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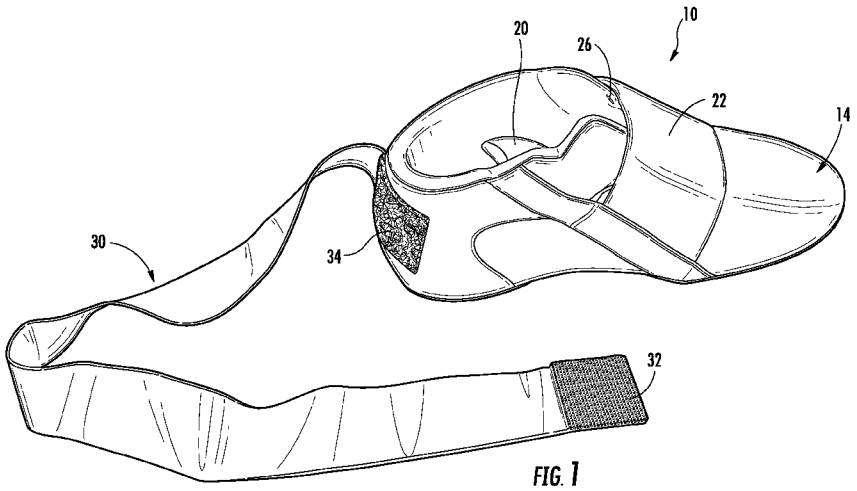


FIG. 1

(57) **Abstract**: An athletic shoe is disclosed that is lightweight and padded for use in mixed martial arts and other related activities. The shoe includes a soft, flexible sole, and a shoe upper adjoined to the flexible sole. Padding is attached to the shoe upper and the sole such that the padding extends substantially completely around the foot of a wearer. At least two resilient sole pads are attached to the flexible sole, the resilient sole pads being positioned at least under the heel and ball of the foot of a wearer, wherein no resilient sole pad is provided under the toes of a wearer.

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# ATHLETIC SHOE

## BACKGROUND OF THE INVENTION

1. Field of the Invention

**[0001]** The present invention relates to footwear, and more particularly to a padded athletic shoe designed for use in athletic activities such as kickboxing and other martial arts.

2. Description of the Related Art

**[0002]** The foot can be subjected to stresses during athletic activities. Existing athletic shoes in the art are primarily constructed to provide support for the arch and ankles of the wearer while running or jumping. However, in addition to running and jumping, some sports and fitness activities require the participant to engage in kicking maneuvers, such as martial arts and soccer. The top, sides, sole, and heel of the feet can sustain severe blows during such activities. Additionally, injury can result from kicks landed against another person during certain activities, either inadvertently or, in the case of the martial arts, while sparring. It is therefore desirable to provide a shoe which protects both the wearer and the sparring partner or opponent from such injuries during activities such as martial arts and kickboxing. It is particularly desirable to provide such a shoe for use by adults, and particularly by children, who are learning martial arts.

**[0003]** Prior art shoes adapted to prevent injury from kicking to both the wearer and an opponent are generally those designed specifically for use in the martial arts. Shepherd, U.S. Patent 6,971,192, discloses a padded shoe for use in kickboxing. This shoe is constructed of padded durable materials, including a resilient sole, and is suitable for both training and everyday wear. However, this shoe has limited flexibility due to the resilient sole covering the bottom of the shoe.

**[0004]** In order to provide flexibility for the foot, a thinner shoe or a shoe with a thinner sole, or a split sole can be employed. For example, ballerina or gymnastics shoes provide great flexibility to the foot of a wearer by using thinner materials, less durable materials, or simply using less material to cover the foot. In the martial arts, flexible shoes are available, but tend to fail to secure to the foot properly, provide little or no support or to the foot and ankles, and have only thin fragile soles. Such shoes do not provide protection to the

foot from injury during martial arts training or fighting, nor can they be worn outside, for example, while traveling to and from the gym.

**[0005]** Therefore, what is needed is a shoe which is adapted for kicking activities, which can protect a wearer of the shoe, and can also protect other participants from injury. However, there is also a need that such shoes still provide adequate foot and ankle support to the wearer and be durable enough for everyday use. There is also a need that such a shoe permit the wearer as much flexibility as possible in the movement of the foot.

## SUMMARY OF THE INVENTION

**[0006]** According to an arrangement of the present invention, an athletic shoe includes a soft, flexible sole; a shoe upper adjoined to the flexible sole; padding attached to the shoe upper and the sole such that the padding extends substantially completely around the foot of a wearer; and at least two resilient sole pads attached to the flexible sole, the resilient sole pads being positioned at least under the heel and ball of the foot of a wearer, wherein no resilient sole pad is provided under the toes of a wearer.

**[0007]** In some arrangements, the resilient sole pads do not extend across the full width of the flexible sole. In addition, the resilient sole pad positioned under the heel of the foot of a wearer may not extend to a rear heel edge of the flexible sole.

**[0008]** In some arrangements, the padding in the shoe upper can include closed cell foam padding extending around a heel area of the wearer. In some arrangements, the padding in the shoe upper can be thicker over forward lateral areas of the dorsum of the foot of a wearer. In yet other arrangements, the shoe upper has a throat, with elastic material provided across the throat to retain the shoe on the foot of a wearer. A padded tongue can be disposed under the throat. The padded tongue may have closed-cell padding disposed therein. An outer protective flap can extend over the elastic material, the outer flap substantially covering the elastic material, and the outer flap can include a thin layer of closed-cell foam padding. The thin layer of foam padding in the outer flap can have a thickness of less than approximately 0.5 cm. The outer flap and the shoe upper include complementary hook and loop fastener material such that the outer flap can be secured to the shoe upper.

**[0009]** In some arrangements, the resilient sole pads can be formed from a material having a shore durometer reading between about 40 and about 50. In other arrangements, at least some of the padding in the shoe upper has a durometer of approximately 0.253. In yet further arrangements, at least some of the padding in the shoe upper has a density of between approximately 1.5 pcf and approximately 4.5 pcf. In some arrangements, at least some of the padding in the shoe upper has a compression strength of between approximately 3 psi and approximately 23 psi at approximately 25% deflection and a compression strength of between approximately 9 psi and approximately 42 psi at approximately 50% deflection.

**[0010]** In some arrangements, the padding in the shoe upper extending over the sides of the dorsum of the wearer's foot has a thickness between approximately 1 cm and approximately 2.5 cm. In some arrangements, the padding around a heel area of the shoe upper has a thickness between approximately 1 cm and approximately 2 cm.

**[0011]** In some arrangements, an elastic wrapping strap is provided, which is designed to be wrapped around the shoe. The elastic wrapping strap can be secured to the shoe at the heel thereof. The elastic wrapping strap can be dimensioned to pass between the sole pads when it is wrapped around the shoe.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** There are shown in the drawings arrangements which are presently discussed, it being understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown, wherein:

**[0013]** FIG. 1 is a perspective view of an athletic shoe according to an arrangement of the invention.

**[0014]** FIG. 2 is a perspective view of the athletic shoe of FIG. 1 showing the sole.

**[0015]** Fig. 3 is a bottom view of the athletic shoe of FIG. 1 showing the sole.

**[0016]** FIG. 4 is a perspective view of the athletic shoe of FIG. 1 with an outer flap open.

**[0017]** FIG. 5 is a perspective view of the athletic shoe of FIG. 1 with the securing strap wrapped around the shoe.

**[0018]** FIG. 6 is a perspective view of the athletic shoe of FIG. 1 with the securing strap wrapped around the shoe.

**[0019]** FIG. 7 is a perspective view of the athletic shoe of FIG. 1 with the securing strap wrapped around the shoe.

## DETAILED DESCRIPTION OF THE DRAWINGS

**[0020]** The present invention is directed to an athletic shoe, such as, but not limited to, a padded martial arts shoe that provides protection to the foot of the wearer and to a sparring partner, yet still provides flexibility for the foot of the wearer. The arrangements of padded shoe described herein disclose training or sparring shoes for sports such as a boxing or kickboxing, but this is a mere example of one of many possible applications for the invention.

**[0021]** An arrangement of the athletic shoe of the present invention is shown in FIGS. 1-7. The shoe 10 can be formed of materials which are lightweight yet strong and durable. The shoe 10 includes a flexible sole 12 adjoined to a shoe upper 14. In the illustrated arrangement, the sole 12 is further provided with two sole pads 16, 18.

**[0022]** The shoe upper 14 can be manufactured from any conventional material such as leather, synthetic leather, or plastic. In the various arrangements, the shoe upper 14 can extend to just below the ankle of the wearer; however, the invention is not limited in this regard. For example, the shoe upper 14 can cover either the internal malleolus, the external malleolus, or both ankles, the shoe upper 14 can extend significantly beyond the ankle of the wearer to cover all or a portion of the shin, or not extend to the ankle of the wearer.

**[0023]** In the illustrated arrangement in FIGS. 1-7, the flexible sole 12 can be formed from any conventional material such as leather, synthetic leather, or plastic. In a preferred arrangement, the flexible sole can be formed of suede or a sueded material such as microsuede. The sole pads 16, 18 can be formed of any suitable resilient material, such as a foam material (for example, EVA), plastic, crepe rubber or similar material. Advantageously, the sole pads 16, 18 are soft enough to reduce the likelihood of scraping or otherwise injuring a human opponent or partner who comes into contact with the sole, yet durable enough to allow the shoe to be worn on the street, as opposed to primarily on a gym floor. In presently preferred arrangements, the sole pads 16, 18 can have a gripping pattern embossed or otherwise provided thereon.

**[0024]** The sole pads 16, 18 do not extend across the full width or length of the flexible sole 12. This means that the sole pads 16, 18 effectively have a border of the softer,

flexible sole 12 around them. This enables a wearer to walk on the sole pads during normal walking, such as to and from the gym or practice area, but allows the flexible sole 12 to contact the floor during movements such as pivoting. Notably, the foot pad 16 is dimensioned so that it does not extend under the toes of a wearer of the shoe. This enables the wearer to smoothly turn the foot, pivoting on the area of flexible sole 12 that extends under their toes, without the sole pads 16, 18 causing the shoe to grip the floor by friction. This allows for a smoother pivoting action, as the flexible sole 12 slides on the floor more easily than the sole pads 16, 18. Additionally, the flexible sole 12 that extends around the sole pads 16, 18 can act as a chamfer or softened edge around the harder sole pads 16, 18 of the sole. This helps to reduce injuries to an opponent from being kicked with the shoe, as there is less of a hard edge to the sole as with known athletic shoes.

**[0025]** In the illustrated arrangement, the sole pads can extend to between approximately 0.5 cm and approximately 3 cm from the side and heel (rear) edges of the flexible sole 12. In a presently preferred arrangement, the sole pads can extend to approximately 1.5 cm from the side and heel edges of the flexible sole 12. The sole pads can extend to between approximately 2 cm and approximately 8 cm from the forward-most portion of the toe edge of the flexible sole. In a presently preferred arrangement, the sole pads 16, 18 can extend to approximately 5 cm from the forward-most portion of the toe edge of the flexible sole 12. It will be appreciated that the measurements given are variable, depending at least in part on the size of the shoe. A child's shoe may have smaller distances, whereas a large adult's shoe may have larger distances, including distances that are outside the ranges given.

**[0026]** The flexible sole 12 and the shoe upper 14 can be attached to one another by any means known in the art, such as gluing, stitching, or heat sealing. Preferably, the shoe upper 14 is formed using a Strobel construction, and the flexible sole 12 is then attached to the shoe upper 14. The Strobel construction involves stitching the shoe upper 14 to a flexible sole liner. In some arrangements, the sole liner may include padding disposed therein, or a padded sole liner may be added to the shoe after construction. In the Strobel construction, an insole board or other reinforcing material is absent from the shoe upper 14. The flexible sole 12 may then be attached to the flexible lining and the shoe upper 14 by any suitable means.

Preferably the flexible sole 12 is attached to the shoe upper 14 by stitching, but cementing, gluing, bonding or any other suitable means is also acceptable.

**[0027]** The sole pads 16, 18 are preferably formed of low density foam made of EVA (Ethylene Vinyl Acetate) resin with a durometer between 0.20 and 0.23. The sole can thus have resiliency to the touch, and can absorb some of the force of an impact. The sole pads 16, 18 may be attached to the flexible sole 12 by any suitable means such as by stitching, cementing, gluing, bonding and the like. In a presently preferred arrangement, the sole pads 16, 18 are each provided with a flange (not shown) that extends around the sole pad. The sole pads 16, 18 can be positioned within apertures cut into the flexible sole 12, with the flange arranged between the flexible sole and the flexible sole liner such that it forms a lip that prevents the sole pads 16, 18 from falling through the apertures in the flexible sole 12. The flexible sole 12 can be stitched to the flanges to securely attach the sole pads 16, 18. Adhesive may be used in addition to the stitching to further strengthen the bond of the sole pads 16, 18 to the shoe.

**[0028]** In the various arrangements, the shoe upper 14 can include padding material disposed therein. The padding material can be any suitable material, for example, foam rubber, cotton, open-cell foam or closed-cell foam. The padding material preferably has a high degree of resiliency and excellent shock absorption properties. In some arrangements, the padding material includes a closed-cell chemically cross-linked polyethylene or polyolefin foam, such as the Minicel® products manufactured by the Voltek Division of the Sekisui America Corporation. The closed-cell foams that can be used in the various arrangements and produced under the Minicel trademark include the L200, L300, L200F, L380, LS200, LS300, LS380, M200, M300, M380, MS200, MS300, MS380, T200, T300, TS200, TS300 and TS380 foams, which have excellent strength and shock absorption properties. In addition, these foams have a low degree of water absorption. Although not limited in this regard, closed-cell foam padding suitable for use in the shoe upper 14 preferably has a durometer of around 0.253. These foams also have a density of between approximately 1.5 and 4.5 pcf, a compression strength of between approximately 3 and 23 psi at approximately 25% deflection and between approximately 9 and 42 psi at approximately 50% deflection, and a tensile strength of between 28 and 145 psi.

**[0029]** In the various arrangements, the padding material can be located throughout the shoe upper 14 or only in certain areas of the shoe upper 14. Furthermore, the padding material can have an increased thickness or density on those points of the shoe upper 14 which cover portions of the foot that are more likely to be injured during athletic activities involving kicking, such as kickboxing and martial arts. Additionally, or in the alternative, different densities of padding, and/or different types of padding (such as closed cell foam vs. open cell foam) can be used in different areas of the shoe upper 14.

**[0030]** In an exemplary arrangement the padding material may have an increased thickness or density at portions of the shoe upper 14 as follows. In the area of the shoe upper 14 that covers the posterior aspect of the heel, and the areas immediately inferior, and inferior and posterior to the internal and external malleolus, a thick (for example, approximately 1.5 cm) closed cell foam padding may be used. In the area of the shoe upper 14 that covers the forward dorsal region of the foot (the vamp), the left and right forward lateral aspects of the foot, the sides of the throat 26, and the areas inferior and distal to the internal and external malleolus may have a thick (for example, approximately 2 cm) open cell foam padding. In the area of the shoe upper 14 that covers the inferior lateral aspects of the foot, a thinner (for example, approximately 0.5 to approximately 1 cm) open cell foam padding may be employed. A padded tongue 20 with a protective flap 22 may be employed, which will be further described hereafter. The padded tongue 20 may include generally thinner (for example, approximately 0.5 to approximately 1 cm) closed cell foam padding along most of its length, with thicker (for example, approximately 1 cm to approximately 1.5 cm) closed cell foam padding positioned above the instep of the foot. The protective flap 22 may include thin (up to approximately 0.5 cm) closed cell foam padding. The open cell foam padding is softer for increased comfort, but the closed-cell foam padding can offer more injury protection and a certain degree of rigidity to the shoe upper 14. It will be appreciated that the padding thicknesses and types given herein are exemplary only, and may be varied to suit the application.

**[0031]** In certain arrangements, the padded tongue 20 may comprise of one or more segments separated by a flexible joint (not shown). In some arrangements, a flexible joint may be naturally formed when the padding material in the padded tongue 20 comprises two separate padding regions. In other arrangements, a stitched seam through the padding may be

used to define the flexible joint, which can act as a hinge without the need to provide two separate padding regions. The present disclosure contemplates other structures and techniques being used to provide a hinge along flexible joint including decreasing the thickness of continuous padding material along the flexible joint region. The use of such a joint may be advantageous to provide a more secure and comfortable fit, especially in embodiments where the padded tongue 20 is extended to cover at least a portion of the lower leg.

**[0032]** An elastic strap 24 can extend between free edges of the throat 26 to help maintain the shoe on the foot of a wearer. The protective flap 22 can extend widthwise (or in some arrangements, lengthwise) across the shoe, to cover the elastic strap 24, the throat and the padded tongue 20. The outer protective flap 74 can be attached to the shoe upper 14 at the medial side of the throat 26. The shoe 10 can also includes an engagement structure 28 to secure the protective flap 22 to the shoe upper 14. The engagement structure can be formed of, for example, a hook and loop type fastener such as Velcro®.

**[0033]** An elongated elastic wrapping strap 30 can be secured, such as by stitching, to the back of the heel of the shoe upper 14. An engagement structure, such as complementary hook and loop type fasteners may be provided, for example with a hook material 32 provided on the free end of the strap 30 and a loop material 34 provided on the back of the heel of the shoe upper 14, adjacent to the attachment point of the elastic strap 30. The elastic strap 30 can be of a size suitable to wrap entirely around the shoe – for example, 65-70 cm long and approximately 5 cm wide. The strap 30 can be wrapped over the protective flap 22, underneath the sole of the shoe so that it extends between the two sole pads 16 and 18, back over the protective flap 22, and can be secured on the loop material 34 at the back of the heel. The elastic strap 30 can help to securely retain the shoe on the foot of the wearer, and helps the wearer to feel more like they are using traditional sparring hand or foot wrapping, thus allowing for a faster acceptance of the shoe 10 in use.

**[0034]** As previously indicated, the shoe 10 provides advantages to the wearer when the wearer is engaged in activities which involve kicking, as the shoe 10 can have a limited number of protruding exterior features or sharp edges that could possibly injure an opponent. The flexible sole 12 provides a softer area around the foot which helps to prevent injuries to

an opponent from kicking. The padded tongue 20 provides protection to the top of the wearer's foot when this area is impacted, such as by kicking a bag or an opponent.

**[0035]** It should be understood that the examples and arrangements described herein are for illustrative purposes only and that various modifications or changes in light thereof will be obvious to persons skilled in the art, and that such modifications or changes are to be included within the spirit and purview of this application. Moreover, the invention can take other specific forms without departing from the spirit or essential attributes thereof.

## CLAIMS

What is claimed is:

1. An athletic shoe, comprising:

a soft, flexible sole;

a shoe upper adjoined to the flexible sole;

padding attached to the shoe upper and the sole such that the padding extends substantially completely around the foot of a wearer; and

at least two resilient sole pads attached to the flexible sole, the resilient sole pads being positioned at least under the heel and ball of the foot of a wearer, wherein no resilient sole pad is provided under the toes of a wearer.

2. The athletic shoe of claim 1, wherein the resilient sole pads do not extend across the full width of the flexible sole.

3. The athletic shoe of claim 1, wherein the resilient sole pad positioned under the heel of the foot of a wearer does not extend to a rear heel edge of the flexible sole.

4. The athletic shoe of claim 1, wherein the padding in the shoe upper comprises closed cell foam padding extending around a heel area of the wearer.

5. The athletic shoe of claim 1, wherein the padding in the shoe upper is thicker over forward lateral areas of the dorsum of the foot of a wearer.

6. The athletic shoe of claim 1, wherein the shoe upper has a throat, with elastic material provided across the throat.

7. The athletic shoe of claim 6, further comprising a padded tongue disposed under the throat.

8. The athletic shoe of claim 6, wherein the padded tongue has closed-cell padding disposed therein.

9. The athletic shoe of claim 6, further comprising an outer flap extending over the elastic material, the outer flap substantially covering the elastic material.

10. The athletic shoe of claim 9, wherein the outer flap includes a thin layer of closed-cell foam padding.

11. The athletic shoe of claim 10, wherein the thin layer of padding in the outer flap has a thickness of less than approximately 0.5 cm.

12. The athletic shoe of claim 9, wherein the outer flap and the shoe upper include complementary hook and loop fastener material such that the outer flap can be secured to the shoe upper.

13. The athletic shoe of claim 1, where the resilient sole pads are formed from a material having a shore durometer reading between about 40 and about 50.

14. The athletic shoe of claim 1, wherein at least some of the padding in the shoe upper has a durometer of approximately 0.253.

15. The athletic shoe of claim 1, wherein at least some of the padding in the shoe upper has a density of between approximately 1.5 pcf and approximately 4.5 pcf.

16. The athletic shoe of claim 1, wherein at least some of the padding in the shoe upper has a compression strength of between approximately 3 psi and approximately 23 psi at approximately 25% deflection and a compression strength of between approximately 9 psi and approximately 42 psi at approximately 50% deflection.

17. The athletic shoe of claim 1, wherein the padding in the shoe upper extending over the sides of the dorsum of the wearer's foot has a thickness between approximately 1 cm and approximately 2.5 cm.

18. The athletic shoe of claim 1, wherein the padding around a heel area of the shoe upper has a thickness between approximately 1 cm and approximately 2 cm.

19. The athletic shoe of claim 1, further comprising an elastic wrapping strap designed to be wrapped around the shoe.

20. The athletic shoe of claim 19, wherein the elastic wrapping strap is secured to the shoe at the heel thereof.

21. The athletic shoe of claim 19, wherein the elastic wrapping strap is dimensioned to pass between the sole pads when it is wrapped around the shoe.

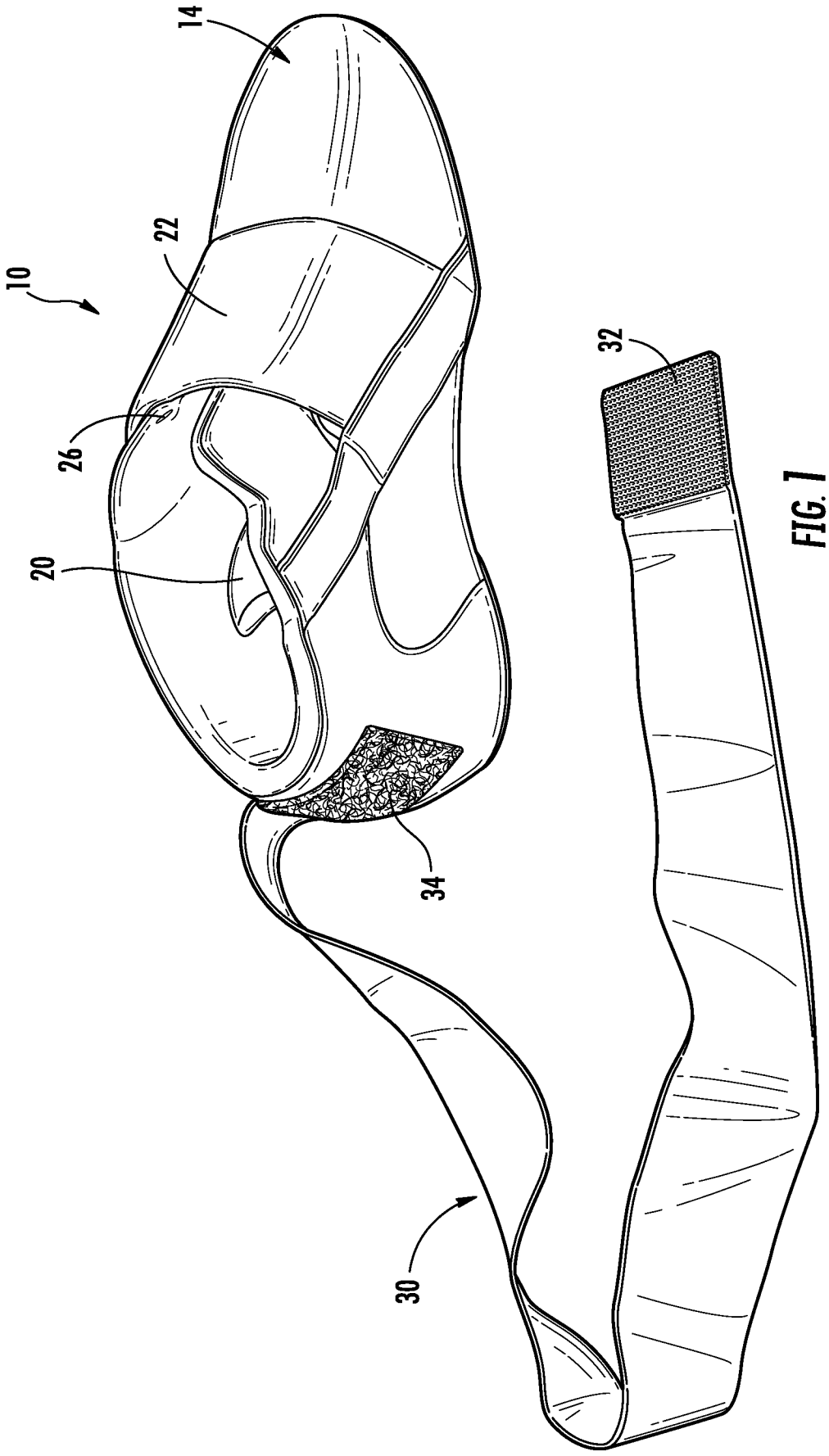


FIG. 1

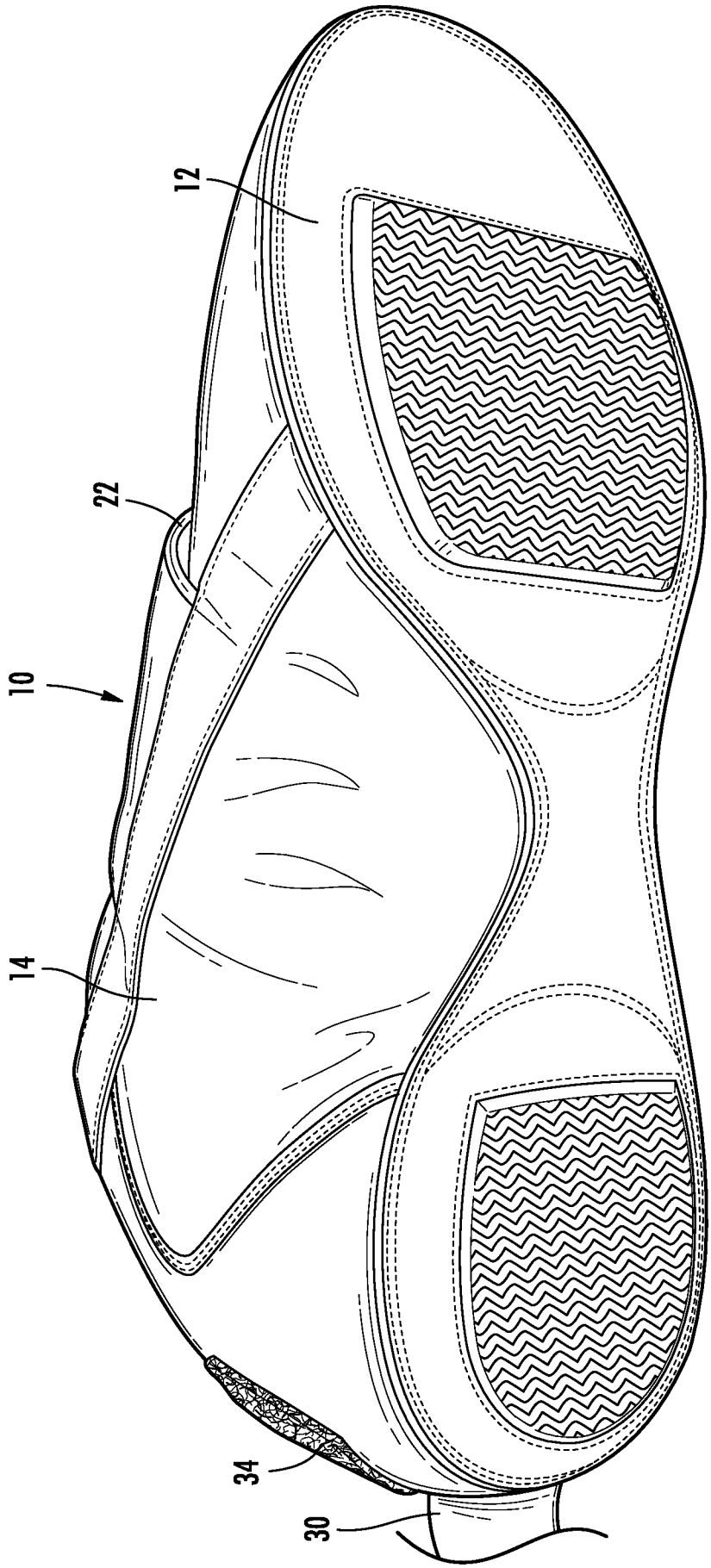


FIG. 2

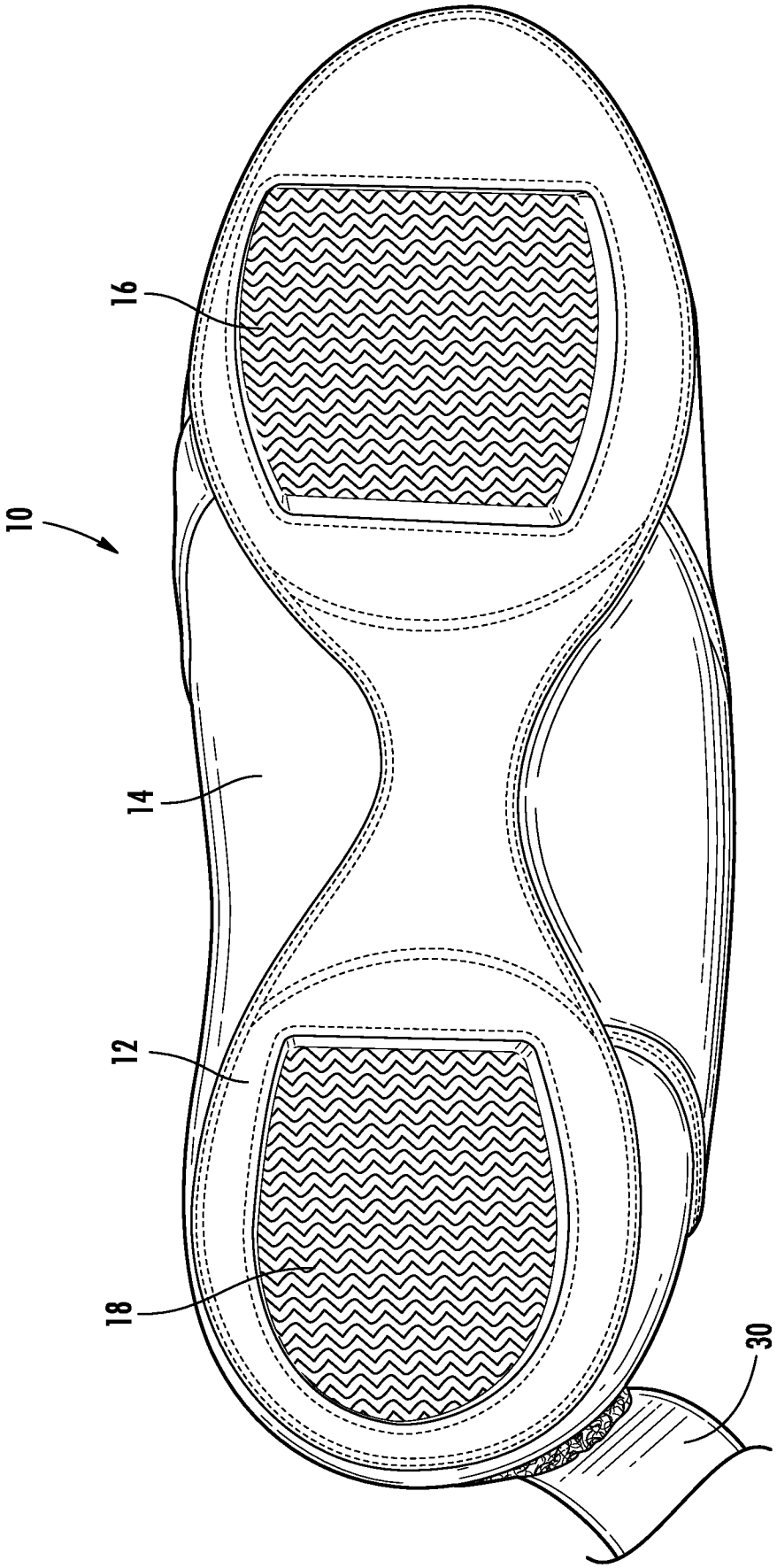


FIG. 3

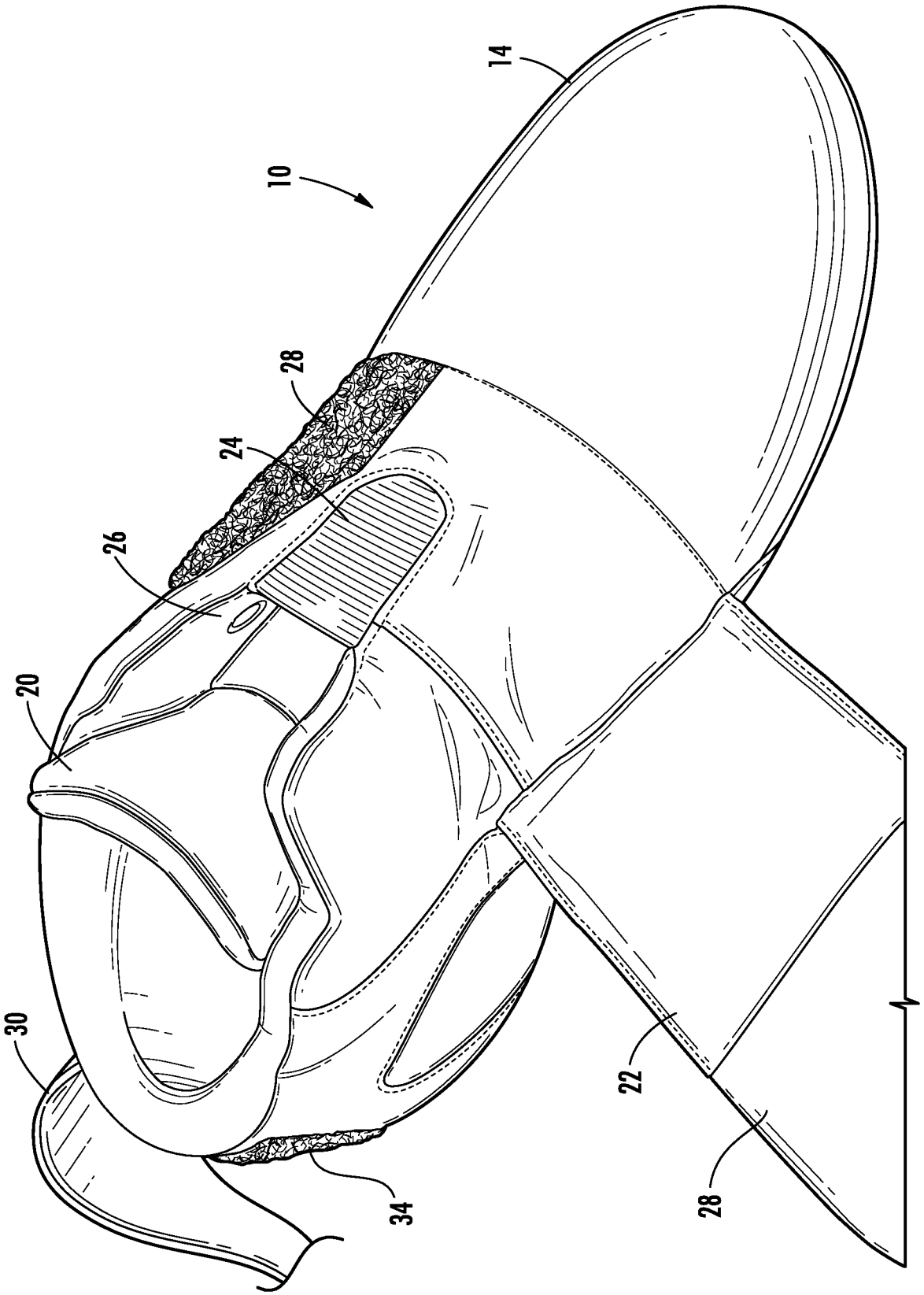


FIG. 4

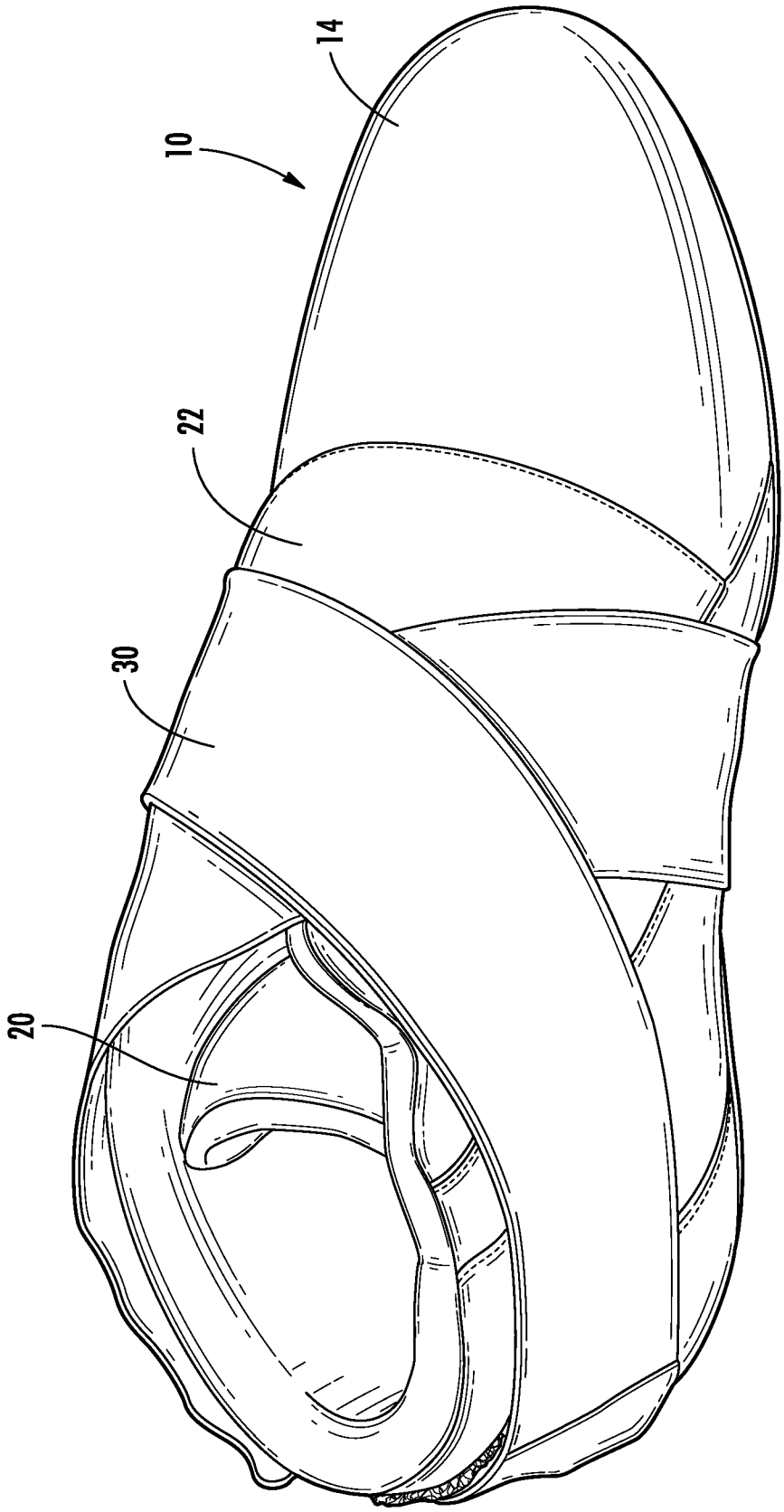


FIG. 5

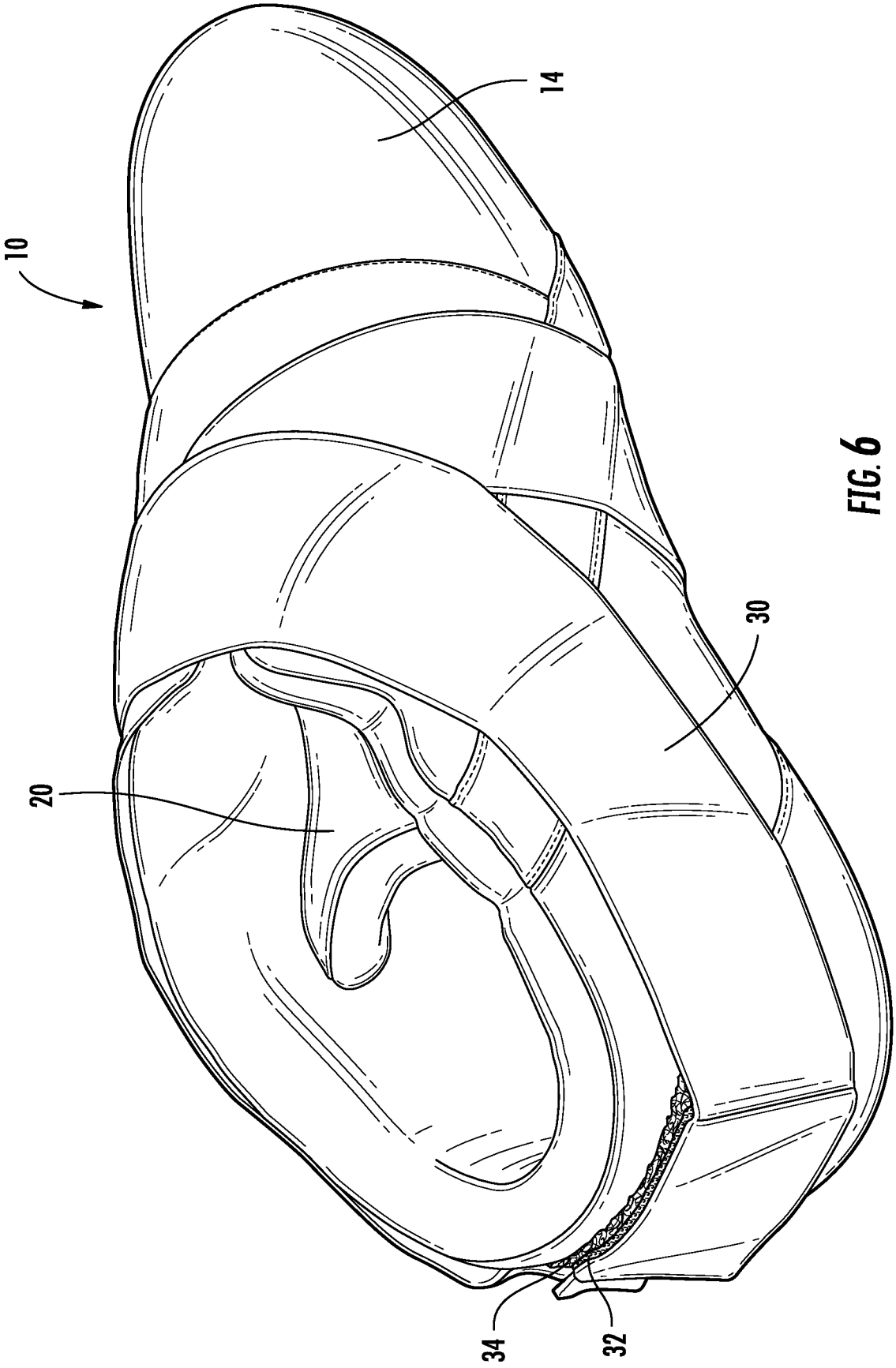


FIG. 6

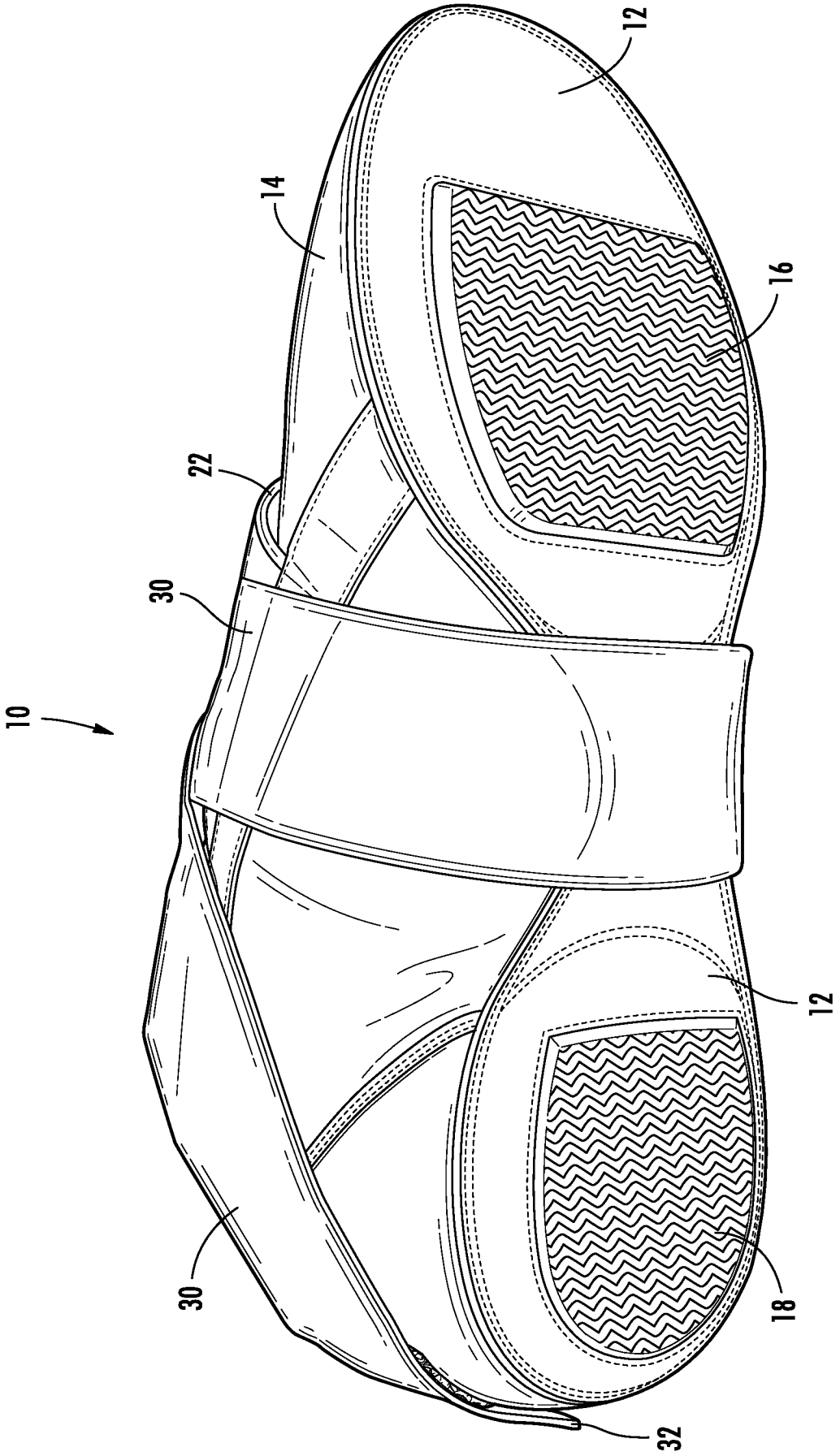


FIG. 7