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(71) Applicant (for all designated States except US):
2 WALKON PTY LIMITED [AU/AU]; c/o Michael Kinchington, Suite 1003, Level 10 MLC Centre, Martin Place, Sydney, New South Wales 2000 (AU).

(72) Inventors; and
(75) Inventors/Applicants (for US only):
KINCHINGTON, Michael [AU/AU]; Suite 1003, Level 10 MLC Centre, Martin Place, Sydney, New South Wales 2000 (AU).

NINIO, Mark [AU/AU]; Suite 104, 107 Walker Street, North Sydney, New South Wales 2060 (AU).

(74) Agent: GRIFFITH HACK; Level 29, Northpoint, 100 Miller Street, North Sydney, New South Wales 2060 (AU).

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(60) Title: OPEN STYLED FOOTWEAR AND COMPONENTS THEREOF

(57) Abstract: An article of open styled footwear comprising a sole member, and a strap fixed relative to the sole member is disclosed. An interdigit toe piece is disposed between an upper portion of the strap and the sole member, whereby the footwear is retained to a foot, at least in part, by the upper portion of the strap extending over the foot and the interdigit toe piece is disposed between the first and second toes. In one form, the interdigit toe piece comprises a body having opposing concave side surfaces configured, in use, to separate and cradle the first and second toes. An inlay for open styled footwear and foot cushion is also disclosed.
OPEN STYLED FOOTWEAR AND COMPONENTS THEREFOR

Field

The present disclosure relates generally to an article of open styled footwear and to anatomically contoured support elements capable of incorporation into such footwear. The disclosure has been described with reference to open styled footwear in the form of flip-flops, but it is to be appreciated that the disclosure is not limited to that use, and may be applied to a broad range of footwear.

Background

Open styled footwear, in particular open styled footwear consisting of a flat sole held loosely on the foot by a Y-shaped strap that passes between the first and second toes and around either side of the foot (commonly known as flip-flops or thongs) are popular despite the fact that such footwear offers little foot support. Open styled footwear has been linked with foot discomfort, postural imbalances and musculoskeletal injury including plantar fasciitis (arch pain) compartment syndrome (shin pain), metatarsalgia (ball of foot pain) and ankle sprains and fractures as well as foot strains and fractures.

Media reports and hospital figures over the past five years estimate casual footwear such as flip-flops result in more than 200,000 people attending medical centres each year after suffering falls or developing long-term problems. The National Health Service of the United Kingdom spends £40 million a year treating injuries caused by wearing such open styled footwear. Podiatry organizations, foot surgeons and hospital departments are regularly interviewed in the media to inform and educate about the hazards of wearing flip-flops.

Some embodiments of open styled footwear and various anatomically contoured support elements described herein seek to address at least some of the aforementioned problems.

The above references to the background art do not constitute an admission that the art forms a part of the common general knowledge of a person of ordinary skill in the art. The above references are also not intended to limit the open styled footwear and various anatomically contoured support elements as disclosed herein.
Summary of the Disclosure

In a first aspect there is disclosed an article of open styled footwear comprising a sole member, a strap fixed relative to the sole member, and an interdigit toe piece disposed between an upper portion of the strap and the sole member, whereby the article of footwear is retained to a foot, at least in part, by the upper portion of the strap extending over the foot and the interdigit toe piece being disposed between the first and second toes, the interdigit toe piece comprising a body having opposing concave side surfaces configured, in use, to separate and cradle the first and second toes.

In one embodiment, the toe piece body includes an aperture in an upper surface that receives a lower portion of the strap.

In one embodiment, the aperture extends through the toe piece body and the lower portion of the strap is secured to the sole member underlying the toe piece. In a particular form, the aperture in the toe piece body is aligned with an aperture in the sole member and the lower portion of the strap extends through the toe piece and the sole member and is retained to an underside of the sole member.

In one embodiment the opposing concave side surfaces are anatomically contoured with respect to the first and second toes. In one embodiment, a rear surface of the body is configured, in use, to receive an interdigit web disposed between the first and second toes.

In one form, a lower surface of the toe piece is fixed to, or integrally formed with, the sole member. Advantageously, integration of the toe piece with the sole member may thicken and thereby strengthen a region of the sole member which in previous open style footwear has been prone to wear and failure particularly in arrangements where a lower portion of strap is fixed to the sole member.

In an alternative form, the toe piece may be fixed to, or integrally formed with, the strap. In this arrangement, the toe piece is disposed between the upper and lower portions of the strap. In such an arrangement the lower portion is fixed to, or integrally formed with, the sole member. In a particular form the lower portion of the strap extends through an aperture in the sole member.

In one form, the toe piece is integrally formed with an inlay which in turn forms part of
the sole member.

In a particular form, the inlay provides support for the foot. In one embodiment the inlay includes forward and rear bulbous portions that are generally shaped to conform with respective pressure regions of the ball and heel of the foot. In this respect, the footbed inlay may be formed from a cushioning material to provide additional comfort in those regions.

In a second aspect of the disclosure, there is provided a footbed inlay for an article of open styled footwear comprising a sole member, a strap fixed relative to the sole member, whereby the footwear is retained to a foot, at least in part, by an upper portion of the strap extending over the foot, the foot bed inlay comprising a body having a forward bulbous portion interconnected with a rear bulbous portion by an isthmus-shaped section, and a interdigit toe piece upwardly extending from the forward bulbous portion, wherein in use the inlay body forms part of the sole member and the interdigit toe piece is disposed between the upper portion of the strap and the sole member and is arranged to be disposed between the first and second toes.

In one embodiment the footbed inlay is configured to be received in a complementary shaped recess in the sole member.

In one embodiment, the interdigit toe piece is integrally formed with the inlay body.

In a further aspect, the disclosure provides an article of open styled footwear incorporating the footbed inlay according to any form described with respect to the second aspect.

In a further form, the article of open style footwear according to any form described above, further comprises a cushion having a midsole portion and a heel portion disposed with and extending between respective midsole and heel regions of the sole member, wherein the midsole portion comprises an arched cushion portion contoured to support a medial longitudinal arch of the foot and the heel portion contoured to provide medial-varus heel support to the foot. The arched cushion portion may be in the form of an arch cookie.

In one embodiment, the heel portion is laterally curved.
In one form, the heel portion provides the sole member with an inward lateral camber in a heel region thereof. The inward lateral camber may be between about 4-6 degrees.

5 Brief Description of the Figures

Notwithstanding any other forms which may fall within the scope of the open styled footwear and support elements as set forth in the Summary, specific embodiments will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of an article of open styled footwear in accordance with one specific embodiment;

Figure 2 is a side view of a footbed inlay with an integral interdigit toe piece in accordance with a specific embodiment, showing the relationship between the interdigit toe piece and a strap for use with an article of open styled footwear;

Figure 3 is a perspective view of the footbed inlay and interdigit toe piece shown in Figure 2;

Figure 4 is an upper plan view of the footbed inlay and interdigit toe piece shown in Figures 2 and 3;

Figure 5 is a front end view of another specific embodiment of the interdigit toe piece when worn between a first toe and a second toe;

Figure 6 is a plan view of a pair of cushion elements of one embodiment, capable of incorporation into respective sole members for pair of articles of open styled footwear;

Figure 7 is a plan view of an article of open styled footwear for a left foot, showing a left foot cushion element from Figure 6 incorporated into the sole member;

Figure 8 is a perspective view of the cushion element; and

Figure 9 is rear view of a right foot wearing the article of open styled footwear,
showing the lateral camber rendered to the sole member by the cushion element when incorporated into the sole member.

**Detailed Description of Specific Embodiments**

The description broadly relates to article of open styled footwear and components therefor. In particular there is disclosed an article of open styled footwear and anatomically contoured support elements capable of incorporation into such footwear to provide ergonomic support to various parts of the foot. Such anatomically contoured support elements may include an interdigit toe piece, a footbed inlay, and an arch cookie.

The term "open styled footwear" as used herein refers to a type of casual footwear having an open toe, open heel and generally flat sole. Examples of such "open styled footwear" are commonly known as thongs but also referred to as flip-flops, thongs, sandals, zorries, slip slaps, pluggers, double pluggers, toesies, jandals or slippers. Generally, the sole is held loosely to the foot by a Y-shaped strap that passes between the first and second toes and around either side of the foot.

Referring to Figure 1 there is shown an article 10 of open styled footwear. The article 10 includes a generally flat sole member 12 and a Y-shaped strap 14. The Y-shaped strap 14 has a forward strap portion 16 having an upper portion 16a and a lower portion 16b and a pair of opposing rear strap portions 18, each having an upper portion 18a and a lower portion 18b. In use, the upper portions 16a, 18a extends over a wearer's foot and the lower portions 16b, 18b engage the sole member 12. Each free end 20 of the lower portions 16b, 18b has a stop member 20a, as shown in Figure 2.

The forward strap portion 16 is connected proximal to a front end 22 of the sole member 12 at a first connection point 24 generally coinciding with a region between where a first toe and a second toe reside when the article 10 is worn. The rear strap portions 18 are connected at respective second connection points 26 adjacent opposing sides 28 of the sole member 12 corresponding, in use, to either side of a wearer's foot. It will be appreciated that, depending on the design of the article 10, the rear strap portions 18 may be located at any point along the length of the opposing sides 28 of the sole member 12, ranging from proximal the ball of the foot to adjacent either side of the heel.
The forward strap portion 16 is connected to the front end 22 of the sole member 12, and the rear strap portions 18 are connected to respective opposing sides 28 of the sole member 12, as described above by providing the front end 22 and the opposing sides 28 of the sole member 12 with apertures (not shown) generally coinciding, respectively, with the first and second connection points 24, 26. Respective free ends 20 of the forward and rear strap portions 16, 18 are passed through the apertures in the sole member 12. The stop members 20a bear against an underside of the sole member 12 when the strap 14 is placed under tension, thereby preventing the free ends 20 of forward and rear strap portions 16, 18 from being withdrawn from the apertures and disconnecting from the sole member 12.

The article 10 also includes a footbed inlay 29 that forms part of the sole member 12. The footbed inlay has a body 30 with an interdigit toe piece 32 integrally formed therein. The footbed inlay body 30 is a generally flat, foot shaped insert that is received in a complementary recess 34 in a base portion 35 of the sole member 12.

Referring to Figures 3, 4 and 5 that illustrate the footbed inlay body 30 and the interdigit toe piece 32 in more detail, the footbed inlay body 30 comprises a forward bulbous portion 36 interconnected with a rear bulbous portion 38 with an isthmus-shaped section 40. The forward and rear bulbous portions 36, 38 are generally shaped to conform to respective pressure regions of the ball and heel of the foot.

The footbed inlay body 30 is fabricated from a cushioning material to provide comfort to the wearer, in particular to provide cushioning for the weight bearing regions of the ball and heel of the foot. Such cushioning materials are well known to those skilled in the art. Illustrative examples include, but are not limited to, ethyl vinyl acetate (EVA), polyurethane (PU), and open or closed cell rubber.

The interdigit toe piece 32 is disposed between an upper portion 16a of the strap 14 and the sole member 12, and is generally disposed in a region between where a first toe and a second toe reside when the article 10 is worn. In the embodiments illustrated in the Figures, the interdigit toe piece 32 is formed as a single moulded piece with the forward bulbous portion 36 of the footbed inlay body 30. Accordingly, in these embodiments, the interdigit toe piece 32 is fabricated from the same material as the footbed inlay body 30, such as the cushioning material.

Integration of the interdigit toe piece 32 with the footbed inlay body 30 prevents
movement of the interdigit toe piece 32 with respect to the sole member 12 when the wearer is walking, thereby allowing the correct position of those components to be maintained.

The interdigit toe piece 32 comprises a body 42 having opposing concave side surfaces 44. The concave side surfaces 44 are configured, in use, to separate and cradle the first and second toes, as shown in Figure 5. Advantageously, separation of the first and second toes enhances the efficiency of first toe joint kinematics by preventing a valgus orientation of the first toe, redistributing weight load from the smaller second toe to the larger first toe, and improving the direction of motion (dorsiflexion) of the first toe, thereby improving overall foot biomechanics.

The opposing concave side surfaces 44 may be anatomically contoured with respect to the first and second toes. Concave side surface 44a may be anatomically contoured to receive the first toe. Concave side surface 44b may also be anatomically contoured to receive the second toe. Referring to the specific embodiment shown in Figures 2 and 3, concave side surface 44a may take the form of a pair of side surfaces 46a, 46b which are disposed with respect to one another at an obtuse angle. The side surfaces 46a, 46b are shaped to complement a general anatomical shape of the proximal phalanx and the distal phalanx, respectively, of the first toe. Concave side surface 44b may take the form of a pair of side surfaces 48a, 48b which are also disposed with respect to one another at an obtuse angle. The side surfaces 48a, 48b are shaped to complement a general anatomical shape of the proximal phalanx and the intermediate phalanx, respectively of the second toe.

Contouring the opposing concave sides 44a, 44b closely to the general anatomical shape of the first and second toes, as described above, may provide the wearer of the interdigit toe piece 32 with the sensation that the first and second toes are securely cradled. Additionally, relative to conventional open styled footwear, where a strap is passed directly and loosely between the first and second toes, the wearer of the interdigit toe piece 32 experiences reduced friction and irritation between the first and second toes.

In the embodiment shown in the Figures, the body 32 has a rear concave surface 50. The rear concave surface 50 is configured, in use, to receive an interdigit web (of skin) disposed between the first and second toes. Cradling of the interdigit web in this way may also contribute to a reduction in friction and irritation to the wearer of the interdigit
toe piece 32.

The interdigit toe piece 32 is adapted to receive the forward strap portion 16 of the strap 14. In the embodiments shown in the Figures, the interdigit toe piece 32 has an aperture 52 extending therethrough. The aperture 52 extends between an upper surface 54 and a lower surface 56 of the body 42, and also through the footbed inlay body 30. The positioning of the aperture 52 coincides with the aperture and first connection point 24 located on the sole member 12.

The upper surface 54 of the body 42 may be appropriately shaped to coincide with the contours of the front strap portion 16 and thereby present a streamlined appearance between the front strap portion 16 and the interdigit toe piece 32. In this way, the front strap portion 16 and the interdigit toe piece may appear to be integrated as a single unit.

Referring in particular to Figures 6 to 9, the article of footwear further includes a cushion 58. The cushion 58 is integrally disposed with and extends between midsole and heel regions of the sole member 12, on an inner side 60 thereof, as shown in Figures 6 and 7.

The cushion element 58 has a midsole portion 62 integrally connected to a heel portion 64.

The midsole portion 62 comprises an arched cushion 66. The arched cushion 66 may take the form of an arch cookie. The term 'arch cookie' as used herein refers to a foam insert placed under the insole, designed to support the arch of the foot. The arch cookie may have an adhesive underside to facilitate positioning of the arch cookie on the sole member 12.

The arched cushion 66 is contoured such that, in use, an upper surface thereof supports a medial longitudinal arch of a wearer's foot. The arched cushion 66 has a first side 68 and a second side 70. The first side 68 of the arched cushion 66 extends coincidently along the inner side 60 of the midsole region of the sole member 12. The second side 70 is shaped to complement and abut the isthmus-shaped section 40 of the footbed inlay body 30.

The heel portion 64 is generally J-shaped or may otherwise curve laterally away from
the inner side 60 of the sole member 12 behind where a heel would reside when the article 10 is worn.

In this specific embodiment, a first side 74 of the heel portion 64 extends coincidently along the inner side of the heel region of the sole member 12 and a second side 76 of the heel portion 64 is shaped to complement and abut the bulbous rear portion 38 of the footbed inlay body 30 on which the wearer's heel would reside. Positioning the heel portion 64 in this way stops the foot sliding in a medial direction and thereby provides medial-varus heel support.

The heel portion 64 is also cushioned and contoured to provide the sole member 12 with a lateral camber, as shown in Figure 9. The lateral camber may be between about 4-6 degrees. The lateral camber of this specific embodiment consequently complies with principles of foot biomechanics for effective kinematic foot function.

The cushion element 58 may vary in size to fit different sized articles 10 of footwear. The sizing of the cushion element 58 may be based upon the mondopoint system for foot-shoe sizing.

The article 10 of open styled footwear and its corresponding sole member 12 may be provided with any one or all of the ergonomic components described herein, including the interdigit toe piece 32, the footbed inlay 30, and the cushion 58. It will be appreciated that such ergonomic components may be particularly beneficial in minimising lower limb musculoskeletal injury and improving comfort performance criteria, in particular for articles of open styled footwear that are worn for recreational pursuits which involve prolonged periods of walking. Particular examples of such articles include, but are not limited to, beach wear footwear, walking sandals, and casual flat-soled footwear.

Numerous variations and modifications will suggest themselves to persons skilled in the relevant art, in addition to those already described, without departing from the basic inventive concepts. All such variations and modifications are to be considered within the scope of the present invention, the nature of which is to be determined from the preceding description.

In the claims which follow, and in the preceding description, except where the context requires otherwise due to express language or necessary implication, the word
"comprise" and variations such as "comprises" or "comprising" are used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the apparatus and method as disclosed herein.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An article of open styled footwear comprising a sole member, a strap fixed relative to the sole member, and an interdigit toe piece disposed between an upper portion of the strap and the sole member, whereby the footwear is retained to a foot, at least in part, by the upper portion of the strap extending over the foot and the interdigit toe piece being disposed between the first and second toes, the interdigit toe piece comprising a body having opposing concave side surfaces configured, in use, to separate and cradle the first and second toes.

2. The article according to claim 1, wherein the toe piece body includes an aperture in an upper surface that receives a lower portion of the strap.

3. The article according to claim 2, wherein the aperture extends through the toe piece body and the lower portion of the strap is secured to the sole member underlying the toe piece.

4. The article according to claim 1 or claim 2, wherein the aperture in the toe piece body is aligned with an aperture in the sole member and the lower portion of the strap extends through the toe piece and the sole member and is retained to an underside of the sole member.

5. The article according to any one of the preceding claims, wherein the opposing concave side surfaces are anatomically contoured with respect to the first and second toes.

6. The article according to any one of the preceding claims, wherein a rear surface of the body is configured, in use, to receive an interdigit web disposed between the first and second toes.

7. The article according to any one of the preceding claims, wherein a lower surface of the toe piece is fixed to, or integrally formed with, the sole member.

8. The article according to any one of claims 1, 5 to 7, wherein the toe piece may be fixed to, or integrally formed with, the strap.
9. The article according to claim 8, wherein the toe piece is disposed between the upper and lower portions of the strap.

10. The article according to claim 9, wherein the lower portion is fixed to, or integrally formed with, the sole member.

11. The article according to claim 9 or claim 10, wherein the lower portion of the strap extends through an aperture in the sole member.

12. The article according to any one of the preceding claims, wherein the toe piece is integrally formed with an inlay which in turn forms part of the sole member.

13. The article according to claim 12, wherein the inlay provides support for the foot.

14. The article according to claim 12 or claim 13, wherein the inlay includes forward and rear bulbous portions that are generally shaped to conform with respective pressure regions of the ball and heel of the foot.

15. The article according to claim 14, wherein the footbed inlay may be formed from a cushioning material to provide additional comfort in said regions.

16. A footbed inlay for an article of open styled footwear comprising a sole member, a strap fixed relative to the sole member, whereby the footwear is retained to a foot, at least in part, by an upper portion of the strap extending over the foot, the foot bed inlay comprising a body having a forward bulbous portion interconnected with a rear bulbous portion by an isthmus-shaped section, and an interdigit toe piece upwardly extending from the forward bulbous portion, wherein in use the inlay body forms part of the sole member and the interdigit toe piece is disposed between the upper portion of the strap and the sole member and is arranged to be disposed between the first and second toes.

17. The footbed inlay according to claim 16, wherein the footbed inlay is configured to be received in a complementary shaped recess in the sole member.

18. The footbed inlay according to claim 16 or claim 17, wherein the interdigit toe piece is integrally formed with the inlay body.
19. An article of open styled footwear incorporating the footbed inlay according to any one of claims 16 to 18.

20. The article according to any one of claims 1 to 15 and 19, further comprises a cushion having a midsole portion and a heel portion disposed with and extending between respective midsole and heel regions of the sole member, wherein the midsole portion comprises an arched cushion portion contoured to support a medial longitudinal arch of the foot and the heel portion contoured to provide medial-varus heel support to the foot.

21. The article according to claim 20, wherein the arched cushion portion comprises an arch cookie.

22. The article according to claim 20 or claim 21, wherein the heel portion is laterally curved.

23. The article according to any one of claims 20 to 22, wherein the heel portion provides the sole member with an inward lateral camber in a heel region thereof.

24. The article according to claim 23, wherein the inward lateral camber may be between about 4-6 degrees.
**INTERNATIONAL SEARCH REPORT**

**International application No.**
PCT/AU2012/000746

**A. CLASSIFICATION OF SUBJECT MATTER**

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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)

**WPI, EPODOC: IPC, ECLA A43B & keywords: thong, sandal, open style, open toe, toe, strap and like terms.**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<td>Further documents are listed in the continuation of Box C</td>
<td><strong>X</strong> See patent family annex</td>
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- **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

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Date of the actual completion of the international search:

07 September 2012

Date of mailing of the international search report:

10 September 2012

**Name and mailing address of the ISA/AU**

AUSTRALIAN PATENTOFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
Email address: pct@ipaustralia.gov.au
Facsimile No.: +61 2 6283 7999

**Authorized officer**

Dr Shuiwei Xie
AUSTRALIAN PATENTOFFICE
(ISO 9001 Quality Certified Service)
Telephone No. 0262837942

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This Annex lists known 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.

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