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SAFETY SHOE

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12 Claims. (Cl. 36—72)

My invention relates to safety shoes and it has for an object to provide means to fit over the toe of a shoe to resist deformation of the latter by impact.

In many occupations requiring the handling and lifting of objects of various kinds, the hazard of personal injury because of accidentally dropping articles on feet of workers should be guarded against. As the toe portion of a shoe is ordinarily well located for injury, in accordance with my invention, a stiff and impact-resistant shield is provided arranged to cover the toe.

A further object of my invention is to provide a shoe toe shield having means so that it may be readily attached to and detached from an ordinary shoe.

A further object of my invention is to provide a shoe toe shield having rearwardly inclined pins for insertion into rearwardly-inclined openings provided in the shoe sole, together with locking pins for insertion in openings provided therefor in the sole after insertion of the inclined pins in their openings.

These and other objects are effected by my invention, as will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application, in which:

Fig. 1 is a side elevation of a shoe showing my improved shield applied thereto;

Fig. 2 is a side elevational view of the shield drawn to larger scale than Fig. 1;

Fig. 3 is a front elevational view of the apparatus shown in Fig. 2;

Fig. 4 is a longitudinal sectional view taken along the line IV—IV of Fig. 3;

Fig. 5 is a detail sectional view taken along the line V—V of Fig. 3; and,

Fig. 6 is a detail sectional view taken along the line VI—VI of Fig. 4.

Referring now to the apparatus more in detail, in Fig. 1, I show an ordinary shoe, at 10, provided with the usual toe portion and having a sole 11, which, as is usual, has an outer exposed marginal portion 11a. My invention is concerned with the provision of an armor or shield for the toe portion of a shoe and this will now be described.

The armor or shield comprises a body 12 conforming to and arranged to fit over the toe of a shoe, such body being made of any suitable stiff or impact-resistant material, such as steel and the like; and, if desired, stiffness and strength of the shield may be increased by forming the latter with ribs 13. As shown, the ribs 13 extend

transversely of the toe and stiffen the intermediate portion thereof joined to the lower upright marginal portion. The upright marginal portion has adequate stiffness, not only because of its curvature, but also because the substantially vertical or upright disposition renders the material thereof highly effective to resist any compression impact stresses. Furthermore, it is unnecessary to provide the ribs at the extreme toe portion for the reason that the latter is adequately curved or arched in a compound manner to be highly resistant to deformation in all directions. As the marginal portion is adequately strong without having ribs, the surface thereof is not deformed with the result that, not only may a closer fit of the shield with respect to the shoe toe be had, but also space is left for the fastening devices, as will be described.

The shield is held in place by front and back rearwardly-inclined pins 14 and 15 extending from the bottom edge 16 thereof, the pins 14 and 15 being arranged to fit rearwardly-inclined openings 17 and 18 provided in the outwardly-extending marginal portion 11a of the shoe sole.

The shield also carries movable locking pins 19 arranged substantially at right angles to the bottom edge 16, the locking pins being arranged for insertion in locking pin openings 20 as shown in Fig. 1.

To assemble the shield with respect to a shoe, inclined openings 17 and 18 are provided in the marginal portion of the sole by means of an awl, or the like, and then the shield is placed in position, with the inclined pins 14 and 15 arranged in the openings 17 and 18, respectively, the locking pins 19 being retracted to the position shown by the dot and dash lines in Fig. 2.

The proper positions for the openings 20 may then readily be determined and such openings provided in the same manner as the openings 17 and 18, or the openings 20 may have been located and provided at the same time as the openings 17 and 18.

With the pins 14 and 15 in their inclined openings 17 and 18 and with the locking pins 19 retracted, the next step is to insert the locking pins in the openings 20, and this is done by moving the locking pins from the position shown in dot and dash lines in Fig. 2 to the full line position thereof.

The locking pins are associated with spring means carried by the shield, the spring means normally serving to bias the pins 19 to unlocked position and the pins being held in locked posi-

tion by means of suitable abutments 22 carried by the shield.

Preferably, the spring means is provided by wire elements 23 connected to the shield at 24, the wire elements conforming to the shape of the shield and having its end portions constructed to provide the pins 14 and 19. With this type of construction, the locking pins are held in locking position by means of the abutments engaging above the wires 23; however, if the wires 23 are deflected outwardly so as to freely pass the abutments 22, the spring effect in such wires will cause them to assume the dot and dash line position shown in Fig. 2 with the locking pins in unlocked position.

From the structure so far described, it will be apparent that the shield may be firmly locked to a shoe sole by the cooperative action of the front and back inclined pins 14 and 15 and the locking pins 19, the inclined pins 14 and 15 serving to anchor the shield in place and the locking pins preventing disengagement of the pins 14 and 15 from their openings 17 and 18. The bottom edge 16 of the shield is preferably serrated, as shown at 25, so that such edge will bite into the upper surface of the shoe sole to resist being flattened or deflected by blows.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In a safety device for a shoe, a construction adapted to fit over the toe of the shoe for resisting deformation of such toe by impact, rearwardly inclined pins fixedly connected to the construction for insertion in inclined openings provided in the shoe sole, and locking pins adapted to fit in openings provided therefor in the sole after insertion of the inclined pins in their openings, said locking pins and their openings extending substantially at right angles to the shoe sole.

2. In a safety device for a shoe, a construction adapted to fit over the toe of the shoe for resisting deformation of such toe by impact, rearwardly inclined pins fixedly connected to the construction for insertion in inclined openings provided in the shoe sole, locking pins adapted to fit in openings provided therefor in the sole after insertion of the inclined pins in their openings, said locking pins and their openings extending substantially at right angles to the shoe sole, and means for mounting the locking pins on the construction and providing for movement of such pins so that they may be caused to enter and to be retracted from their openings.

3. In a safety device for a shoe, a construction adapted to fit over the toe of the shoe for resisting deformation of such toe by impact, rearwardly inclined pins fixedly connected to the construction for insertion in inclined openings provided in the shoe sole, locking pins adapted to fit in openings provided therefor in the sole after insertion of the inclined pins in their openings, said locking pins and their openings extending substantially at right angles to the shoe sole, spring means carried by the construction and connected to the locking pins, the force of the spring means being effective to lift or to retract

the locking pins, and means carried by the construction to hold the locking pins in locking position against the force of the spring means.

4. In a safety device for a shoe, a construction adapted to fit over the toe of the shoe for resisting deformation of such toe by impact, rearwardly inclined pins fixedly connected to the construction for insertion in inclined openings provided in the shoe sole, locking pins adapted to fit in openings provided therefor in the sole after insertion of the inclined pins in their openings, said locking pins and their openings extending substantially at right angles to the shoe sole, a wire spring joined to the construction and to said locking pins and biasing the latter to unlocked position, and abutments on the construction for engagement with the wire spring to hold the locking pins in locked position.

5. In a safety device for a shoe, an armor resistant to deformation adapted to fit over the toe of the shoe, rearwardly inclined pins fixedly secured to the armor and adapted to fit similarly inclined openings formed in the sole of the shoe, and locking pins carried by the armor and adapted to be inserted in openings in the shoe sole after insertion of the inclined pins in their openings.

6. In a safety device for a shoe, an armor resistant to deformation adapted to fit over the toe of the shoe, rearwardly inclined pins fixedly secured to the armor and adapted to fit similarly inclined openings formed in the sole of the shoe, locking pins adapted to be inserted in openings in the shoe sole after insertion of the inclined pins in their openings, and means for movably mounting the locking pins on the armor and providing for holding such pins in locking position.

7. In a safety device for a shoe, a metallic shield conforming to and adapted to fit over the toe of the shoe to resist deformation of such toe by impact, said shield having a serrated bottom edge for engagement with the upper surface of the margin of the sole exposed beyond the toe, and releasable holding means for attaching the shield to said margin.

8. In a safety device for a shoe, a metallic shield conforming to and adapted to fit over the toe of the shoe to resist deformation of such toe by impact, front and back rearwardly inclined pins fixedly secured to the shield and adapted to enter inclined openings provided in the shoe sole, and locking pins carried by the shield and movable for insertion in openings provided therefor in the sole after insertion of the inclined pins in their openings.

9. In a safety device for a shoe, a metallic shield conforming to and adapted to fit over the toe of the shoe to resist deformation of such toe by impact, front and back rearwardly inclined pins fixedly secured to the shield and adapted to enter inclined openings provided in the shoe sole, movable locking pins carried by the shield for insertion in openings, provided therefor in the sole, after insertion of the inclined pins in their openings, spring means for holding the locking pins in retracted position, and means for holding the locking pins in locking position against the force of the spring means.

10. In a safety device for a shoe, a metallic shield conforming to and adapted to fit over the toe of the shoe to resist deformation of such toe by impact, front and back rearwardly inclined pins fixedly secured to the shield and adapted to enter inclined openings provided in the shoe sole, locking pins carried by the shield and movable for

insertion in openings, provided therefor in the sole, after insertion of the inclined pins in their openings, spring means for holding the locking pins in retracted position, and means for 5 holding the locking pins in locking position against the force of the spring means, said spring means being comprised by wire elements whose end portions constitute the front inclined and the locking pins and 10 said holding means being constituted by an abutment on the shield for engagement above the wire elements to hold the locking pins in locking position.

11. In a safety device for a shoe, a metallic 15 shield conforming to and adapted to fit over the toe of the shoe to resist deformation of such toe by impact and means for detachably connecting the shield to a shoe, said means comprising first and second pins extending in non-parallel directions and arranged to fit in openings provided 20 therefor in the margin of the shoe sole exposed beyond the toe, each first pin being fixedly secured to the shield, and means providing for

movement of each second pin, whereby, with the latter retracted, the shield may be positioned with each first pin inserted in its opening or be removed with removal of each first pin from its opening, and with each first pin in its opening, 5 each second pin may be moved from retracted position into its opening in order to lock the shield in place with respect to a shoe.

12. In a safety device for a shoe, a shield resistant to deformation and adapted to fit over the 10 toe of the shoe and means for connecting the shield to the shoe and providing for ready attachment and detachment thereof, said means including rearwardly inclined pins fixedly secured 15 to the shield and adapted to fit similarly inclined openings formed in the shoe sole and locking means carried by the shield and movable relatively to the latter to effect engagement with the shoe sole after insertion of the inclined pins in 20 their openings in order to lock the shield in place with respect to the toe of the shoe.

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