March 30, 1965 C. MacQUAID 3,175,311

PROTECTIVE WORK SHOE

Filed March 20, 1964

Fig. 1.

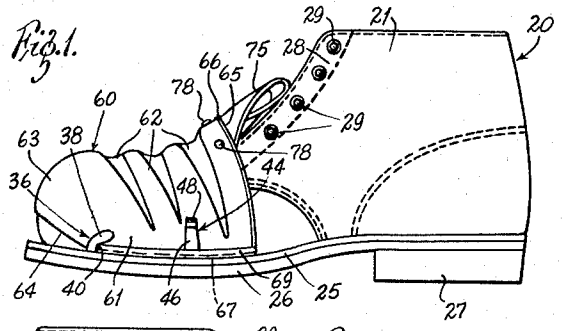


Fig. 2.

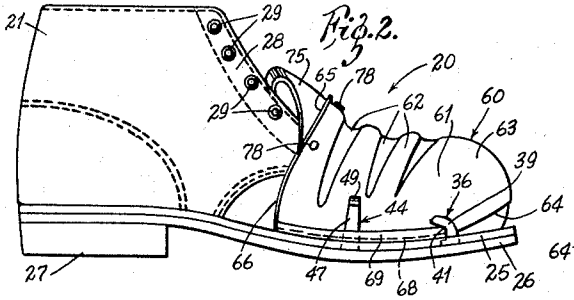


Fig. 3.

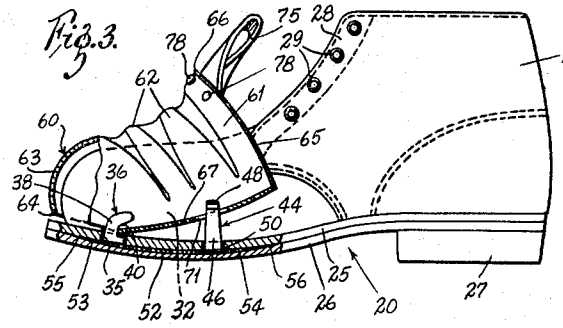


Fig. 4.

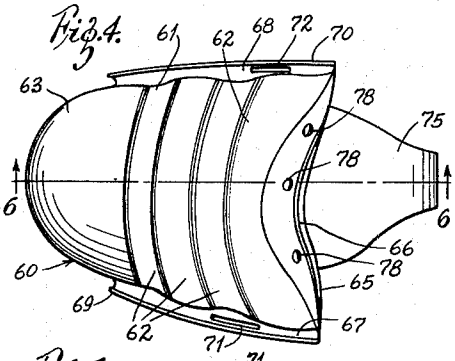


Fig. 5.

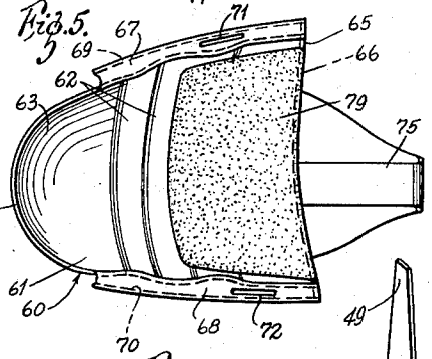


Fig. 8.

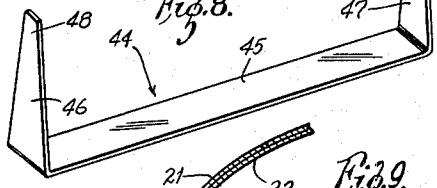


Fig. 9.

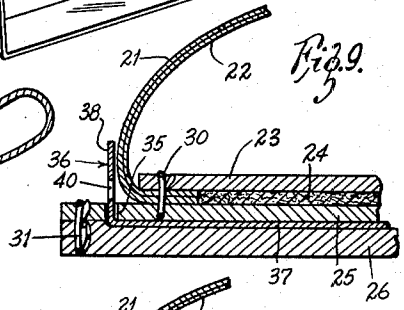


Fig. 10.

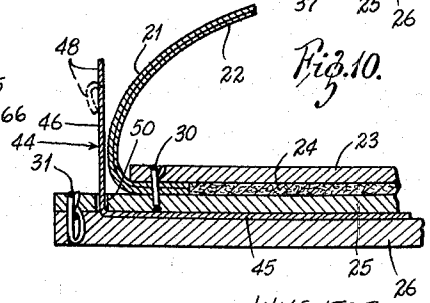


Fig. 6.

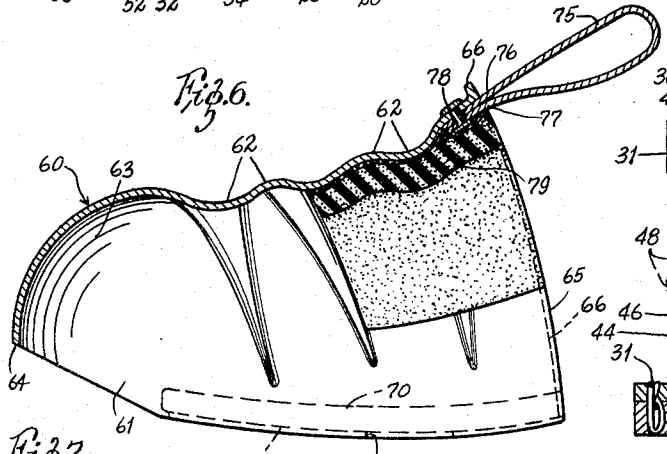
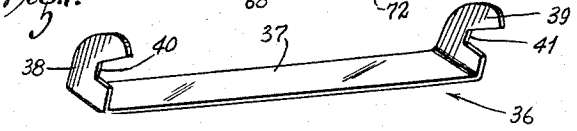


Fig. 7.



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3,175,311

PROTECTIVE WORK SHOE

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5 Claims. (Cl. 36—72)

This invention relates to a protective work shoe, and particularly to a work shoe having an instep guard with lower sides resting upon the sole of the shoe and with means to keep the sides from spreading beyond the side edges of the sole. Thus, loads resulting from blows applied to the guard are transmitted through the guard directly to the sole of the shoe.

In general, the shoe has an upper and a liner which are fastened by lockstitching to an insole and to a midsole. An outsole is fastened by stitching to the midsole. The shoe preferably has a steel toe cap. A single piece lateral stop bracket has a base mounted between the midsole and the outsole at the ball area of the shoe and has side members extending upwardly through slots in the midsole along the opposite sides of the upper. Another single piece pivot bracket is mounted with its base positioned between the midsole and the outsole at the toe area of the shoe. The pivot bracket has pivot arms extending above the midsole. The instep guard comprises a shell extending across the toe and instep portions of the shoe. The sides of the guard extend down to the upper surface of the sole of the shoe. The shell is preferably made of steel. It has corrugations extending laterally across its surface, and has flanges to give it added strength. The lower sides which rest upon the upper surface of the midsole are defined by horizontal bearing walls, each of which has an outer upwardly extending flange for strength. The instep guard pivots about the pivot end while the side members on the lateral stop bracket project through slots in the horizontal bearing walls on the instep guard. The side members therefore permit the guard to pivot with motions of the shoe when it is being worn, but laterally restrain the sides of the guard and hold them over the midsole. A flexible leather loop which is riveted to the upper rear edge of the steel guard is held by the shoelaces to the shoe, but permits pivotal action as necessary for comfort when the shoe is worn.

The principal object of this invention is to provide a protective shoe having a strong instep guard with means for positively restraining lateral spreading of the sides of the guard and for holding these sides over the upper surface of the sole of the shoe.

Another object of the invention is to provide a work shoe with an instep guard and with a single piece lateral stop bracket having a base mounted between sole layers and having sides extending upwardly above the sole to prevent lateral spreading of the sides of the guard.

Another object of the invention is to provide a steel instep guard on a work shoe having corrugations and flanges to give it added strength with steel bracket members for preventing lateral spreading of the guard when heavy blows are imparted to the guard.

Other objects and advantages will appear.

In the drawings:

FIGURE 1 is a left side elevation view of a shoe for a right foot;

FIGURE 2 is a right side elevation view of the shoe;

FIGURE 3 is a left side elevation view of the shoe with the instep guard raised and with portions of the instep guard shown and shoe shown in section;

FIGURE 4 is an enlarged top plan view of the instep guard;

FIGURE 5 is an enlarged bottom plan view of the instep guard;

FIGURE 6 is a view in section on an enlarged scale taken along the line 6—6 of FIGURE 4;

FIGURE 7 is an enlarged isometric view of the pivot bracket before being installed on the shoe;

FIGURE 8 is an enlarged isometric view of the lateral stop bracket before being installed on the shoe;

FIGURE 9 is an enlarged fragmentary view in transverse section through the left side of the shoe where the pivot bracket is mounted and with the instep guard removed; and

FIGURE 10 is an enlarged fragmentary view in transverse section through the left side of the shoe where the lateral stop bracket is mounted and with the instep guard removed.

Referring now to the drawings, the shoe **20** has the usual parts including an upper **21**, and as particularly shown in FIGURES 9 and 10, a lining **22**, an insole **23**, and a filler **24** that is about as thick as the upper **21** and lining **22** combined. Below these parts, there are a midsole **25** and an outsole **26**. A heel **27** is fastened by conventional means to the outsole **26**.

The upper **21** has the usual vamp **28** with eyelets **29** through which a shoestring can be laced.

The midsole **25** is fastened to the upper **21**, the lining **22** and the insole **23** by lockstitching **30**. The outsole **26** is joined to the midsole **25** by stitching **31**.

In addition to the foregoing, the shoe preferably has a conventional steel reinforcing toe cap that is not shown in the drawing except for the dotted line **32** in FIGURE 3 indicating the back edge of such a toe cap.

The midsole **25** has two slots **35** through it on opposite sides of the upper **21**. The slots **35** are about an inch or an inch and one-half back from the front of the shoe. There is a pivot bracket **36** which, as shown in FIGURE 7, comprises a horizontal base **37** and vertical side arms **38** and **39**. There are slots **40** and **41** opening to the rear edges of the pivot arms **38** and **39**. The pivot bracket **36** is mounted on the shoe with the base **37** positioned between the midsole **25** and the outsole **26**. The vertical pivot arms **38** and **39** extend through the slots **35** with the recesses **40** and **41** directed rearwardly. The pivot arms **38** and **39** are spaced laterally about ⅛" or less from the sides of the upper **21**.

Spaced to the rear of the pivot bracket **36** at the ball portion of the shoe, there is a lateral stop bracket **44**. As shown in FIGURE 8, the lateral stop bracket **44** comprises a horizontal base **45** and vertical side members **46** and **47**. The side members **46** and **47** are tapered somewhat toward their upper ends **48** and **49**.

The midsole **25** has two slots **50** through its opposite sides, as shown in FIGURES 3 and 10. The bracket **44** is mounted on the shoe with the base **45** positioned between the midsole **25** and the outsole **26** and with the side members **46** and **47** projecting through the slots **50**. The side members **46** and **47** are spaced from the outer surface of the upper **21** by about ⅛".

Both the pivot bracket **36** and the lateral stop bracket **44** are made of steel up to 16 gauge. Therefore, when positioned between the midsole **25** and the outsole **26**, they occupy a significant space because of their thickness. To mask the presence of the pivot bracket **36** and lateral stop bracket **44**, there is a cork layer **52** between the midsole **25** and the outsole **26**, and between the brackets **36** and **44**. The cork layer **52** is approximately equal in thickness to the thickness of the bases **37** and **45**. Additional cork layers **53** and **54** are positioned between the midsole **25** and outsole **26**, one being in front of the pivot bracket **36** and the other being in back of the lateral stop bracket **44**. The cork layers **53** and **54** taper to thin edges

55 and 56, respectively. All the cork pieces 52, 53, and 54 are glued in position and are entirely within the outer stitching 31.

The instep guard 60 comprises a shell 61 of about 16 gauge steel having transverse corrugations 62. When the instep guard 60 is on the shoe, as illustrated in FIGURE 1, the toe portion 63 thereof fits over the steel toe cap 32, but the front edge 64 of the guard is spaced above the midsole 25. The guard 60 extends across the instep portion of the shoe, and its rearward edge 65 has an upturned flange 66 that extends across the top and down the sides of the guard. The flange 66 is about 1/8" to 3/16" wide.

There are two horizontal bearing walls 67 and 68 projecting laterally outwardly from the lower sides of the steel shell 61, with upturned flanges 69 and 70 along the outer edges of these bearing walls 67 and 68. The flanges 69 and 70 are about 1/8" to 3/16" high. Longitudinal slots 71 and 72 a little longer than the width of the side members 46 and 47 are cut in the horizontal bearing surfaces 67 and 68.

A leather strip 75 is doubled over on itself to form a loop, and its ends 76 and 77 are fastened by rivets 78 to the underside of the steel shell 61. A foam rubber pad or other resilient cushion 79 is then glued to the under surface of the steel shell 61, as illustrated particularly in FIGURES 5 and 6.

The instep guard 60 is fitted on the shoe 20 by sliding the front edges of the horizontal bearing walls 67 and 68 into the recesses 40 and 41 on the pivot bracket 36. Then the instep guard is swung down until the side members 46 and 47 on the lateral stop bracket 44 project through the slots 71 and 72. After this, the upper ends 48 and 49 on the side members 46 and 47 are bent over, as illustrated in FIGURES 1, 2 and 3, and the instep guard 60 cannot be removed from the shoe 20, the forward end of the guard being retained by the upper edges of the pivot bracket recesses 40 and 41.

In use

This shoe 20 can be put on and taken off by the wearer as easily as any other shoe. The shoestrings are laced through the eyelets 29, but they cross through the loop 75. Since the loop 75 is made of leather that will flex, the guard follows the motion of the shoe 20 as the wearer walks. The elevated lower toe edge 64 allows the guard 60 to pivot about the pivot bracket arms 38 and 39 between the position illustrated in FIGURE 1 and the position illustrated in FIGURE 3, limited by the bent over ends 48 and 49 on the side members 46 and 47. When the guard 60 is in the position illustrated in FIGURE 1, the horizontal bearing walls 67 and 68 rest upon the upper surface of the midsole 25.

When a heavy blow hits the instep guard 60, it is transmitted from the top of the guard down the sides to the horizontal bearing walls 67 and 68. Since these bearing walls 67 and 68 rest upon the midsole 25, the force of the blow is transmitted directly through the midsole and the outer sole 26 to the floor under the shoe.

Such heavy blows applied against the top of the guard 60 tend to spread the sides, and normally would cause the bearing walls 67 and 68 to spread beyond the midsole 25. This would allow the guard to swing down against the foot and cause injury. However, the lateral stop bracket 44 holds the sides of the guard inwardly. The side members 46 and 47 which extend through the slots 71 and 72 hold the bearing walls 67 and 68 on the upper surface of the midsole 25. Since the lateral stop bracket 44 is made in one piece with the base 45 connecting the side members 46 and 47, these side members 46 and 47 cannot yield. Since the applied force exerts both a downward and lateral force, there is great resistance to bending of the side members 46 and 47, and most of the lateral force tending to spread these sides of the guard 60 is taken by the side members 46 and 47 in shear.

The flange 66 across the rear edge of the guard 60 adds

strength as do the corrugations 62. With the foregoing construction, the guard 60 has been found capable of withstanding forces up to 200 foot pounds with no impression upon a wax foot.

Various changes and modifications may be made within the purview of this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended thereto.

What is claimed is:

1. A work shoe having an upper and a sole, the sole being formed of at least two layers fastened together, an instep guard overlying the toe and instep portions of the shoe, means near the forward end of the instep guard and fastened to the shoe for pivotally supporting the guard, and a lateral stop bracket including a base mounted between the sole layers, the bracket having generally vertical side members extending from the base upwardly beyond the upper surface of the sole, the sides of the guard extending between the outer surface of the upper and the adjacent side members of the bracket, the instep guard having horizontal walls projecting outwardly from the lower sides thereof with slots through the walls through which the said side members project.

2. The combination of claim 1 wherein the instep guard is formed of steel and has transverse corrugations in it.

3. The combination of claim 1 wherein the upper ends of the side members are bent over to provide a double thickness which will not pass through the slot.

4. A protective work shoe having an upper, an insole, a midsole and an outsole; the upper, insole and midsole being fastened together by lock stitching around the outer periphery of the insole, a single piece lateral stop bracket having a base mounted between the insole and the midsole and extending laterally between the sides of the insole and the midsole, the bracket having vertical side members extending upwardly from the base, the midsole having slots in it through which the side members project, an instep guard, means for pivotally mounting the instep guard to pivot with the shoe as it is flexed in walking, the instep guard overlying the toe and instep portions of the shoe and having sides extending downwardly along opposite sides of the upper with the said side members being positioned laterally outwardly of the sides of the instep guard, whereby the side members of the bracket restrain lateral spreading of the sides of the guard and the base of the bracket holds the side members from being pulled free of the insole and midsole.

5. A protective work shoe comprising an upper, a sole connected to the lower edge of the upper, an instep guard shaped to overlie the instep portion of the upper, a pair of arms supported by the sole on opposite sides of the upper, the arms being positioned toward the toe end of the upper and having upwardly and rearwardly extending hook portions, the instep guard having laterally projecting flanges on opposite lower side edges, the forward edges of the flanges being positioned for receipt within the hook portions, and means projecting upwardly from either side of the sole for holding the sides of the instep guard against lateral spreading while holding the forward edges of the flanges within the hook portions.

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