimeters from the floor of the points on the upper surface (which is in contact with foot or sock or insole, i.e., which is the bottom surface of the inner space of a shoe) of the outer portion of the rear end portion of the sole, when the surface bears 3 kilograms per square centimeters and when the shoes are placed on a horizontal floor;

Said "mean bearing height" is calculated out through weighted average method, the sampling unit being one square centimeters.

Furthermore, "the mean bearing thickness of the rear portion (TR)" is the mean thickness of the rear portion when bearing 3 kilograms per square centimeters.

[0005] "The mean bearing thickness of the rear end portion (TRE)" is the mean thickness of the rear end portion when bearing 3 kilograms per square centimeters.

[0006] Said "mean bearing thickness" is calculated out through weighted average method, the sampling unit being one square centimeters.

[0007] "The backward inclination angle of the sole (BIA)" is the angle the sole inclines backward, when a shoe with its HH greater than its HRE is placed on a horizontal floor. The following is how to measure the angle taking the midpoint of the boundary between the inner and outer portions of the halfsole portion and the midpoint of the boundary between the inner and outer portions of the rear end portion as reference points, taking the HH and the HRE respectively as the heights of the two points, obtaining the extension line of the line between the two points. Said BIA is just the angle included between said extension line and the horizontal floor.

[0008] "The inward inclination angle of the halfsole portion (IAH)" is the angle the halfsole portion inclines inward, when a shoe with its HOH greater than its HIH is placed on a horizontal floor. The following is how to measure the angle: drawing the perpendicular bisector of the boundary between the inner and outer portions of the halfsole portion, taking the midpoints respectively of the outer section and the inner section of the perpendicular bisector as reference points, taking the HIH and the HOH respectively as the heights of the two points, obtaining the extension line of the line between the two points. Said IAH is just the angle included between said extension line and the horizontal floor.

[0009] "The inward inclination angle of the rear end portion (HARE)" is the angle the rear end portion inclines inward, when a shoe with its HORE greater than its HIRE is placed on a horizontal floor. The following is how to measure the angle: drawing the perpendicular bisector of the boundary between the inner and outer portions of the rear end portion, taking the midpoints respectively of the outer section and the inner section of the perpendicular bisector as reference points, taking the HIRE and the HORE respectively as the heights of the two points, obtaining the extension line of the line between the two points. Said HARE is just the angle included between said extension line and the horizontal floor.

[0010] In one embodiment of the invention, the HH is greater than the HRE by 1-75mm.

[0011] Because the shape and size of the foot, walking habit and the defect of posture are different from one person to another, the difference between the HH and the HRE should be variable within a reasonable range,

so that the shoes may be adapted to more persons.

[0012] If the HH is 1-25mm greater than the HRE, the shoes are suitable to help remit and cure slight chronic lumbago, rectify walking and standing posture, strengthen the lumbar and abdominal muscles, prevent chronic lumbago, reduce excessive sciatic and lumbar fat, and are helpful to the postpartum restoring of bodily form. Such shoes are most suitable for daily wearing.

[0013] If the HH is 25-50mm greater than the HRE, the shoes are suitable to help remit and cure moderate strain of lumbar muscles and consolidate the curative effect. If the HH is 50-75mm greater than the HRE, the shoes have best curative effect, are helpful to the remission and curing of severe chronic lumbago and have the effect of traction therapy, but the patient wearing the shoes needs some supporting means when standing or walking.

[0014] The shoes of the invention are higher in the front and lower in the rear. Such posture can also be depicted, besides by the mean bearing height, by the BIA. The mean bearing height would be different depending on the size of the shoes, while the BIA will define the shoes' posture more accurately. The BIA should vary between 2 and 7 degrees, so that the shoes may be used to remit and cure of chronic lumbago as well as correct walking and standing posture, strengthen lumbar and abdominal muscles, and prevent chronic lumbago. The BIA preferably varies between 2.5 and 6 degrees, so that the shoes are most adapted to daily wearing.

[0015] The effect of the invention is to have the half sole of the foot higher than the heel of the foot when one wearing the shoes stands on a horizontal floor, so that the barycenter of the body is forced to move backward. The feet are the basic organs that a human being's standing and walking relies on, and are the bases of human body mechanics. All movements of the feet have to rely on the soles of shoes to take effect. The configuration of the sole directly influences the transfer of force, can determine the transferring manner of force in some degree. For example, one will have totally different gait when wearing flatties and when wearing high-heel shoes. The body is an organically united mechanical system, the gait determines the mode of motion of the body, and directly influences the body's posture. Remaining in a same posture for a long period will make the posture permanent. The lumbago and the skelalgia are just the consequences of unhealthy posture. Unhealthy posture will make the barycenter of body move too much forward, which has the consequences of forward-inclining pelvis, curved backbone and forward-projecting lumbar vertebra, make the stress on the farces articularis of lumbar vertebra un-balanced, results in damages to articular cartilage and acceleration of its degradation. If things continue in this way, strain of lumbar muscles and other diseases are inevitable.

[0016] Considering the anatomical structure of the half sole and the heel of foot, the heel of foot is more

suitable to bear loads than the half sole of foot. If the half sole of foot bears load for long period, it will results in damages to muscles and ligamentum, thus the transversal arch of the foot can not be maintained, ultimately the arch might collapse, resulting in platypodia. While above event will not occur in the heel of the foot, because there is a huge tuberosity under the calcaneus, thus the heel of the foot is the most suitable portion to bear load.

[0017] Considering the entire body, the human being's walking ability depends mainly on the heel of the foot. Walking and standing by means of the heel of the foot is a specific and distinguishing feature of the human being which reflects the human being's evolution. From the medical viewpoint, the heel of the foot is the main organ to bear load. If the heel of the foot is damaged, the waling ability will be severely affected, even lost. While the disability or cut of toes or the front part of the foot has less influence to the walking ability, one still can walk.

[0018] At the present time, an functional exercise for curing the strain of lumbar muscles and the chronic lumbago prevails in the world, that is backward walking to force the barycenter to move backward, and to remain the backbone straight. Walking backward 300m per day for 3 months will remit markedly the lumbago, change the structure of the locomotorium during the tissue's recovering, and have certain therapy effects better than other kinesitherapies. The common point between backward-walking and the invention is to adjust the posture of the back and the waist through controlling the barycenter of the body, but the invention has more advantages, have better and more stable effects, in that: (1) The exercise will be safer, the patient will not tumble because of in-visibility to the road behind him or her; (2) The body may relax sufficiently because the patient need not look backward constantly; (3) Using the shoes of the invention, one can exercise every second, so it is unnecessary to arrange special exercising time or find better floor condition; (4) The effects are more stable. Backward walking relaxes and exercises the waist just temporarily and locally, has no correcting effect. Once the user stands or walks forward, he or she will resume the abnormal posture, so it is difficult to remain the curative effects, because the abnormal posture is not the result of backward walking, and the mechanisms of forward walking and backward walking are totally different. Using the invention, one can do exercises on the basis of correcting, with the emphasis placed on the correcting, and the user can behave just like in datly life, with the correcting effect much more stable; (5) The curative effect appears more quickly. After a short adaptation time, the user will immediately feel relaxed and comfortable in the neck and the waist. The curative effect will appear more and more in pace with the increasing of the amount of exercise, gradually achieves the ideal remitting and curative effects.

[0019] In the medical field, it is a common knowledge

that the basic way to cure chronic lumbago is to correct unhealthy walking and standing posture. However, once an unhealthy posture habit has been formed, it's hard for one person to overcome the habit depending on his or her own will, that's why the chronic lumbago is difficult to cure. It is necessary to apply external forces to the body to correct the posture habit forcibly. The invention aims at this object through adjusting the body from the root, improving the conformation of the backbone through the body's self-adjusting, can effectively remit and cure the chronic lumbago, and have the function of health care and disease preventing, can correct unhealthy posture formed in the daily life and work. By wearing the shoes, the lumbar muscles relax and shrink alternatively and rhythmically when the user walks, so that the lumbar blood circulation could be improved, which may help improve the metabolism of the lumbar tissues. The stabilization of the lumbar vertebra will be considerably improved when the strength of the lumbar muscles and the ligamentum are restored and improved. Thus the curative effect is consolidated and the disease will not relapse too easily.

[0020] In the following, the applicant will describe the invention from the viewpoint of the relation between the supporting area of the body and the body's balancing ability. Generally, said relation is an inverse relation when walking or standing. The two aspects are both opposed and complementary. Weaker the balancing ability is, i.e. weaker the ability of the body to carry out self-balancing is, larger the necessary supporting area is, and more distributed the force on the foot is. Inversely, stronger the balancing ability is, smaller the necessary supporting area is, and more concentrated the force on the foot is. To stand on a smaller supporting area, the easiest way is to stand as upright as possible. Adopting smaller supporting area contributes to overcome and prevent a number of abnormal standing and walking postures, thus decreasing the lumbosacral angle, balancing, the stress on the falces articularis of the backbone arthrosis, thus avoiding overstrain of the backbone and protecting it. When walking, smaller supporting area will promote the function of the cerebella in charge of body balance, compel the peripheral muscles of the backbone to contribute to the dynamic balance of the body, maintain the normal state of the backbone more effectively, exercise relevant muscles at the same time that the correct posture of the backbone is kept, thus improving the balancing ability of body and correcting the backbone conformation. Through decreasing the supporting area progressively, the balancing ability of the body will be improved and the conformation of the backbone will become normal; thus, a better-to-better cycle will come into being. The invention can effectively limit the supporting area of the body. Higher the half sole is, greater the load on the heel is, and more concentrated the force is, and smaller the actual supporting area is, and more apparent the ability to compel the backbone peripineral muscles to adjust the balance is. When the

peripheral muscle groups of the vertebra cervicalis and the vertebra lumbalis are strong enough, a correct standing and walking posture will be formed and kept. After that, the balance-adjusting function of the backbone peripheral muscle groups will become active and natural, no longer passive and compelled.

[0021] The invention also can make the lumbar, abdominal and sciatic muscles contract and make them have enough exercises. Therefore, wearing the shoes for a certain period will reduce the lumbar and abdominal fat, and is helpful to weight reduction and the post-partum restoring of bodily form. Excessive abdominal fat and pregnancy are also one of the causes resulting in the abnormal state of the waist, being one of the factors contributing to the chronic lumbago. Said factors and the diseases in the waist are sometimes the causes and the effects of each other. The abnormal state in the waist may be the cause of fat accumulation. So, eliminating the cause will improve the bodily form with stable effect, without reoccurrence, without needs to diet. A number of teenagers have abnormal backbone postures derived from long time unhealthy habits and necessary to be corrected. The product of the invention may achieve the object very well, without any uncomfortable sensation or inconvenience, better than the backbone posture-correcting products in the art. To such abnormal posture formed in relative short period, the progress and effect to correct it using the shoes of the invention are more apparent than to correct the chronic lumbago.

[0022] With respect to the shoes in the art, the product of the invention has the following advantages: (1) it may eliminate the basic pathogeny of the curved backbone. With the HH greater than the HRE, the half sole of the foot of the user standing or walking will be higher than the heel of the foot so the barycenter of the body is compelled to move backward, so that the gluteus will be moderately strained, and the forward inclination of the pelvis will be limited effectively. Therefore, the unhealthy standing and walking posture excessively inclined forward will be rectified effectively, the backbone will be naturally straight, and the stress on the falces articularis of the articulus of the vertebra lumbalis will be balanced. Thus the lumbar muscle will not suffer or suffer less overstrain. Therefore, the shoes of the invention may remit and cure the strain of lumbar muscles, and have the function of health protection. (2) The shoes have excellent long period curative effect. When one walks, the unhealthy posture is corrected, the correct postures are stabilized, and the body is strengthened. The remittance, curing, correcting and stabilization occur simultaneously, so the curative effect is lasting, the disease will not relapse. (3) The technical prejudice in the shoe-making industry is overcome.

[0023] The invention provides shoes with its HH 1-75mm greater than its HRE, and with its HOH and/or HORE 1-30mm greater than its HH and/or HIRE.

[0024] Similar to the shoes' posture that is higher in the front and lower in the rear, the posture of the halfsole

portion and/or rear portion can also be described, besides by the mean bearing height, by the inward inclination angle. The mean bearing height would be different depending on the size of the shoes, while the inward inclination angle will define the shoes posture more accurately.

[0025] The HAH and/or HARE should vary between 2 and 7 degrees, so that the shoes may affect the postures of the feet effectively. There are very thick fat in the half-sole and the heel of the foot. If the rear end portion of the sole just inclines slightly inward, the influence to the posture of the calcaneus will be little and the inclining state of the heel of the foot cannot be changed, so the shoes will not be able to rectify O-legs.

[0026] Preferably, the HAH and/or HARE vary between 2.5 and 5 degrees. Such shoes can prevent and rectify O-legs without causing uncomfortable sensation, and without in-advantageous influence to normal standing and walking.

[0027] The half sole of the foot, especially its outer portion, is relative soft; the inclination of the sole of shoes affects the half sole of the foot less than the heel of the foot. So, generally, the HAH should be greater than the HARE.

[0028] In the shoes of above-said type, the HAH and the HARE may be same or different depending on practical situation. The shoes with same HAH and HARE are suitable for healthy person. The shoes with the HAH greater than the HARE are suitable for a person with disease in the heel of the foot. The shoes with the HAH less than the HARE are suitable for a person with disease in the half sole of the foot.

[0029] To remit and cure disease, it is necessary to heighten the outer portion of the halfsole portion and/or rear end portion when heightening the halfsole portion. That is to say, the bearing height of the halfsole portion and/or rear end portion decreases gradually from the outer portion to the inner portion. The inward inclining bearing surface of the halfsole portion will make the lower surface of the outer portion of the half sole of the foot (where the fifth toe is) higher than the lower surface of the inner portion (where the thumb is) when the user stands on a horizontal floor. The rear end portion of the shoes also can be formed as above configuration. Thus, the sole will be higher in the front, lower in the rear, and higher in the outer, lower in the inner. Then, when walking or standing, the body weight will be centered on the inner-rear end of the foot; the barycenter will be between the feet, in favor of the balanced distribution of the body weight between the two legs. Thus the left and right sides of the waist will bear the body weight more equably avoiding excessive strain of either side. So, the invention may prevent spraining the ankle, and avoid the unhealthy state of the cervical and lumbar muscles. This feature is very important, because most patients suffering chronic lumbago have their muscle groups on the two sides of the lumbar vertebra in unbalanced state, with the rear-outer portion of the heel of the foot bearing

greater force. This can be seen from the worn condition of soles of shoes: most soles of shoes have the most worn parts on the rear-outer portions. If the outer portion of the halfsole portion or rear end portion remain unheightened, not only there will be no curative effects, but also the un-balanced state between the left and right sides will be more severe, resulting in abnormal walking posture with the toes separated more than the heels, and resulting in damages to the ankles. If things continue in this way, O-legs will be formed and the waist will suffer severer damages.

[0030] It is very advantageous to make the weight-bearing portions of the sole higher in the outer and lower in the inner, as described detailed as follows. (1) If without such conception, the shoes with its front part higher than its rear part will be dangerous to a person with O-legs. (2) Such shoes may rectify O-legs. One person with O-legs differs from a normal person mainly in that it's the outer portion of the feet to bear most of the body weight. O-legs posture is a habitual posture. If the outer portion of the sole is higher than the inner portion, the sole will incline inward; the weight bearing position of the legs will move inward, thus the weight-bearing manner of the O-legs will be changed. When forming a new habit after using the shoes for a long period, the O-legs will be rectified. (3) Capable of rectifying the lateralcurvature. The shoes higher in the front and lower in the rear may help limit the forward inclination of the pelvis, but cannot help limit the leftward or rightward inclination of the pelvis. If the two legs of an O-legs person are curved in different extent, the lengths of the two legs will not be same, resulting in the lateralcurvature. Therefore, if the O-legs are rectified, the lateralcurvature will be rectified, fundamentally. (4) The loads that the legs and the feet bear will be more balanced. Many people have O-legs so that the loads borne by the legs are un-balanced, resulting in the inclination of the pelvis. The shoes higher in the outer and lower in the inner will make the loads on the two legs more balanced. (5) The loads on the feet will be more concentrated, the supporting area will further decreased, and the body will be trained more intensively in its balancing capacity, the rectifying effect to the unhealthy posture will be more obvious. (6) The control to the barycenter of the body in the direction of left-right is intensified, this will strengthen the self-balancing ability of the body.

[0031] The invention provides health care shoes with its HH 1-75mm greater than the HRE, its HOH and/or HORE 1-30mm greater than its HIH and/or HIRE, and its TR 1-15mm greater than its TRE.

[0032] To various gym shoes, relaxing shoes or flat-ties, preferably, the TRE is 1-3mm greater than the TR.

[0033] To various shoes with relatively lower heel, preferably, the TRE is greater than the TR by 3-8mm.

[0034] To various shoes with heel of moderate height, preferably, the TRE is greater than the TR by 8-15mm.

[0035] In know shoes, the heel generally is relatively bulky, with its rear end portion and rear portion all height-

ened. Actually, this is unnecessary, because the rear portion generally does not bear any load, it is a waste of material to heighten the rear portion when heightening other bearing-load portions; and also has the effect of increasing the weight of the shoes and the burden of the feet. So, heightening the rear portion has no advantage even has some disadvantages. For example, if the material of the sole is in bad quality, or if the sole is over worn, the thickness of the rear end portion will decrease. Then, the rear portion, which does not bear any load in the beginning, will begin to bear the load. If the rear portion of the shoes bears loads, the arch of the foot will be damaged severely. This is because, in such condition, it is not the lower-most portion of the arch to bear the weight, but the inner-rear portion to bear the weight that should be borne by the lower-most portion. Therefore, the mechanical condition of the arch of the foot changes fundamentally. When the two end portions of the arch of the foot touch the floor, the arch is under an elastic compression. But when the inner-rear portion of the arch bears the weight, the arch will suffer a outward force, which make the arch become longer and lower, and which will harm the arch more than when the two end portions bear the weight. Therefore, it is necessary to make the TRE greater than the TR, with the rear portion having no heel or just a relatively lower heel, so that damages to the arch may be avoided, and the weight of the shoes may be decreased, and the cost may be lowered. The transition between the rear end portion of the sole and the other portions of the sole may be continuous or discontinuous.

[0036] In the health care shoes of all the types as above described, on the halfsole portion and/or rear end portion of the outsole, there are at least two raised parts, similar to the bossing of ball-playing shoes or track shoes, which may be of metal, rubber, plastic material, or combination of both rubber and plastic material. The raised parts may be of any shape such as cylindrical form, square column, prism, cone and pyramid. They may be integral with or mounted on the outer sole of the shoes. The diameter and height of the raised parts may be selected depending on the types of shoes. With such raised parts, the shoes will be considerably lightened, very comfortable, and may be manufactured in lower cost. When only the halfsole portion less such raised parts, the structure will be similar to track shoes, light and suited to sports, thus suited to active teenagers. The inner sole and the plane formed by the lower end surface of three or more raised parts may be parallel or include an angle. When they are parallel, the shoes are particularly suited to running sports.

[0037] Above-said raised parts are detachably mounted. The mounting manner may be similar to the structure of football shoes. In pace with the disease curing or posture rectifying, the relative heights between the from and the rear and between the outer portion and the inner portion will be frequently adjusted. Such detachably mounted raised structures may be located on

the halfsole portion and/or rear end portion. For one pair of shoes, a plurality of raised parts with different heights may be provided. Replacement of the raised parts is equivalent to the replacement of shoes. Consequently, a pair of shoes, may be used as a plurality of shoes economically, and is particularly suited for posture rectifying and forming. Preferably, such structures are mounted on the halfsole portion, so that the shoes are light and handy.

[0038] In one embodiment of the health care shoes according to the invention, on the halfsole portion and/or rear end portion of the outer sole are provided detachably mounted thickening blocks. Such thickening blocks having a certain thickness may be of any solid material, preferably rubber or plastic material. The thickening blocks may be mounted by means of slot, bayonet, fastener such as loop-hook fastener (Velcro®), and nut-bolt structure. The function of the thickening blocks is as same as that of the detachably mounted raised parts, but is more stable than the latter, and is particularly suited to be mounted on the rear end portion of the sole.

[0039] In one embodiment of the health care shoes according to the invention, the inner sole and/or midsole are detachably mounted. The parts above the outsole or bottom of the shoe are not fixed, i.e., the inner sole and the midsole have not been bonded, sewed or stitched together. Thus the outsole or bottom forms a cavity together with the uppers, with the inner sole and midsole readily replaceable. The condition of the sole will vary depending on the relative height between the midsole and the inner sole. For one pair of shoes, a plurality of inner soles and midsoles with different heights and postures may be provided.

[0040] The whole body or part of the inner sole and midsole may be replaced. The relative height between the front and the rear of the sole may be adjusted effectively through replacing the weight-bearing portions, i.e. the halfsole portion and the rear end portion. The relative height between the inner portion and the outer portion and the extent of inward inclination may be adjusted through replacing the outer portion and inner portion of the halfsole portion and/or rear end portion. For the sake of convenience, it may be only the rear end portion to be replaced to adjust as desire the front and rear heights of the sole and the inward and outward inclining posture of the sole. Consequently, it may be only the rear end portion to be formed as detachably mounted structure. The detachably mounted inner sole and outsole have functions similar to that of the detachably mounted raised parts, but with more convenience and smaller varying range.

[0041] In one embodiment of the health care shoes according to the invention, the rear end portion of the sole is solid. In the know shoes, in the rear end portion of the sole there are generally some cavities to lighten the shoes. In the invention, hollow heel is not preferred because the weight will be concentrated on the heel.

The solid heel is preferred to prevent the heel from deforming.

[0042] The sole may be provided with a strengthening core. If the height difference between the halfsole portion and the rear end portion is relatively large, then a strengthening core should be embedded, so as to strengthen the connection between the two portions, and lighten the burden of the feet wearing the shoes. We may also do not provide strengthening core in the sole, if said height difference is relatively small. The resultant shoes are flexible and suited to sports and walking tour.

[0043] In the shoes of the invention, the height and posture of the sole may be different from one to the other shoe of a same pair of shoes, so that the shoes may have specific rectifying effect to those having legs of different heights or having feet bearing different forces with large difference. In particularly, the halfsole portion or the rear end portion on the side bearing greater weight is heightened so as to be higher than that of another shoes. When walking with such shoes, the weight to be borne on the side of higher sole will be smaller, so that the balance of the body may be adjusted. Such shoes may help remit and cure the severe chronic lumbago and lateral curvature, and may compensate some physical defects.

[0044] To make the shoes more comfortable, the technical solutions disclosed in CN Patent No. 94110290.4 and No. 96225238.7 may be adopted. Raising the midsole of the shoes to leave somewhat a space between the midsole and the outsole, with vent holes arranged on one and the other sides, to discharge sweat and foul air out of the shoes. The outlets of said vent holes are more than 5 mm above the floor. Said midsole are made of impermeable material. The midsole may be composed of an upper part and a lower part, with the lower part made of impermeable material, and with the upper part made of material with strong hydroscopicity. Thus the lower part for water proof and the upper part for sweat absorbing may keep the feet dry for long time, thus taking good care of the feet

[0045] To make the shoes more health caring, the sole may be provided with magnetic devices, infrared ray emitting devices or medicines on the positions corresponding to the acupoints on the sole of the foot. The medicines may be packaged as small packets, or may be incorporated in the midsole to facilitate the absorbance. Some small high spots may be formed on the upper surface of the sole so as to knead the sole of the foot. Said spots may be integral with the sole, or may be mounted on the sole.

[0046] To protect the arch of the foot, on the halfsole portion may be formed an upward convex arc structure. Thus, when the foot bears weight, the arcus pedis transversalis will not become fully straight and will be protected effectively from being damaged.

[0047] The inner sole and the outsole may be connected by electric conductors to discharge excessive

electric charges in the body and balance the positive and negative charges in the body to improve the health. Said conductors may be metal thread or wire. To facilitate the discharging, in the inner sole may be provided a net of conductors of certain area. Larger the area of the net is, better the discharging effect is. The outsole may be treated in similar manner.

[0048] The shoe of the invention shall have a "lower waist", i.e., the portion of the upper corresponding to the rear end portion of the sole shall have a height smaller than 90mm. If the upper is too high, the movement of the ankle will be restricted while the ankle when walking have to move frequently because the sole is higher in the front and lower in the rear. The shoes with lower waist will not interfere the movements of the ankle. The height of the upper is preferably in the range of 50-80mm.

[0049] To remit the discomfort during the initial wearing (especially to the shoes with the front higher than the rear), existing impact or shock absorbing structures may be adopted. Such structure is composed of enclosed saccate absorber (of any shape) having considerable strength, in the absorber is enclosed a gas (such as air cushion sole of Nike ®), a liquid or a solid with good elasticity, so that the sole of the foot may be protected very well, the heel of the foot will not suffer maladjustment because of sudden change of posture. Such structure also improves the comfort when wearing the shoes for long time. Preferably, there may be provided two or more saccate absorbers.

[0050] The sole of the health care shoes according to the invention may be made of leather. Leather sole is good for health due to its woolliness, light weight, and may be used in slap-up footwear product especially family shoes. Leather is very light, so the feet suffer less burden, Leather is very flexible and comfortable, so the feet suffer less bondage than wearing ordinary shoes.

[0051] The sole of the health care shoes according to the invention may be made of rubber, either natural rubber or synthetic rubber. Rubber sole has excellent elasticity, wear resistance and flexibility.

[0052] The sole of the health care shoes according to the invention may be made of plastic material, which may have said raised parts mounted more firmly.

[0053] The sole of the health care shoes according to the invention may be made of the combinations of both rubber and plastics. Thus the sole may take advantage of the respective natures of the two kinds of materials. As examples, polystyrene may be used together with butadiene acrylonitrile rubber; also, polyethylene, EVA or high styrene resin may be used together with rubber.

[0054] The sole of the health care shoes according to the invention may be made of thermoplastic elastomer, which is an excellent sole material due to its excellent mechanic properties, such as excellent resistance to tearing. Such material has excellent resistance to temperature and is suited to be used in lower temperature region or season. One of the materials that should be

noted is SBS thermoplastic elastomer, which is one of the thermoplastic elastomers having excellent properties, has larger friction coefficient and is more resistant to temperature. To shoes with relative high angle of inward or outward inclination, or forward or afterward inclination, SBS thermoplastic elastomer is preferred, which may exhibit the natures of thermoplastic elastomer adequately.

[0055] The Shore hardness of the sole of health care shoes according to the invention may be 50-70 degrees, preferably not lower than 55 degrees. If the sole is too soft, the force acting against the floor will be absorbed by the sole, and the user will consume more physical force. Proper hardness will facilitate sports and walking tour for long distance.

[0056] The health care shoes according to the invention may have no back upper. It may be slippers. Slippers according to the invention are ideal domestic product. They may quickly adjust the mechanical unbalance state of the body and remit effectively the body's tiredness.

[0057] In the sole according to the invention, textures are formed on the part of the outsole touching the floor, which function for antislip, and improve the stability of the body when walking or standing. Said textures may be any of the existing textures with any patterns. Both the halfsole portion and rear end portion of the outsole shall be provided with textures. Especially on the rear end portion of the outsole, the texture is indispensable. In the invention, the force is concentrated on the heel of the foot, so the rear end portion of the sole bears larger force. Therefore the rear end portion needs texture to increase its friction coefficient. The texture may be of any depth, width or density, which may be determined depending on the friction coefficient of the material. The depth is preferably not more than 4mm. The texture may be of any shape, such as linear, curved or wave-like line, which may be continuous or discontinuous. The texture also may be in the form of continuous or discontinuous circle, square, ellipse, rectangle, diamond, trapezium or any polygon or irregular shape. The texture also may be in the form of more than three columns, tapers, semi-spheres, semi-ellipsoids, such as cylinders, square columns, prisms, cones, square tapers, pyramids or their combinations. Preferably, the texture is irregular or in the form of combinations of a plurality of columns, tapers, semi-spheres, semi-ellipsoids, so that frictional forces in all directions may be increased.

[0058] For the health care shoes of the invention, the parts above the sole may be of any type, mode, structure or material as known in the art. The material of the uppers and vamps may be natural leather, leatheroid, canvas various textiles, and any existing material. To improve the shoes' tagging-on-feet ability, shoestrings, elastic textiles or fasteners (hook-and-loop type, such as Velcro®) may be used. The shoes of the invention may be gym shoes, four shoes, slippers, relaxing shoes, cloth shoes, leather shoes, slip-on shoes or safety foot-

wear. When placing the shoes, on a horizontal floor, the tip portion, pre-halfsole portion, halfsole portion, post-halfsole portion, waist portion, rear portion or rear end portion may be hanging or may touch the floor. The transition between the rear tip of the sole and the upper may be continuous or discontinuous. The form of continuous transition may be a slant or an arcwall face. The transitions between the heights of respective portions of the sole may be continuous or discontinuous, or a combination of the two transition forms, for example, on either side of the sole, it may be a continuous transition, while in the middle, it may be a discontinuous transition. The sole of the invention also may be made of metal or wood.

[0059] There will be no technical difficulty for manufacturing the shoes of the invention. The existing techniques and industrial welfare are totally enough, because the invention just relates to the adjustments to the relative heights between various portions of the sole.

Brief Description of the Drawings

[0060]

Fig. 1 is a schematic view illustrating a health care shoe of the invention;

Fig. 2 is a schematic view illustrating the seven portions of the sole of the health care shoes according to the invention;

Fig. 3 is a schematic view illustrating the inner portion and the outer portion of the halfsole portion and rear end portion of the sole of a left shoe;

Fig. 4 is a schematic view illustrating the inner portion and the outer portion of the halfsole portion and rear end portion of the sole of a right shoe;

Fig. 5 is a schematic view illustrating the shape of a cross section of the rear end portion of a sole.

[0061] As illustrated in Fig. 1, a health care shoe of the invention has its HH greater than its HRE.

[0062] As shown in Fig. 2, the area of the sole is divided, according to the weight to be supported, into seven parallel portions. They are, from the front to the rear a tip portion (7), a pre-halfsole portion (6), a halfsole portion (5), a post-halfsole portion (4), a waist portion (3), a rear portion (2), and a rear end portion (1).

[0063] In fig. 3, the inner portion of the halfsole portion and rear end portion of the left sole is indicated by reference sign (8), and the outer portion is indicated by reference sign (9).

[0064] In fig. 4, the inner portion of the halfsole portion and rear end portion of the right sole is indicated by reference sign (8), and the outer portion is indicated by reference sign (9).

[0065] Fig. 5 is a schematic view of a cross section of

the rear end portion. In the drawing, there are illustrated six soles with different postures of inclination of outer portions or inner portions. Different postures are focused on feet of different states. Wherein, the sole indicated by reference sign "a" is a sole with inclined plane surface, suited to normal person; the sole indicated by reference sign "b" is a sole with inclined downward-concave surface, suited to person having slight O-legs; the sole indicated by reference sign "c" is a sole having a recess, the profile of cross section of which is a downward angle drifted to one side; the sole indicated by reference sign "d" is a sole with a outside inclined plane surface and an inside horizontal surface, suited to person having severe O-legs; the sole indicated by reference sign "e" is a sole having a recess, the profile of cross section of which is an inversed trapezium drifted inward, such sole may fit the foot better; the sole indicated by reference sign "f" is a sole having a recess, the profile of cross section of which is an arch drifted inward, such sole may fit the foot better. The halfsole portion of the sole may also be an inclined plane surface or an inclined upward-convex surface.

Detailed Description of the Invention

Example 1:

[0066] The sole has a BIA of 2-4 degrees, an HAH and an HARE of 2-4 degrees. The shoes with such soles are suited to normal person in daily life, avoiding the formation of unhealthy posture and O-legs. Such shoes may correct the unhealthy posture of children.

Example 2:

[0067] The sole has a BIA of 4-7 degrees, an HAH and an HARE of 4-7 degrees. The shoes with such soles are suited to limit and correct the unhealthy posture of adults, may be used in the first phase for correcting unhealthy postures. Normal person may use such shoes as exercising appliance, for strengthening the lumbar muscles, improving the health and maintaining graceful bodily form. Such shoes may correct slight O-legs.

Example 3:

[0068] The sole has a BIA of 2-4 degrees, an HAH and an HARE of 4-7 degrees. The shoes with such soles are specially suited to the rectification of O-legs.

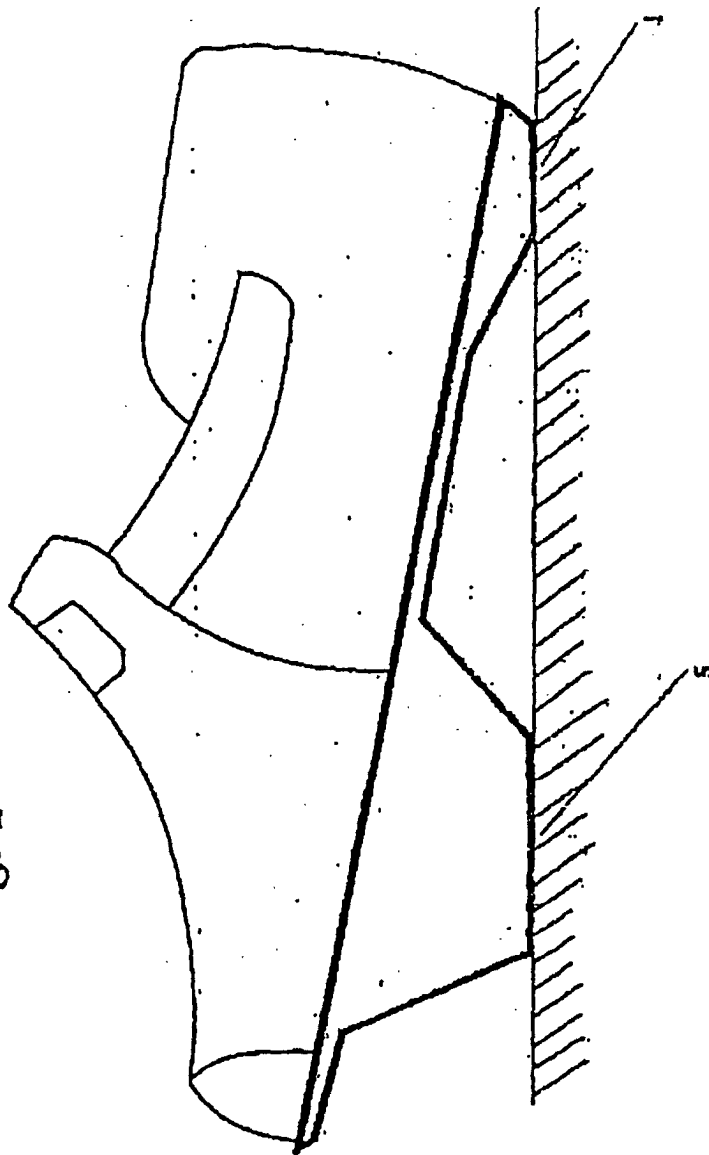
Example 4:

[0069] The sole has a BIA of 4-7 degrees, an HAH and an HARE of 2-4 degrees. The shoes with such soles are suited to the rectification of kyphosis and lumbar flexion.

Claims

1. Health care shoes, **characterized in that**, the mean bearing height, of the halfsole portion of the sole is greater than that of the rear end portion of the sole by 1-75mm. 5
2. Health care shoes according to claim 1, **characterized in that** the backward inclination angle of the sole is in the range of 2-7 degrees. 10
3. Health care shoes according to claim 1, **characterized in that**, the backward inclination angle of the sole is in the range of 2.5-6 degrees. 15
4. Health care shoes according to claim 1, **characterized in that** the mean bearing height of the outer portion of the halfsole portion and/or the rear end portion of the sole is greater than that of the inner portion of the halfsole portion and/or the rear end portion of the sole. 20
5. Health care shoes according to claim 2, **characterized in that**, the inward inclination angle of the halfsole portion and/or the rear end portion of the sole is in the range of 3-7 degrees. 25
6. Health care shoes according to claim 3, **characterized in that**, the inward inclination angle of the halfsole portion and/or the rear end portion of the sole is in the range of 2.5-5 degrees. 30
7. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the mean bearing thickness of the rear end portion of the sole is greater than that of the rear portion of the sole. 35
8. Health care shoes according to any one of claims 1 to 6, **characterized in that**, on the outsole of the sole are provided with at least two raised parts. 40
9. Health care shoes according to any one of claims 1 to 6, **characterized in that**, said raised parts of the outsole of the sole are detachably mounted. 45
10. Health care shoes according to any one of claims 1 to 6, **characterized in that**, on the rear end portion of the outsole of the sole so provided a detachably mounted thickening block. 50
11. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the rear end portion of the sole is provided with saccate absorbers. 55
12. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the midsole of the sole is detachably mounted.
13. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the upper is lower than 90mm.
14. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the rear end portion of the sole is solid.
15. Health care shoes according to any one of claims 1 to 6, **characterized in that**, the sole is made of thermoplastic elastomer.

Fig.1



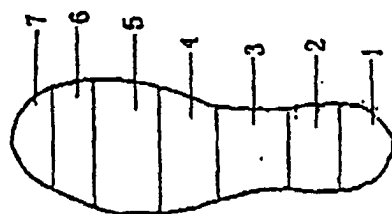


Fig. 2

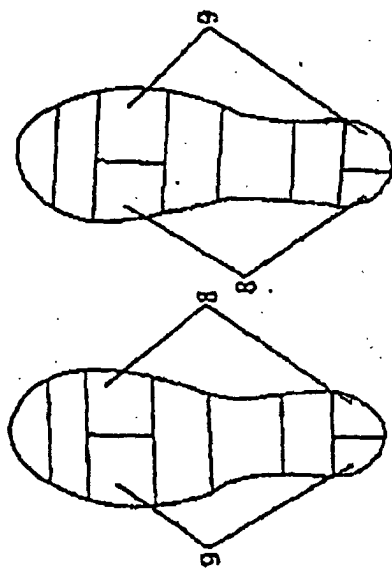


Fig. 3

Fig. 4

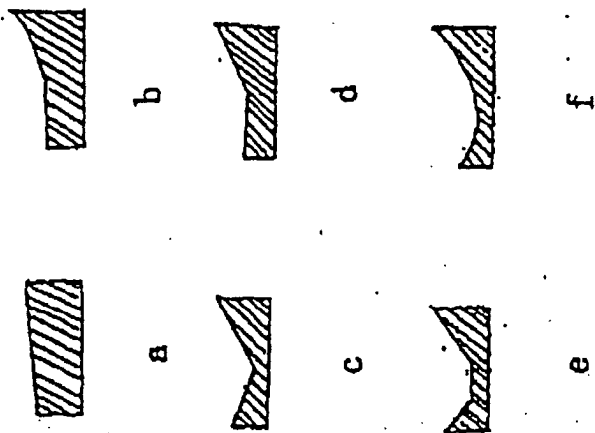


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN99/00134

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁶ A43B13/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁶ A43B13/14, 21/24, A43B7/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Chinese Patent Document (1985-)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAPS(75-99), CNPAT ESPACE/ACCESS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN.A.1099959(Zao MingYan) 11.Septmber 1993(11.09.93) The whole document	1~15
Y	CN.U.2089802(Cui Gang) 4.December1991(04.01.91)The whole document	4、7~15
Y	EP.A.0044086(Melcer) 20.January1991(20.01.82) The whole document	1~15
Y	US.A.5579591(Sachiko Kousaka; Mitsuko Kousaka) 3.December1996(03.12.96)The whole document	4、7~15
Y	US.A.3716930(Harry Brahm) 20.February1973(20.02.73) The whole document	11

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search 13.Septmber1999(13.09.99)	Date of mailing of the international search report 23 SEP 1999 (23.09.99)
Name and mailing address of the ISA/CN 6 Xitucheng Rd., Jimen Bridge, Haidian District, 100088 Beijing, China Facsimile No. 86-10-62019451	Authorized officer Zhou Pei zhi Telephone No. 86-10-62093419

Form PCT/ISA /210 (second sheet) (July 1998)

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Information patent family members

International application No.

PCT/CN 99/00134

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