March 29, 1966 E. N. GEORGE ETAL 3,242,597

SAFETY SHOE

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FIG.1

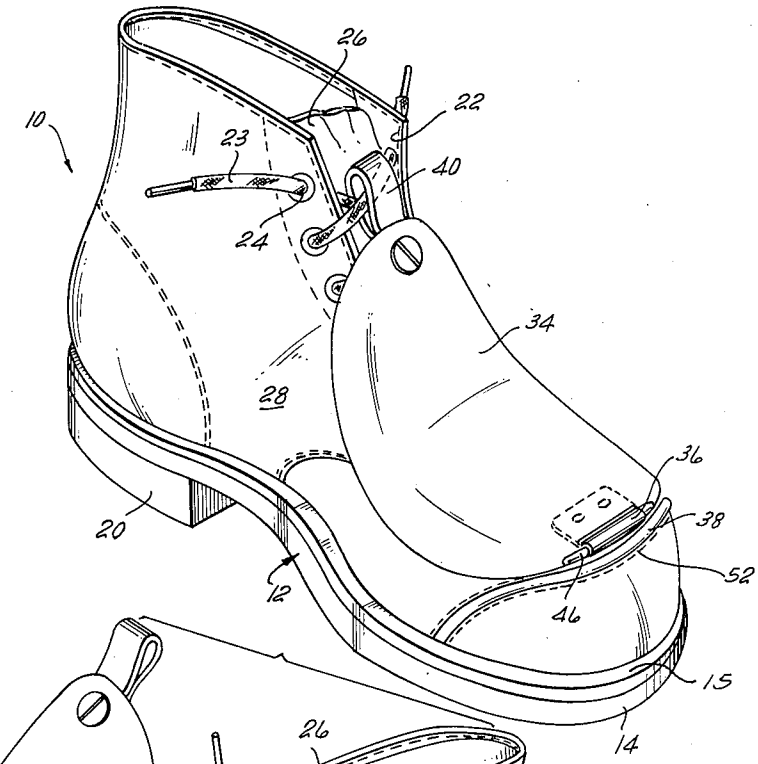
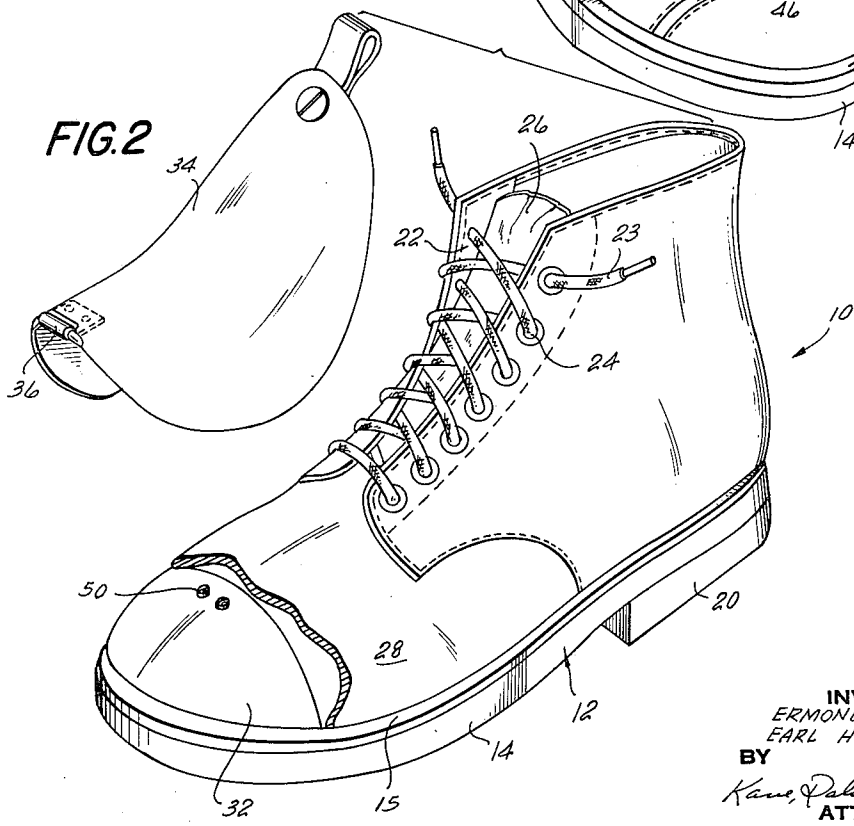


FIG.2



INVENTORS
ERMOND N. GEORGE
EARL H. INGALLS
BY
Kane, Dalsimer & Kane
ATTORNEYS

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FIG. 3A

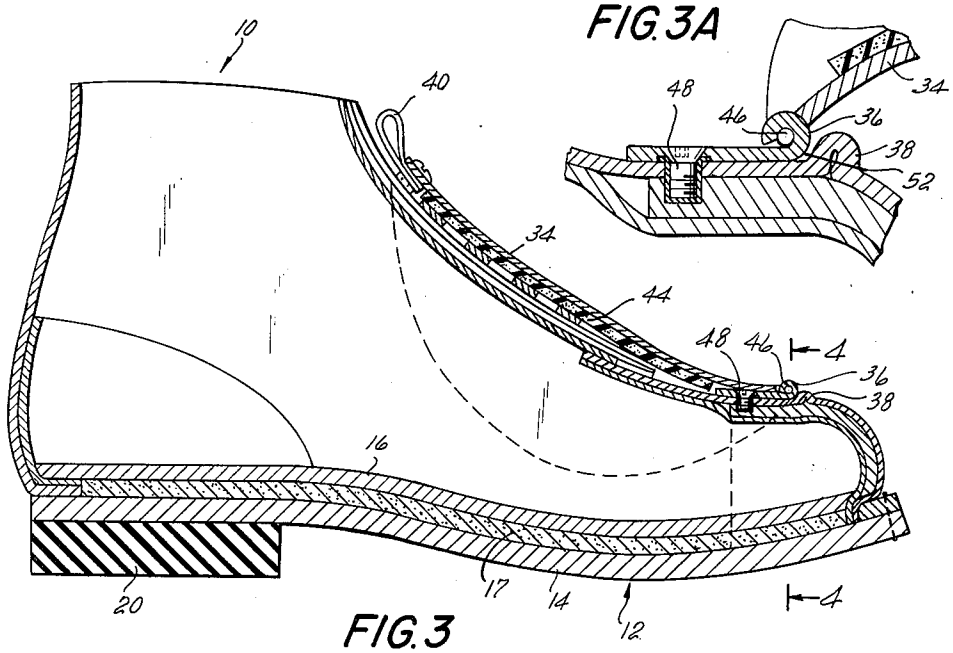
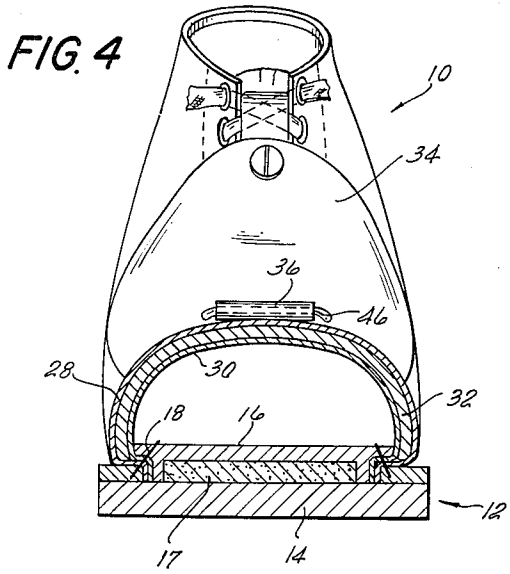


FIG. 3

FIG. 4



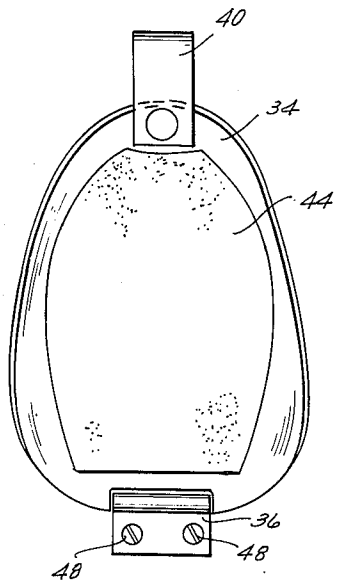


FIG. 5

INVENTORS
ERMOND N. GEORGE
EARL H. INGALLS
BY
Kane, Dalsimer & Kane
ATTORNEYS

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SAFETY SHOE

Ermond N. George, Endicott, and Earl H. Ingalls, Maine, N.Y., assignors to Endicott Johnson Corporation, Endicott, N.Y., a corporation of New York

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1 Claim. (Cl. 36—72)

The present invention pertains to an improved safety shoe of the type which affords protection to the toe, metatarsal and instep portions of the foot of the wearer.

Heretofore safety shoes have been provided, having built-in metal box toes to protect the toe portion of the foot. Certain of these shoes have had flaps pivotally connected to the toe portion so that the flap can be pivoted upwardly to facilitate the insertion and removal of the foot of the wearer and downwardly to operative position to afford protection to the metatarsal and instep portions of the foot. Attempts have also been made to prevent wires and other sharp objects from penetrating beneath the lower end of the guard flap and becoming entangled with the guard flap. Thus, leather hinge tabs have been extended across the toe portion of the shoe and secured to the forward end of the guard flap.

Tabs of this type have presented a number of disadvantages. Thus, a leather tab such as this does not have the stability of a metal hinge. In addition, the toe portion of a shoe is transversely convex and when the tab is secured to the forward end of the guard for the major portion of the width of the toe, it interferes with the proper pivoting or hinging of the flap. Furthermore, assemblies of this type have presented manufacturing problems and, in addition, the guard flap has usually been permanently secured in place so that it cannot be readily replaced when damaged.

It is an object of the present invention to overcome the difficulties and disadvantages heretofore encountered and to provide an improved safety shoe of the type having a built-in metal toe box and a guard flap affording protection to the metatarsal and instep portions of the shoe in which the flap is mounted in an improved manner affording stability to the assembly; in which the guard flap may be readily replaced; which has an improved type of hinge mounting enabling the flap to be readily pivoted between elevated inoperative position and lowered operative position; and which also is provided with an improved form of barrier to prevent wires and sharp objects from entering beneath the guard flap and becoming entangled therewith.

A further object is the provision of an improved safety shoe of the type described above which is relatively simple and inexpensive to manufacture and assemble.

The invention contemplates the provision of an improved safety shoe having a guard flap removably secured to the rigid box toe by means of a relatively narrow hinge and having a barrier in the form of an upwardly projecting bead formed in the shoe upper above the metal box toe and extending across the toe portion of the shoe in close proximity to the forward edge of the guard flap when in operative position so as to prevent the insertion of sharp objects beneath the flap.

In the accompanying drawings:

FIG. 1 is a perspective view of a safety shoe embodying the invention;

FIG. 2 is an exploded view showing the guard flap detached from the shoe and showing the leather of the shoe upper in the toe portion broken away to expose the metal box toe;

FIG. 3 is a longitudinal sectional view through the safety shoe with the guard fiap in operative position;

FIG. 3*a* is a detailed sectional view on an enlarged scale illustrating the detachable hinge connection between the guard flap and the metal box toe of the shoe with the guard flap pivoted upwardly to operative position;

FIG. 4 is a cross-sectional view through the toe portion of the shoe in the direction of the arrows on the line 4—4 of FIG. 3; and

FIG. 5 is a plan view of the lower surface of the guard flap and detachable hinge connection.

We have illustrated one form of shoe in the accompanying drawings to which the invention may be applied. The shoe comprises generally an upper assembly **10** secured to the sole assembly **12**.

The sole assembly comprises generally an outsole **14** and an insole **16** with a filler portion **17** between the outsole and insole at the central portion thereof. The outsole **14** has a marginal portion projecting beyond the front and sides of the shoe upper and a welt **15** extends around and is secured to the upper surface of this marginal portion of the sole.

It will be seen that the insole, upper and lining are secured to the welt by a line of stitching **18**. The welt in turn is suitably secured to the marginal area of the outsole in some suitable manner as by stitching or an adhesive or both. The rear portion of the sole assembly has a heel **20** secured thereto in the usual manner.

The upper **10** is open at the top in the usual manner and the forward face of the upper is provided with a closable opening **22** which may be opened or closed in the usual manner by means of a conventional shoelace **23** which engages with the eyeletted openings **24**. A suitable tongue or gusset may be provided inside the opening in the usual manner, as shown at **26**, so as to breach the gap when the shoe has been laced. The shoe upper is made of an outer layer of a suitable flexible tough material, such as leather, as shown at **28**. All or a portion of the shoe may be lined in the usual manner, as indicated at **30**.

As indicated most clearly in FIG. 4, the shoe upper, lining and insole are all secured to the welt **15** as by means of a line of stitching **18**.

The shoe preferably embodies a safety box toe **32** positioned in the toe portion of the upper between the outer layer **28** and the lining **30**, Thus, the safety box toe is permanently secured in the toe portion of the shoe and it rests on or finds support on the welt portion of the toe of the sole assembly. Thus, any blow or impact imparted to the safety box toe is transmitted directly to the sole.

The safety box toe may be of the conventional type made of a suitable rigid material such as metal, for example, brass or an aluminum alloy or preferably steel.

The shoe illustrated and described herein is one conventional type of safety shoe having a metal box toe and is illustrative of the type of shoe to which the invention is applicable.

In carrying out the present invention a guard flap **34** is detachably and pivotally connected to the toe portion of the shoe by means of a relatively narrow metal hinge **36**, and a barrier in the form of an upwardly projecting bead **38** is extended across the toe portion of the shoe in close proximity to the forward edge of the guard flap so as to prevent the insertion and entanglement of wires and other sharp objects beneath the forward edge of the guard flap when it is in operative position.

The guard flap is made of a suitable high impact rigid material capable of affording adequate protection to the foot of the wearer against blows or impact. It is preferably made of a strong metal, such as steel, but it also may be made of other rigid high impact materials, such as resin reinforced fiberglass or high impact plastics,

such as polystyrene, polyvinyl, polyethylene or polyurethane. As shown, the guard flap is long enough to extend from overlapping relationship with the rear portion of the metal box toe over the metatarsal and instep portions of the shoe upper. It is transversely concave on its inner surface and transversely convex on its outer surface and it is longitudinally convex on its inner surface and longitudinally concave on its outer surface. Thus, it is shaped to conform generally with the metatarsal and instep portions of the shoe upper. It is wide enough to extend across the whole central portion of the shoe upper and to overlap the sides thereof.

A suitable fastener, such as loop **40**, is preferably attached to the upper portion of the guard flap as by means of a screw or rivet so that the shoelaces may be extended through the loop in the manner shown in FIG. 1 so as to retain the guard flap in upwardly pivoted operative position when in use.

A suitable pad or lining of flexible, yielding, resilient material is preferably suitably secured to the under surface of the guard flap as by an adhesive, as shown at **44**. The pad should be made of a suitable flexible, yielding and resilient shock-absorbing material such as foam rubber, a foam resin or plastic, for instance polyurethane or polyvinyl foam or from soft rubber or felt. The pad provides additional protection and absorbs some of the shock when a blow, force or impact is applied to the flap **34**.

A hinge **36** is connected to the forward portion of the guard flap **34** and rests on the toe portion of the shoe upper and is secured to the metal box toe. One of the connections should be detachable. In the illustrated embodiment the hinge is permanently secured to the guard flap by being formed with a tubular portion pivotally engaging the pin or rod **46** secured to the leading edge of the guard flap at its opposite ends and extending across a recess formed in the central portion of the forward edge of the flap. The hinge has a flat plate portion, as shown most clearly in FIGS. 3 and 5, which is detachably secured to the metal toe box in a suitable manner, or, for instance, by means of a pair of threaded studs or machine screws **48** extending through the plate and the leather covering of the toe portion into threaded engagement with the internally threaded tubular grommets **50** suitably secured, as by brazing or welding, to the box toe near the rear edge thereof. The grommets may extend through the leather upper as shown and the threaded openings in the grommets may extend through the metal box toe or terminate at the upper surface thereof as shown.

Thus, the guard flap is readily replaceable by simply removing the screws **48** from engagement with the box toe.

As previously indicated, the hinge should be relatively narrow, as for instance, no more than approximately an inch in width, so as to avoid interfering with the pivoting of the guard flap due to the transverse curvature at the toe portion of the shoe. It should also preferably be made of metal, such as steel, so as to provide stability and strength to the mounting.

As indicated above, a barrier in the form of a bead **38** is extended across the toe portion of the shoe upper above the metal box toe in close proximity to the forward edge of the guard flap when in operative position so as to prevent the insertion of sharp objects, such as wires, and to prevent entanglement with the guard flap. The bead may be suitably formed as by deforming the leather of the shoe upper upwardly in inverted U form and extending a line of stitching therethrough, as indicated at **52**. The bead should be high enough to extend over any space between the shoe upper and the lower surface of the forward edge of the guard flap. Thus, the beaded surface is both a barrier to prevent sharp objects from entering beneath the guard flap and a deflector to deflect any sharp objects which may be encountered.

A safety shoe embodying the present invention is assembled in the manner illustrated and described herein. In using the shoe, the guard flap **34** is pivoted upwardly

to permit unlacing of the shoe and insertion of the foot of the wearer into the shoe. Thereafter, the guard flap is pivoted downwardly to operative position and the shoelaces are extended through the loop **40** and then laced and tied. When the guard flap is thus applied to the shoe and in operative position it affords protection to the metatarsal and instep portions of the foot of the wearer. Should any force or impact be applied to the upper surface of the guard flap it finds support from the safety toe box which it overlaps and to which it is pivotally connected.

The shoe may be readily removed by untying the laces, pivoting the guard flap upwardly and opening the front portion of the shoe to permit the withdrawal of the foot.

From the foregoing it will be seen that the safety shoe disclosed herein is provided with a guard flap which is mounted in an improved manner affording stability to the assembly. In addition, the guard flap may be readily replaced; has an improved type of hinge mounting enabling the flap to be readily pivoted between elevated inoperative position and lowered operative position; and also is provided with an improved form of barrier to prevent wires and sharp objects from entering beneath the guard flap and becoming entangled therewith.

Modifications may be made in the illustrated and described embodiment of the invention without departing from the invention as set forth in the accompanying claim.

We claim:

A safety shoe comprising: a sole assembly; a shoe upper secured to the sole assembly and made of flexible material and having a toe, metatarsal and instep portions with a relatively rigid metal box toe permanently built into the toe portion inside the shoe upper and supported on the sole assembly and with the flexible shoe upper material extending over the metal box toe, said box toe having a pair of transversely spaced internally threaded metal ferrules mounted on the upper surface thereof adjacent the center of the trailing portion thereof and extending upwardly through the flexible shoe upper material; a guard flap of longitudinal and transversely concavo-convex configuration with the inner surface being longitudinally convex and transversely concave and with a convexly curved forward edge, said guard flap extending from overlapping relationship with the rear of the box toe over the metatarsal and instep portions of the shoe upper; relatively narrow hinge means hingedly and removably securing the central portion of the forward edge of the guard flap to the rear portion of the metal box toe so that it can be pivoted upwardly to facilitate the insertion or the removal of the foot of the wearer and downwardly into operative position, said hinge means comprising a first hinge plate secured to the undersurface of the forward portion of the guard flap and a second hinge plate resting on the ferrules and shoe upper material above the central rear portion of the metal box toe and releasably secured thereto by screws extending through the second hinge plate into the ferrules with said first hinge plate resting on the second hinge plate and with the forward edges of the hinge plates being pivotally secured together; and a barrier in the form of an upwardly projecting bead formed in the shoe upper above the metal box toe and extending across the toe portion of the shoe and in front of the hinge in a curve conforming with the forward edge of the flap in close proximity thereto when the flap is in operative position so as to prevent the insertion of objects beneath the flap when in such operative position.

References Cited by the Examiner

UNITED STATES PATENTS

3,068,593	12/1962	O'Donnell	36—72
3,082,553	3/1963	Wilmanns	36—72
3,101,559	8/1963	Smith	36—72
3,175,310	3/1965	MacQuaid	36—72

FRANK J. COHEN, *Primary Examiner.*