

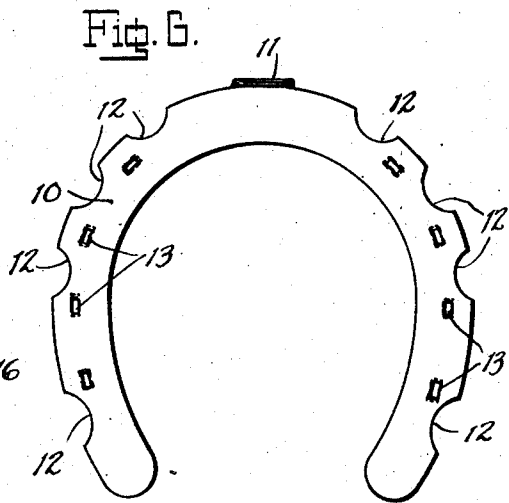
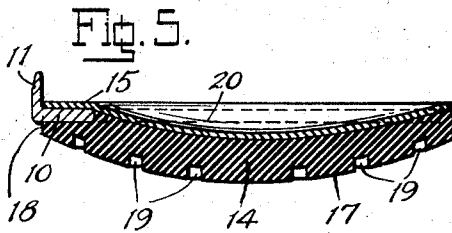
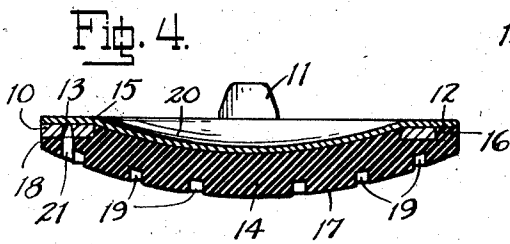
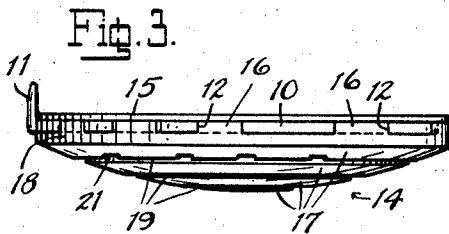
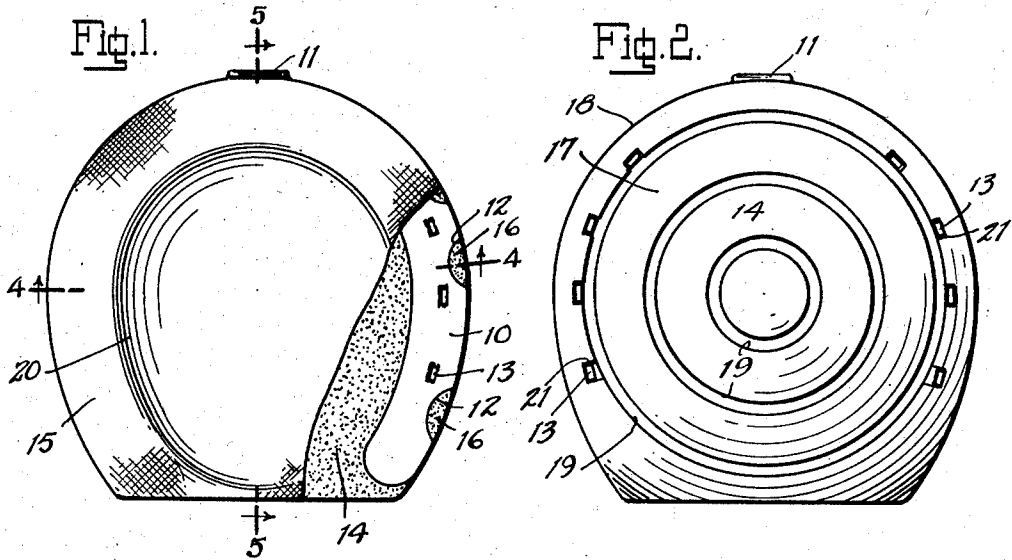
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2,296,111

SHOE FOR HOOFED ANIMALS

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# UNITED STATES PATENT OFFICE

2,296,111

## SHOE FOR HOOFED ANIMALS

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3 Claims. (Cl. 168—28)

The present invention relates to a shoe for hoofed animals such as horses, mules, and the like, and has for an object to provide a resilient flexible safety shoe which in addition to serving the purposes of the usual type of metallic horse shoe provides a resilient cushioned shock-absorbing shoe designed to absorb the shock of impact with the road, and thus eliminate the damage to the hoof and leg of the animal usually resulting from such shock of impact.

It is further proposed to provide a shoe of this character which may be fitted to animals suffering with various foot and leg afflictions, such as corns, split hoofs, injured frogs, and the like, the shoe protecting the hoof in such manner that the animal will be permitted to walk or run without aggravating such afflictions, and thus permitting them to cure.

It is a further object to provide a shoe in which all points of contact with the road are effectually cushioned, the metal core or frame of the shoe being completely cushioned and having its surfaces so arranged that even after considerable use and wear such metal core or frame will not be exposed to contact with the road.

It is another object to provide a cushioning body having a structural cross-sectional shape which will be inherently resilient under all loads that the horse or other animal may impose thereon under varying conditions, and will at the same time resist such distortion as might cause injurious contact with the under surface of the hoof in the region of the frog, and to this end it is proposed to provide a cushioning body substantially in the form of a section of a spherical wall, convex at its under surface and concave at its upper surface, and having a rigid core or frame embedded in its marginal portion, and whereby load imposed upon any point of such spherical surface will be distributed through the spherical wall along compression lines extending to the rigid margin without collapsing.

It is further proposed to provide a shoe in which the tread or road-engaging surface will effectually prevent skidding, and will at all times be free of pocketing recesses in which snow and ice may accumulate and form into a ball, this being one of the greatest of winter hazards.

It is further proposed to provide a shoe which will be long wearing, and in which the cushioning means will be so formed and arranged that abrasive wearing contact thereon is reduced to a minimum and the metallic core or frame is

completely protected against abrasive contact with the road during the life of the shoe.

It is a further object to provide a resilient safety shoe having a metallic core or frame, and which may be conveniently fitted in a cold state to varying sizes and shapes of hoofs, and to this end it is proposed to provide the metallic core or frame in such form that it may be bent to shape in an ordinary vise, being free of flanges or similar structures that would prevent such shaping or break under the strain of such shaping. It is further proposed to provide the cushioning means in such relation to the metallic core or frame that such cushioning means will not be appreciably altered in its fundamental characteristic shape within a considerable range of contraction or expansion in the width dimension of the metallic core or frame, or through such reshaping as may be required to fit the shoe to a particular shape of hoof.

A further object of the invention is to provide a shoe of this character, which will be substantially noiseless, and will therefore be highly advantageous for use on milk wagons, or the like.

It is a further object to provide a resilient safety shoe which may be economically manufactured by quantity production methods, the structure lending itself to production in automatic molding and vulcanizing machines of known type.

With the above and other objects in view an embodiment of the invention is shown in the accompanying drawing, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawing:

Fig. 1 is a plan view of the upper hoof-engaging side of a resilient safety shoe, according to the invention, a portion of the upper layer being shown broken away.

Fig. 2 is a plan view of the lower road engaging or tread side of the shoe.

Fig. 3 is a side elevation.

Fig. 4 is a transverse sectional view, taken along the angular line 4—4 of Fig. 1.

Fig. 5 is a longitudinal sectional view taken along the line 5—5 of Fig. 1.

Fig. 6 is a plan view of the metal core or frame element to which the molded elements of the shoe are bonded.

Similar reference characters indicate corresponding parts throughout the several figures in the drawing.

Referring to the drawing, the resilient safety shoe, according to the exemplary illustrated embodiment of the invention, comprises a metal core or frame member 10, having the general shape of the common all-metal horse shoe, and having its upper and lower sides free of projections or flanges, so that it may be readily contracted or expanded, or reshaped to modify the degree of curvature, so as to fit animal hoofs of varying shapes within a reasonable range by shaping in a vise while in a cold state, it being understood that this shaping will take place after the frame is embedded in the molded rubber and fabric structure bonded thereto, and presently to be more fully described.

The frame 10 is provided at its forward end with an upwardly bent toe lug 11, and along the outer periphery there is provided a series of cut-outs 12, preferably rounded, and also preferably produced by rough cutting, so that the surfaces of these cut-outs will have a rough form to facilitate the bonding of the rubber element thereto. It will be understood that the other surfaces of the frame may also be suitably roughened, if desired. At suitably spaced points there are provided nail holes 13, of rectangular form and converging from the lower to the upper side for the purpose of receiving and retaining the nail heads.

At the lower side of the frame 10 there is provided a rubber body element indicated generally as 14, and at the upper side there is provided a relatively non-stretchable layer 15, preferably formed of a heavy fabric, such as duck or canvas, impregnated with rubber or other suitable waterproofing and preservative substance. The rubber body 14 and the fabric layer 15 have their outer edges conforming to the outer edge of the frame 10, except at the cut-out portions 12 where the rubber body extends into the cut-outs, as at 16, where it is bonded by vulcanization to the under surface of the fabric layer and to the roughened surface of the cut-outs. The rubber body also extends upwardly within the inner periphery of the frame 10 to contact the under surface of the fabric layer 15 which spans the frame, the rubber body and fabric layer being vulcanized to each other along their contacting surfaces. It will be understood that in the process of manufacturing the shoe, the fabric layer 15, the metal frame 10, and a piece of raw rubber to form the body 14 are all placed in a suitable mold, and thereupon through the application of heat are molded to shape and bonded and vulcanized together.

The rubber body 14 is convexly formed at its lower or tread surface, and this convex surface 17 extends to the peripheral wall surface 18, which is preferably flush with the periphery of the frame 10, and is of substantial vertical thickness directly below the frame, so that there is a relatively thick cushion of rubber below the frame. The convexity of the surface 17 is preferably of the same curvature both transversely and longitudinally, so that the projected tread surface constitutes a section of a true sphere.

A series of circular grooves 19 are formed in the tread surface, these being concentric to the center point of the tread and to each other. These grooves are sufficiently spaced so that a firm tread surface is provided, and at the same time they provide a non-skid tread in which the concentric rings of rubber will be permitted to expand laterally under compressive load, the expansion taking place in the grooves.

The upper surface of the shoe within the outline of the inner periphery of the frame 10 is

concavely formed, and the curvature of the concave pocket 20 thus provided is substantially concentric to the curvature of the tread 17, so that the spherical wall formed by the rubber body and the fabric layer 14 vulcanized thereto is of substantially uniform thickness throughout the major portion of the shoe, that portion at the heel of the shoe which spans the ends of the frame 10 being tapered slightly to a lesser thickness at the extreme heel end, as indicated clearly in Fig. 5, this being for the purpose of bringing the upper surface at the heel into the plane of the upper marginal surface directly above the frame 10, while still maintaining the spherical form of the tread 17. This structural shape wherein the wall of a section of a sphere is rigidly connected to and suspended between the rigid metal frame 10 is such that any normal load that may be imposed upon the tread by the shod animal will not cause the spherical wall to collapse at the center, but will direct the force of the load along lines from the point of impact through the spherical wall to the rigid frame. At the same time a cushioning action is provided which is relatively localized in the rubber body. The under surface of the animal's hoof is thus protected against injurious contact, such as might occur if the animal stepped upon a stone, the structural shape preventing the pocket 20 from collapsing inwardly against the under surface of the hoof. While the grooves 19 provide a non-skid and resilient tread, the convex surface 17 extending entirely to the periphery of the shoe provides a tread which is free from any pockets in which stones may become lodged or which will permit the balling of snow and ice therein.

The rubber body 14 is provided in alignment with the nail holes 13 of the frame 10 with counter-sunk holes 20 molded therein, and which permit the nail heads to be directly engaged with the nail holes without the interposition of rubber, so that the shoe may be securely and non-yieldingly attached to the hoof, and the nail heads will be so disposed that they cannot contact the road surface. The flat upper marginal surface of the shoe above the frame 10 is of sufficient area to furnish ample bearing of the shoe on the hard outer portion of the hoof which is usually contacted by the common metal horse-shoe, and through which the attaching nails are driven.

Without further description it is believed that the novel features and advantages of the invention will be readily appreciated by any person familiar with the farrier's art. It is understood that any changes in size, shape, dimensions, materials and other minor details may be resorted to without departing from the spirit of the invention, as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a resilient safety shoe for hoofed animals, a metallic frame element of substantially horse-shoe shape, a resilient cushion body secured to and spanning said frame element, said cushion body having a bottom tread surface of convex form and extending to the outer periphery of and entirely beneath said frame element, the upper side of said resilient body being concave within the inner periphery of said frame element and being extended upwardly in fitting relation in contact with the inner periphery of said frame element to prevent lateral shifting between said frame element and said cushion body, and a top layer element extending to the outer periphery

of and entirely over the upper surface of said frame element and secured to the upper surface of said resilient body within the inner periphery of said frame element.

2. In a resilient safety shoe for hoofed animals, a metallic frame element of substantially horse-shoe shape having a series of spaced cut-outs in its outer periphery extending from the lower to the upper surface thereof, a resilient cushion body spanning and extending to the outer periphery of and entirely beneath said frame element and having spaced peripheral portions extending upwardly in said cut-outs to the upper surface of said frame element, and a top layer element extending to the outer periphery of and entirely over the upper surface of said frame element and secured to the upper surface of said resilient body within the inner periphery of said frame element and to the upper ends of said spaced peripheral portions of said cushion body within said peripheral cut-outs of said frame element.

3. In a resilient safety shoe for hoofed animals, a metallic frame element of substantially horse-shoe shape having a series of spaced cut-outs in its outer periphery extending from the lower to the upper surface thereof, a resilient cushion

body extending to the outer periphery of and entirely beneath said frame element and having spaced peripheral portions extending upwardly in said cut-outs to the upper surface of said frame element, said cushion body having a bottom tread surface of convex form having a series of concentric circular grooves therein providing spaces into which the portions of the resilient body between said spaces may expand under compressive load, the upper side of said resilient body being concave and being extended upwardly in fitting relation in contact with the inner periphery of said frame element to prevent lateral shifting between said frame and said cushion element, the curvature of said concave side being substantially parallel to the curvature of said tread surface, and a top layer element formed of substantially non-stretchable material extending over the upper surface of said frame element and secured to the upper surface of said resilient body within the inner periphery of said frame element and to the upper ends of said spaced peripheral portions of said cushion body within said peripheral cut-outs of said frame element.

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