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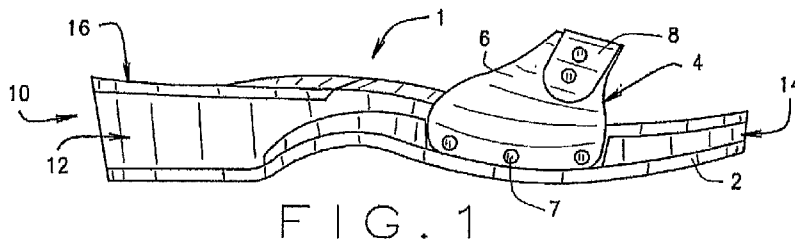
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(54) Title: COMPOSITE SOLE ASSEMBLY



(57) Abstract: A composite sole assembly for attachment to an outsole of suitable material, the sole assembly including a chassis, a forefoot pad and a heel pad. The chassis includes an opening for receiving the heel pad and further includes two peripheral flanges for securing attachment with the shoe upper. A cushioning forefoot pad is positioned between the chassis and the outsole and between the two peripheral flanges and is formed of a soft cushioned foam material. The top surface of the chassis and the heel pad define a raised area in the midfoot region and a recessed area in the heel region of the assembly to better conform to the anatomical shape of a wearer's foot. The combination of the raised and recessed areas along with the positioning of the heel and forefoot pads improves comfort and provides for a better distribution of foot pressure during a normal gait.

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COMPOSITE SOLE ASSEMBLY

BACKGROUND OF INVENTION

The present invention relates to a shoe sole construction with improved comfort and, more particularly, to a composite sole assembly for use with sandal type footwear designed to stimulate and exercise the foot during a natural walking gait.

Sandals are an open type of outdoor footwear consisting of a sole held to the wearer's foot by straps or thongs passing over the instep and generally, but not always, around the ankle. Some traditional sandals, such as clogs, are made predominantly out of wood and, as such, are inflexible in that the entire sole construction is solid and does not flex as the foot normally does during a normal gait.

Many conventional clog type sandals made of hard wood have a reputation of being popular yet uncomfortable because of their inflexibility. Further, the "exercise" associated with this type of sandal is created by encouraging the "gripping action" of the toes during toe-off which requires plantar-flexing of the toes against the wooden base. Although this "gripping action" promotes exercise of the foot, this action against an inflexible base also forces a user's instep against the forefoot strap. These actions increase foot pressure and discomfort. In addition, due to such sandals being made of wood, they are much heavier than other shoes in the market. This is exaggerated by the gripping action of the toes which causes a mid-foot strike. Thus, it is known that many users of such sandals experience foot pain when wearing these shoes immediately, and the majority of users experience such pain after as little as several hours of use.

Additionally, when the shapes of the sole don't match the plantar surface of a wearer's foot, such soles or shoe interiors have minimal arch and heel contact with the foot. Combining this with inflexible soles increases pressure during flex and toe off.

While many improvements have been made, there is still a need for an improved light weight sole construction particularly useful in sandal-type footwear with improved comfort. It is therefore desirable to provide a superior cushioned foam pad arrangement for a sandal sole assembly. It is a further object of the present invention to provide an improved anatomical footbed design for a sandal which delivers more cushioning and arch support and improves toning.

In view of the foregoing, it is an important object of the present invention to provide a composite sole assembly for a sandal type shoe including a chassis, a forefoot pad and a heel pad wherein both pads are made of a foam material so as to deliver improved cushioning and

comfort. It is a further object of the present invention to provide an exercise sandal so shaped as to automatically cause an anatomically correct positioning of the toes and foot when the sandal is worn and used. Introducing anatomical shapes to support the heel and arch areas is needed to alleviate forefoot discomfort and improve the overall comfort of the shoe.

5 Specific advantages and features of the present invention will be apparent from the attached drawings and the description of an illustrative embodiment of the present invention.

SUMMARY OF INVENTION

 A sole assembly of the present invention includes, in one embodiment, a chassis made of a somewhat rigid material that integrates with a heel pad of foam material and a forefoot
10 pad of foam material. The chassis includes two opposite posts or flanges for securing the upper, in some cases and, the outsole to the sole assembly. A heel pad is designed for the heel area to deliver improved cushioning and comfort. The heel pad is insertable into an opening in the chassis and covers the entire heel area from the center of the shank back and continues through the middle of the heel from top to bottom. A forefoot pad is positioned in
15 the forefoot area under the chassis but on top of the outsole and extends the entire width of the chassis with the exception of two posts or flanges needed to secure the upper. The forefoot pad creates a pivot point that enables natural flexing and enhances forward roll and toe off as well as reduces forefoot strap stress. An upper is attached to the sole assembly via the posts or flanges of the chassis on the medial and lateral sides. The outsole is attached to
20 the bottom of the chassis and the forefoot pad.

 The present invention is designed for incorporation into an article of footwear. Although the present invention will be described in connection with a conventional clog type sandal, it is likewise well-suited for use in essentially any sandal type footwear construction as well as other non-sandal type shoe constructions.

25 According to the present invention, there is provided a sandal-type shoe having a sole assembly on the underside of which is attached an outsole of suitable material. In one embodiment, the sole assembly includes a chassis, a forefoot pad and a heel pad that is mounted in an opening formed in the chassis. The opening in the chassis includes a rim extending around the periphery thereof and functions to create a space for the insertion of the
30 heel pad. The chassis further includes two peripheral posts or flanges, each post or flange extending toward the outsole below the bottom surface of the chassis. The chassis and the peripheral posts or flanges are molded in one piece and designed to provide secure attachment with the shoe upper. The forefoot pad includes a pair of notches or cut-outs

adapted to receive the flanges of the chassis and is shaped to conform to at least a portion of the bottom of the chassis.

The chassis, combined with heel pad and forefoot pad, form the present composite sole assembly. The heel pad includes a generally concaved top surface, a curved side wall extending downwardly from the top surface and a tapered front wall. The heel pad fits into an opening in the chassis and mates with the interior front wall of such opening. A cushioning forefoot pad is positioned between the chassis and the outsole. Thus, when a person's foot steps-down onto the sole assembly of the present invention, the forefoot and heel pads which are constructed of a low density material provide cushioning and shock absorption to the wearer's foot and the chassis which is constructed of a more rigid material supports the wearer's foot.

The top surface of the chassis combined with the top surface of the heel pad defines a raised area in the midfoot region and a recessed area located in the hind foot or heel region. The raised area is positioned to underlie the medial arch of the wearer's foot and the recessed area is positioned to underlie the heel of the wearer's foot. The recessed area is defined by the peripheral edges formed around the top surface of the heel pad from the medial side to the lateral side of the heel. The peripheral edge associated with the heel pad forms a raised portion where it wraps around the heel of a wearer's foot.

When a foot is inserted into a sandal that houses the top surface of the present sole assembly, the recessed area serves to receive and locate the heel in a substantially concaved heel area, and the raised area portion supports the medial arch of a wearer's foot so that the top surface of the sole assembly contacts substantially the entire bottom surface of a wearer's foot. The raised area portion may be associated with one or both of the chassis and heel pad. The combination of a raised area under the medial arch and a recessed area immediately under the heel improves the distribution of pressure and comfort of shoes made in accordance with the teachings of the present invention.

While wearing the composite sandal of the present invention, a micro imbalance is created during toe-off that increases the range of motion during a person's stride or normal walking gait which enhances muscle activity and increases a wearer's focus on a natural gait. The forefoot pad also creates a pivot point that promotes forward roll and natural gait.

These and other objects and advantages of the present invention will become more apparent to those skilled in the art after considering the following detailed specification taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a side elevational view of a sandal type footwear showing the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 2 is an exploded perspective view of the present sole assembly combined with an outsole showing the various components of the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 3 is an exploded side elevational view of the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 4 is a bottom plan view of the present sole assembly of FIG. 3.

FIG. 5A is a perspective view of a chassis of the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 5B is a bottom plan view of the chassis of FIG. 5A.

FIG. 5C is a top plan view of the chassis of FIG. 5A.

FIG. 6A is a perspective view of a forefoot pad of the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 6B is a side elevational view of the forefoot pad of FIG. 6A.

FIG. 7A is a perspective view of a heel pad of the present sole assembly constructed in accordance with the teachings of the present invention.

FIG. 7B is a bottom plan view of the heel pad of FIG. 7A.

FIG. 7C is a side elevational view of the heel pad of FIG. 7A.

FIG. 8 is a perspective view of another embodiment of the present chassis.

It should be understood that the present drawings are not necessarily to scale and that the present embodiments are sometimes illustrated by graphic symbols, phantom lines, diagrammatic representations and fragmentary views. In certain instances, details which are not necessary for an understanding of the present invention or which render other details difficult to perceive may have been omitted. It should also be understood that the present invention is not necessarily limited to the particular embodiments illustrated herein. Like numbers utilized throughout the various Figures designate like or similar parts or structure.

DETAILED DESCRIPTION

In the present invention, a composite sole assembly is provided to improve comfort and can be installed in any sandal type shoe. Although the present sole assembly will be disclosed in connection with a clog type sandal, those skilled in the art will recognize that the present sole assembly can be used with any sandal type shoe and with any footwear in general without departing from the spirit and scope of the present invention.

The reference numeral 1 designates generally a sandal type shoe construction as illustrated in FIG 1. The shoe 1 includes an outsole 2, a sole assembly 10 mounted onto the outsole 2 and an upper 4 attached to the sole assembly 10. The upper 4 includes overlapping inner and outer flaps or straps 6 and 8 which are each respectively secured to the sole assembly 10 by any suitable fastening means 7 including, but not limited to, screws, buttons, snaps, laces, glue, cement or other adhesives, a hook and loop fastening means, or other suitable means. Strap 8 closes and fastens to strap 6 over the forefoot to hold the shoe in place on a person's foot. The shoe upper 4 is constructed of an outer covering material such as leather, canvas, nylon mesh or other suitable material with an inner lining of fabric or soft foam material.

In the first illustrated embodiment of the present invention as best illustrated in FIGS. 2 and 3, there is shown a sole portion of a sandal-type shoe 1 which includes a sole assembly 10 on the underside of which is attached an outsole 2 of a suitable material. The sole assembly 10 is relatively thick in comparison with the outsole 2. The overall shape of the sole assembly 10 and outsole 2 is generally that of a human foot, a sole structure or sandal for a right foot being illustrated in the drawings. It will be understood, of course, that a corresponding structure would be used for the left foot. The present invention is comprised of a three-part sole assembly 10. In one embodiment, the sole assembly 10 includes a chassis 12, a forefoot pad 14 and a heel pad 16 that is mounted in an opening 18 in the chassis 12. Any other suitable layer may be provided and may be positioned between the present sole assembly 10 and the outsole 2 such as a midsole (not shown). The sole assembly 10 and the outsole 2 are secured to the upper 4 and to each other using any suitable attachment means 7 including cement, adhesives, glue, welt and direct attachment constructions.

Chassis 12 has a top surface 20 and a bottom surface 22 as best illustrated in FIGS. 5A, 5B and 5C. The top surface 20 is positioned and oriented for engagement with a foot. Since the chassis 12 is designed to support the foot and to be incorporated into conventional footwear, the chassis 12 is generally foot-shaped. The chassis 12 may, however, take on other shapes, as desired, to accommodate various alternative sole and shoe designs. The chassis 12 includes a generally smooth top surface designed to support the wearer's foot. The top surface 20 of the chassis 12, combined with the top surface 24 of the heel pad 16, is shaped to match the natural shape or silhouette of a wearer's foot, for example, by providing the top surface with a concaved area 44 and a raised arch area 42 as will be hereinafter further explained.

The chassis 12 of the illustrated embodiment further includes an opening 18 in the interior of the chassis 12, with a rim 26 extending around the periphery thereof. The opening 18 is positioned in the heel area and extends completely through the chassis 12. In another embodiment, the opening 18 may be just a recessed portion with a closed bottom portion, the recessed portion being sized and shaped to receive the heel pad 16. The opening 18 creates space for the insertion of the heel pad 16 and is bounded on one side by a sloped front wall 28 having a downwardly and rearwardly tapered surface that causes the top of the opening 18 to be wider than the bottom as best illustrated in FIGS. 5A and 5C.

The chassis 12 further includes a pair of peripheral posts or flanges 30 and 32, each flange extending downwardly towards the outsole 2 and below the bottom surface of the chassis 12. The chassis 12 and the peripheral flanges 30 and 32 are molded in one piece and the flanges 30 and 32 are designed to provide a structure for attaching the shoe upper 4 to the sole assembly 10 as illustrated in FIG. 1. In the present invention, the chassis 12 could be made from a variety of materials including, but not limited to, wood, a rigid polymer such as BPU, TPR, ABS, PCU and PU, or a foam material such as ethyl vinyl acetate (EVA), polyurethane (PU), blended co-polymers and blown rubber. The chassis 12 is preferably made from a material having a durometer hardness in the range of about 30-100 on the Shore A scale.

In one embodiment, the chassis 12 is disposed along the entire length of the sole assembly 10. The chassis 12 may be tapered in thickness toward the forefoot area as best illustrated in FIGS. 3 and 5A, the depth or thickness varying from front to rear due to the anatomical shape. It will be apparent to one of ordinary skill in the art that chassis 12 may be altered in length, depth and shape without impairing the teachings and practice of the present invention.

Heel pad 16 includes a generally concaved top surface 24, a curved side wall 34 extending downwardly from the top surface 24 to a bottom surface 35, and a tapered front wall 36 as best illustrated in FIGS. 3 and 7A – 7C. As shown in FIGS. 2-4, the heel pad 16 mates with and is receivable into the opening 18 in the chassis 12, the heel pad 16 having a downwardly and rearwardly tapering front wall 36 (FIG. 3) that mates and cooperates with the interior front wall 28 of the opening 18 (FIGS. 5A and 5C). Heel pad 18 may fully extend into and fill opening 18 of chassis 12 when received therein, or heel pad 18 may extend less than fully into opening 18 thereby leaving a gap or space underneath the bottom surface 35 of heel pad 16 when the heel pad 16 is received within opening 18. The heel pad 16 can be deformed or bent sufficiently if necessary so that the pad 16 fits inside the tapered

opening 18. In another embodiment, the heel pad 16 includes a flange 38 extending around the periphery of its top surface 24 for engaging the rim 26 of the chassis 12. This engagement further prevents the heel pad 16 from slipping out of the opening 18.

5 Heel pad 16 is generally constructed of a material that is less dense than that used for the outsole 2 such as a soft cushioned foam material. Examples of materials appropriate for the heel pad 16 include ethyl vinyl acetate (EVA), polyurethane (PU), thermoplastic elastomer (TPE), latex and other specialty elastomers. The heel pad 16 is preferably made from material having a durometer hardness in the range of about 15-60 on the Asker C scale.

10 In the shoe construction 1 of FIGS. 1 and 2, a cushioning forefoot pad 14 made of a foam material is positioned between the chassis 12 and the outsole 2. The forefoot pad 14 provides structure to the sole assembly 10 as well as additional padding between a wearer's foot and the ground. The forefoot pad 14 generally lies on the top of the outsole 2 and preferably terminates adjacent the front end portion 39 of the heel area of the chassis 12 as best seen in FIG. 3. The depth or thickness of the forefoot pad 14 varies from the rear to the
15 front edge portion 40 and the front edge portion 40 may likewise be tapered as illustrated in FIGS. 3, 6A and 6B. The rear edge portion 41 may also be tapered as illustrated. In another embodiment, the forefoot pad 14 may extend from the heel to the toe area (not shown).

Forefoot pad 14 is generally constructed of a material that is less dense than that used for the outsole 2 such as a soft cushioned foam material so that the thickness of sole assembly
20 may be increased to provide a cushioning effect while keeping the overall weight down. Examples of materials appropriate for the forefoot pad 14 include ethyl vinyl acetate (EVA), polyurethane (PU), thermoplastic elastomer (TPE), latex and other specialty elastomers. The pad 14 is preferably made from material having a durometer hardness in the range of about 15-60 on the Asker C scale. The forefoot pad 14 is positioned under the chassis 12 and on
25 top of the outsole 2 along the entire width of the chassis 12 except for the flanges 30 and 32. In this regard, the forefoot pad 14 includes a pair of notches or cut-outs 46 and 48 for receiving the flanges 30 and 32 on the medial and lateral sides of the chassis 12 as best illustrated in FIGS. 2-4. The length of the forefoot pad 14 will depend upon the desired location of cushioning. The forefoot pad 14 is generally shaped to conform to the shape of
30 the bottom surface of the chasses 12.

Thus, when a person's foot steps-down onto the sole assembly 10 of the present invention, the forefoot and heel pads 14 and 16 containing the low density material provides cushioning and shock absorption to the foot during a person's normal walking gait. The forefoot pad 14 helps to relieve pressure between a person's toes and the straps 6 and 8 and it

also provides a gripping action during toe-off. It likewise provides flexibility to the overall forefoot assembly which likewise promotes a more comfortable gripping action during toe-off.

5 It is noted that the forefoot and heel pads 14 and 16 can be affixed to the chassis 12 in a wide variety of different ways. In one embodiment, the pads 14 and 16 made of a low density material and the chassis 12 made of a high density material can be affixed to each other by cementing, insert molding, or heat sealing.

10 An outsole 2 is provided and positioned on the underside of the sole assembly 10 and includes a bottom surface for engagement with a walking surface such as the ground. The outsole 2 may be constructed of any suitable material such as rubber, polyurethane, a foam material such as EVA, or TPR having the preferred resiliency and abrasion resistance, depending upon the type of shoe desired. The outsole 2 is intended to provide traction as the ground-engaging surface of shoe 1 and it is preferably made from a material having a durometer hardness in the range of about 30-100 on the Shore A scale. The outsole 2 can be
15 of conventional thickness. In the embodiment shown in FIGS. 1 and 2, the outsole 2 covers the entire lower-most surface of sole assembly 10. It will be apparent to one skilled in the art that outsole 2 may cover only portions of sole assembly 10.

The top surface 20 of chassis 12 combined with the top surface 24 of the heel pad 16 define a raised area 42 in the midfoot region and a recessed area 44 located in the hind foot or heel region of the sole assembly 10 as best illustrated in FIGS. 2, 3, 5A, 5C, 7A and 7C. The raised area 42 is positioned to underlie the medial arch of a wearer's foot and the recessed area 44 is positioned to underlie the heel of wearer's foot. The raised area 42 gradually rises to an apex 50 (FIGS. 3, 5A and 5C) positioned to underlie the medial arch of a wearer's foot. A foot of the user rests directly upon the top surface of the sole assembly 10. In alternative
20 25 embodiments, the raised area 42 may be associated solely with the chassis 12.

It is also recognized and anticipated that the chassis 12 can also be formed as a plurality of attachable members which is then integrated with the forefoot pad 14 and heel pad 16 as previously explained. In this regard, FIG. 8 illustrates one embodiment of the present chassis 12' wherein the chassis 12' is comprised of two members, namely, a forefoot portion 52 and heel portion 54. The heel portion 54 includes two tapered flanges 56 and 58 extending horizontally from the heel portion 54 toward the forefoot portion 52. Each distal end 60 and 62 of the flanges 56 and 58 are attached to the top surface 20' of the forefoot portion 52. The bottom surface of the flanges 56 and 58 are attached to the forefoot portion 52 adjacent the side edges of the sloped front wall 28' as illustrated in FIG. 8. However,

those skilled in the art will recognize that the present chassis 12' can be divided and attached at any suitable location along the length thereof without departing from the spirit and scope of the present invention. The forefoot portion 52 and the heel portion 54 are secured to each other using any suitable attachment means including, but not limited to, cement, adhesives, glue, welt and direct attachment constructions. It is noted that the forefoot portion 52 and heel portion 54 can be made of different materials to enhance comfort. The multi-piece construction of the chassis 12' likewise is easy and inexpensive to manufacture and is more readily adaptable to fit different types of shoe constructions.

The components of the sole assembly 10 are preferably secured together via conventional means such as by cementing or adhesives and are provided as an integral unit during assembly of the shoe 1. Joining the components 12 or 12', 14 and 16 together prevents relative movement therebetween during assembly and use of the shoe 1. In a further embodiment, a lining (not shown) may be provided and may overlay the top surface of the sole assembly. The lining may be a fabric, coated fabric, leather or other suitable material. The lining may be secured to the sole assembly 10 with a suitable cement.

It should be understood, however, that the boundaries between the forefoot, midfoot and heel regions or areas described above are not precise and that these terms should be interpreted loosely and with a great deal of flexibility.

Further, the overall dimensions of the present sole assembly 10 as well as the specific shape and configuration of the various components thereof are also subject to wide variations and may be sized and shaped into a wide variety of different sizes and configurations so as to be compatible with the size and shape of the particular footwear onto which the present structures may be mounted, or to conform with any space limitations associated therewith without impairing the teachings and practice of the present invention. It is also understood that various modifications may be made to all of the various embodiments without departing from the spirit and scope of the present invention.

In use, the sole assembly 10 is associated with or located within a shoe 1 with its heel end at the back of the shoe so that the recessed area 44 underlies substantially the heel of a wearer such that the recessed area 44 receives and the heel pad 16 supports and wraps around a substantial portion of the heel of a wearer. From there, the sole assembly 10 extends forwardly to the toe area with the raised area 42 or 42' lying under substantially the medial arch area of a wearer's foot. The raised area 42 or 42' tapers toward the toe end of the chassis 12 or 12'. Thus, when a wearer's foot is inserted into a shoe 1, the recessed area 44 serves to locate the heel on a substantially concave surface. The raised area 42 or 42' positions and

supports the medial arch of the foot so that the top surface of the sole assembly 10 contacts substantially the entire bottom surface of the foot. The combination of a raised area 42 or 42' under the medial arch and recessed area 44 immediately under the heel along with the positioning and location of the forefoot and heel pads 14 and 16 improves the comfort of shoes made in accordance with the present invention, and such a construction introduces a more natural anatomical shape to support the heel and arch areas of a person's foot. This construction further provides a better distribution of foot pressure and reflects a more natural shape of the foot. It also provides an improved foundation to support the foot and to alleviate forefoot discomfort.

10 Thus, there has been shown and described several embodiments of a composite sole assembly. As is evident from the foregoing description, certain aspects of the present invention are not limited by the particular details of the examples illustrated herein, and it is therefore contemplated that other modifications and applications, or equivalents thereof, will occur to those skilled in the art. The terms “having” and “including” and similar terms as
15 used in the foregoing specification are used in the sense of “optional” or “may include” and not as “required”. Many changes, modifications, variations and other uses and applications of the present invention will, however, become apparent to those skilled in the art after considering the specification and the accompanying drawings. All such changes, modifications, variations and other uses and applications which do not depart from the spirit
20 and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

CLAIMS

What is claimed is:

1. A sole assembly for use in a shoe having an upper and an outsole, the sole assembly comprising:
 - 5 a chassis extending from a heel region to a toe region, the chassis including an opening;
a heel pad insertably receivable into the opening in said chassis, the heel pad being positioned to underlie at least an area of a wearer's heel, said heel pad being made of a foam type material;
 - 10 a forefoot pad positioned in underlying relation to a bottom surface of said chassis, said forefoot pad being made of a foam type material.
2. The sole assembly of claim 1 wherein said chassis further includes two flanges, each flange extending toward an outsole located below a bottom surface of said chassis, said
15 forefoot pad being positionable between said flanges.
3. The sole assembly of claim 2 wherein a shoe upper is attachable to said two flanges.
4. The sole assembly of claim 1 wherein said heel pad has a top surface that forms a
20 recessed portion for receiving a wearer's heel.
5. The sole assembly of claim 1 wherein said chassis has a top surface forming at least a portion of a raised area which gradually rises to an apex positioned to underlie a medial arch of a wearer's foot.
25
6. The sole assembly of claim 1 wherein said heel pad has a durometer hardness in the range of about 15-60 Asker C.
7. The sole assembly of claim 1 wherein said forefoot pad has a durometer hardness in
30 the range of about 15-60 Asker C.
8. The sole assembly of claim 1 wherein said heel pad and said forefoot pad are made of the same foam type material.

9. The sole assembly of claim 1 wherein said chassis has a durometer hardness in the range of about 30-100 Shore A.

10. The sole assembly of claim 1 wherein said chassis is made of a rigid material.

5

11. The sole assembly of claim 1 wherein said shoe is a sandal.

12. The sole assembly of claim 1 wherein said chassis is comprised of a forefoot portion and heel portion wherein the forefoot portion is attached to the heel portion.

10

13. The sole assembly of claim 1 wherein the heel pad extends less than fully into the opening of the chassis when the heel pad is received within the chassis opening.

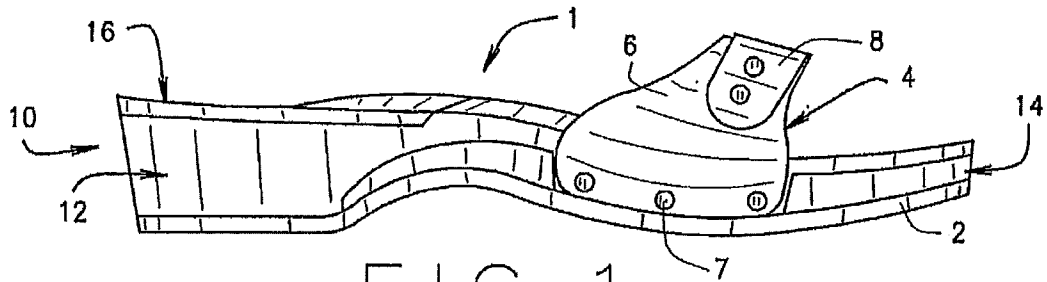


FIG. 1

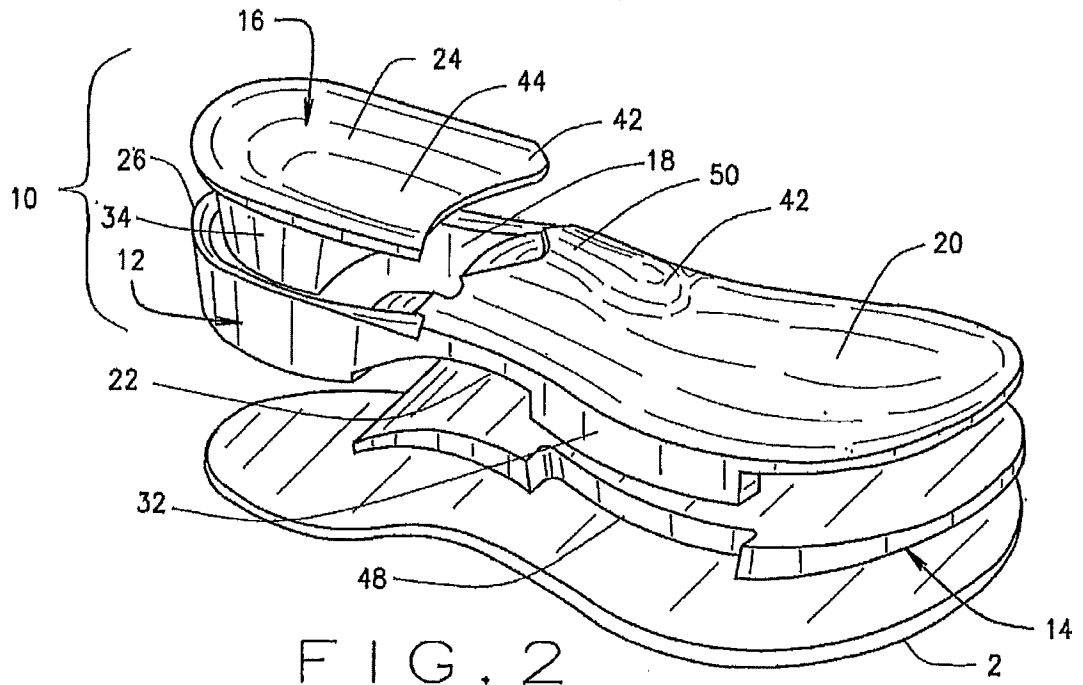


FIG. 2

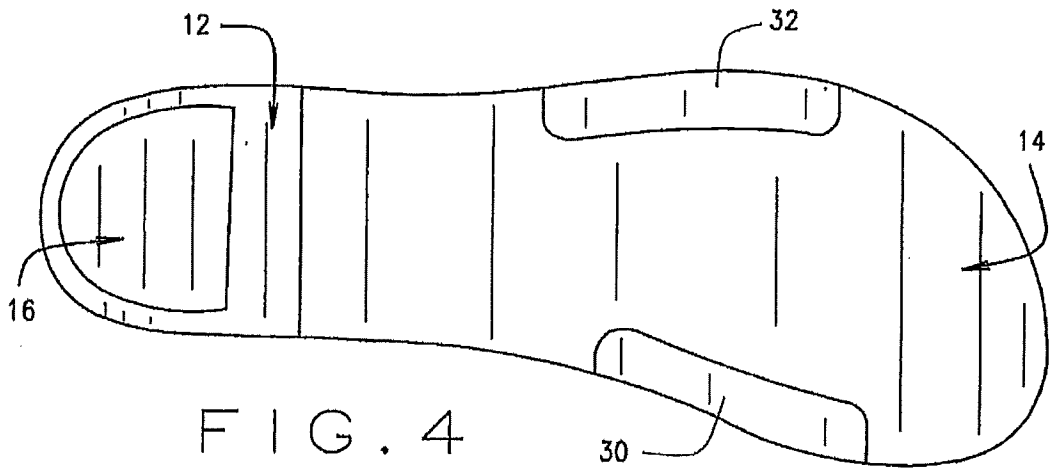


FIG. 4

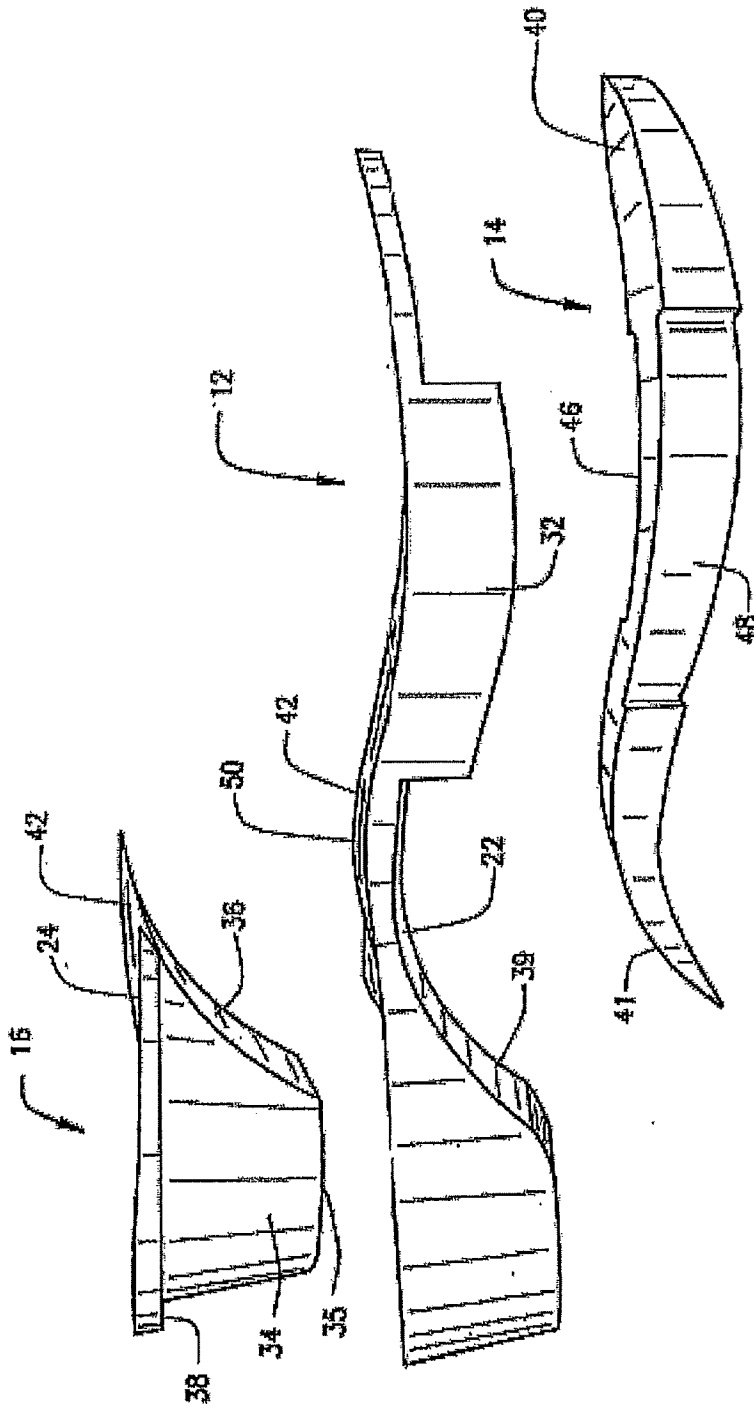


FIG. 3

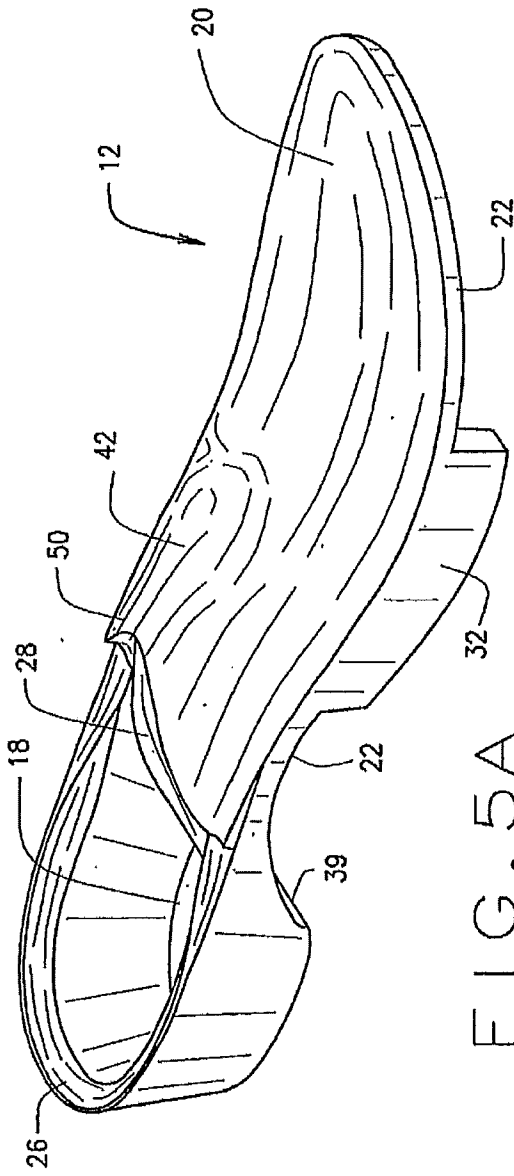


FIG. 5A

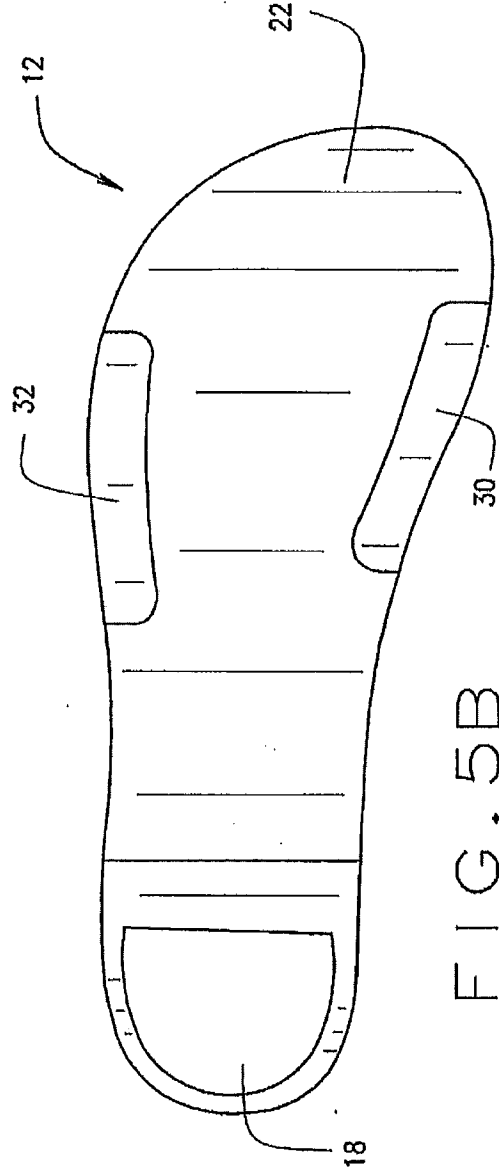


FIG. 5B

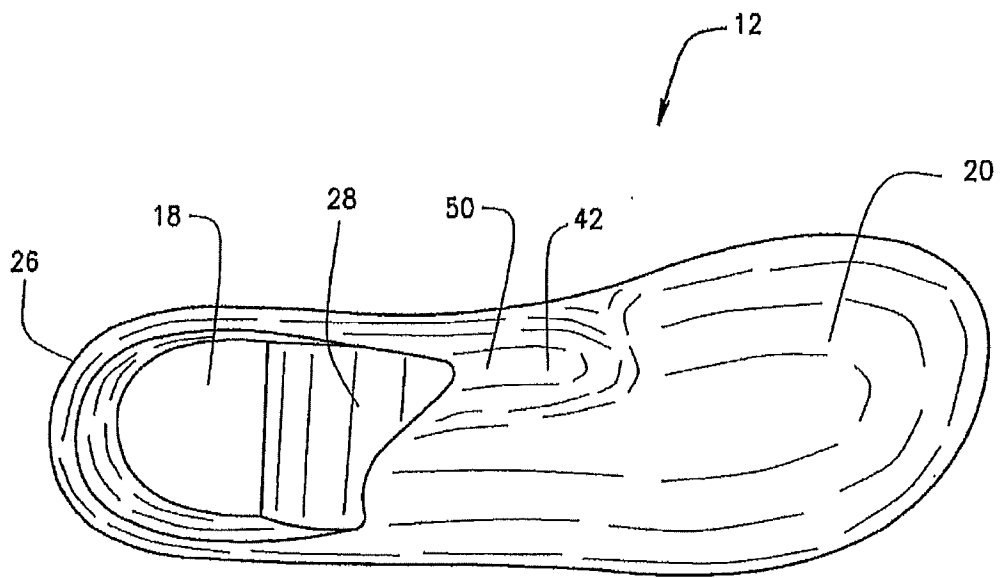


FIG. 5C

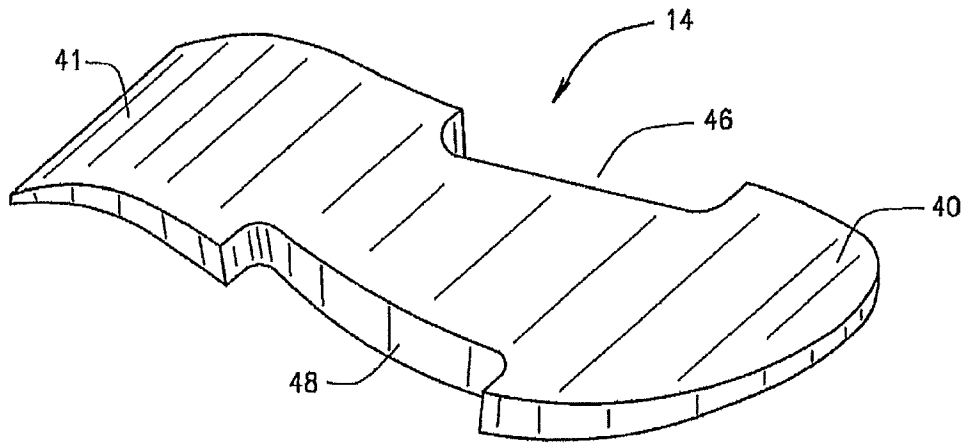


FIG. 6A

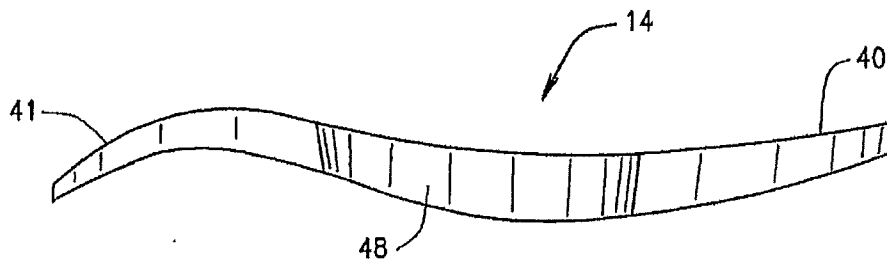


FIG. 6B

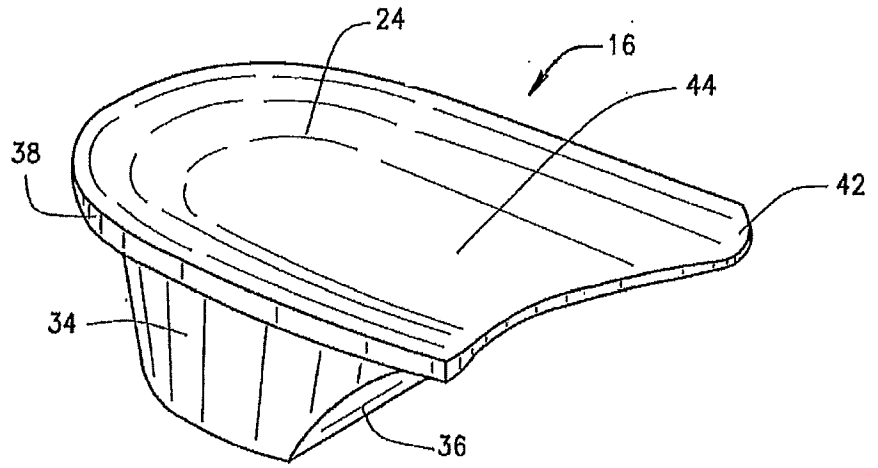


FIG. 7A

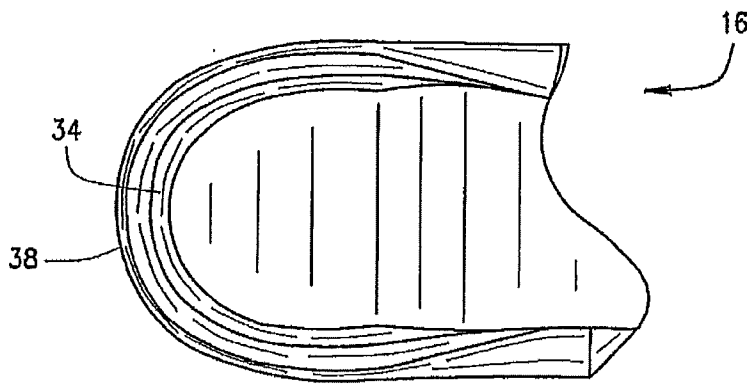


FIG. 7B

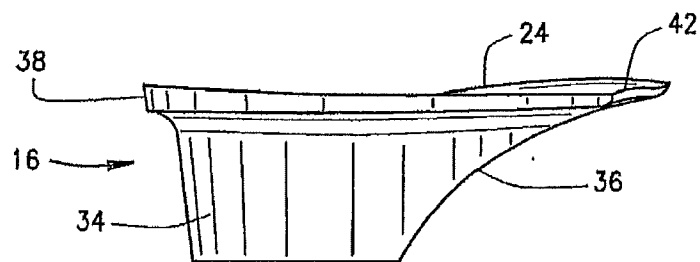


FIG. 7C

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 11/46161

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A43B 13/14 (2011.01)

USPC - 36/30R

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)
USPC -36/30R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 36/83, 103, 104, 12, 22A, 22R, 25A, 25R, 31

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (PGPB,USPT,EPAB,JPAB,DWPI); Google
flange sole (mid outer upper Shore A Asker C hardness durometer heel pad laminated foam recess cup frame chassis upper rigid forefoot peripheral flange post sandal shoe core padded cushion composite

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-------------|--|--|
| X — Y | US 2007/0039209 A1 (White et al.) 22 February 2007 (22.02.2007) (Abstract; para [0058], [0061], [0067]-[0068], [0071] -[0074]; Fig 1, 4, 6a, 6b, 7, 9a, 9b, 10a, and 10b) | 1-2, 5, 8, and 12 ----- 3-4, 6-7, 9-11, 13 |
| Y | US 7,107,707 B2 (Schenone) 19 September 2006 (19.09.2006) (Col. 3, ln 8-15; Col. 6, ln 58-60; Col. 7, ln 51-52; Fig 1, 5b, and 7) | 3 and 11 |
| Y | US 6,041,524 A (Brooks) 28 March 2000 (28.03.2000) (Abstract; Fig 4 and 6) | 4 |
| Y | US 6,082,023 A (Dalton) 04 July 2000 (04.07.2000) (Col. 3, ln 37-48; Fig. 1) | 6-7 |
| Y | US 2008/0168684 A1 (Khalifa) 17 July 2008 (17.07.2008) (para[0075]; Fig. 7) | 9-10 |
| Y | US 7,152,341 B2 (Dean) 26 December 2006 (26.12.2006) (Col 4. ln 1- 5; Fig. 3) | 13 |

Further documents are listed in the continuation of Box C.

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"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

"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
"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
"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
"&" document member of the same patent family

Date of the actual completion of the international search
27 December 2011 (27.12.2011)

Date of mailing of the international search report
10 JAN 2012

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