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(54) **Title:** HEEL-LOCK SHOE

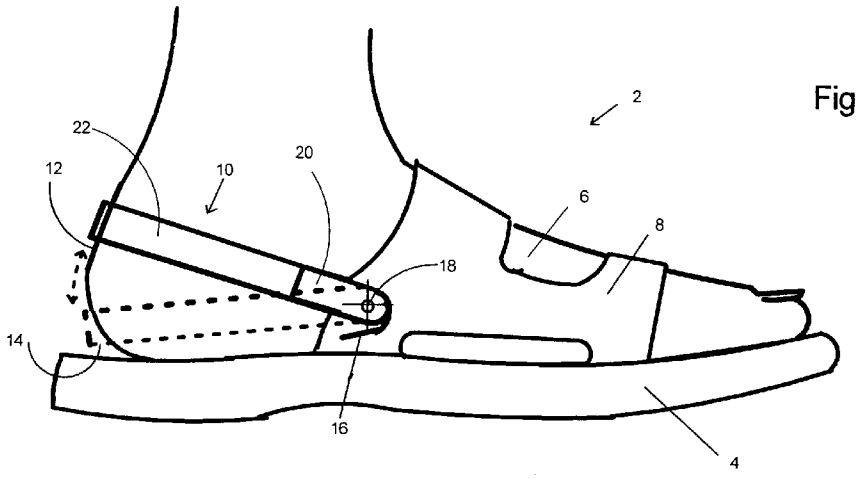

Figure 1

(57) **Abstract:** The present invention relates to footwear. The footwear includes a sole for supporting a foot and vamp means for extending from the sole. A heel restraint extends from either side of the vamp means. The heel restraint includes biasing means for biasing the heel restraint to extend around the upper heel of the foot so that the foot is restrained from slipping from the footwear. The heel restraint is able to be moved from the upper heel and toward the sole so that the foot can be slipped from the footwear. The footwear of the present invention is less prone to cause discomfort than other known footwear, owing to the fact that the heel restraint extends from the vamp means.

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HEEL-LOCK SHOE

TECHNICAL FIELD

The present invention generally relates to footwear.

BACKGROUND

The reference to any prior art in this specification is not, and should not be taken as an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

Footwear is widely used for protecting feet. Footwear comes in a variety of different forms including, for example, shoes, boots and slippers.

The applicant has perceived a need for footwear which can restrain the foot when in use, yet can enable the foot to be either more readily inserted into or slipped from the footwear without using hands or hand-operated tools.

Figure 1 of DE 196 11 797 discloses such a shoe including a sole for supporting a foot, and a vamp for covering the instep of the foot to hold the shoe onto the foot. A heel restraint extends from either side of the sole and around the upper heel of the foot so that the foot is restrained from slipping rearward from the shoe. However, in practice, the shoe is uncomfortable to wear and the heel restraint may cause blistering about the upper heel.

It is an object of the present invention to provide alternative footwear to that of Figure 1 of DE 196 11 797.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, there is provided footwear including:

a sole for supporting a foot;

vamp means for extending from the sole;

a heel restraint for extending from either side of the vamp means, the heel restraint including biasing means for biasing the heel restraint to extend around the upper heel of the foot so that the foot is restrained from slipping from the footwear, the heel restraint configured to be moved from the upper heel and toward the sole so that the foot can be slipped from the footwear.

The heel restraint extends from the vamp means which is elevated with respect to the sole. Accordingly, the free end of the heel restraint can more freely move when the foot moves within the footwear during walking and is less prone to cause discomfort to the heel, than if the heel restraint otherwise extended from the sole thereby increasing the acute angle between the sole and the heel restraint. Furthermore when steps are taken, the heel restraint applies less pressure to the heel, than if the heel restraint otherwise extends from the sole.

Preferably, the heel restraint is configured to pivot proximal to the vamp means. The user can readily pivot the heel restraint from the upper heel and toward the sole so that the foot can be slipped from the footwear.

Preferably, the biasing means biases the heel restraint to extend around the top of the heel. Preferably, the heel restraint can lock the foot within the footwear.

The heel restraint may extend from the vamp means such that a plane of the heel restraint approaches an orthogonal relationship with a tangential plane of the upper heel. The heel restraint may extend from the vamp means and contact the heel to form a comfortable fit.

The heel restraint may include a heel strap or band. The heel restraint may further include a stiffener for stiffening the heel strap. The heel strap may be mounted directly to the vamp means. The biasing means may be integrally formed with the heel strap. The biasing means may include a pair of neck portions on either side of the heel strap about which the heel strap can pivot.

Alternatively, the biasing means may include at least one discrete torsional spring located between the heel strap and the vamp means. The biasing means may include a pair of discrete torsional springs located on either side of the vamp means.

The heel restraint may be substantially resistant to lateral bending when it is moved downwards from the upper heel and toward the sole. Preferably, the heel restraint can be rotated downwards from the upper heel and toward the sole. The heel restraint may substantially maintain its shape when it is moved along the heel and toward the sole.

In one embodiment, the vamp means includes a single vamp extending from either side of the sole and for retaining the foot between the sole and the vamp. The vamp may be made from leather, fabric or plastic.

In another embodiment, the vamp means includes two separated instep restraints each extending from either side of the sole. A first one of the instep restraints may be located distal from the toes of the foot and include instep biasing means for biasing the first instep restraint to extend around the upper instep of the foot.

The first instep restraint may include a first instep strap. The vamp means may further include a pair of anchor tabs extending from the sole and to which the heel and first instep restraints are pivotally anchored. The instep biasing means may include at least one torsional spring located between the first instep strap and the anchor tabs. The instep biasing means may include a pair of torsional springs fast with respective anchor tabs. Alternatively, the first instep strap, instep biasing means and anchor tabs may be integrally formed.

A second one of the instep restraints may be located proximal to the toes of the foot and include a second instep strap extending from either side of the sole.

The biasing means may include a pair of resilient stretchable portions extending between the heel restraint and the vamp means. For example, each portion can include fabric, rubber or plastic elastomer material.

The footwear may further include a waterproof heel cover that can extend between the heel restraint and the sole.

The footwear may include any one of the following group: low shoes, shoe, slipper, sandal, mule, slide, scuff, backless sandal, slip-on, athletic shoe or similar.

The footwear may or may not include a tongue.

According to another aspect of the present invention, there is provided footwear including:

a sole for supporting a foot;

an upper for extending from the sole;

a foot restraint for extending from the upper, the foot restraint including a biasing arrangement for biasing the foot restraint to extend behind the upper rear portion of the foot so that the foot is restrained from slipping rearward from the footwear, the foot restraint configured to be moved toward the sole so that the foot can be slipped from the footwear.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred features, embodiments and variations of the invention may be discerned from the following Detailed Description which provides sufficient information for those skilled in the art to perform the invention. The Detailed Description is not to be regarded as limiting the scope of the preceding

Summary of the Invention in any way. The Detailed Description will make reference to a number of drawings as follows:

Figure 1 is a side view of footwear in accordance with a first embodiment of the present invention;

Figure 2 is a plan view of the footwear of Figure 1;

Figure 3a is a side view of the Footwear of Figure 1 showing a foot being slipped into the footwear;

Figure 3b is a side view of the Footwear of Figure 1 showing a foot being slipped from the footwear;

Figure 4 is a side view of footwear in accordance with a second embodiment of the present invention;

Figure 5 is a side view of footwear of Figure 4 showing insertion of a foot into the footwear;

Figure 6 is a side view of footwear in accordance with a third embodiment of the present invention;

Figure 7 is a side view of the footwear of Figure 6 showing the pivotal movement of the rear instep restraint;

Figure 8 is yet another side view of the footwear of Figure 6 with the heel removed from the footwear;

Figure 9 is a side view of footwear in accordance with a fourth embodiment of the present invention; and

Figure 10 is a side view of footwear in accordance with a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

According to a first embodiment of the present invention, there is provided a sandal 2 as shown in Figures 1 and 2. The sandal 2 includes a rubber sole 4 for supporting a foot 6, and a leather vamp 8 extending from either side of the sole 4. The vamp 8 retains the foot 6 between the sole 4 and the vamp 8 in use. The sandal 2 further includes a pivotal heel restraint 10 which extends from either side of the vamp 8 and around the upper heel 12 of the foot 6 so that the foot 6 is restrained from slipping rearward from the footwear 2 and is effectively locked into the footwear 2. Referring to Figure 1, the heel restraint 10 can be pivoted downward from the upper heel 12 and toward the sole 4 (see dashed lines) so that a small gap 14 may be formed between the heel restraint 10 and the heel 12. Accordingly, the foot 6 can then more readily slip or be slipped from the footwear 2 without significant impediment.

The heel restraint 10 includes biasing means in the form of a pair of discrete torsional springs 16a, 16b mounted on either side of the vamp 8 so that they are co-incident with a pivot axis 18 of the heel restraint 10. Each discrete spring 16 may be in the form of a resilient bar or leaf spring and is mounted between the vamp 8 and a heel strap 20 of the heel restraint 10 so that the heel restraint 10 can undergo pivotal motion. The biasing means biases the heel restraint 10 in an orientation so as to extend around the upper heel 12 or heel top of the foot 6 as shown in Figure 1.

The heel restraint 10 includes the arcuate heel strap 20 which, in turn, is made from leather. The heel restraint 10 further includes a plastic stiffener 22 mounted to the outside of the heel strap 20 so that the heel restraint 10 is stiffened. As shown in Figure 1, the heel restraint 10 is substantially resistant to lateral bending when it is rotated down from the upper heel 12 and toward the sole 4 (see dashed lines). Accordingly, the heel restraint 10 substantially maintains its shape when it is moved along the heel 12 and toward the sole 4.

The heel restraint 10 extends from the vamp 8 which is elevated with respect to the sole 4. Accordingly, the free end of the heel restraint 10 can more freely move when the foot 6 moves within the sandal 2 during walking and is less prone to cause discomfort to the heel 12, than if the heel restraint 10 otherwise extended from the sole 4 thereby increasing the acute angle between the sole 4 and the heel restraint 10. Furthermore, the heel restraint 10 applies less pressure to the heel 12 owing to the cyclic action of the foot 6 during walking, than if the heel restraint 10 otherwise extended from the sole 4.

Operation of the sandal 2 will now be described with reference to Figure 3.

Turning firstly to Figure 3a, the sole of the foot 6 initially presses down on the free end of the heel restraint 10 which causes the heel restraint 10 to retract toward the sole 4. The user fully slips his or her foot 6 into the vamp 8 and the heel restraint 10 then springs back away from the sole 4 so that the heel restraint 10 extends around the upper heel 12 of the foot 6. The foot 6 is then locked securely into the footwear 2 and is restrained from slipping from the footwear 2. Accordingly, the insertion of the foot 6 into the footwear can be readily achieved without the need to use the hands (or a hand operated tool such as a shoe horn) which would undesirably require the user to stoop.

Referring to Figure 3b, the user can use a toe 24 of his or her other foot (or another shoe) to retract the heel restraint 10 toward the sole 4. Pushing the foot 6 a small distance into the footwear 2 may assist in creating a gap 14 between the heel restraint 10 and the heel 12. The foot 6 is no longer locked into the footwear 2 and can then more readily slip from the footwear 2. Accordingly, the release of the foot 6 from the footwear can be readily achieved without the need to use the hands (or a hand operated tool such as a shoe horn) which would undesirably require the user to stoop.

A second embodiment of the present invention is shown in Figures 4 and 5 where like reference numerals refer to like features previously described. The heel restraint 10 extends directly from either side of the vamp 8 and includes a

heel strap 23. The biasing means include a pair of discrete springs 16 mounted on either side of the rear of the single vamp 8. In turn, the heel strap 23 is mounted to the springs 16 so that the springs 16 are located between the vamp 8 and the heel strap 23.

The springs 16 are mounted at a distance 27 above the sole 4 so that a plane 26 of the heel restraint 10 approaches an orthogonal relationship with the skin surface (or a tangential plane 25) of the top of the heel 12. In practice, the angle between the plane 26 of the heel restraint 10 and the skin surface (or tangential plane 25) of the top of the heel 12 is greater than 70°. Because of this near orthogonal relationship combined with the pivotal mounting of the strap 23, a comfortable and a safe fit of the foot 6 within the footwear 2 is provided. In particular, the inner surface or apex of the heel strap 23 hugs the top of the heel 12 and thereby provides a comfortable fit.

As shown in Figure 5, the stiff heel restraint 10 may define a neck portion 30 about which it can pivot so that the centre of rotation is located proximal to the vamp 8.

A third embodiment of the present invention is shown in Figures 6 to 8 where like reference numerals refer to like features previously described. The footwear 2 includes vamp means 32 (or an upper) for partially covering the instep of the foot 6. The vamp means 32 includes two separated instep restraints 8a, 8b each extending from either side of the sole 2. The rear instep restraint 8a is located distal from the toes of the foot 6 and includes instep biasing means 29 for biasing the rear instep restraint 8a to extend around the upper instep of the foot 6.

The rear instep restraint 8a is of similar construction to the heel restraint 10 described in detail above. Accordingly, the rear instep restraint 8a includes a rear instep strap 40. The vamp means 32 further includes a pair of anchor tabs 34 extending from opposite sides of the sole 4 and to which the heel restraint 10 and rear instep restraint 32 are pivotally anchored. The instep

biasing means 29 includes a pair of torsional springs fast with respective anchor tabs 34.

Turning to Figure 7, the rear instep restraint 8a can be pivoted forward (from rear position R to forward position F) toward the toes of the foot 6 when the foot 6 is inserted into or removed from the footwear 2. This compliance of the restraint 8a particularly facilitates insertion of the foot 6 into footwear 2 which includes orthotic (or orthopedic) soles. Upon insertion of the foot 6, the biasing means 29 pivots the restraint 8a rearward to position R once again and, together with the heel restraint 10, securely locks the foot 6 within the footwear 2. In this manner, the footwear 2 has a safety fit when the foot is restrained in use, so that movement of the foot 6 relative to the footwear 2 is minimized and the foot 6 is prevented from involuntarily slipping rearward from the footwear 2.

The front instep restraint 8b is located proximal to the toes of the foot 6 and includes a front instep strap extending directly from either side of the sole 4.

A fourth embodiment of the present invention is shown in Figure 9 where like reference numerals refer to like features previously described. The biasing means, for biasing the heel restraint 10 to extend around the upper heel of the foot 6, includes a pair of resilient stretchable (e.g. woven elastic) fabric portions 50 extending between the heel restraint 10 and the vamp 8. The fabric portions 50 are located on respective sides of the footwear 2.

A fifth embodiment of the present invention is shown in Figure 10 where like reference numerals refer to like features previously described. A limp waterproof heel cover 52 or fabric panel can extend between the heel restraint 10 and the sole 4. The heel cover 52 is sewn about its periphery to the footwear 2.

A person skilled in the art will appreciate that many embodiments and variations can be made without departing from the ambit of the present invention.

In the preferred embodiments, the heel restraint 10 extends from the vamp 8. The user can readily pivot the heel restraint 10 from the upper heel 12 and toward the sole 4 so that the foot can be slipped from the sandal 2. The intersection point (and pivot axis 18) of the heel restraint 10 with the vamp 8 can be varied.

In the first embodiment, the vamp 8 was made from leather. Alternatively, the vamp 8 may be made from fabric or plastic. Similarly, in the first embodiment, the heel strap 20 was made from leather. Alternatively, the heel strap 20 may be made from fabric or plastic.

In the first embodiment, the biasing means included a pair of torsional springs 16a,b. In an alternative embodiment, the biasing means may include only one of the springs 16. The springs 16 may be made from rubber, plastic, metal or other suitable resiliently flexible material.

The first embodiment related to a sandal, however, the present invention can be equally applied to other forms of footwear such as shoes, slippers, sandals, sport shoes, runners, mules, slides, scuffs, backless sandals, slip-ons, athletic shoes or similar.

In the preferred embodiment, the sole 4 was made from rubber. However, in alternative embodiments, the sole may be made from plastic or leather.

In the first embodiment, a gap 14 was formed between the heel restraint 10 and the heel 12. In an alternative embodiment, this gap 14 need not be formed.

In one embodiment with reference to Figure 5, the heel restraint 10 may be integrally formed from a resilient rubber strip or moulding, and therefore the biasing means may be integrally formed with the heel strap 23. The biasing means can include a pair of neck (or narrowing) portions on either side of the heel restraint 10 about which the heel restraint 10 can pivot.

In another embodiment with reference to Figure 8, the rear instep restraint 8a may be integrally formed from a resilient rubber strip or moulding. Accordingly, the rear instep strap 40, instep biasing means 29 and anchor tabs 34 may be integrally formed. The heel restraint 10 may be of similar construction to that previously described in the preceding paragraph and may be integrally formed with the rear instep restraint 8a.

In one embodiment with reference to Figures 9 and 10, the heel restraint 10 may be pivotally affixed to the vamp 8 using pins or rivets. The footwear may or may not include a tongue.

In compliance with the statute, the invention has been described in language more or less specific to structural or methodical features. It is to be understood that the invention is not limited to specific features shown or described since the means herein described comprises preferred forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted by those skilled in the art.

The claims defining the invention are as follows:

1. Footwear including:

a sole for supporting a foot;

vamp means for extending from the sole;

a heel restraint for extending from either side of the vamp means, the heel restraint including biasing means for biasing the heel restraint to extend around the upper heel of the foot so that the foot is restrained from slipping from the footwear, the heel restraint configured to be moved from the upper heel and toward the sole so that the foot can be slipped from the footwear.

2. Footwear as claimed in claim 1, wherein the heel restraint is configured to pivot proximal to the vamp means.

3. Footwear as claimed in claim 1, wherein the heel restraint extends from the vamp means such that a plane of the heel restraint approaches an orthogonal relationship with a tangential plane of the upper heel.

4. Footwear as claimed in claim 1, wherein the heel restraint includes a heel strap and a stiffener for stiffening the heel strap.

5. Footwear as claimed in claim 4, wherein the heel strap is mounted directly to the vamp means and the biasing means is integrally formed with the heel strap.

6. Footwear as claimed in claim 5, wherein the biasing means includes a pair of neck portions on either side of the heel strap about which the heel strap can pivot.

7. Footwear as claimed in claim 4, wherein the biasing means includes at least one discrete torsional spring located between the heel strap and the vamp means.

8. Footwear as claimed in claim 1, wherein the biasing means includes a pair of resilient stretchable portions extending between the heel restraint and the vamp means.

9. Footwear as claimed in claim 1, further including a limp heel cover that can extend between the heel restraint and the sole.

10. Footwear as claimed in claim 1, wherein the vamp means includes a single vamp extending from either side of the sole and for retaining the foot between the sole and the vamp.

11. Footwear as claimed in claim 1, wherein the vamp means includes two separated instep restraints each extending from either side of the sole, a first one of the instep restraints being located distal from the toes of the foot and including instep biasing means for biasing the first instep restraint to extend around the upper instep of the foot, a second one of the instep restraints being located proximal to the toes of the foot and including a second instep strap extending from either side of the sole.

12. Footwear including:

a sole for supporting a foot;

an upper for extending from the sole;

a foot restraint for extending from the upper, the foot restraint including a biasing arrangement for biasing the foot restraint to extend behind the upper rear portion of the foot so that the foot is restrained from slipping rearward from the footwear, the foot restraint configured to be moved toward the sole so that the foot can be slipped from the footwear.

13. Footwear as claimed in claim 12, wherein the foot restraint is configured to pivot proximal to the upper.

14. Footwear as claimed in claim 12, wherein the foot restraint extends from the upper such that a plane of the foot restraint approaches an

orthogonal relationship with a tangential plane of the upper rear portion of the foot.

15. Footwear as claimed in claim 12, wherein the foot restraint includes a foot strap and a stiffener for stiffening the foot strap, the foot strap being mounted directly to the upper and the biasing arrangement being integrally formed with the foot strap.

16. Footwear as claimed in claim 15, wherein the biasing arrangement includes a pair of neck portions on either side of the foot strap about which the foot strap can pivot.

17. Footwear as claimed in claim 15, wherein the biasing arrangement includes at least one discrete torsional spring located between the foot strap and the upper.

18. Footwear as claimed in claim 12, wherein the biasing arrangement includes a pair of resilient stretchable portions extending between the foot restraint and the upper.

19. Footwear as claimed in claim 12, further including a limp heel cover that can extend between the foot restraint and the sole.

20. Footwear as claimed in claim 12, wherein the upper includes either:

a vamp extending from either side of the sole and for retaining the foot between the sole and the vamp; or

two separated instep restraints each extending from either side of the sole.

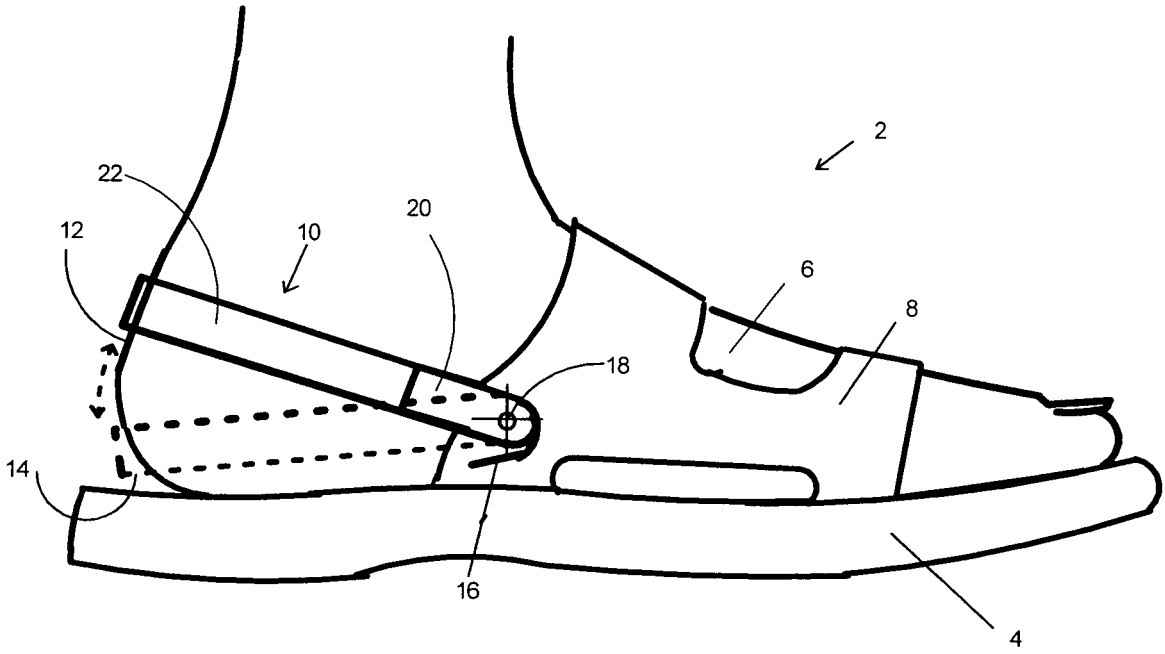

Figure 1

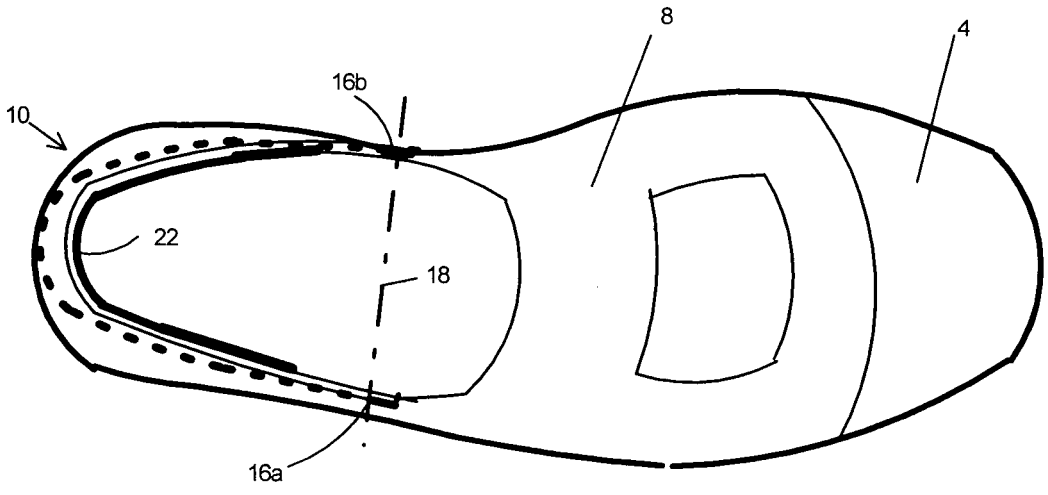

Figure 2

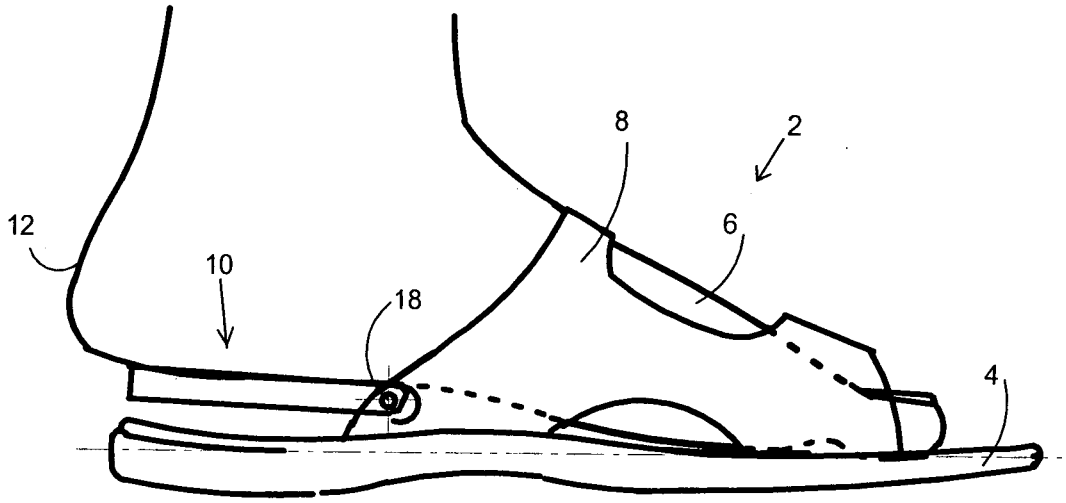

Figure 3a

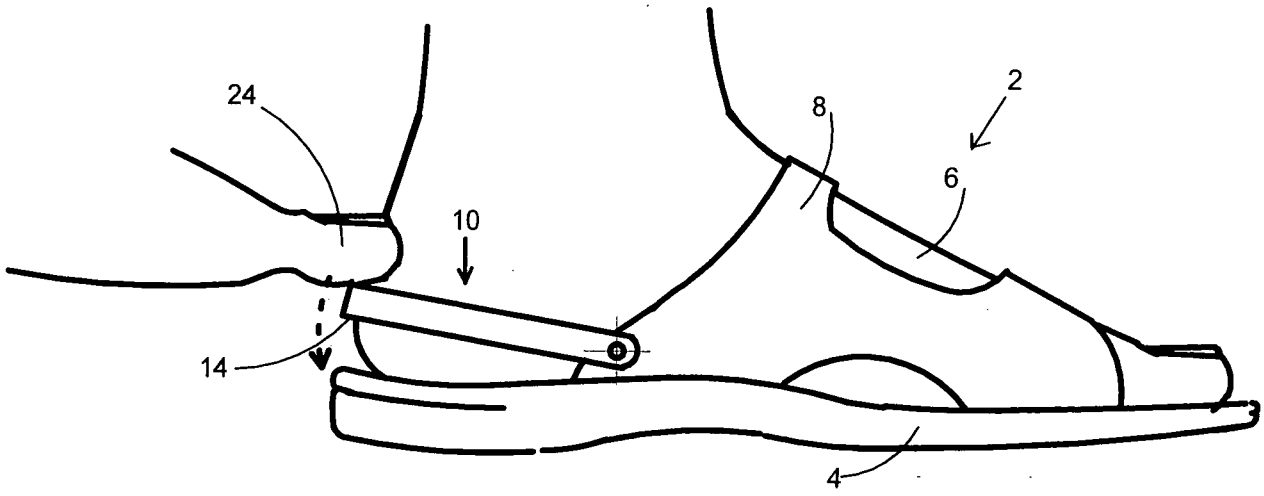

Figure 3b

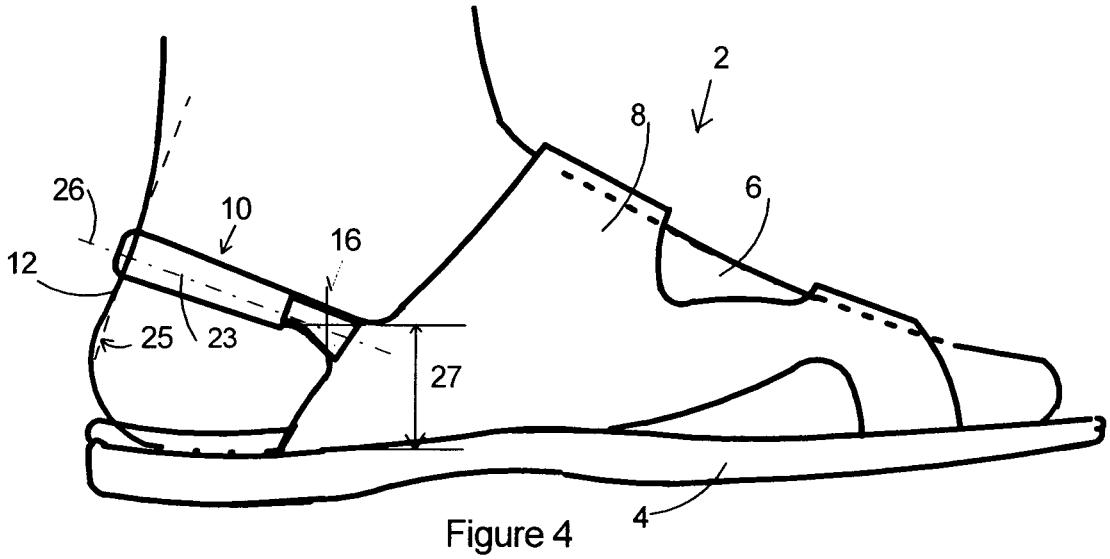

Figure 4

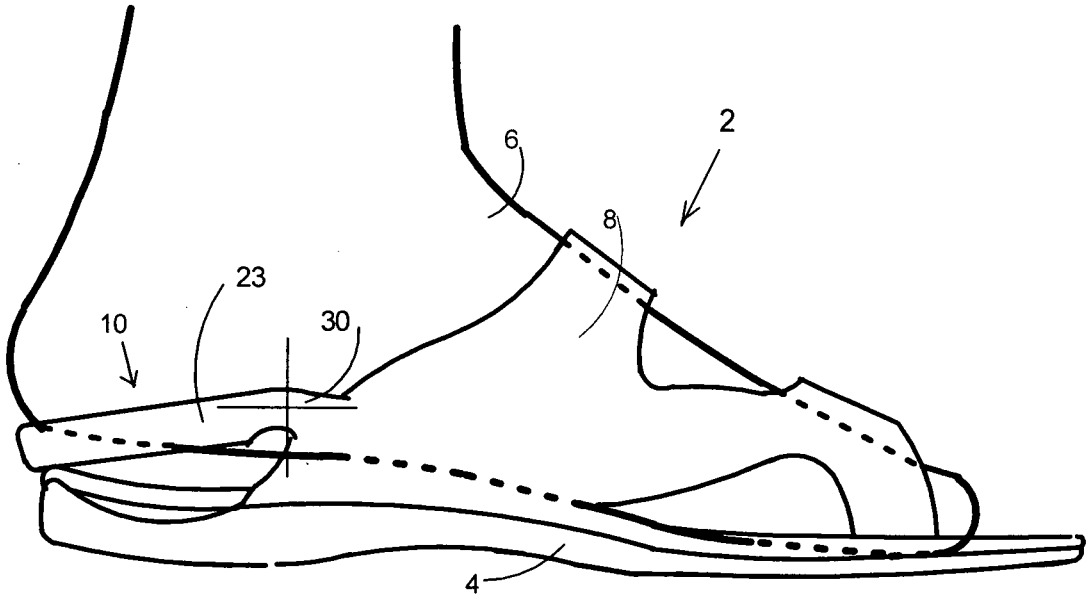

Figure 5

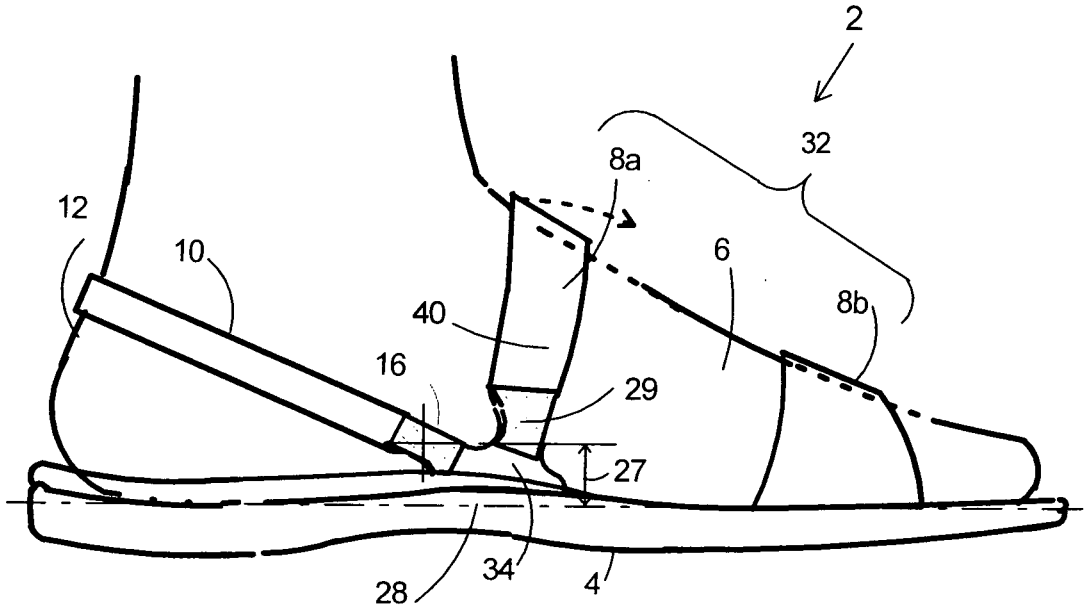

Figure 6

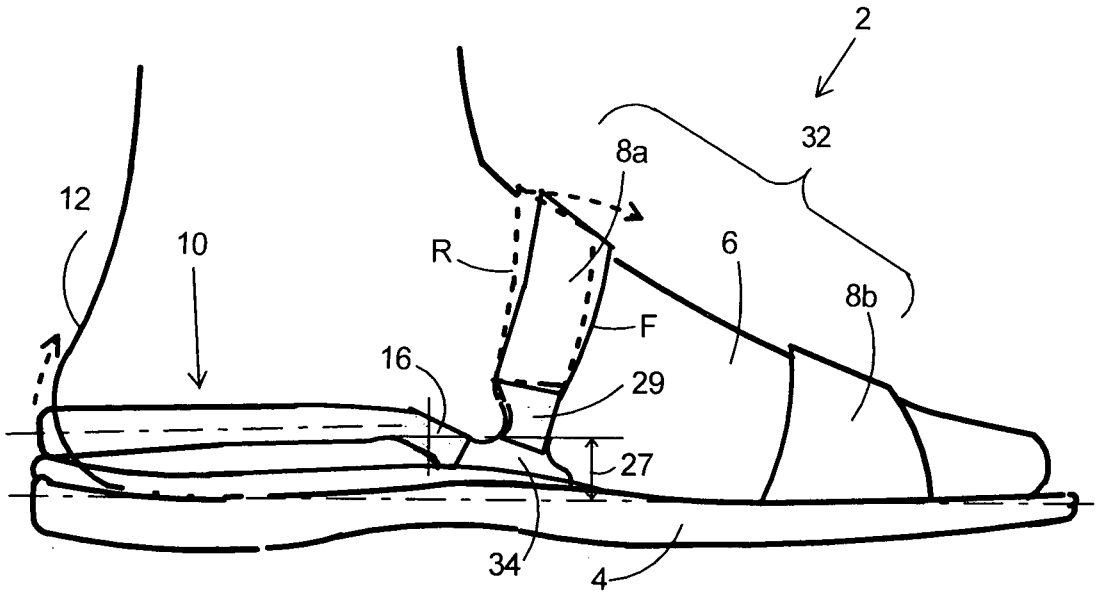

Figure 7

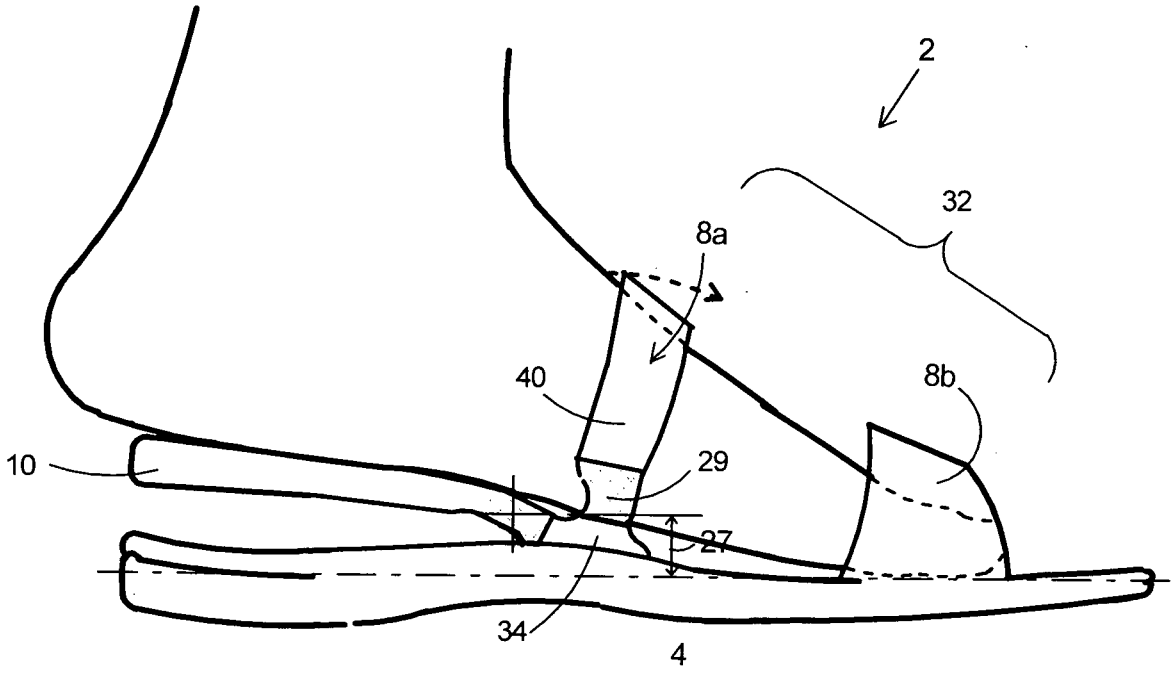

Figure 8

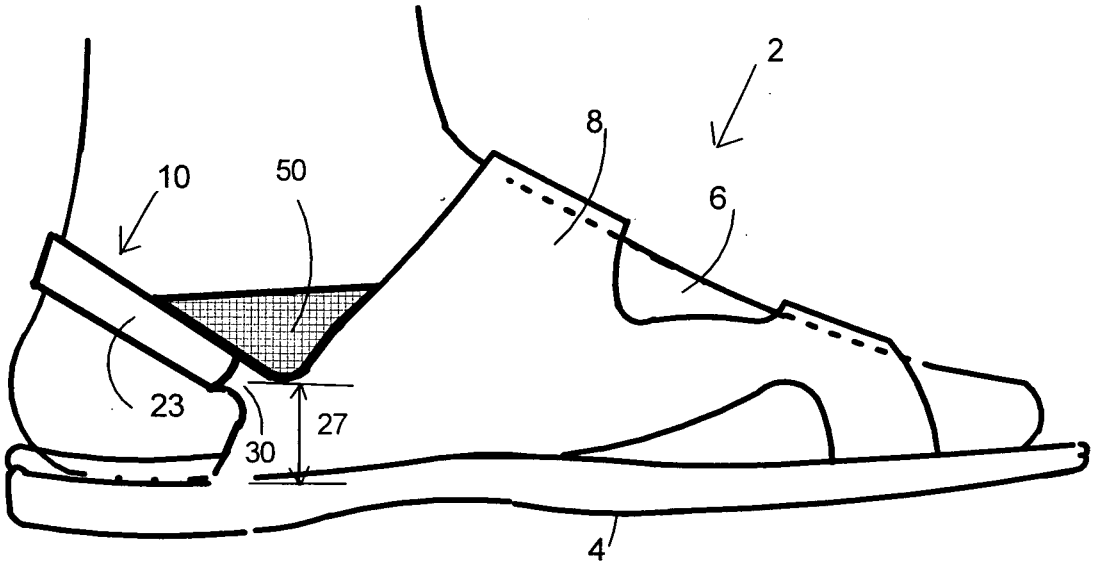

Figure 9

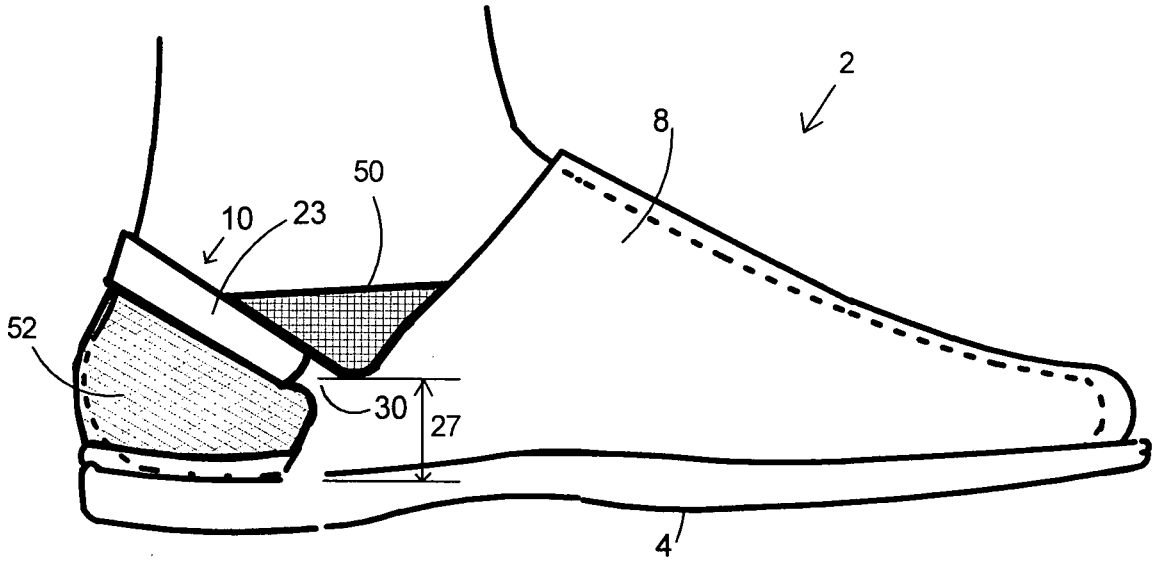

Figure 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/001824

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A43B 3/12 (2006.01) ***A43B 11/00*** (2006.01)

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)

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPODOC & WPI: IPC A43B 3/12, 3/26, 21/47, 11/00, 21/36 & Keywords (Flexible, Resilient, Elastic, Bend, Deflect, Restrain, Spring, Extend, Deform, Strap, Lace Belt, Loop, Band, Ribbon, Bias, Pivot, Slide, Swing, Swivel, Hinge, Rotate
ESP@CENET: Keywords (Heel, Strap, Flexible)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/0074425 A1 (LEONG) 05 April 2007 See especially [0030] to [0032] and figures 5a & 5b	1-4, 9, 10, 12-14, 19, 20
Y	See especially figures 5a & 5b	5-8, 11, 15-18
Y	US 3336683 A (SCHELLKOPF) 22 August 1967 See especially column 2, lines 55-72 and figures 1&2	5-7, 15-17
Y	US 3407517 A (GESSNER) 29 October 1968 See especially column 2, lines 17-27 and figures 1&2	8, 18
Y	US 2136084 A (PERUGIA) 08 November 1938 See especially column 1, line 45 to column 2, line 5 and figures 1&2	11

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search	Date of mailing of the international search report
15 January 2009	26 FEB 2009
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **DANIEL ATHYSAYARAJ** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6225 6131

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2008/001824

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	2007074425	CN	1943463	SG	131774
US	3336683	GB	1111341		
US	3407517	NONE			
US	2136084	NONE			

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX