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(54) **Metallic insert for working and safety shoes**

(57) The metal insole is characterised by the presence of ribs in the area of the arch support comprised between the heel (3.3) and the arch of the sole (4).

The ribs (3) are applied so as to counteract longitu-

dinal and transversal torsions of the arch support and are characterised by a semi-circular section (3.1) or alternatively a triangular one (3.3) or of any concave or convex form.

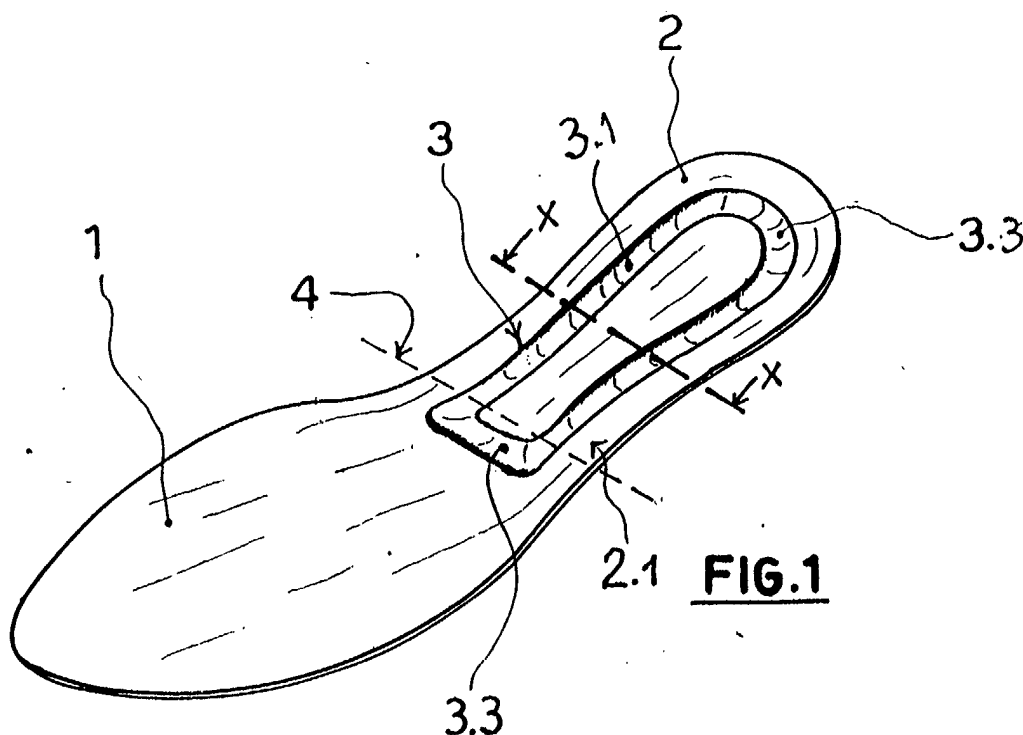


FIG. 1

Description

[0001] The object of the present invention is a metal insole to be applied to working or safety footwear. As known, the current norms regarding safety at work for various categories of workers, foresee the necessity to wear appropriate safety footwear.

[0002] In order to be in conformity with these norms said footwear must possess specific technical features which vary according to the working environment in which they are to be used: the norms particularly foresee that in environments such as construction sites, ship-yards, steelworks or mechanic industries, often characterized by the presence on the workfloor of blunt and sharp objects, such as nails, blades or metal shavings, safety footwear must withstand perforation, that is furnished with a suitable protective metal insole which prevents accidental contact of the foot with said objects.

[0003] To this end said metal insoles are made up of a flat metal sheet inserted into the plastic sole made of PU, TPU or rubber of the footwear.

[0004] The main drawback of said existing metal insoles lies in the lack of rigidity in the area between the heel and the arch, that is in the arch of the sole.

[0005] In order to create the necessary rigidity in the arch and to avoid flexion along the vertical plane passing through the longitudinal axis, see Fig. 9, and torsion around the longitudinal axis 6 of the insole, see fig. 10, a 'cambrillon' (French term) is applied, that is, a reinforced element in the area of the arch and positioned in the area situated between the arch of the sole and the base of the heel thus also preventing flattening of the same arch.

[0006] In fact, the lack of a cambrillon flattens the sole and does not allow the foot a comfortable or functional position see fig. 8, due to the scarce rigidity in the area 4.1

[0007] Application of the cambrillon does however present various drawbacks listed as follows:

1. it must be applied using glue or a mechanical fixing method resulting in consequent lengthening of the production process and an increase in the final production costs.
2. Increased weight of the footwear, greater thickness of the sole in the arch support area and the consequent overheating of feet during in the hot season due to reduced heat transmission caused by the greater thickness at the arch support area.

[0008] The aim of the present invention is to eliminate the abovementioned drawbacks by using a metal insole for protective heavy duty industrial footwear which does not require the use of other reinforcing elements, such as a cambrillon.

Another important aim is to propose a protective metal insole which may be easily inserted and blocked inside a plastic sole, said plastic sole being of PU, TPU rubber,

etc.

[0009] Yet another aim is to provide a metal insole which guarantees rigidity in the heel-arch of the sole area avoiding torsions illustrated in figures 9 and 10: the reference 4.1 indicates the area near the arch of the sole.

[0010] To this end the metal insole as claimed in the present invention at the same time solves both the problem of withstanding perforation and that of rigidity in the heel-arch of the sole area, avoiding flattening of the arch support or torsion thereof without applying a reinforcing element.

[0011] The metal insole, according to the invention is described in some preferred embodiments not limiting to further variations within this field of invention and illustrated in the attached drawings which illustrate respectively:

fig. 1: an axonometric view of a metal insole according to the invention;

fig. 2: view from above of the insole according to the invention with ribs different from that of fig. 1);

fig.3: transversal section X-X of figure 2) with U-shaped ribs;

fig.4: section of fig. 3) with V-shaped ribs;

fig.5: view from above of a variant of the insole with rectilinear ribs;

fig. 6: transversal section of the metal insole inserted into the sole of the footwear having convexity of the ribs facing upward;

fig. 7: transversal section of the metal insole inserted into the sole of the footwear with convexity of the ribs facing downward;

fig. 8: the flexion of the insole according to the state of the art, without ribs;

fig. 9: the torsion of the heel in the vertical plane passing the longitudinal axis of the insole of fig. 8;

fig. 10: the torsion in the heel area around the longitudinal axis of the insole of fig. 8.

[0012] The metal insole has a shape similar to that of a loose sole of a shoe. The invention consists in the application to a metal insole by means of moulding, of special longitudinal ribs 3 which form on the upper surface of the sole grooved ribs 3.1 protruding from the opposite surfaces so as to form the convexities 3.2.

[0013] The channels obtained in this way, stiffening the area of the arch of the foot, that is the part of the metal insole 2.1 comprised between the heel and the arch of the sole 4 cause rigidity of the shoe, in the heel-arch of the sole area of the shoe thus giving it greater resistance to flexion and torsion.

[0014] Moreover, the grooved ribs 3.1 of the ribs 3 on the upper surface of the metal insole facilitate attachment of the latter into the sole of the shoe; in fact, the grooved ribs 3.1 fill up with PU, TPU, rubber etc. during realisation of the sole thus rendering impossible to detach once positioned into the said sole.

[0015] In the preferred embodiment illustrated in figure 1, the ribs 3 are constituted only by a perimetral narrow channel which copies the line of the edges of the posterior surface 2 of the metal insole, joining transversally with the rib 3 in the intermediate area 4 of the said insole forming a closed profile.

[0016] The intermediate surface 2.1 of the insole may however be crossed by one or more than one transversal rib 5 of any shape, size and profile, being able to furnish the insole with the necessary resistance.

[0017] In the embodiment illustrated in figure 5, the posterior part 2 of the insole is in fact crossed longitudinally by three U-shaped rectilinear and parallel ribs, while in the further embodiment as seen in figure 7, the ribs are characterised by a "V" section rather than a "U"-shaped one.

[0018] As seen, it is therefore evident that the metal insole as claimed in the present invention, is intrinsically furnished with means which substitute the function of the cambrillon (French term) the absence of which produces a series of advantages which may be summarised as follows:

1. Possibility to realise a sole of reduced thickness;
2. Lowering of final costs of the footwear;
3. Reduced production time and manufacturing time with consequent decrease in production costs.

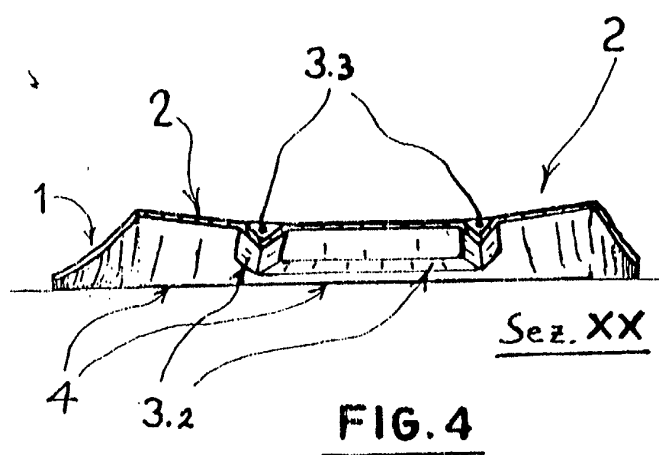
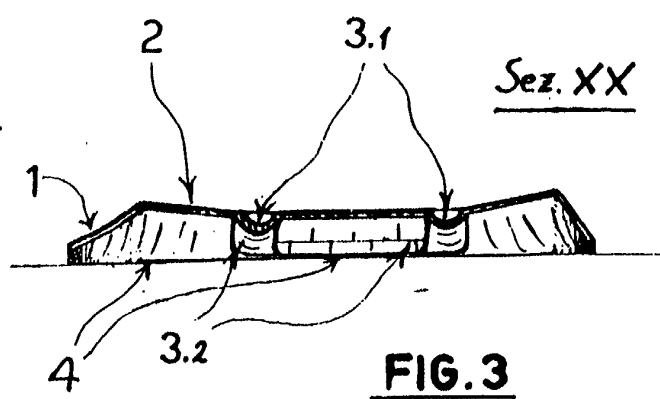
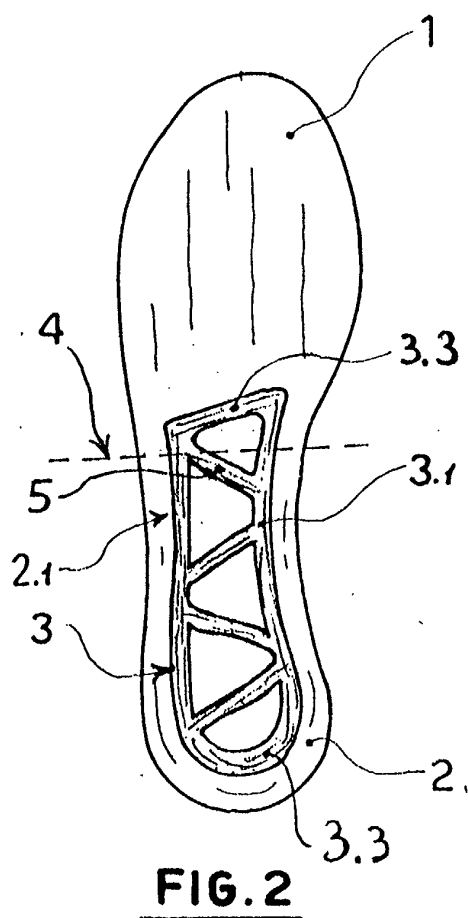
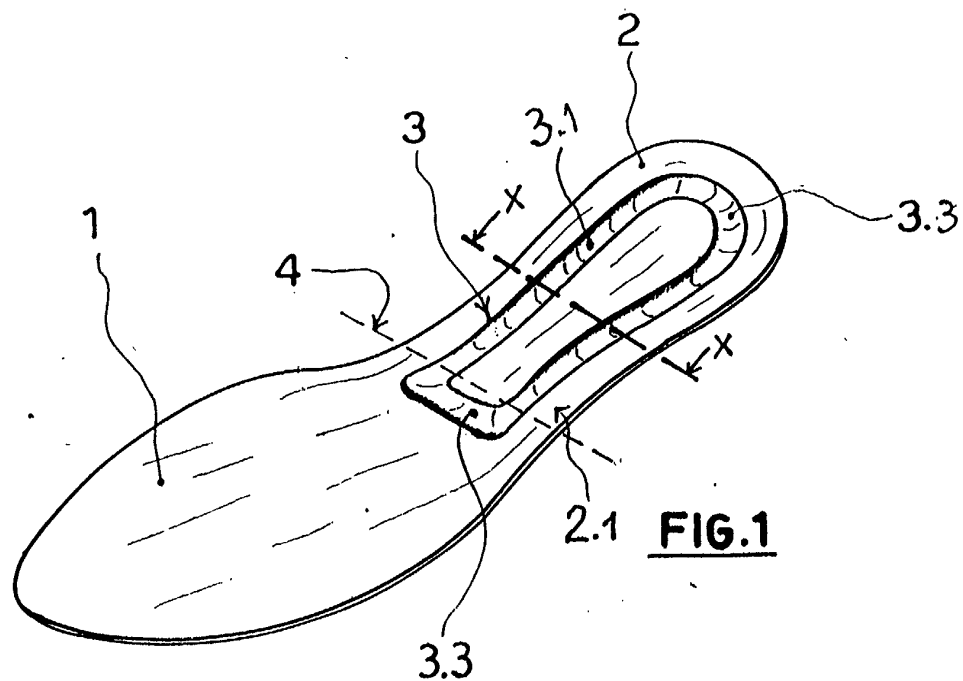
[0019] The invention in question implies an invention according to Art. 56 of the EPC, since all of the existing protective metal insoles inserted into the rubber, PU, TPU etc. for heavy duty footwear, not being furnished with ribs in the arch support area, do not suggest to a person skilled in the art, the application of ribs in the arch support area, both to stiffen the said area and above all to avoid torsion with respect to the longitudinal axis and transversal axis situated in the area between the heel and the same arch support.

Claims

1. "Metal insole for working and safety footwear" made of a metal sheet having the shape and size similar to that of a loose sole of a shoe to be inserted into the plastic, rubber, PU, TPU sole of the footwear, **characterised by** the fact that the area of the insole comprised between the heel and the arch of the sole, is lined by one or more ribs (3), having transversal or semi-circular or alternatively a triangular section or being of any other shape with the concavity facing upward or in alternative downward.
2. Metal insole as claimed in Claim 1) **characterised by** the fact that the longitudinal ribs are joined to transversal ribs (3.3), the longitudinal ones following the profile of the insole, the transversal ones being perpendicular or inclined compared to the lon-

gitudinal ones joined to the transversal ones.

3. Metal insole as claimed in Claims 1) and 2) **characterised by** the fact that the transversal ribs (3.3) are applied to the extremities of the longitudinal ribs.
4. Metal insole as claimed in the previous claims **characterised by** diagonal ribs (5) inserted between the perimetral ribs as claimed in Claim 1).
5. Metal insole as claimed in Claim 1) **characterised by** parallel or convergent ribs whose longitudinal axis forms a straight or curved line.
6. Metal insole as claimed in Claim 1) suited to avoid perforation caused by sharp objects and to avoid flexion and torsion of the arch of the sole, that is the area comprised between the heel and the arch of the sole, with respect to the heel and without the application of a reinforcing element, i.e. cambrillon (French term), **characterised by** the application of ribs in the said area according to the previous Claims.
7. Metal insole as claimed in Claim 6) **characterised by** the application of ribs of any shape or type in the area comprised between the heel and the arch of the sole and by the fact that the ribs are attached to the heel.
8. Application to protective metal insoles of longitudinal ribs to increase the flexion and transversal ribs to increase resistance to torsion in the area comprised between the heel and the arch of the sole.



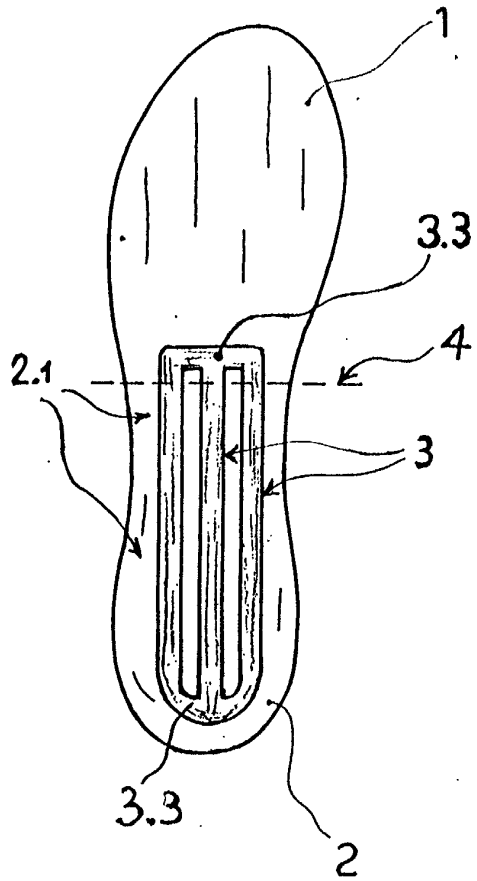


FIG. 5

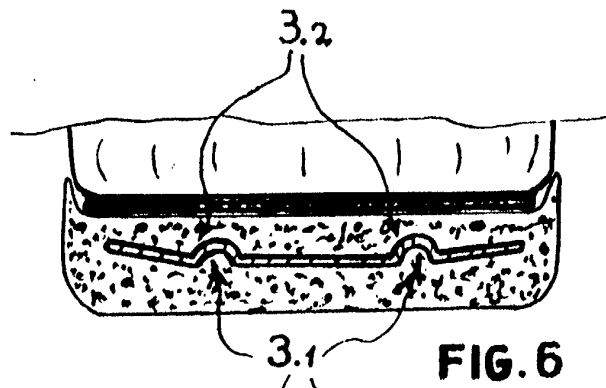


FIG. 6

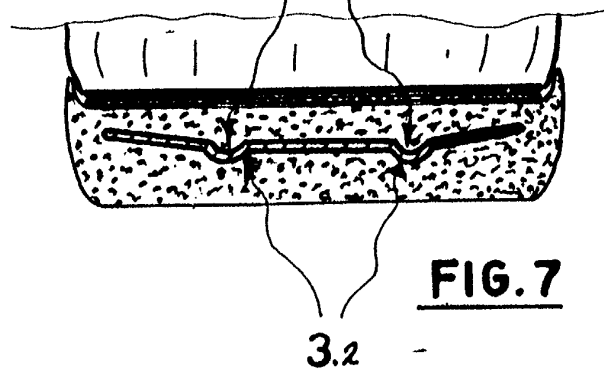


FIG. 7

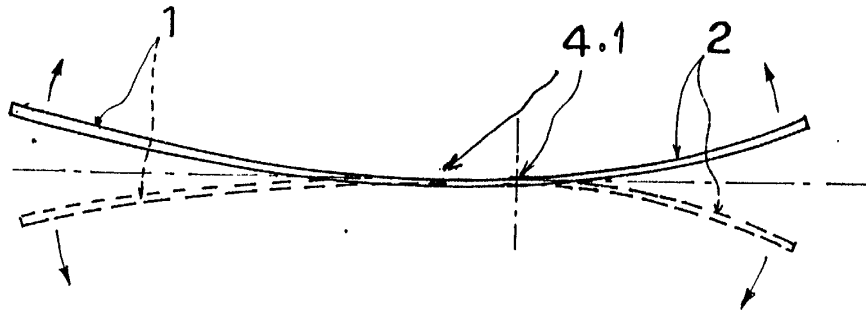


FIG. 8

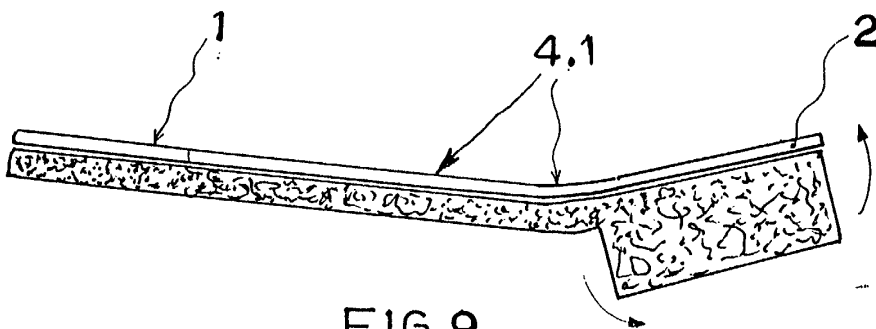


FIG. 9

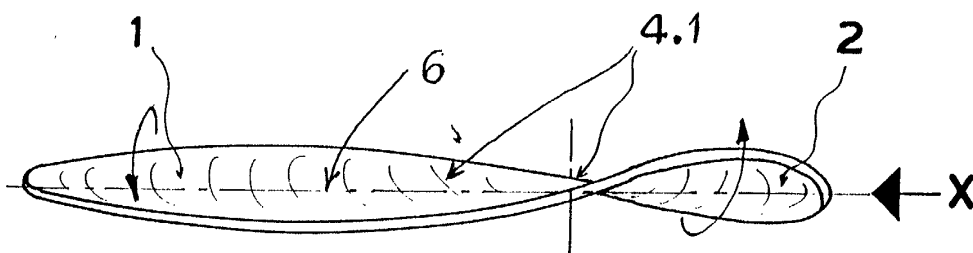
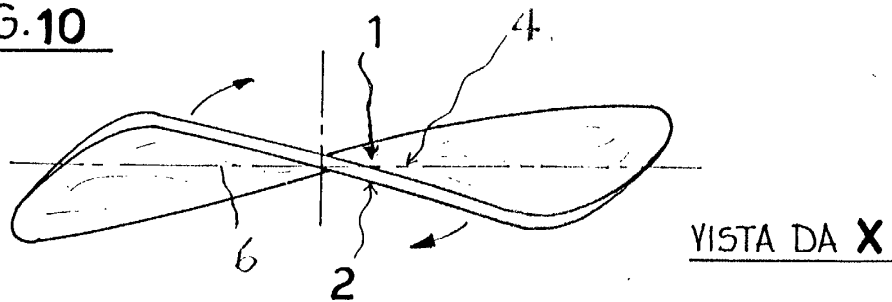


FIG. 10



VISTA DA X



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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5242

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 17 September 2002	Examiner Herry, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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