Sept. 16, 1958 R. A. PHILLIPS 2,851,798

FOOT PROTECTIVE GUARD

Filed July 25, 1956

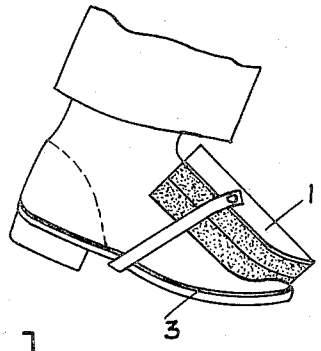


Fig. 1.

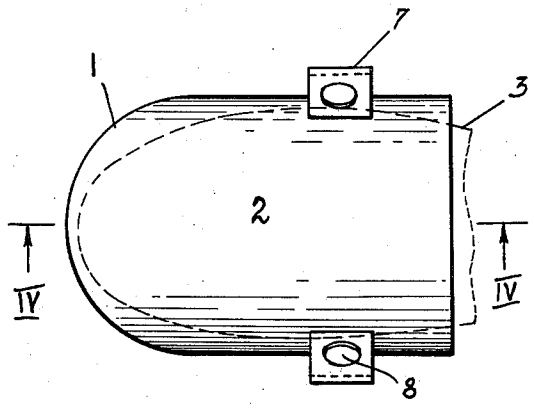


Fig. 2.

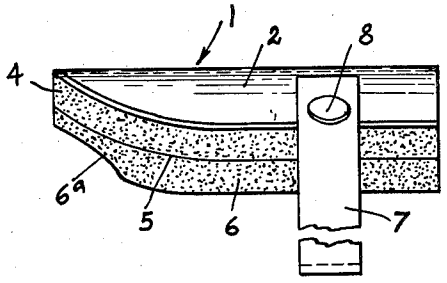


Fig. 3.

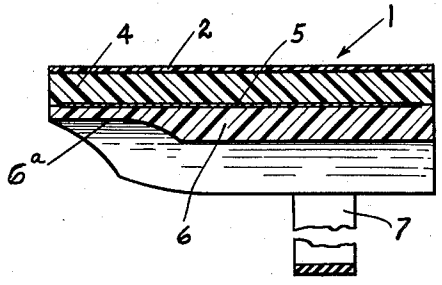


Fig. 4.

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United States Patent Office 2,851,798 Patented Sept. 16, 1958

2,851,798

FOOT PROTECTIVE GUARD

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Application July 25, 1956, Serial No. 600,057

2 Claims. (Cl. 36—72)

The present invention is directed to protective guards and more specifically to protective guards for the feet of men working in and about heavy manufacturing plants such as steel mills and fabricating shops.

The need for equipment in the protection of feet of workmen in and about steel mills and fabricating plants has long been recognized. One step in this direction was the safety toe shoes having a steel insert for protection of the toes of the wearer from falling objects. This protection was limited to the toes only leaving the instep unprotected. Damage to the protective plate usually meant replacing the pair of shoes.

Workmen in and about steel mills and foundries not only need protection against falling heavy objects but also protection against splashing molten metal. Frequently, for this purpose, heavy leather shields were provided about the shins and feet of workmen in addition to the aforesaid safety shoes. This however did not provide the desired safety and subsequently led to the provision of a reinforced metal shield mounted over the toes and instep of each foot. Such protective devices were cumbersome and heavy. Falling objects indented the shields and imparted a major portion of the force of a blow to the shoe and foot therein. Molten metal falling upon the shield adhered thereto and impaired the usefulness of the shield. Chains and other fastening means were cumbersome and if passed under the instep of the shoe were a hazard when the men trod upon metal plates or climbed ladders.

In the present invention the new and improved guard serves to deflect falling objects and molten metal as well as to provide a shock absorbing padding which both distributes the force of a blow over the entire area of the guard and absorbs such blows preventing their transfer to the foot of the wearer.

The shock absorbing feature of the present guard is provided by the combination of a closed cell sponge material having embedded therein a stiff metal plate which spreads the force of a blow over the entire area of the sponge material.

One object of the invention is to provide a foot guard which is light in weight, and deflects falling objects or molten metal engaging therewith.

Another object of the invention is to provide a guard of the type described which absorbs blows from falling objects and prevents the force thereof from being transferred to the shoe and foot of the wearer.

Another object of the invention is to provide a novel form of padding between the foot of the wearer and the outer face of the guard which dissipates the force of a blow thereon by distributing it over substantially the entire area of the guard.

These and other objects of the invention will be made apparent from the following description of the invention, wherein the drawing forming a part thereof comprises:

Fig. 1 showing a view of the guard in place upon the foot and shoe of a wearer;

Fig. 2 shows a plan view of the guard;

Fig. 3 shows a side elevation of the guard; and

Fig. 4 shows a vertical section taken along line IV—IV of Fig. 2.

Referring now in detail to the drawing reference character 1 indicates the guard generally. The outer face of the guard is comprised of an arcuate member 2 extending longitudinally above the instep and toe of the wearer and transversely of the same surfaces. The member 2 is preferably formed of a suitable thermoplastic material or may be of relatively thin metal such as steel. Beneath the member 2 and spacing same from the instep and toe of the shoe 3 is a composite shock absorbing means comprising a member 4 of substantial thickness extending substantially coextensively with member 2 and preferably formed of a closed cell vinyl sponge which is commercially available. Beneath the member 4 and preferably terminating short of the periphery thereof is a metal member 5 of substantially the same contour of member 4. Beneath member 5 is another member 6 preferably formed of a closed cell vinyl sponge material substantially coextensive with member 4. The members 4, 5 and 6 are adhered together by a suitable adhesive. Due to member 5 being smaller than members 4 and 6, these latter members adjacent their periphery may overlap member 5 so as to conceal the member. It is to be understood however that members 4, 5 and 6 may be of the same linear dimensions. The preferred form being to have member 5 smaller as hereinbefore described. The member 2 is preferably secured to the adjacent face of member 4 by adhesive between the entire adjacent faces of the members, other suitable means may be used. The portion of member 6 overlying the toe of the shoe may be recessed as at 6*a* to better conform to the contour of the toe.

The manner of attaching the guard to the foot and shoe of the wearer also forms an important part of the invention. The rigid metal guards of the prior art are usually provided with a metal member disposed beneath the shoe of the wearer and attached to adjacent sides of the guard to impart rigidity thereto. The guard is generally provided with additional means, often of metal, attached to the ankle or beneath the shoe to retain the guard in place. These latter means combining with the metal cross tie of the guard causes the wearer to present metal surfaces to the floor, steel plates or ladder rungs over which he is moving. Such metal to metal contact frequently causes slippery footing resulting in falls.

In the present invention, the guard is held in place by a resilient and flexible strap 7 preferably formed by synthetic rubber which passes under the instep of the wearer in front of the heel of the shoe. In this manner the shoe of the wearer has the normal and usual contact with the surface over which he is walking. This contributes to safety in normal walking, as the strap 7 is usually disposed out of contact with the ground. When climbing ladders, no slippery metal surfaces engage the ladder rungs, thus adding safety of movement in such cases. In those cases where the instep engages a ladder rung, the rubber forms a yielding non-slip surface.

The strap 7 may be secured to the member 2 in any suitable manner to form a loop. Under ordinary use the guard will outwear the strap so it is preferable to detachably connect the strap and guard by readily detachable members. Such members are shown in Figs. 2 and 3 as snap fasteners 8, one part of which is attached to the strap and the complementary part to the member 2 as shown.

The maximum efficiency is obtained from the composite shock absorbing means supporting the arcuate member 2 upon the shoe of the wearer when a closed cell type of resilient material is adhered to the opposite faces of the substantially rigid member 5. Such a con-

struction is shock absorbing in that the insert 5 spreads, over the entire face of the resilient material, the force of a blow applied to the member 2. The closed cell structure of the resilient material aids in absorbing force applied to it by the members 2 and 5. The smooth outer face of the member 2 serves to deflect an object falling thereon and, due to its inclination as shown in Fig. 1 of the drawings, deflects such objects away from the legs of the wearer of the guard disclosed herein.

The presently preferred form of the invention has been shown and described. It will be obvious to those skilled in the art to which the invention pertains that many changes may be made in the several members thereof without departing from the spirit of the invention. Thus, the member 2 may be made of other materials than plastic, such as metal. A different material may be substituted for the closed cell vinyl, such as open cell sponge material but with loss of the effectiveness of the closed cell material to absorb shock. The metal insert member 5 may be modified in size and made of a different material used but present tests show that a metal plate as shown and described is to be preferred.

I claim:

1. A detachable safety protector for the instep and toe of a shoe, comprising a first layer of downwardly curving resilient material supported on the instep and toe of the shoe and disposed in spaced relation to the sole of the shoe, a rigid member conforming to the top surface of said first layer and secured thereto, a second layer of resilient material conforming to the top surface of said rigid member and secured thereto, an outer rigid member

conforming to the top surface of said second layer of resilient material and secured thereto, and a strap secured to opposite sides of the outer member and passing beneath the shoe for retaining the protector in engagement with said instep and toe of the shoe.

2. A detachable safety protector for the instep and toe of a shoe, comprising an inner integral convex laminated shock absorbing pad supported upon the instep and toe of the shoe and conforming to the upper surface thereof with the pad side portions in spaced relation to the sole of the shoe, said pad having an inner layer of rigid material and outer layers of closed cell cellular resilient material cemented to opposite faces of the rigid layer with the periphery of the pad free to move relative to the shoe, an outer rigid member overlying and cemented to the outer face of the said pad, and a resilient strap having its ends connected with opposite sides of said rigid outer member forming a loop which is passed beneath the shoe to hold the said pad into contact with the instep and toe of a shoe upon which the protector is mounted.

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