PATENT SPECIFICATION

720,140

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COMPLETE SPECIFICATION

Improvements in or relating to Shinguards

I, WALTER ALFRED GEORGE, a British Subject, of 25, Tootswood Road, Shortlands, Kent, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to shin guards for personal wear as a protection against injury when playing games such as hockey and football.

One object of the invention is to provide protective articles of the above type which will be lighter in construction, more comfortable to the wearer, and will give more effective protection than those hitherto in use.

To this end according to the present invention a shin guard comprises separate inner and outer resilient members made of non-metallic hard sheet material, the inner member being shaped to fit against the leg of the wearer, and said members being connected together at their longitudinal edges with a space between them.

End closure members may be provided which connect corresponding ends of the curved members to form a totally enclosed hollow element.

According to a feature of the invention, the space between the inner and outer members may contain a resilient material, for example, a cellular material having cells extending transversely of said space with their axes disposed at right angles to the surfaces of the said inner and outer members.

Where the end closure members are provided to form a totally enclosed hollow element, the inner and outer members may be connected together in an airtight manner so as to provide a pneumatic cushion.

In order to explain the invention more completely, two embodiments thereof will now be described by way of example, with reference to the accompanying drawings, which are purely diagrammatic and by way of example only.

In the drawings:

Figure 1 shows a shin guard in front elevation;

Figure 2 is a side elevation of the shin guard;

Figure 3 illustrates the shin guard in cross cross section on the line III—III in Figure 1;

Figure 4 shows the shin guard in section on the line IV—IV in Figure 1; and

Figure 5 shows a transverse section of a modified form of shin guard.

In the construction shown in Figures 1 to 4, the shin guard comprises an inner member 1 which is U-shaped in section and has a curvature to enable it to be fitted on to the shin of the wearer, and an outer U-section member having a sharper curvature, the inner and outer members being secured together along their longer edges to form a hollow element, and spaced apart by a distance which is a maximum at the front of the shin guard and diminishes towards the longer edges thereof so as to form a hollow element of crescent-shaped section (Figure 3) the ends of said element being closed in the manner hereinafter described.

In order to secure the members 1 and 2 together the inner member 1 is made of larger dimensions than, although of similar shape to, the outer member 2, and the edge 4 of the inner member is folded round the edge of the outer member and secured thereto all round its periphery as by stitching, indicated at 5, or by adhesive, or by a combination of both. Alternatively rivets may be employed.

At the top and bottom the portions 4*a* of the folded part of the member 1 form end closures to the guard as shown in Figure 4.

The inner and outer curved members 1 and 2 are made of non-metallic hard sheet material which, while possessing a certain degree of flexibility, has a high resistance to impact. Suitable materials are vulcanised fibre sheet, a thermoplastic material such as rigid polyvinyl chloride sheet or a thermo-setting plastic sheet material. Materials made from glass fibre impregnated with a synthetic resin may also be used.

The space between the two members 1 and 2 is filled with a shock-resistant, resilient material, indicated at 3. This material should be stiff and shock-resistant, yet resilient. A suitable material is a honeycomb paper mesh bonded with synthetic resin, such as that sold under

the Trade Mark "Dufaylite," the axes of the honeycomb cells being disposed at right angles to the surfaces of the members 1 and 2. Alternatively foamed rubber or a foamed synthetic resin material, or another cellular material may be used in the space between the members 1 and 2.

The joint between the inner and outer members 1 and 2 may be made airtight, for example, by introducing a sealing compound into the joint, so that the air trapped in the space between the parts 1 and 2 acts as a resilient cushion.

Figure 5 shows an alternative construction according to the invention, in which the space between the inner and outer members 1 and 2 is constant in width.

The concave face of the inner member 1, which fits against the shin of the wearer, may be lined with resilient material, for example sponge or foamed rubber, felt or leather cloth, to afford greater comfort to the wearer.

What I claim is:—

1. A shin guard comprising separate inner and outer resilient curved members made of non-metallic hard sheet material, the inner member being shaped to fit against the leg of the wearer, and said members being connected together at their longitudinal edges with a space between them.

2. A shin guard according to Claim 1 wherein end closure members are provided which connect corresponding ends of the curved members to form a totally enclosed hollow element.

3. A shin guard according to Claim 1 or Claim 2 wherein the two curved members are spaced apart by a distance which is a maximum at the front of the shin guard and diminishes towards the longitudinal edges thereof.

4. A shin guard according to any of the preceding claims wherein the space between the inner and outer members contains a resilient material.

5. A shin guard according to any of the Claims 1 to 3 wherein the space between the inner and outer members contains a cellular material having cells extending transversely of said space with their axes disposed at right angles to the surfaces of the said inner and outer members.

6. A shin guard according to Claim 5 wherein the cellular material is a honeycomb paper mesh impregnated with a synthetic resin.

7. A shin guard according to any of the Claims 2 to 6 wherein the edges of the inner and outer members are connected together in an airtight manner.

8. Shin guards substantially as hereinbefore described with reference to Figures 1 to 4 or to Figure 5 of the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Protective Articles for Personal Wear

I, WALTER ALFRED GEORGE, a British Subject, of 25, Tootswood Road, Shortlands, Kent, do hereby declare this invention to be described in the following statement:—

This invention relates to articles for personal wear as a protection against injury, such for example, as miners' helmets, crash helmets, and shin guards for wear when playing games such as hockey and football.

The object of the invention is to provide protective articles of the above type which will be lighter in construction, more comfortable to the wearer, and will give more effective protection than those hitherto in use.

To this end a protective article according to the invention, which is shaped to fit the part of the body to which it is to be applied, is made of a flexible material, and is formed hollow with a totally enclosed internal space containing air, which serves pneumatically to absorb shock.

Preferably the protective article comprises an inner member curved approximately to fit the part of the body to which it is to be applied and an outer member of sharper curvature, the inner and outer members being secured together in an air tight manner along their edges, so that an air-containing space is produced between them.

The internal air space may, if desired, be cellular; for example, said space may be divided into cells by means of flexible partitions or it may be wholly or partly filled with a flexible or resilient cellular material, such as sponge or foamed rubber.

A shin guard according to the invention comprises an inner U-section member having a curvature which enables it to fit on to the shin of the wearer, and an outer U-section member, having a flatter curvature, the inner and outer members being secured together in an air-tight manner along their longer edges, to form a hollow element of crescent-shaped section, while the ends of said element are closed, also in an air-tight manner, so that the air contained within the guard acts as a pneumatic cushion.

The inner and outer members and the end closure members are made of a material which while possessing a certain degree of flexibility and resilience is also stiff, so that shocks are absorbed by a combination of the inherent

resilience of the material of which the guard is made, and of the cushioning action of the air contained within it.

The end closures may be constituted by integral extensions of one or other of the inner and outer U-shaped members, each extension being bent over at right angles to the member with which it is integral and having its free edge secured in an airtight manner to the other member. Alternatively the end closures may be separate parts.

In one form of the invention as applied to a shin guard, the shin guard is formed from two elements substantially rectangular in elevation each of which is of arcuate or curved section and each having different curvatures, the element having the flatter curvature being placed outside the other element, with its concave surfaces opposed to the convex surface of said other element. The two elements are preferably made of stiff fibre or polyvinyl chloride sheet and have their longitudinal edges secured together, whereby an article of crescent-shaped section, open at the ends is produced.

One of the arcuate or curved section elements forming said open-ended article preferably the outermost of said elements, is made longer than the other element and the two elements are so connected together that the ends of the outer element project above and below the ends of the inner element. These projecting ends are then turned over at right angles, as by pressing, until their free edges come to lie in register with the end edges of the inner element, the free edges of said projecting ends having been shaped so that they fit the said end edges. The free edges of the outer element are then secured to the end edges of the inner element whereby a totally enclosed hollow member of crescent-shaped section is produced.

The concave face of the inner element, which fits against the leg of the user, may be lined with resilient material, for example, sponge or foamed rubber, felt, or leather cloth to afford greater comfort to the wearer.

If desired the internal space within the hollow member formed in the manner described above may be sub-divided into cells to increase the resilience of the shin guard. Such cells may be formed by attaching longitudinally directed strips of resilient material, for example, stiff fibre, or polyvinyl chloride sheet to the inner face of one or other of the arcuate-section elements from which said hollow member is formed, so as to produce longitudinal channels within the hollow member, which channels may be sub-divided by transverse strips of resilient material which may be similar to that forming the longitudinal strips.

Alternatively, the internal space within the above described hollow member may be filled with light sponge or foamed rubber or other cellular material.

Instead of making the hollow member of crescent-shaped section, its section may be that of a segment of a ring, the member comprising two concentric elements connected along their longer edges by substantially rectangular strips and at their curved edges by strips in the form of a segment of a ring. The strips may be separate elements or may be integral with the remaining elements.

In order to increase the protective effect, the outer element of the shin guard may be fluted longitudinally.

In applying the invention to miners' helments, crash helments or other protective headgear the inner and outer members may each be in the form of a cap of a sphere, the inner member having a greater radius than the outer member, and the inner member is attached by its edge in an air-tight manner to the inside of the outer member which may if desired project beyond the edge of the inner member, the projecting portion serving to carry an internal head band to fit the head of the wearer.

Such an assembly of inner and outer members with head band may be detachably secured within an outer shell of shock resistant material, as in the case of a steel helmet.

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720,140 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

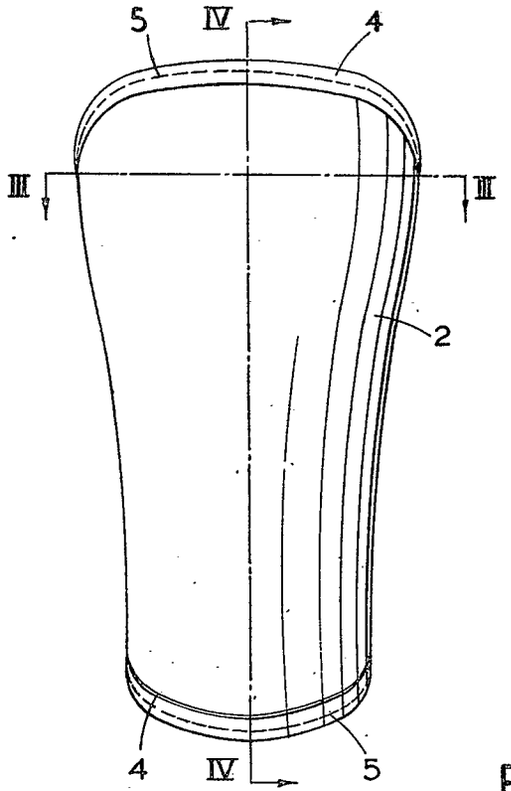

FIG. 1.

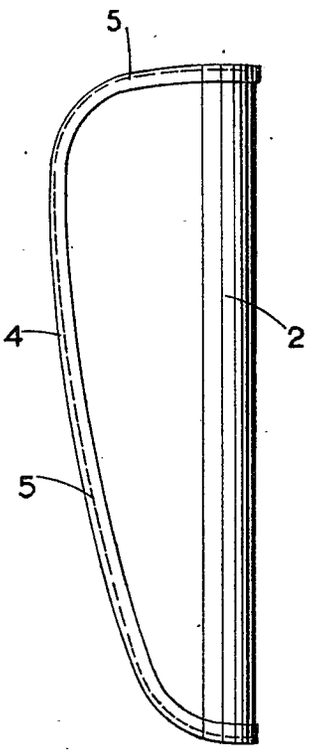

FIG. 2.

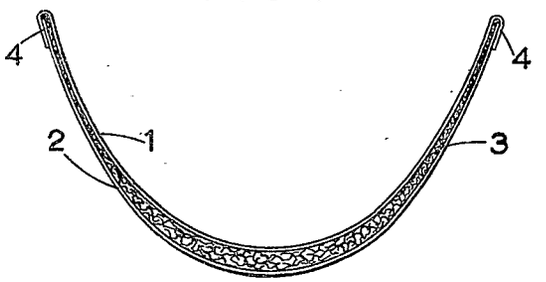

FIG. 3.

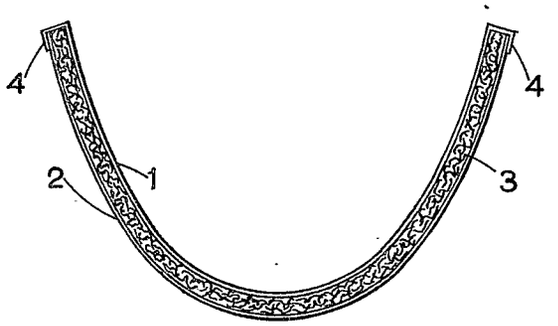

FIG. 5.

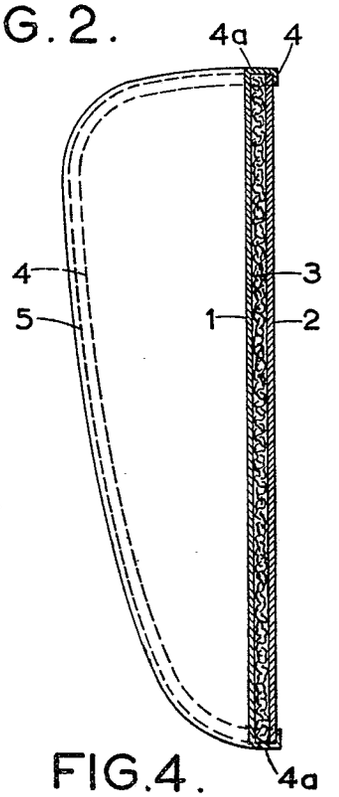

FIG. 4.