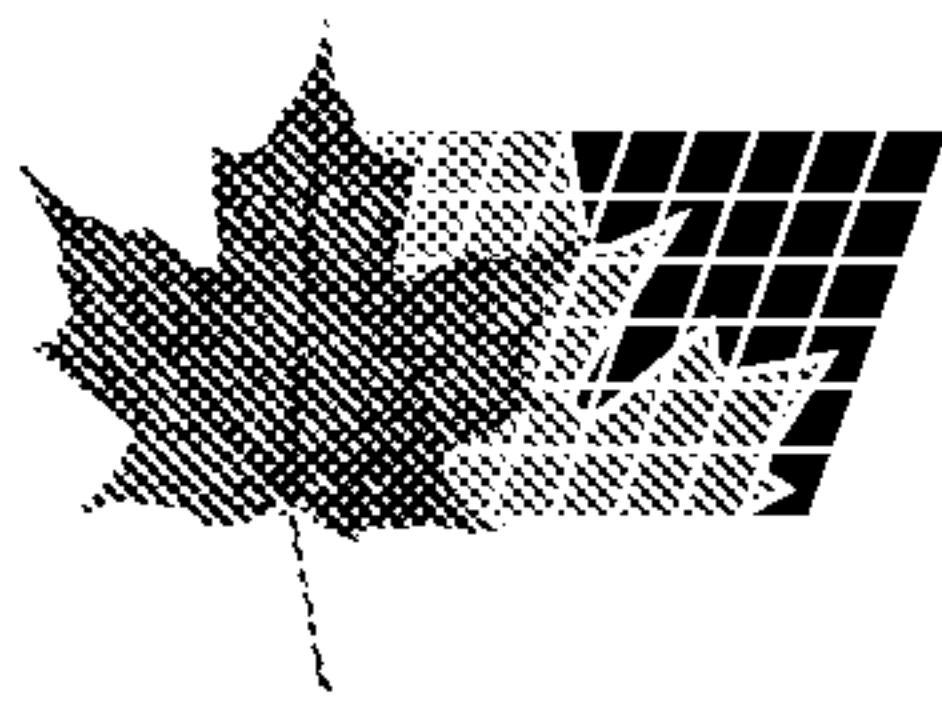




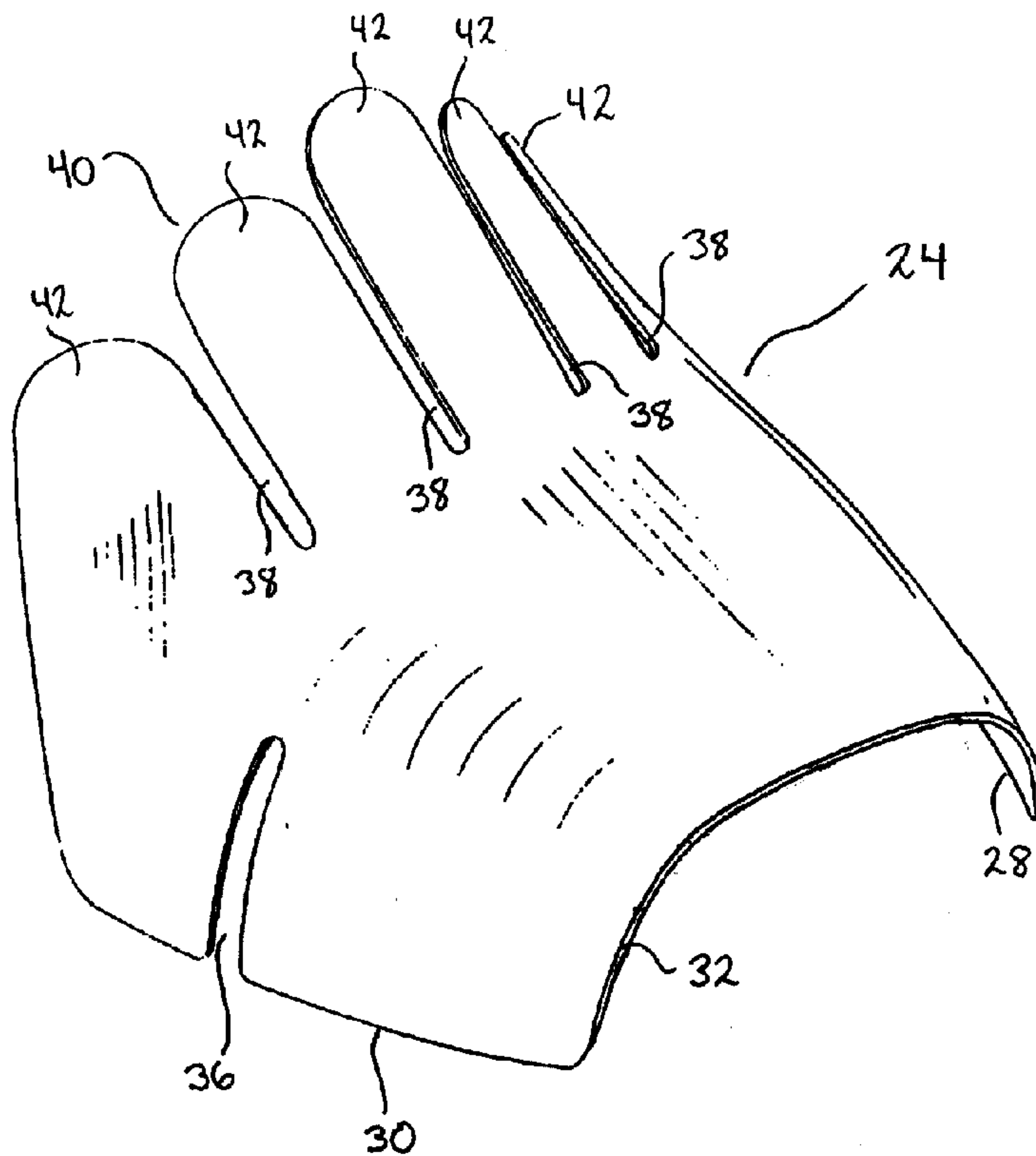
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(54) **CHAUSSURE DE SECURITE COMPRENANT UN PROTECTEUR
METATARSIEN**

(54) **SAFETY SHOE HAVING METATARSAL GUARD**



(57) A safety shoe has a concealed metatarsal guard enclosed, with a rigid toe cap, between the inner and outer layers of the upper of the shoe. The guard defines an arch extending from slightly above the sole on a lateral side of the wearer's instep to slightly above the sole on the medial side of the wearer's instep, and has a rear impact-absorbing portion having longitudinal slits which form a series of longitudinal tongues which spread apart to follow the movement of the foot when the wearer is walking or crouching. The metatarsal guard is further provided with at least one lateral slit which extends transversely from one side of the sole to facilitate flexing of the metatarsal guard upon flexing of the wearer's foot.

ABSTRACT OF THE DISCLOSURE

A safety shoe has a concealed metatarsal guard enclosed, with a rigid toe cap, between the inner and outer layers of the upper of the shoe. The guard defines an arch extending from slightly above the sole on a lateral side of the wearer's instep to slightly above the sole on the medial side of the wearer's instep, and has a rear impact-absorbing portion having longitudinal slits which form a series of longitudinal tongues which spread apart to follow the movement of the foot when the wearer is walking or crouching. The metatarsal guard is further provided with at least one lateral slit which extends transversely from one side of the sole to facilitate flexing of the metatarsal guard upon flexing of the wearer's foot.

SAFETY SHOE HAVING METATARSAL GUARD

FIELD OF THE INVENTION

The invention is a safety shoe having a rigid toe cap and a metatarsal guard.

BACKGROUND OF THE INVENTION

It has been recognized for some time that the addition of metatarsal protection to the standard steel toed safety shoe would be desirable. A number of attempts have been made to produce a suitable product with varying degrees of success.

Metal metatarsal guards were initially provided over the exterior surface of the safety shoe, usually as detachable boot accessories. Built-in metatarsal guards extending rearwardly of the metal toe cap were unsatisfactory due to the added weight and loss of boot flexibility such devices caused. The use of articulated metal guards somewhat addressed the flexibility problem, but sacrificed impact protection.

Recently, several shoes have been disclosed using non-metal metatarsal guards with steel toe caps. These non-metal metatarsal guards either are too rigid to allow the shoe to flex appreciably or sacrifice strength to impart sufficient flexibility to the boot.

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SUMMARY OF THE INVENTION

The present invention overcomes the deficiencies of prior art safety shoes by providing a safety shoe having a metatarsal guard forming an arch extending from slightly above the sole of the safety shoe on one side of the instep of the wearer's foot to the slightly above the sole on the other side of the wearer's instep. The metatarsal guard of the present invention further comprises a rear impact-absorbing portion that is transversely extendable relative to the wearer's foot to prevent the metatarsal guard from impeding movement of the foot when the wearer is walking or crouching. The rear impact-absorbing portion preferably comprises a series of longitudinal slits formed in the metatarsal guard, these slits forming a series of longitudinal tongues capable of spreading apart from each other to follow the movement of the foot of the wearer.

To further assist in flexing of the metatarsal guard, at least one slit is formed in the material comprising the metatarsal guard, extending transversely of the wearer's foot from a lateral edge surface of the metatarsal guard.

The safety shoe according to the present invention preferably also comprises a toe cap with a top surface. It may be preferred to fix the metatarsal guard to the toe cap without impeding flexing of the shoe, for example by a strip of adhesive-backed material, such as adhesive tape, applied to the upper surfaces of the toe cap and the metatarsal guard.

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BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example only, with reference to the appended drawings, in which:

Figure 1 is a perspective, cut away view of a left safety shoe incorporating a metatarsal guard according to the present invention;

Figure 2 is a cut away side elevation view of the shoe and metatarsal guard of Fig. 1; and

Figure 3 is a perspective, isolated view of the metatarsal guard of Figure 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

As shown in Figures 1 and 2, a preferred safety shoe 10 of the invention has a sole 12 which is attached to an upper 14. The toe portion of shoe 10 encloses a rigid toe cap 16 having an upper surface 18, which may preferably be made of a metal such as steel, and which is attached to the sole 12 in a conventional manner. The upper 14 comprises at least inner layer 20 and outer layers 22, with the inner layer 20 preferably being made from a synthetic fabric and the outer layer preferably being made of leather. The inner layer 20 may also include padded portions (not shown). The toe cap 16 is preferably sandwiched between the inner and outer layers 20 and 22 of the upper 14.

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A rigid metatarsal guard 24 is provided in the vamp region 26 of the upper 14, the guard 24 being arched to follow the natural shape of the top of the instep of the human foot, and extending rearwardly and upwardly from the toes to cover the wearer's instep (metatarsal region).

The metatarsal guard 24 is also sandwiched between the inner and outer layers 20 and 22 of the upper 14. Although Figures 1 and 2 illustrate only a left safety shoe and metatarsal guard 24, it will be appreciated that a corresponding right shoe will have a right metatarsal guard which is a substantially identical mirror image of the left metatarsal guard 24. The metatarsal guard is preferably injection moulded from a slightly flexible plastic material, such as high density polyethylene or high density polypropylene.

The metatarsal guard 24 comprises a lateral edge 28 and a medial edge 30 (Figure 3), both of which are located slightly above the top surface of the sole 12 of the safety shoe 10 at the respective lateral and medial edges thereof. The metatarsal guard 24 therefore defines an arch extending from slightly above the sole 12 on the lateral (left or outer) side of the instep of the left foot to slightly above the sole 12 on the medial (right or inner) side of the instep.

The anterior (front) edge 32 of the metatarsal guard 24 is substantially vertically oriented relative to the sole 12 and is spaced rearwardly from the toe cap 16 by a sufficient distance to allow sufficient flexing of the toe portion of the shoe and thereby provide comfort to the wearer. It has been found by the inventors that a spacing of about 5 to 7 mm is preferred. The guard 24 is preferably held in place by virtue of its frictional engagement with the inner and outer layers 20

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and 22 of the upper 14. However, it may be preferred in some preferred embodiments of the invention to fix the metatarsal guard 24 to the upper surface 18 of toe cap 16, such as by fixing a flexible adhesive tape 34 to the outer surfaces of the metatarsal guard 24 and toe cap 16, the adhesive tape bridging the gap between the front edge 32 of metatarsal guard 24 and the toe cap 16. Preferably, as shown in the drawings, the adhesive tape 34 extends from lateral edge 28 to medial edge 30 of metatarsal guard 24.

In order to enhance comfort to the wearer of the shoe 10, and not to impede flexing of the wearer's foot in a walking or crouching position, a side slit 36 is formed in the metatarsal guard 24 and extends upwardly and inwardly from the medial edge 30. Although not shown, it may be preferred in some embodiments of the present invention to provide a similar slit extending upwardly from the lateral edge 28 of the metatarsal guard 24, either in addition to or in substitution for the slit 36 in the medial edge 30.

Flexing of the guard 24 is further enhanced by a transverse series of relatively long and generally longitudinal slits 38 which extend forwardly and downwardly from the rear edge 40 of metatarsal guard 24. These slits 38 form a plurality of adjacent, generally longitudinal tongues 42 which will spread apart from one another to follow the movement of the foot of the wearer when walking or crouching, thereby preventing the metatarsal guard 24 from impeding movement of the wearer.

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While the invention has been described in relation to certain preferred embodiments, it is not intended to be limited thereto. Rather, the invention is intended to include all embodiments which may fall within the scope of the following claims.

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What is claimed is:

1. A safety shoe having toe and vamp regions, comprising:
a sole;
a protective rigid toe cap attached to the sole;
an upper attached to the sole, the upper having inner and outer layers, the toe cap being sandwiched between the layers of the upper; and
a metatarsal guard comprising an arch to cover a wearer's instep and having an impact-absorbing portion having a plurality of laterally spaced apart and generally co-extending slits forming a plurality of laterally adjacent tongues in said metatarsal guard.
 2. The safety shoe of claim 1, wherein said slits and said laterally adjacent tongues are substantially longitudinally directed, said plurality of laterally adjacent tongues being capable of spreading apart from each other to follow the movement of the foot when the wearer is walking.
 3. The safety shoe of claim 1, wherein said metatarsal guard is injection moulded from a slightly flexible plastic material.
 4. The metatarsal guard of claim 3, wherein said plastic material comprises high density polyethylene.
 5. The metatarsal guard of claim 3, wherein said plastic material comprises high density
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polypropylene.

7. The safety shoe of claim 1, wherein the forward edge of the metatarsal guard is spaced from a trailing edge of the toe cap by a gap of about 5 to 7 mm.

8. The safety shoe of claim 7, wherein said gap between said toe cap and said metatarsal guard is bridged by a piece of adhesive-backed material which is adhered to an outer surface of the metatarsal guard and an outer surface of the toe cap.

9. The safety shoe of claim 1, wherein said metatarsal guard is provided with a slit extending transversely from a lateral edge of the metatarsal guard.

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FIG. 1

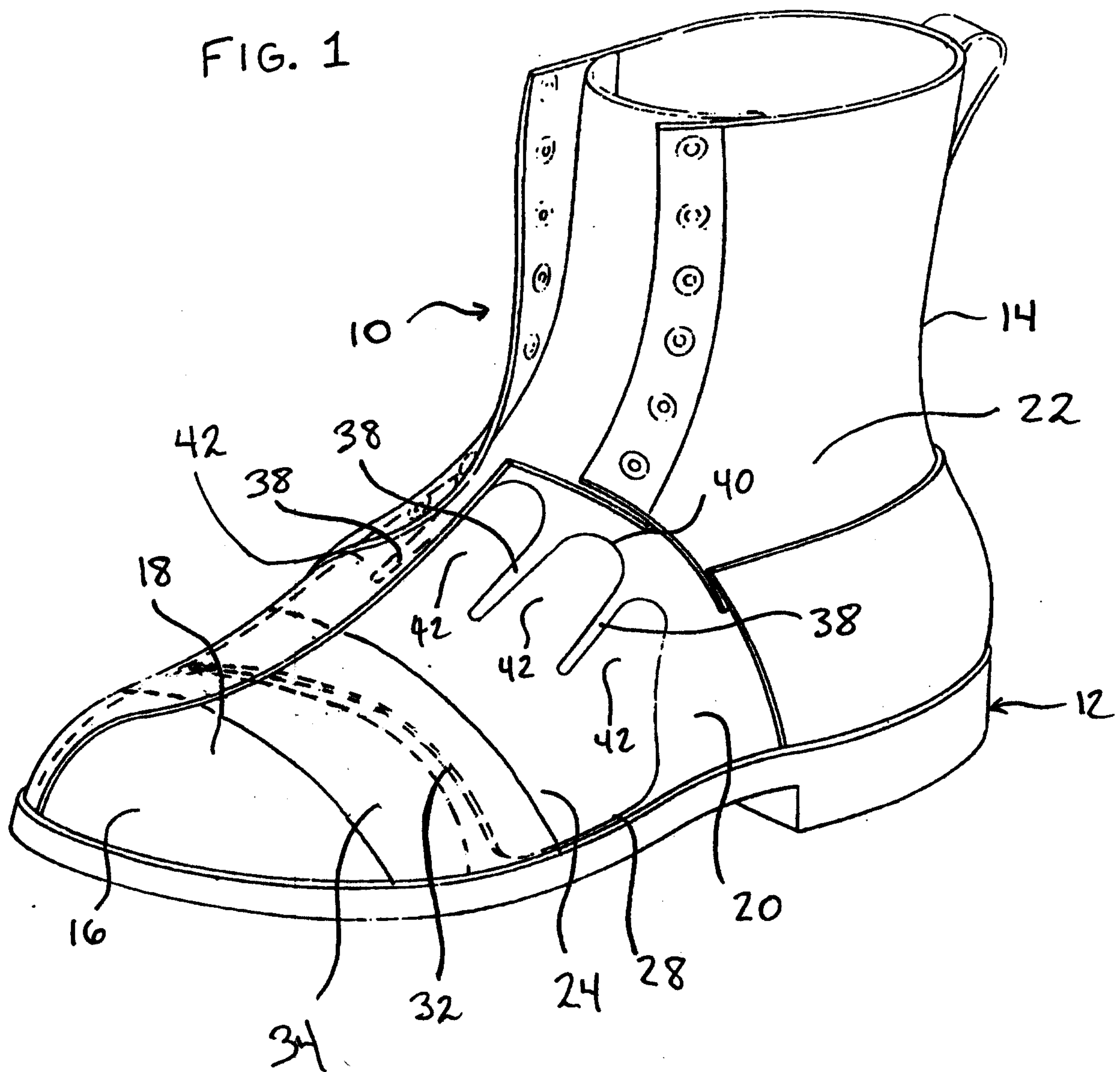


FIG. 2

