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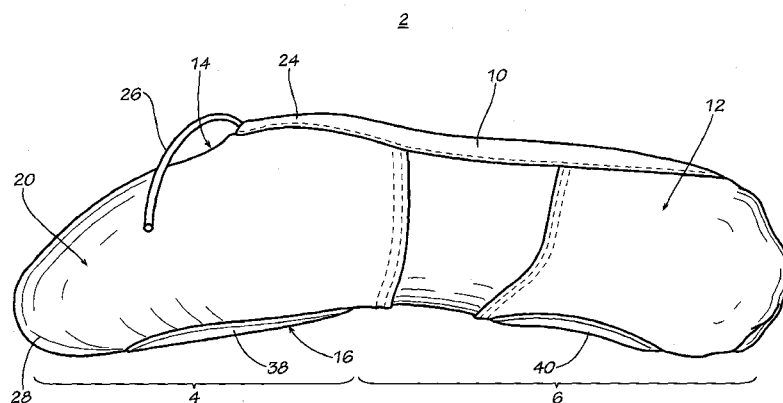


FIG. 3

(57) Abstract: The inventive subject matter is generally directed to dance shoes that include a distal portion for receiving at least a portion of a forefoot of a wearer. The distal portion includes a rigid structure for supporting the foot, such as a toe box for an en pointe dance shoe. A proximal portion extends from the distal portion and it is configured for receiving the midfoot and rearfoot portions of the foot. The shoe is constructed so as to conform to the shape of the foot through a range of foot flexations that vary the distance of the toes to the heel, particularly the flexations that occur when dancing en pointe. According to certain embodiments of the inventive subject matter, this is achieved in whole or part by configuring the proximal portion to be elastically, longitudinally extendible relative to the distal portion and/or configuring the shoe's foot-receiving compartment with a shape that generally mimics the foot in a shape corresponding to plantar flexation, for example, a shape mimicking a foot en pointe.



DANCE SHOE

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BACKGROUND

The inventive subject matter is generally directed to a dance shoe that includes a distal portion for receiving at least a portion of a forefoot of a wearer. The distal portion includes a rigid structure for supporting the foot, such as a toe box for an en
10 pointe dance shoe. A proximal portion extends from the distal portion and it is configured for receiving the midfoot and rearfoot portions of the foot. The shoe is constructed so as to conform to the shape of the foot through a range of foot flexations that vary the distance of the toes to the heel, particularly the flexations that occur when dancing en pointe. According to certain embodiments of the inventive subject
15 matter, this is achieved in whole or part by configuring the proximal portion to be elastically, longitudinally extendible relative to the distal portion and/or configuring the shoe's foot receiving compartment with a shape that mimics the foot en pointe.

Ballet dancers use specifically designed pointe shoes to assist the dancer to stand on the tips of their toes, referred to as dancing "en pointe." The pointe shoe
20 typically provides support to the dancer's foot through (1) a toe box, which is a rigid structure encasing the front of toes and some or all of the rest of the forefoot, and (2) a shank, which extends longitudinally therefrom. The toe box generally hugs the foot across the metatarsal so that the sides of the dancer's foot are held in place. The shank is an elongate, rigid element that is structurally coupled (e.g., as a separately attached
25 or as an integrated piece) to the toe box and extends rearwardly from the toe box, typically at least across the midfoot region to the rearfoot region of the shoe, in the bottom, foot-supporting portion of the shoe.

When dancing en pointe, the shank and toe box help support the foot and help distribute the dancer's weight across a broader area foot instead of the weight being concentrated in the toes. To effectively spread the weight, however, the shoe should fit tightly to the dancer's foot.

5 One of the problems with traditional pointe shoes is that the dimensions of a foot change, depending on the position, i.e., how extended or contracted the dancer's foot is during dance moves. For example, when the foot is flat on the ground, the foot is at its most elongate form (see FIG. 1), generally filling up a properly sized dance shoe. The dance shoe fits smoothly around the foot in the length as well as in the
10 width of the foot, and there is no extra space in the rearfoot portion of the dance shoe. However, the foot en pointe takes on a more arcuate shape, shortening the distance between the tips of the toes and the heel, and the shoe does not fit tightly anymore. Therefore, conventional dance shoes when placed in the en pointe position become baggy and creased in the midfoot to rearfoot portions (see FIG. 2).

15 The aesthetic of the foot in ballet, modern dance and other dance forms is of the utmost importance. Unfortunately, until the inventive subject matter described herein, there has not been an adequate solution that provides a properly supportive shoe, which maintains a smooth and uncreased look, naturally following the foot through a range of foot flexations.

20 Another common problem with traditional pointe shoes is that they are often too rigid in the midfoot portion of the dance shoe. Thus, the dancer needs to break-in a shoe to obtain a desired flexibility. Breaking-in a dance shoe typically consists of bending the hard shank sufficiently to create a platform for the heel and sometimes softening the toe box slightly to allow the shoe to bend in demi-pointe. Because of

such manipulations, the toe box and/or shank of a pointe shoe may become weakened and vulnerable to degradation, making the shoe less supportive with use.

One attempt at making a more flexible pointe shoe is described in US Patent No. 6,895,693, which describes a “split-sole” shoe, i.e., a shoe without outsole material in the midfoot. (The ‘693 patent is incorporated herein by reference in its entirety for all purposes.) While this patent may describe an advance in pointe shoe flexibility, the shoe still has the undesirable bagging and creasing when the shoe is placed in the en pointe position.

Accordingly, there is a need for a pointe shoe and other dance shoes that support the foot, while conforming to the foot through a range of foot flexations, including those that correspond to the en pointe position. There is also a need for en pointe and similar shoes that provide more flexibility, eliminating or reducing the need for the wearer to manipulate the toe box or shank to achieve a desired fit.

SUMMARY

The inventive subject matter is generally directed to dance shoes that include a distal portion for receiving at least a portion of a forefoot of a wearer. The distal portion includes a rigid structure for supporting the foot, such as a toe box for an en pointe dance shoe. A proximal portion extends from the distal portion and it is configured for receiving the midfoot and rearfoot portions of the foot. The shoe is constructed so as to conform to the shape of the foot through a range of foot flexations that vary the distance of the toes to the heel, particularly the flexations that occur when dancing en pointe. According to certain embodiments of the inventive subject matter, this is achieved in whole or part by configuring the proximal portion to be elastically, longitudinally extendible relative to the distal portion and/or configuring

the shoe's foot-receiving compartment with a shape that generally mimics the foot when substantially en pointe.

In certain embodiments, having a proximal portion elastically coupled to a distal portion and a shank that extends from the distal portion into the proximal portion, the stretch of the proximal portion allows the shank stay against the dancer's foot while en pointe and other positions, advantageously allowing for easier entry into the en pointe positions, improved weight relief when en pointe, and easier and more aesthetic tendu.

These and other embodiments are described in more detail in the following detailed descriptions and the figures.

The foregoing is not intended to be an exhaustive list of embodiments and features of the inventive subject matter. Persons skilled in the art are capable of appreciating other embodiments and features from the following detailed description in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The following figures show embodiments according to the inventive subject matter, unless noted as showing prior art. The figures presented are for illustrative and explanatory purposes and are not necessarily in scale.

FIG. 1 shows a pointe shoe according to the prior art with the wearer in a flat standing position.

FIG. 2 shows a pointe shoe according to the prior art with the wearer in en pointe.

FIG.3 shows a side view of a dance shoe, in this case a pointe shoe, according to one possible embodiment of the inventive subject matter.

FIG. 4 shows the opposite side of the shoe of FIG.3

FIG. 5 shows a bottom view of the shoe of FIG. 3.

FIG. 6 shows a longitudinally cross section of a shoe according to another embodiment of the inventive subject matter.

FIG. 7 shows a foot en pointe and wearing an en pointe shoe like the one in
5 FIG. 3.

FIG. 8 shows the shoe of FIG. 7 with the foot in a flat, regular weight-bearing position.

FIG. 9 shows an example of a side profile of a last for forming a shoe according to the inventive subject matter.

10 FIG. 10 shows a partial view of the inside of a foot-receiving compartment of a shoe, with a retaining element for slideably receiving a shank in the compartment.

Fig. 11 is an anatomical mapping of the foot.

DETAILED DESCRIPTION

15 Representative embodiments according to the inventive subject matter are shown in FIGS. 3-8 and 9, wherein the same or generally similar features share common reference numerals.

The inventive subject matter is directed to dance shoes and assemblies therefor that provide a foot conforming fit and an aesthetically pleasing foot line through a
20 range of plantar foot flexations, particularly from through the “en pointe” position to regular weight-bearing positions of the foot. In some embodiments, the foregoing objectives are achieved via a shoe that has at least some elasticity in a portion ranging from the midfoot to rearfoot regions so that the portion of the shoe that is rearward (proximal) the toe box or other forefoot structure, can follow the foot through a range
25 of plantar flexations along the longitudinal axis of the foot, i.e.,

contractions/extensions of the foot that vary the curvature of the arch the foot. In other words, the toe box or other structure encasing the forefoot is elastically coupled to the remaining proximal portion of the shoe at one or more points from proximal the toe box or other forefoot structure and up to the heel. (“As used herein, “heel” refers
5 to the very end of the rearfoot portion of the foot.) In certain embodiments, this is achieved in whole or part via a split-sole shoe, as described in more detail below.

In other embodiments, the inventive subject matter is directed to a shoe or foot compartment for a shoe that is configured to correspond to a foot in plantar flexation. As used herein, a “plantar foot flexation” is the downward movement of
10 the foot and toes which increases the approximate 90 degree angle between the front part of the foot and the shin, thereby changing the curvature of the arch of the foot between the tips of the toes and heel of a foot so that the distance between the tips of the toes and heel decreases with increased plantar flexation. In this application, a plantar flexation of the foot may also occur if just the toes are flexed downwardly so
15 that the angle between the toes and shins is increased to more than the approximate neutral angle of 90 degrees, thereby changing the curvature of the arch of the foot between the tips of the toes and heel of a foot so that the distance between the tips of the toes and heel decreases with increased plantar flexation.

For example, the plantar flexation may be the en pointe shape of the intended
20 foot, i.e., the foot size(s) the shoe is intended to fit. Such a shoe conforms to the intended foot without creases or bagginess.

In other embodiments, the inventive subject matter is directed to a last corresponding to a foot in plantar flexation, e.g., a shape that corresponds to or mimics the en pointe position of the foot. A shoe made with the last will conform to
25 the intended foot with essentially no creasing or bagginess or substantially less

creasing or bagginess than that of the prior art, such as seen in FIG. 2, for instance.

In other embodiments, the inventive subject matter is directed to (1) a split-sole shoe wherein the toe box or other forefoot structure is elastically coupled to the remaining proximal portion of the shoe at a point between the proximal end of the toe
5 box or other structure encasing the forefoot and the heel of the shoe; and (2) the shoe is configured to correspond to the shape of the intended foot in the en pointe position.

The inventive subject matter is further directed to methods for making any of the foregoing dance shoes, and to lasts used for making the shoes.

These and other embodiments are described in more detail below.

10 As used herein, the “en pointe position” refers to the well-known dance position wherein there is complete or substantially complete plantar flexation of the foot and flexation of the ankle, as generally seen in Fig. 7, for example. These positions and any other substantial plantar flexation of the foot, which is reminiscent of en pointe, may be referred to herein as “mimicking” the en pointe position. As
15 seen in Fig. 7, in the en pointe position, a proximal portion 6 pivots relative to distal portion 4, creating a pronounced curvature through at least the arch in midfoot region of the foot. In the en pointe position, the toes are generally aligned relative to the longitudinal axis of the foot. In this position, the dancer’s weight is generally supported on the tips of the toes. When dancers dance on the tips of the toes in pointe
20 shoes, the foot is generally shorter than in other weight-bearing positions or non-weight bearing positions due to the arching of the foot. In conventional pointe shoes, for example, as shown in FIGS. 1-2, the shortening of the foot causes the shoe upper to bag and crease, as generally indicated in the area designated by the arrow A in FIGS. 1-2. By comparison, dance shoes according to certain embodiments of the
25 inventive subject matter resiliently adjust to the difference in length because of the

longitudinal adjustable properties of the foot-receiving compartment.

Compared with prior art shoes, dance shoes according to the inventive subject matter provide a better general appearance and better looking curved line on the foot through a range of dance moves.

5 As used herein, “regular weight-bearing positions” may refer to any position of the dancer wherein the dancer’s body weight is not generally supported on the tips of the toes.

Fig. 11 is an anatomical mapping of the foot. The “forefoot” includes the toes and metatarsals and it provides the ground contact area of the ball of the foot. It
10 consists of most of the bony architecture of the foot including phalanges to the toes, five metatarsal bones and the two sesamoid bones of the big toe joint. The “midfoot” is the intersection between the forefoot and rearfoot. Its anatomic location is at the peak or highest part of the arch and has important joints connecting it to the forefoot and the rearfoot region. It consists of five bones including three cuneiform bones, and
15 the navicular and cuboid bones. The “rearfoot” connects to the midfoot and to the ankle and provides the ground contact area of the heel region of the foot. It consists of the bony architecture of the calcaneus and talus.

Accordingly, in the inventive shoes, the “forefoot region” (or “forefoot portion”) of the compartment refers generally to a portion of the compartment
20 receiving the toes as well as the the metatarsals of the foot of a wearer. The “midfoot region” (or “midfoot portion”) of the compartment refers generally to a portion of the compartment receiving the arch of the foot of a wearer. The “rearfoot region” (or “rearfoot portion”) of the compartment refers generally to a portion of the compartment receiving the heel of the wearer.

25 As used herein, the terms proximal, distal, upper, bottom, front, rear etc. refer

to parts of a shoe worn by a dancer who is standing upright and with the feet flat.

In some embodiments, the inventive subject matter is directed to a dance shoe having a foot-receiving compartment 12 that is formed of a distal portion 4 and a proximal portion 6, as shown in FIGS. 3-6. Distal portion 4 of foot-receiving compartment 12 generally corresponds to the forefoot region of a foot, and it is configured to receive at least a portion of a forefoot of a wearer. Proximal portion 6 of foot-receiving compartment 12 generally corresponds to the midfoot through rearfoot regions of a foot and is coupled (i.e., it is attached as a separate piece or as an integrated piece) to distal portion 4, and it is configured for receiving at least a rear foot portion of the foot. The foot-receiving compartment 12 generally attaches to a sole unit disposed on the bottom side 16 of the shoe. The sole unit comprises an outsole and optionally a midsole 41. The sole unit can be selected and configured to provide any number of attributes, including traction or lack of traction (e.g., a smooth surface for spin moves), protection, and/or force dissipation or force return. A sole unit may be fashioned to have multiple attributes in a given zone of the foot. Similarly, a sole unit may be fashioned to have multiple zones, each with a unique set of attributes.

The foot-receiving compartment 12 generally comprises a shoe upper 14 that attaches to a sole unit, e.g., a full length sole unit or a partial sole unit, e.g., just forefoot and rearfoot sole units 38 and 40. The length separating furthest points between the toes and heel is L . The upper may be a full or partial encasing for the foot. For example, it may have portions that encase the sides and top of the foot and connect to a sole unit that forms a bottom portion 16 of the shoe. Or, it may include a bottom portion connected to the side portions, creating a sock-like structure, for fully encasing the foot, as shown in FIGS. 3-5, for instance, with the bottom portion

connecting directly or indirectly to a sole unit such as an outsole 40 or an assembly of a midsole 41 and outsole 40, as seen in FIG 6. In certain applications, the non-toe box part of the foot compartment, i.e., the midfoot and rearfoot portions, will be constructed of one or more thin, flexible plies of materials that can conform to the foot similar to the way a sock does. By comparison, for example, most athletic or work shoes have relatively non-conforming rubber or other molded-polymer outsoles and midsoles in the midfoot and rearfoot portions that prevent a sock-like fit. And their uppers may include non-compliant portions such as natural and synthetic leathers, molded plastic sections, or plies of material that while flexible are not very compliant.

In pointe shoes, the distal portion 4 includes a toe box or other rigid compartmental portion 20 that provides support for a dancer to stand en pointe. The construction of such toe boxes is well-known in the art. For example, see US Patent No. 6,895,693 and US Patent No. 7,765,718, which is incorporated herein by reference in its entirety for all purposes.

In certain embodiments, proximal portion 6 may include an elastically extendible portion 10, which is generally distal portion 4 and the end of proximal portion 6. In the embodiment shown, the distal portion 4 generally corresponds to the forefoot region of the foot, and proximal portion 4 corresponds to the midfoot and rearfoot regions of the foot.

In the embodiments of FIGS. 3-5, the elastically extendible portion 10 is disposed substantially in the midfoot portion (corresponding to brackets 10) of proximal portion 6 of the shoe. It may comprise a section of elastic material or materials that extend around at least the sides and bottom of the foot. Elastically extendible portion 10 should be of sufficient elasticity to conform to the shape of the

foot through a range of movements. In pointe shoes, elastically extendible portion 10 allows the foot-receiving compartment 12 of dance shoe 2 to stretch when the foot and is in regular, weight-bearing positions and to hug the foot in the en pointe position, as indicated in FIGS. 7-8. Accordingly, it can be appreciated that in select
5 embodiments, the inventive subject matter contemplates a rigid or relatively inelastic distal portion 4 for the forefoot, which is coupled to a relatively elastic midfoot portion 10, which in turn is coupled to a rearfoot portion of proximal portion 6, which may or may not be elastic relative to the midfoot portion.

In other embodiments, elastically extendible portion 10 may correspond to the
10 entire midfoot and proximal portion or any one or more segments along those portions. It may be made of satin stretch, canvas stretch, or stretch leather. An example of a compartment 12 with a proximal portion 6 made substantially entirely of a stretch material is shown in FIGS. 7-8. Also, the foot-receiving compartment may be made in whole or part of a single-ply of thin, flexible material (except possibly for
15 the toe box structure, a thin comfort lining and/or an optional insole). In other embodiments, the foot-receiving compartment may be made of multiple plies of material, or a combination of single-ply and multi-ply materials.

In some embodiments of the inventive subject matter, compartment 12 includes an upper 14, a bottom portion 16, a toe box 20, and a shank 15. An example
20 of a shank 15 is shown in FIG. 6. Shoe 2 may further include a front sole 38 secured to bottom portion 16 of compartment 12 in the forefoot (distal) region 4 and a heel sole 40 secured to bottom portion 16 of compartment 12 in the rearfoot region of proximal portion 6. Compartment 12 may be made of a satin textile material, canvas, leather, or various other soft and thin ply materials. In some embodiments, the pointe
25 shoe may have pleats 28 at the front of the compartment. As shown in FIG. 5, for

example, pleats 28 are located at front 36 of toe box 15. Pleats 28 are created when upper 14 is folded into the bottom of the shoe underneath front sole 38.

In some embodiments, seams may join portions of fabric, for example a portion of stretchable material may be inserted in between portions of relatively inelastic material. For example, in FIGS 3-4, elastically extendible portion 10 may one or more plies of a resilient, longitudinally-extendable material. It extends around the bottom and sides of the shoe. By constructing the midfoot section entirely of elastic material, the midfoot and rearfoot portions may extend away from the forefoot portion. To allow for this, shank 15 is sufficiently decoupled from the midfoot or rearfoot portions so those portions are not bound and restricted by the shank.

In some embodiments, the inside of the foot-receiving compartment 12 may be provided with a liner inside a ply of an outer-facing material, such as a ply of satin.

FIGS. 3-8 show a toe box 20 of a generally rigid structure located at the front of shoe 2 and positioned inside flexible compartment 4. Toe box 20 has a flat face or a platform, which allows the dancer to stand en pointe. The upper of toe box 20, called the vamp, may vary in length and width depending on the dancer's forefoot length and width. The toe box may cover at least the entire length of the third phalanx.

Typically, a toe box 20 is made from layers of thin plies of materials that are bonded together using a bonding agent such as pastes, adhesives, glues, and resins. As is well known on the art, the layers of material may be various combinations of textiles (e.g., hessian or jute), papers, or fiber-based sheets. The layers may also be based on molded polymers, such as thermoplastics.

An underfoot support element, herein referred to as a shank 15, is coupled to the toe box and extends rearwardly toward the heel. The shank supports the foot at

least through the arch and in a pointe shoe it structurally ties into the rigid toe box to facilitate the shoe's support of the foot and ankles en pointe. The shank may be in any configuration that serves the aforementioned functions. It may be directly or indirectly connected to the toe box, including being formed as integrated or unitary extension of the toe box. It may be based from one or more of boards, such as, cardboard, redboard, fiberboard, Texon board, leathers, polymers, such as thermoplastics, woods, metals, and other materials that may be assembled or formed into a rigid structure. In some embodiments, the shank may be selectively flexible in some areas but providing significant foot-supporting rigidity in other areas.

Fig. 6 shows a shank 15 of a stiff material, for example redboard, on the inside of shoe 2. Together with toe box 20, shank 15 provides support to the foot for dancing en pointe. Shank 15 extends along bottom portion 16 of compartment 12 and across some or all of rearfoot portion 6. Shank 15 is disposed above a layer of compartment material in the midfoot region and under liner 22. In other embodiments, the shank may have different lengths, for example, a shank may span three-fourths of the foot or one-half of the foot. The shank may be coupled to the toe box, for example glued or nailed to the toe box, so that the shank provides support under the arch of the foot when the foot is en pointe. The shank may provide flexural strength to prevent the dancer's foot from rolling over or falling off pointe. The shank may also provide compressive strength to support the vertical load from the dancer's body weight.

As noted earlier, in select embodiments where some or all of the midfoot portion 4 to proximal portions 6 of the shoe is elastically extendible, shank 15 is decoupled from the proximal portion and coupled strictly to the distal portion or toe box so that the proximal portion can extend rearwardly from the distal portion. If less

than a full length shank is used, the shank need not necessarily be decoupled from such portion of the proximal portion 6 that corresponds in length to the shank. In such case, the portion of the proximal portion that extends rearwardly from the shank can be provided with longitudinal elasticity to conform to the changing length of the foot.

5 Select embodiments may include an outsole in the form of a split outsole, which may be simply referred to herein as a "split sole," such as that disclosed in US Patent No. 6,895,693. Since outsole materials are typically stiffer, inelastic materials, when the midfoot portion of a dance shoe is entirely or sufficiently free of such outsole materials, the midfoot portion can be made of more flexible or elastic
10 materials, thereby allowing the shoe to conform better to a wearer's foot through a range of flexations. Another advantage of such construction is that it eliminates or reduces the need for the wearer to break-in the shoe.

FIGS. 3-8 show an example of a split outsole, including a front outsole 38 and a rear outsole 40 which are attached to bottom portion 16 of compartment 12. Front
15 outsole 38 is located in forefoot region and is generally positioned below the ball of a dancer's foot. Rear outsole 40 is located in rearfoot region and is generally to be positioned below the heel of a dancer's foot. Front outsole 38 is spaced apart from rear outsole 40, separated by the midfoot portion, which is free of outsole material and therefore a thinner section. In this, the midfoot portion is just the material forming the
20 proximal portion of the sock-like upper of compartment 12.

Outsoles 38, 40 may be attached to bottom portion 16 in any known or to be constructed manner, for example, with threads or adhesives, or a combination thereof. The outsoles may be made of a suitable material for contacting the floor or ground that generally is wear resistant and provides some desired degree of frictional
25 engagement with the surface of contact. The outsoles may be made of natural leather,

synthetic leather, natural and synthetic rubbers, including molded polyurethane (PU) or ethyl vinyl acetate foams (EVA) and other synthetic materials, known in the art. In addition to the outsole components, the sole unit may incorporate midsole elements, including cushioning elements formed of known materials and structures, including EVA, PU, gas and gel-filled bags, and mechanical springs. It is contemplated that a stiff sole or variably stiff sole may be used as the support element to serve the function of a shank and that a separate shank is not required.

In addition to the split sole embodiments, in select embodiments, the shoe may have just a front outsole or just a rear outsole sole or have no outsole at all, in which case the bottom portion 16 of compartment 12 serves as the ground-facing portion. For example, the bottom portion 16 could simply be ply of the thin, flexible ply or plies of materials forming the compartment 12 and being of a sock-like compliant nature.

Optionally, compartment 12 may include a lining or layer 22 for comfort or cushioning of the foot, such as an in-sock and/or insole that may be provided within the foot compartment of the shoe. In some embodiments, the insole may be coupled to the toe box in the forefoot region and extends to overlie the shank 15 in the midfoot and rearfoot regions. In other embodiments, the insole may be integrated to the toe box. The insole may be disconnected from the compartment 12 in the midfoot and rearfoot regions to allow stretching of the compartment. However, in some embodiments, the insole may be coupled to the shank even if it is decoupled from compartment 12. The insole 56 may come in varying lengths, including half-lengths, three-quarter length or full length.

To provide a desired amount of support and to prevent the foot from sliding in the dance shoe it is desirable for pointe shoes to closely fit the foot, almost like a

glove.

In some embodiments, upper 14 may include a binding 24 applied at the finished edge of a foot-receiving opening of upper 14. Binding may include a drawstring 26 to help secure the shoe on the foot. In those embodiments wherein
5 elasticity of some or all foot compartment 12 is a feature, binding 24 would have elasticity in at least the corresponding portions of the compartment. The binding 234 defines what is known as the topline or throat line of the shoe, which is the aperture in the shoe through which a foot is placed.

In select embodiments, the inventive subject matter contemplates a shoe made
10 on a last representing a pronounced plantar flexation. In certain embodiments, the plantar flexation corresponds to or mimics the shape of the foot when en pointe, for example the last may have a curved profile in mimicking the profile of a foot en pointe, resulting in a shoe having a corresponding curvature. As is well-known in the art, a last is a shaped, three-dimensional body corresponding to a size and shape of a
15 model foot. Shoe parts, including those that form the foot-receiving compartment, such as compartment 12, are placed around the last form and assembled together. Once assembled in the shape of the last, the last is removed. The sole unit may be assembled to the compartment while it is on the last.

FIG. 9 shows the side profile of a last 120 made according to the inventive
20 subject matter. As can be seen, the last substantially mimics the shape of the foot en pointe. FIGS. 3-5 and 7-8 represent the appearance of a shoe made according to a last such as FIG 9. As can be gleaned from FIGS. 7-8, the shoe conforms to the foot with essentially no wrinkling or creasing through a full range of flexation. It is also believed that the curved last results in a shoe that will allow the dancer to achieve
25 improved balance en pointe because of its ability to anatomically and closely conform

to the dancer's foot. For example, the inventive last also shapes the shoe and shank so that the shank more readily stays against the dancer's foot while en pointe and other positions. The shaped shank also allows for easier entry into the en pointe positions, improved weight relief when en pointe, and easier and more aesthetic tendu.

5 In addition to lasted shoes, the inventive subject matter contemplates that any other now known or to be discovered method of shaping a foot compartment, such as compartment 12, can be used to configure a shoe to correspond to the en pointe position of the foot

Looking at the details of last 120 shown in FIGS. 9, it has a length of L between the
10 furthest points separating toe and heel. It has a maximum arch depth D , which is measured from point R on the surface of the arch. The point R also generally defines a pivot point on which distal portion 4 and proximal portion 6 rotate downwardly toward each other to define a curved arch region in the midfoot area, with the maximum depth D . As can be seen, the distal and proximal portions are not pivoting
15 in a strict linear angular relation. Rather there is some allowance for foot conforming arch curve on either side of R . Further, the point of rotation R may be varied along L . A suitable range for placement of the pivot R is somewhere from 50% to 75% of the length of L , measuring back from the distal (toe) end of L . Another approach is to generally place point of rotation R in the topline (throat line) region T of the
20 intended shoe.

The pivoting of the proximal portion 6 relative to distal portion generally defines a wedge-shaped region indicated by angle Θ . In the prior art Θ such as seen in Fig. 1, Θ is typically around 5 degrees. In certain embodiments, the inventive subject matter, Θ is greater than 5 degrees. In certain embodiments, it is 15 to 40
25 degrees or thereabouts. Notably, an unworn shoe made using embodiments of lasts

described above may or may not have an angling or curvature, equivalent to that in the last used to make the shoe, depending on the nature of the materials used in the shoe, e.g., the elasticity of the upper or the rigidity of the shank.

In the embodiments of shoes made with a last having a curved profile,
5 mimicking the en pointe shape of the foot, the shoe may or may not have a zone of stretchable material in a portion of compartment 12 and/or a split sole, as described above.

As shown in FIG. 10, a retaining element 29 such as a channel or loop of material may be affixed to the bottom, inside of a foot compartment 12 at some point
10 along the length of the compartment to slideably receive the shank 15, while holding it down. A suitable location is at or about the rearfoot portion of compartment 12.

The shoes and lasts shown can be symmetrical in form, i.e., a given last or shoe can be for either the left or right foot, or the shoes and lasts can be configured specifically for a left or right foot.

15 Persons skilled in the art will recognize that many modifications and variations are possible in the details, materials, and arrangements of the parts and actions which have been described and illustrated in order to explain the nature of the inventive subject matter, and that such modifications and variations do not depart from the spirit and scope of the teachings and claims contained therein.

20 All patent and non-patent literature cited herein is hereby incorporated by references in its entirety for all purposes.

CURRENTLY CLAIMED INVENTIONS:

1. A dance shoe, having a foot-receiving compartment, comprising:
a distal portion having a rigid structure comprising a toe box for encasing at least
a portion of a forefoot of a wearer and supporting the foot; and
a proximal portion coupled to the distal portion and configured for receiving a
midfoot to rearfoot portion of the foot; and
the proximal portion comprising an elastically, longitudinally extendible portion,
allowing at least the proximal portion of the compartment to conform to a
foot of an intended wearer through a range of plantar foot flexations that
vary the distance between the toes and heel of the foot.
2. The dance shoe of claim 1 wherein the elastically extendible portion is disposed in
at least a midfoot portion of the shoe.
3. The dance shoe of claim 1 further comprising an outsole portion disposed in the
forefoot portion and/or the rearfoot portion of the shoe, and the shoe is
substantially free of outsole in at least a portion of the midfoot portion, giving the
midfoot portion a thinner, more flexible construction than the forefoot and/or
rearfoot portions that include outsole material.
4. The dance shoe of claim 3 wherein the forefoot portion of the shoe includes an
outsole but the rearfoot portion is substantially free of outsole and has a thinner,
more flexible construction than the forefoot portion that includes outsole material

5. The dance shoe of claim 1 further comprising a shank coupled to the distal portion that extends at least along the midfoot portion of the foot compartment, and the proximal portion is longitudinally extendible relative to the shank.
6. The dance shoe of claim 1 further comprising a full-length shank extending from the distal portion to about the heel of the proximal portion, and the shank is sufficiently decoupled from some or all of the proximal portion so as to allow the proximal portion to be longitudinally extendible relative to the shank.
7. The dance shoe of claim 5 wherein the shank has a profile generally mimicking the shape of an arch of the foot in plantar flexation, e.g., generally mimicking the en pointe position of the foot.
8. The dance shoe of claim 5 wherein the proximal portion of the shoe comprises elastic material so that the proximal portion is longitudinally extendible relative to the distal portion.
9. The dance shoe of claim 5 wherein the proximal portion of the compartment comprises a two-way stretch material.
10. The dance shoe of claim 5 wherein the proximal portion of the compartment comprises a four-way stretch material.

11. The dance shoe of claim 5 wherein the rigid structure comprises a toe box disposed in the forefoot portion of the compartment.
12. The dance shoe of claim 5 further comprising a retaining element for holding the shank in place in the rearfoot region and for restricting transverse movement of the shank in the compartment while allowing longitudinal movement of the shank.
13. The dance shoe of claim 12 wherein the retaining element comprises a loop coupled to the compartment.
14. The dance shoe of claim 5 further comprising a split sole comprising a front outsole secured to the forefoot portion of the compartment and a rear outsole secured to the rearfoot portion of the compartment, the midfoot portion being of a thinner construction than the combination of the compartment and the front or rear outsole and being elastically, longitudinally extendible.
15. The dance shoe of claim 5 further comprising an insole, a proximal portion of the insole being decoupled from the compartment in the midfoot region and in the rearfoot region.
16. A dance shoe comprising:
a compartment for surrounding a portion of a wearer's foot, the compartment comprising a forefoot portion, a midfoot portion, and a rearfoot portion, at

least the midfoot and rearfoot portions comprising a thin, flexible textile structure providing a sock-like fit on the intended foot;

a rigid portion capable of encasing at least the front of the toes of a foot of the intended wearer included in the forefoot portion of the compartment;

a shank coupled to the rigid portion and extending along at least the midfoot portion of the compartment; and

wherein the compartment is longitudinally extendible relative to the shank, allowing the compartment to conform to the foot in both regular weight-bearing positions and in an en pointe position.

17. A method for making a dance shoe comprising:

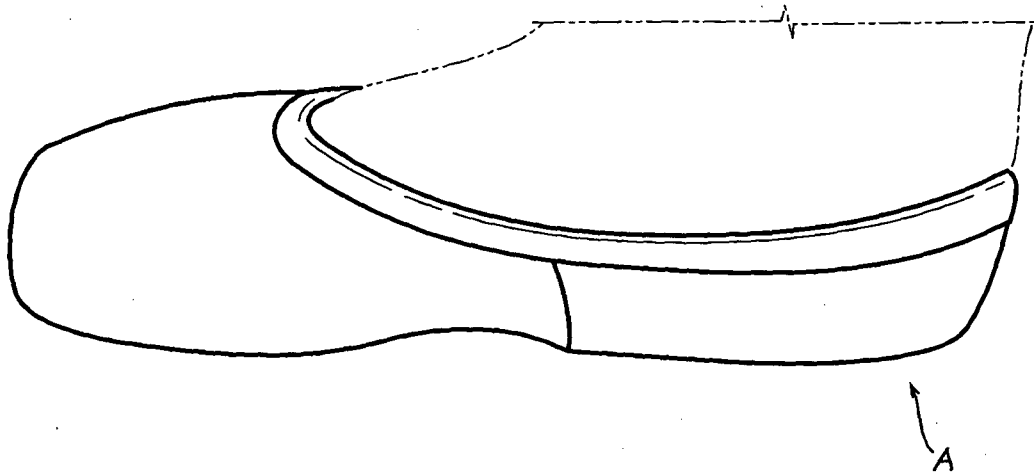
forming a foot-receiving compartment on a last, the foot-receiving compartment comprising a rigid distal portion capable of encasing at least the front of the toes of a foot of an intended wearer included in the forefoot portion of the flexible compartment; and

forming a proximal portion configured for receiving a portion of the foot of the wearer that is proximal to the portion of the forefoot of the wearer received in the distal portion, the proximal portion comprising an elastically, longitudinally extendible portion so that the assembly conforms to the foot of the wearer both in regular, weight-bearing positions of the foot and in an en pointe position of the foot.

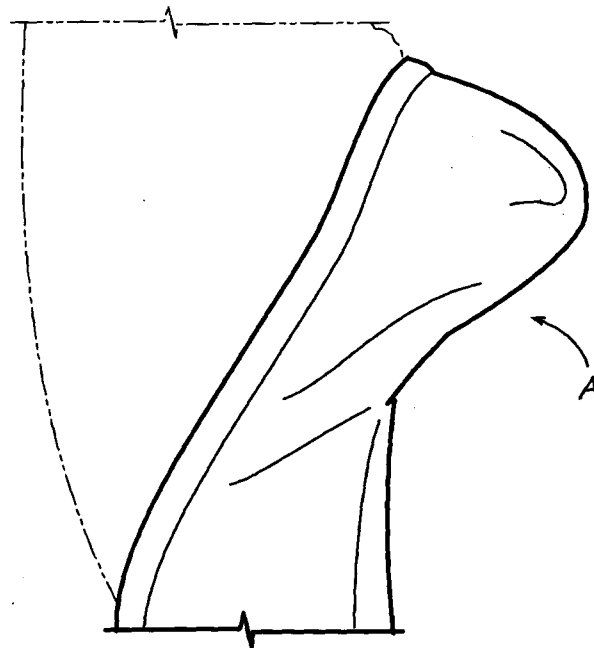
18. The method of claim 17 further comprising coupling a shank to the distal portion but allowing the shank to be sufficiently decoupled from some or all of the

proximal portion so that the proximal portion is longitudinally extendable from the distal portion.

19. The method of claim 17 further comprising coupling a split sole comprising a front outsole to the forefoot portion of the compartment, the midfoot portion being of a thinner construction than the combination of the compartment and the front outsole and being elastically, longitudinally extendible.
20. The method of claim 18 wherein the forming of the rigid distal portion comprises forming a toe box for encasing substantially all of the forefoot of the wearer.



(PRIOR ART)
FIG. 1



(PRIOR ART)
FIG. 2

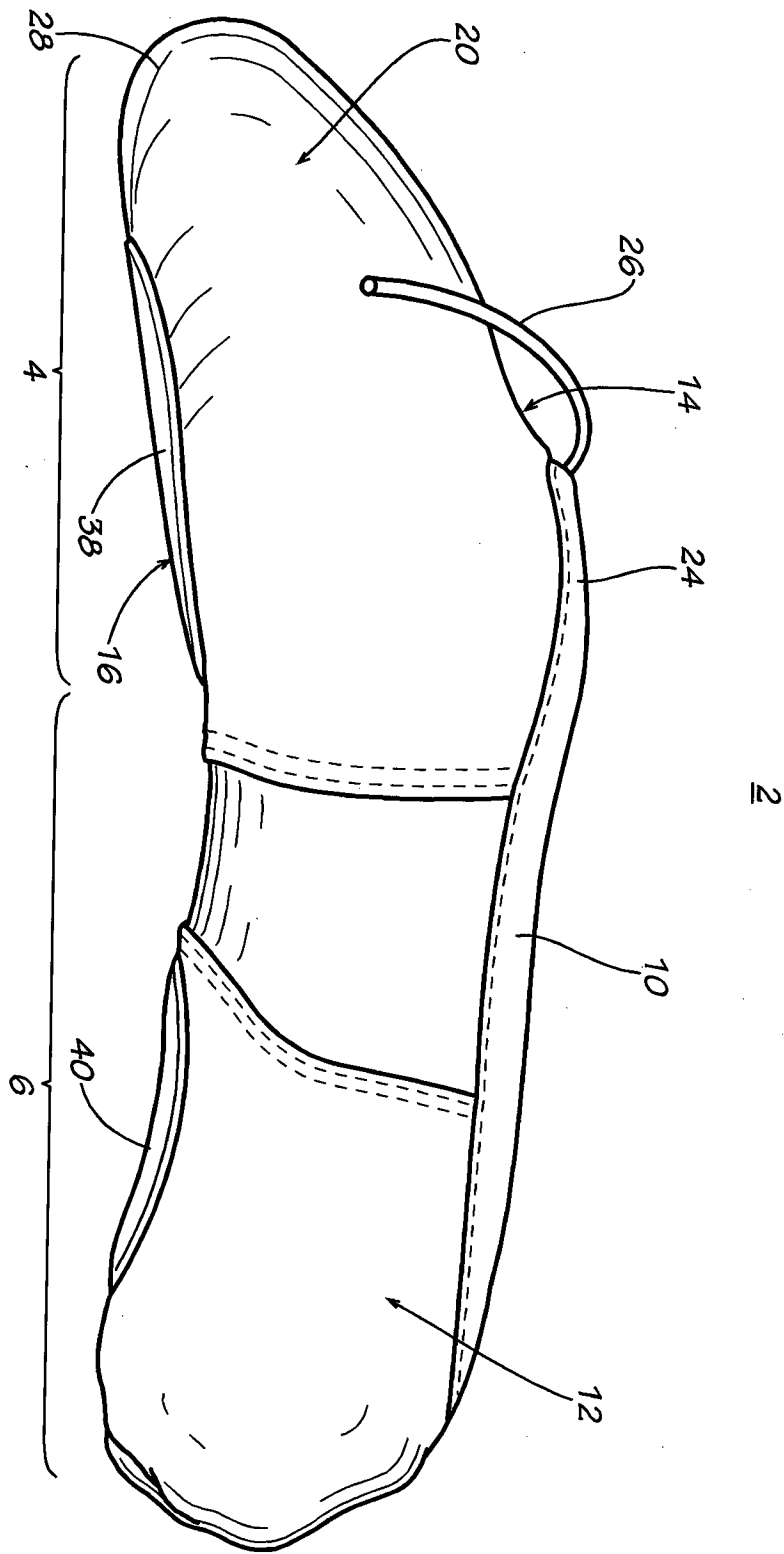


FIG. 3

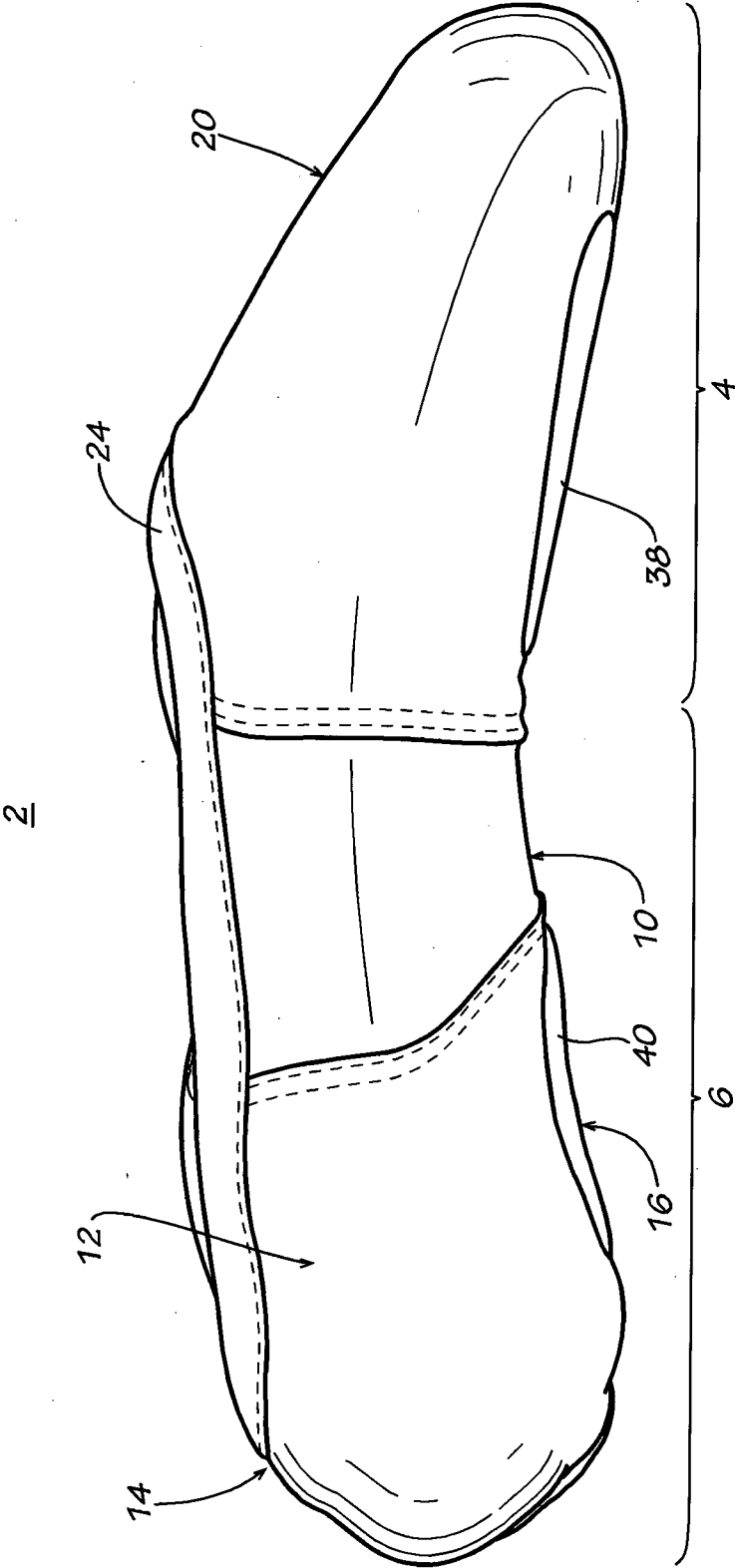


FIG. 4

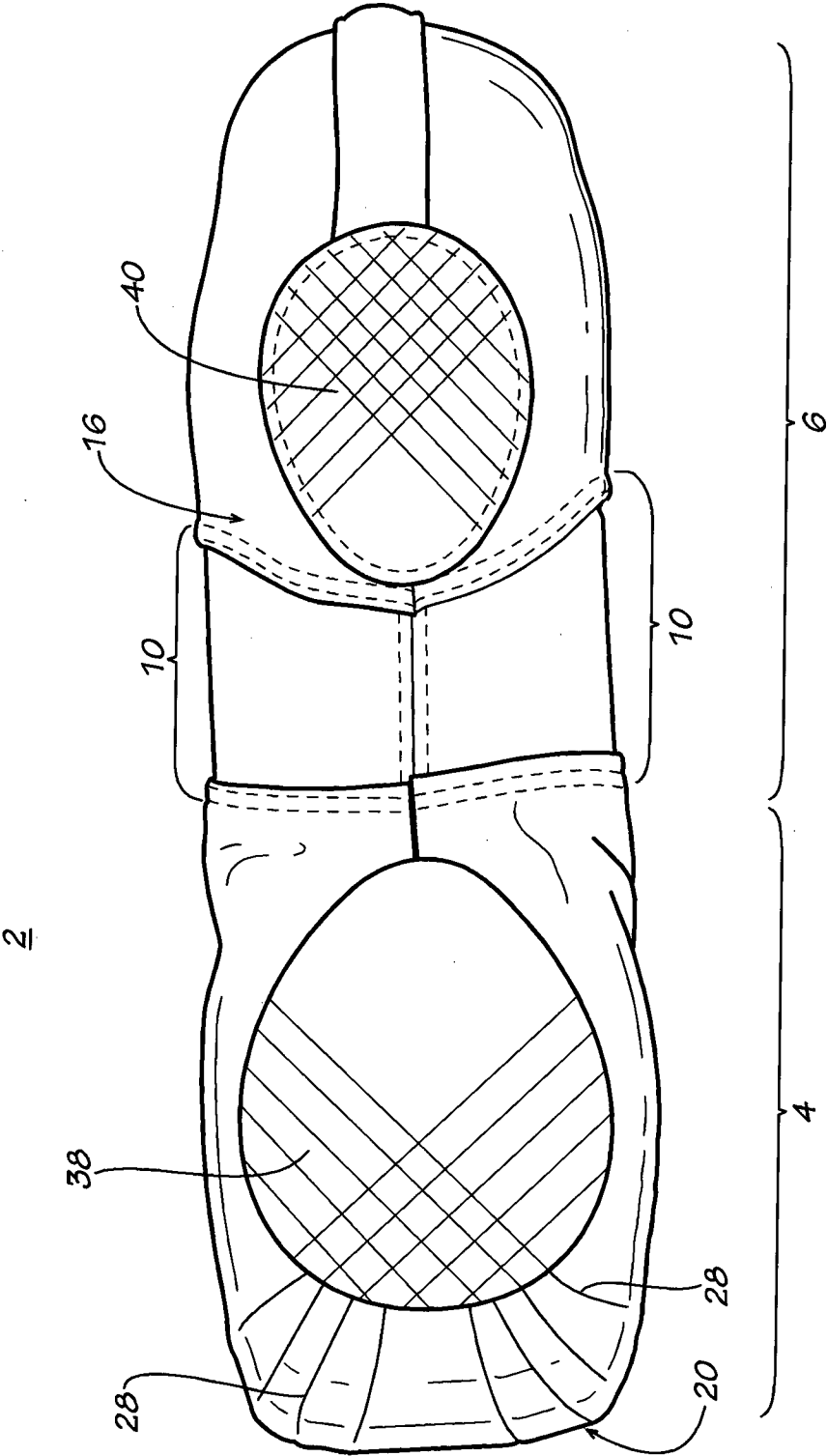


FIG. 5

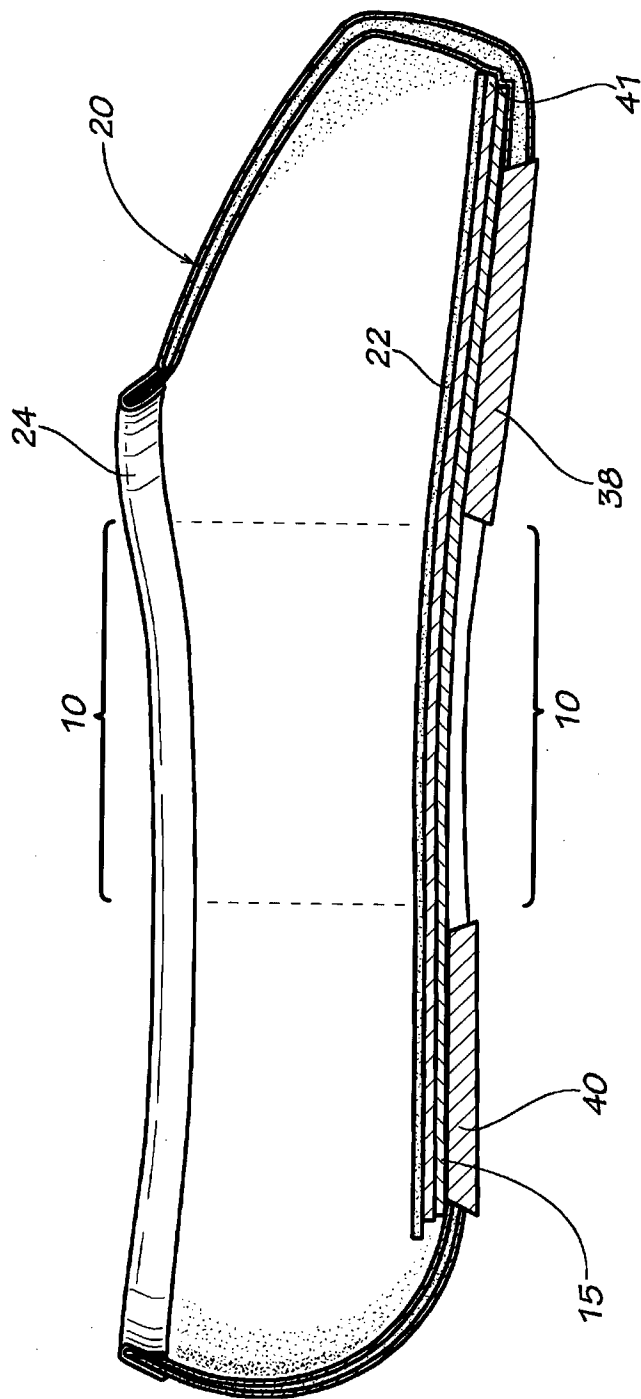


FIG. 6

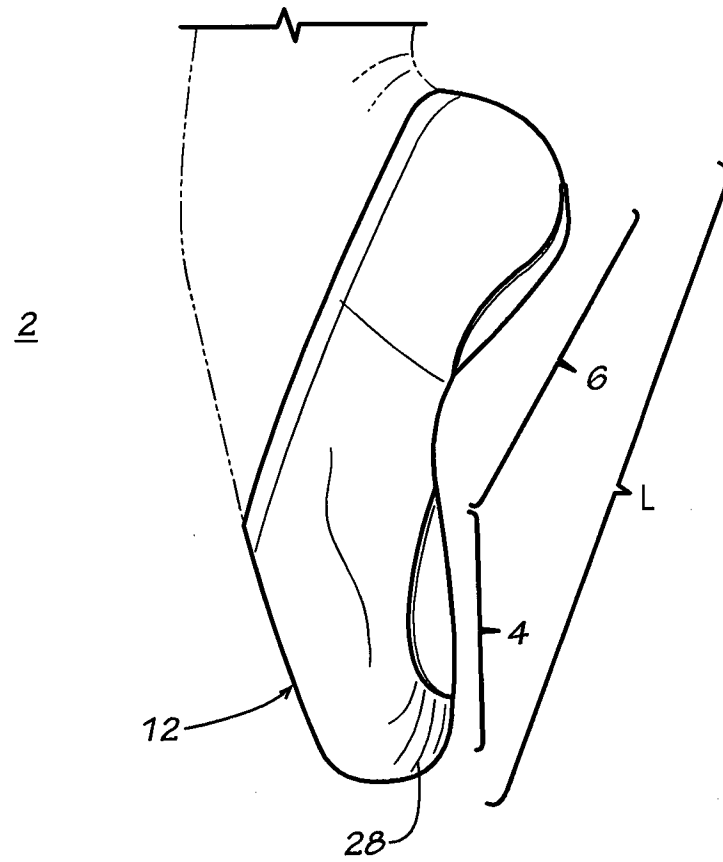


FIG. 7

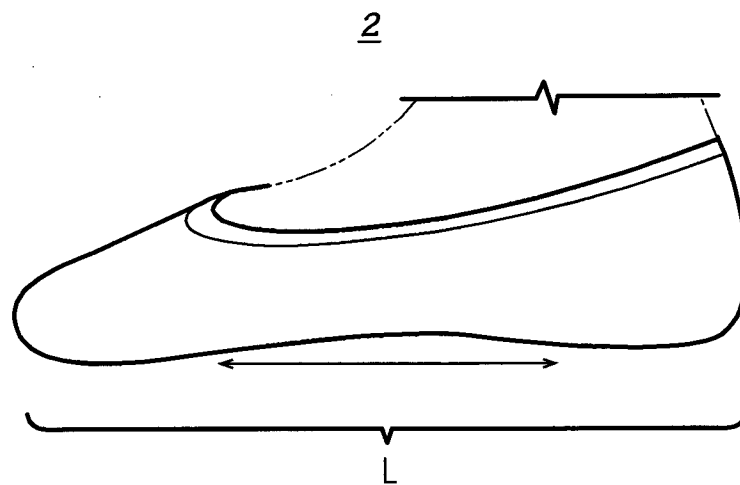


FIG. 8

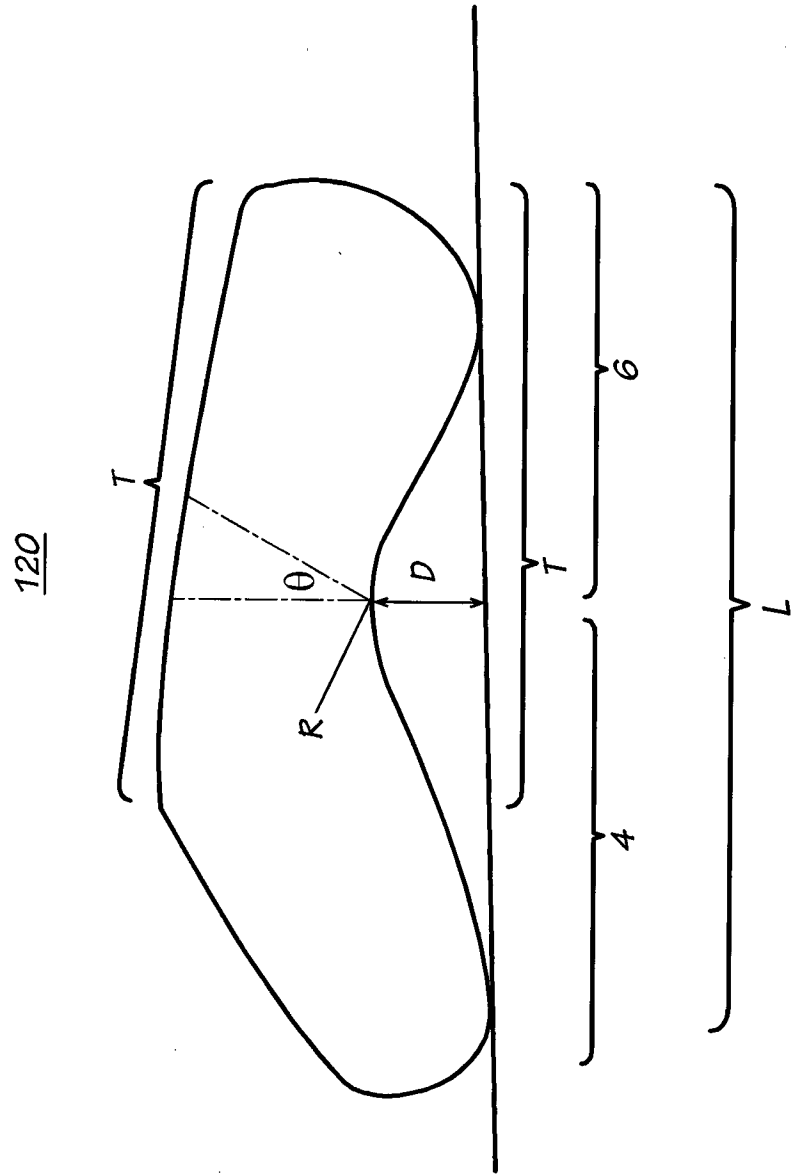


FIG. 9

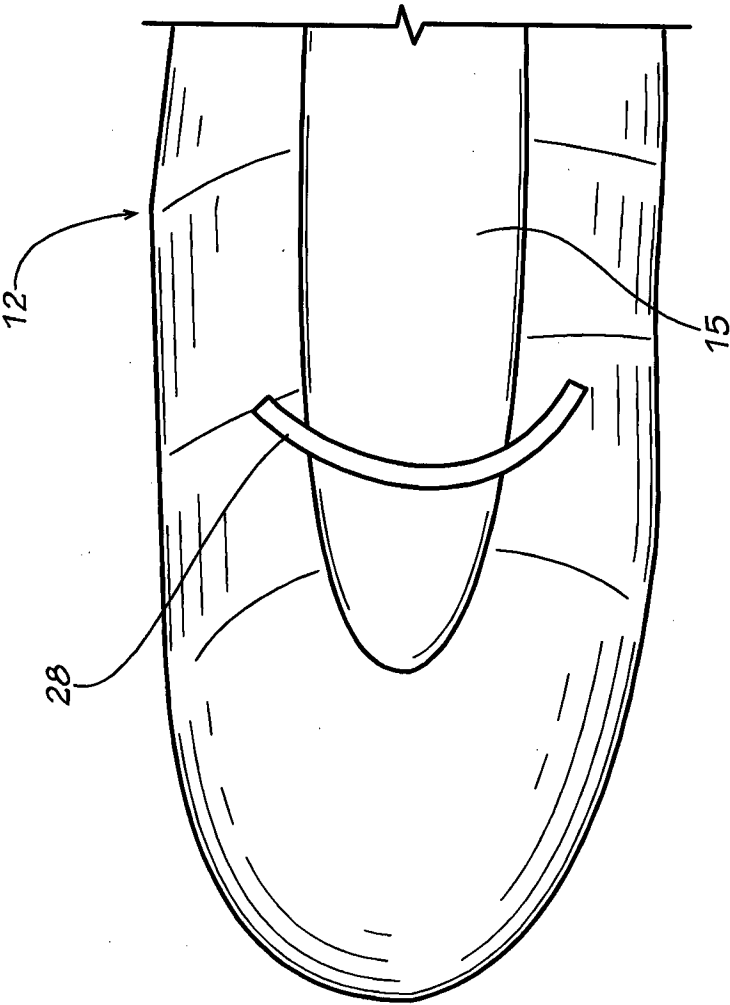
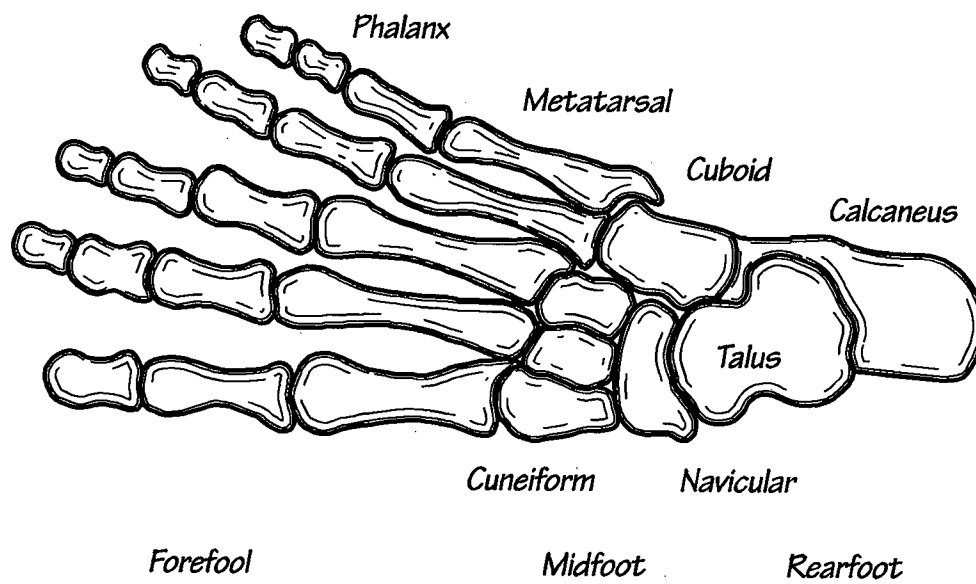


FIG. 10

**FIG. 11**