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(54) **An article of headgear**

Kopfbedeckung

Couvre-chef

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Description

THIS INVENTION relates to an article of headgear. More particularly, the invention relates to an article of protective headgear and to a method of manufacturing an article of protective headgear.

It is known to provide safety helmets having a reflective coating arranged on an outer surface of a protective shell. US-A-3885246 discloses a protective helmet having a reflective layer over an outer surface of a protective shell of the helmet. A transparent sheet is located over the reflective coating to protect the reflective layer.

US-A-4993082 discloses a helmet having a moulded cover shell for decorating and protecting the exterior surface of a helmet body. A thin clear plastic sheet of material is moulded in the shape of the upper exterior portion of the helmet body and painted or colaminated on the interior surface of the cover prior to fitting of the cover to the helmet's body.

It is an object of this invention to use the strength of a shell of a helmet to protect a reflective layer arranged on the helmet. It is also an object of this invention to provide a method of manufacturing a reflective helmet which is simple and cost-effective.

According to a first aspect of the invention, there is provided a method of manufacturing an article of protective headgear, the method including the steps of: providing an impact-resistant shell, applying a layer of light-dispersing material to the shell and applying a layer of reflective material to the shell, the method being characterised in that :

the shell is of a substantially transparent material;
the layer of light-dispersing material is applied to an inner surface of the shell; and
the layer of reflective material is applied to the layer of light-dispersing material.

The method may include the further step of applying a layer of sealing material to the layer of reflective material to inhibit damage to the reflective material.

The method may further include forming the light dispersing material by dispersing glass beads in a resin. The resin may be a waterless resin.

A solvent, a flow agent and acrylic beads may be mixed together to form the resin, so that the resin is in a sprayable form. A suspension agent may be added to the resin to suspend the glass beads within the resin so that, on application, the glass beads are substantially evenly dispersed in the layer of light dispersing material.

The reflective material may be dissolved in a suitable solvent to form a liquid solution of the reflective material. The method may include the step of dissolving a reflective metal in said suitable solvent.

The light dispersing material may be sprayed onto said shell. The solution of reflective material may be sprayed onto the layer of light dispersing material.

The resin may be sprayed onto the layer of reflective material to form the layer of sealing material.

The method may include the step of adding a colourant to the layer of light dispersing material.

The layers of light dispersing material, reflective material and sealing material may be applied to substantially the entire inner surface of the shell.

According to a second aspect of the invention, there is provided an article of protective headgear having an impact-resistant shell, a layer of light-dispersing material applied to the shell and a layer of reflective material applied to the layer of the light-dispersing material, characterized in that :

the impact-resistant shell is of a substantially transparent material; and
the layer of the light-dispersing material is applied to an inner surface of the shell.

It is further to be appreciated that the article of protective headgear will usually be in the form of a helmet, more particularly, a safety helmet. It is to be understood that a safety helmet comprises a protective shell and a support structure or harness to support the shell on a user's head.

The article may further include a layer of a sealing material applied to the layer of reflective material to inhibit damage to the layer of reflective material.

The layer of light dispersing material may comprise glass beads dispersed in the resin. The sealing material may also be in the form of a resin. In both cases, the resin may be a waterless resin.

The reflective material may include a reflective metal carried in a solvent. The reflective metal may be aluminium.

Substantially the entire inner surface of the shell may have the coating of reflective material.

It is to be appreciated that a large number of users of protective headgear utilize the headgear at night or under other conditions of low visibility, for example in underground mines. A disadvantage of reflective elements which are affixed to apparel, and which are presently utilised, is that, when they are affixed to clothing, such reflective elements are easily obscured by other articles of clothing which a user may wear over the affixed reflective elements. A further disadvantage is that these reflective elements are easily damaged, dirtied or ripped off in strenuous or adverse working conditions such as those which might occur in an underground mine. The Applicant believes that these disadvantages will be overcome by utilising the article of protective headgear in accordance with the invention.

The invention is now described, by way of example, with reference to the accompanying drawings in which

Figure 1 shows a side view of an article of headgear in accordance with the invention; and
Figure 2 shows a sectioned view of part of the article of headgear.

In Figure 1, reference numeral 10 generally indicates an article of protective headgear in accordance with the invention.

The article of protective headgear 10 is in the form of a safety helmet 12. The safety helmet 12 comprises a protective shell 14 and a harness (not shown) to support the shell 14 on a user's head.

The entire shell 14 of the safety helmet 12 is impregnated with a reflective material.

It is to be appreciated that the shell 14 of the safety helmet 12 is moulded from a plastics material 16. The reflective material is in the form of a reflective pigment. The reflective pigment is incorporated into the plastics material 16 of the shell 14 prior to moulding the plastics material 16.

In a development of the invention, the shell 14 of the safety helmet 12 is coated with a reflective material 18 on substantially an entire inner surface 19 of the shell 14. The plastics material 16 is in the form of a polycarbonate, and is substantially transparent.

The helmet 12 includes a layer 20 of light dispersing material 22 applied to said inner surface 19 of the shell 14. A layer 24 of the reflective material 18 is applied to the layer 20. The reflective material 18 is in the form of aluminium 26.

A layer 28 of a sealing material in the form of a waterless resin 30 is applied to the layer 24 of aluminium 26 to inhibit damage to the layer 24.

The light dispersing material 22 comprises glass beads 32 dispersed in a resin 30, which is also a waterless resin. In use, to manufacture the resin 30, a solvent, a flow agent, acrylic beads and a suspension agent are mixed together. Since the resin 30 is waterless, separation of the beads 32 from the hardened resin 30, which would result in cracking of the layer 20, is inhibited. Similarly, separation of the layer 28 from the layer 24 is inhibited. Since the resin 30 includes a suspension agent, the beads are suspended in the resin 30 so that, on application, the beads 32 are substantially evenly dispersed in the layer 20.

Further, in use, the layers 20, 24, 28 are sprayed onto the inner surface of the shell 14. Hence, the resin 30 is such that, prior to hardening, it has a sufficiently low viscosity to permit spraying of the resin 30. Still further, the aluminium 26 is carried in a solvent, the combination of aluminium 26 and the solvent being of a suitably low viscosity, so that they are capable of being sprayed onto the layer 20 to form the layer 24.

If desired, a colourant is introduced into the light dispersing material 22 prior to the material 22 being sprayed to form the layer 20, so that the helmet 12 appears to be of a desired colour. Instead, the colourant can be added to the plastic material of the shell 14, prior to injection moulding of the shell 14.

The Applicant believes that the article of protective headgear 10 will be particularly useful in conditions of low visibility, for example, in underground mines. A disadvantage of reflective elements which are affixed to apparel, and which are presently utilised, is that, when they are affixed to clothing, they are easily obscured by other articles of clothing which a user may wear over the affixed reflective elements. A further disadvantage is that these reflective elements are easily damaged or ripped off in strenuous or adverse working conditions such as those which might occur in an underground mine.

Since the shell 14 is coated, as described, with the reflective material 18, the Applicant believes that the reflectivity of the safety helmet 12 will be substantially maintained in the working conditions described above and hence the disadvantages set out above will, to a large extent, be overcome.

Claims

1. A method of manufacturing an article of protective headgear (10), the method including the steps of:

   providing an impact-resistant shell;
   applying a layer (20) of a light-dispersing material (22) to the shell; and
   applying a layer (24) of reflective material (26) to the shell;
   characterized in that :-

   the shell (14) is of a substantially transparent material;
   the layer (20) of light-dispersing material (22) is applied to an inner surface (19) of the shell (14); and
   the layer (24) of reflective material (26) is applied to the layer (20) of light-dispersing material (22).

2. The method as claimed in claim 1 which includes the step of applying a layer (28) of sealing material (30) to the layer (24) of reflective material (26) to inhibit damage to the reflective material (26).

3. The method as claimed in claim 1 or claim 2 which includes forming the light-dispersing material (22) by dispersing glass beads (32) in a resin (30), preferably a waterless resin.

4. The method as claimed in claim 3, which includes the step of mixing a solvent, a flow agent and acrylic beads together to form the resin (30), so that the resin (30) is in a sprayable form.

5. The method as claimed in claim 4, which includes adding a suspension agent to the resin (30) to suspend the glass beads (32) within the resin (30) so that, on application, the glass beads (32) are substantially evenly dispersed in the layer (20) of light-dispersing material.

6. The method as claimed in any one of claims 2 to 5, which includes dissolving the reflective material

(18) in a suitable solvent to form a liquid solution of the reflective material (18).

7. The method as claimed in claim 6, which includes the step of dissolving a reflective metal in said solvent.

8. The method as claimed in claim 6 or claim 7, which includes the step of spraying the light-dispersing material (22) onto said shell (14), and optionally spraying the solution of reflective material (18) onto the layer (20) of light dispersing material (22).

9. The method as claimed in claim 8 which includes the step of spraying the resin (30) onto the layer (24) of reflective material (18) to form the layer (28) of sealing material (30).

10. The method as claimed in any one of claims 2 to 9, inclusive, which includes applying the layers of light-dispersing material (22), reflective material (18) and sealing material (30) to substantially the entire inner surface (19) of the shell (14).

11. The method as claimed in any one of the preceding claims, which includes adding a colourant to the layer (20) of light-dispersing material (22).

12. An article of protective headgear having an impact resistant shell (14), a layer (20) of a light-dispersing material (22) applied to the shell (14), and a layer (24) of reflective material (18) applied to the layer (20) of the light-dispersing material (22), characterized in that :

the impact resistant shell (14) is of a substantially transparent material (16); and
the layer (20) of the light dispersing material (22) is applied to an inner surface (19) of the shell (14).

13. The article as claimed in claim 12 which includes a layer (28) of a sealing material (30) applied to the layer (20) of reflective material (18) to inhibit damage to the layer (20) of reflective material (18).

14. The article as claimed in claim 13 in which the layer (20) of light-dispersing material (22) comprises glass beads (32) dispersed in a resin (30).

15. The article as claimed in claim 14 in which the sealing material (30) is also a resin.

16. The article as claimed in claim 14 or 15, wherein the resin (30) is a waterless resin.

17. The article as claimed in any one of claims 12 to 16, in which the reflective material (18) includes a reflective metal, preferably aluminium, carried in a solvent.

18. The article as claimed in any one of claims 12 to 17, inclusive, in which substantially the entire inner surface (19) of the shell (14) has the coating of reflective material (18).

Patentansprüche

1. Eine Herstellungsmethode für einen Gegenstand der schützenden Kopfbedeckung (10), die folgende Vorgänge einschließt:

Bereitstellung eines schlagfesten Rohlings;
Auftragen einer Schicht (20) eines reflektierenden Materials (22) auf den Rohling; und
charakterisiert dadurch, daß

der Rohling (14) weitgehend aus transparentem Material besteht;
die Schicht (2) des lichtstreuenden Materials (22) auf der Innenseite (19) des Rohlings (14) aufgetragen wird; und
die Schicht (24) des reflektierenden Materials (26) auf die Schicht (20) des lichtstreuenden Materials (22) aufgetragen wird.

2. Die in Patentanspruch 1 geltend gemachte Methode einschließlich des Vorgangs der Beschichtung (28) mit Dichtungsmasse (30) auf die Schicht (24) des reflektierenden Materials (26) zur Einschränkung von Beschädigungen des reflektierenden Materials (26).

3. Die in Patentanspruch 1 oder Patentanspruch 2 geltend gemachte Methode einschließlich Formung des lichtstreuenden Materials (22) durch Verteilung von Glasperlen (32) in einem Harz (30), vorzugsweise wasserloses Harz.

4. Die in Patentanspruch 3 geltend gemachte Methode einschließlich des Vorgangs der Mischung eines Lösemittels, eines Flußmittels und Akrylperlen zur Herstellung des Harzes (30), so daß das Harz (30) in Sprühform entsteht.

5. Die in Patentanspruch 4 geltend gemachte Methode einschließlich Zugabe eines Suspensionsmittels zu dem Harz (30), um die Glasperlen (32) in dem Harz (30) zu suspendieren, damit bei Anwendung weitgehend gleichmäßige Verteilung der Glasperlen (32) in der Schicht (20) des lichtstreuenden Materials gewährleistet wird.

6. Die in Patentansprüchen 2 bis 5 geltend gemachte Methode einschließlich Auflösung des reflektierenden Materials (18) in einem geeigneten Lösemittel, um eine flüssige Lösung des reflektierenden Materials (18) zu erhalten;

7. Die in Patentanspruch 6 geltend gemachte Methode einschließlich des Vorgangs der Auflösung eines reflektierenden Metalls in der genannten Lösung.

8. Die in Patentanspruch 6 oder 7 geltend gemachte Methode einschließlich des Vorgangs der Aufsprühung des lichtstreuenden Materials (22) auf den genannten Rohling (14), und alternativ Aufsprühung der Lösung auf reflektierendes Material (18) auf die Schicht (20) des lichtstreuenden Materials (22).

9. Die in Patentanspruch 8 geltend gemachte Methode einschließlich des Vorgangs der Besprühung der Schicht (24) mit reflektierendem Material (18) mit dem Harz (30) zur Erzielung einer Schicht (28) als Dichtungsmasse.

10. Die in Patentansprüchen 2 - 9 geltend gemachte Methode einschließlich des Vorgangs der Beschichtung mit lichtstreuendem Material (22), reflektierendem Material (18) und Dichtungsmasse (30) weitgehend auf der Innenseite (19) des Helm-Rohlings (14).

11. Die in jedem der Patentansprüche geltend gemachte Methode einschließlich Zugabe von Farbstoff in die Schicht (20) des lichtstreuenden Materials (22).

12. Ein Gegenstand zur schützenden Kopfbedeckung mit einem schlagfesten Helm-Rohling (14), einer Beschichtung (20) mit lichtstreuendem Material (22) auf dem Rohling (14) und einer Schicht (24) reflektierendem Material (18), das auf die Beschichtung (20) des lichtstreuenden Materials (22) aufgetragen wird, charakterisiert dadurch, daß:

der schlagfeste Rohling (14) aus weitgehend transparentem Material (16) besteht; und
die Schicht (20) des lichtstreuenden Materials (22) auf der Innenseite (19) des Rohlings (14) aufgetragen wird.

13. Der in Patentanspruch 12 geltend gemachte Gegenstand einschließlich einer Schicht (28) Dichtungsmasse (30), die auf die Schicht (20) des reflektierenden Materials (18) aufgetragen wird, um Beschädigungen der Schicht (20) des reflektierenden Materials (18) einzuschränken.

14. Der in Patentanspruch 13 geltend gemachte Anspruch, wobei die Schicht (20) des lichtstreuenden Materials (20) Glasperlen (32) enthält, die in einem Harz (30) verteilt sind.

15. Der in Patentanspruch 14 geltend gemachte Gegenstand, wobei die Dichtungsmasse (30) gleichzeitig ein Harz ist.

16. Der in Patentansprüchen 14 oder 15 geltend gemachte Gegenstand, wobei das Harz (30) ein wasserloses Harz ist.

17. Der in jedem der Patentansprüche 12 - 16 geltend gemachte Gegenstand, wobei das reflektierende Material (18) ein reflektierendes Metall, vorzugsweise Aluminium in einer Lösung, einschließt.

18. Der in jedem der Patentansprüche 12 - 17 geltend gemachte Gegenstand, wobei die gesamte Innenfläche (19) des Rohlings (14) weitgehend mit einer Beschichtung aus reflektierendem Material (18) ausgestattet ist.

Revendications

1. Une méthode de fabrication d'un article de couvre-chef de protection (10), methode qui inclut les étapes où:

l'on fournit une carapace résistante aux chocs,
l'on applique une couche (20) de matériau dispersif (22) sur la carapace, et
l'on applique une couche (24) de matériau réfléchissant (26) sur la carapace,
caractérisée par:

la carapace (14) est d'un matériau pratiquement transparent,
la couche (20) de matériau dispersif (22) est appliquée sur une surface intérieure (19) de la carapace (14), et
la couche (24) de matériau réfléchissant (26) est appliquée sur la couche (20) de matériau dispersif (22).

2. La méthode, telle qu'elle est revendiquée dans la revendication 1, qui inclut l'étape d'application de la couche (28) de matériau d'étanchéité (30) sur la couche (24) de matériau réfléchissant (26) pour empêcher les dégâts que pourrait souffrir le matériau réfléchissant (26).

3. La méthode telle qu'elle est revendiquée dans la revendication 1 or dans la revendication 2 et qui inclut la préparation du matériau-dispersif (22) en dispersant des perles de verte (32) dans une résine (30), préférablement une résine anhydre.

4. La methode telle qu'elle est revendiquée dans la revendication 3, qui inclut l'étape ou l'on mélange ensemble un solvant, un agent d'écoulement et des perles d'acrylique, pour obtenir la résine (30), de manière que cette résine soit dans une forme pulvérisable.

5. La méthode, telle qu'elle est revendiquée dans la revendication 4, qui inclut l'adjonction d'un agent de suspension à la résine (30), pour obtenir une suspension des perles de verte (32) dans la résine (30), de manière à avoir, à l'application, les perles de verte (32) uniformement répandues dans la couche (20) de matériau dispersif.

6. La méthode telle qu'elle est revendiquée dans n'importe quelie des revendications de 2 à 5, qui inclut l'operation de dissoudre le matériau réfléchissant (18) dans un solvant approprié pour obtenir une solution liquide du matériau réfléchissant (10).

7. La méthode telle qu'elle est revendiquée dans la revendication 6, qui inclut l'étape où l'on dissout un métal réfléchissant dans le solvant mentionné.

8. La méthode telle qu'elle est revendiquée dans les revendications 6 ou 7, qui inclut l'étape où l'on pulvérise le matériau dispersif (22) sur la carapace mentionnée (14) et facultativement, l'on pulvérise la solution de matériau réfléchissant (18) sur la couche (20) de matériau dispersif (22).

9. La méthode telle qu'elle est revendiquée dans la revendication 9, qui inclut l'étape où l'on pulvérise la résine (30) sur la couche (24) de matériau réfléchissant (18) pour obtenir la couche (28) de matériau d'étanchéité (30).

10. La méthode telle qu'elle est revendiquée dans n'importe quelle des revendications de 2 à 9, inclusivement, qui inclut l'application des couches de matériau dispersif (22), de matériau réfléchissant (18) et de matériau d'étanchéité (30) sur pratiquement toute la surface intérieure (19) de la carapace (14).

11. La méthode telle qu'elle est revendiquée dans n'importe quelle des revendications précedentes, qui inclut l'adjonction d'un colorant à la couche (20) de matériau dispersif (22).

12. Un article de couvre-chef de protection ayant une carapace resistante aux chocs (14), une couche (20) de matériau dispersif (22) appliquée sur la carapace (14), et une couche (24) de matériau réfléchissant (18) appliquée sur la couche (20) de matériau dispersif (22), caractérisé comme il suit:

    la carapace resistante aux chocs (14) est d'un matériau (16) pratiquement transparent, et
    la couche (20) de matériau dispersif (22) est appliquée sur la surface intérieure (19) de la carapace (14).

13. L'article, tel que revendiqué dans la revendication 12, qui inclut une couche (28) de matériau d'étanchéité (30) appliqué sur la couche (20) de matériau réfléchissant (18) pour empêcher que la couche (20) de matériau réfléchissant (18) soufre des dégâts.

14. L'article, tel que revendiqué dans la revendication 13, où la couche (20) de matériau dispersif (22) contient des perles de verre (32) dispersées dans la résine (30).

15. L'article, tel que revendiqué dans la revendication 14, où le matériau d'étanchéité (30) est aussi une résine.

16. L'article, tel que revendiqué dans les revendication 14 ou 15, où la résine (30) est une résine anhydre.

17. L'article, tel qu'il est revendiqué dans n'importe quelle des revendications de 12 à 16, où le matériau réfléchissant (18) inclut un metal réfléchissant, préférablement l'aluminium, porté par un solvant.

18. L'article, tel qu'il est revendiqué dans n'importe quelle des revendications de 12 à 17 inclusivement, où pratiquement toute la surface intérieure (19) de la carapace (14) a le recouvrement de matériau réfléchissant (18).

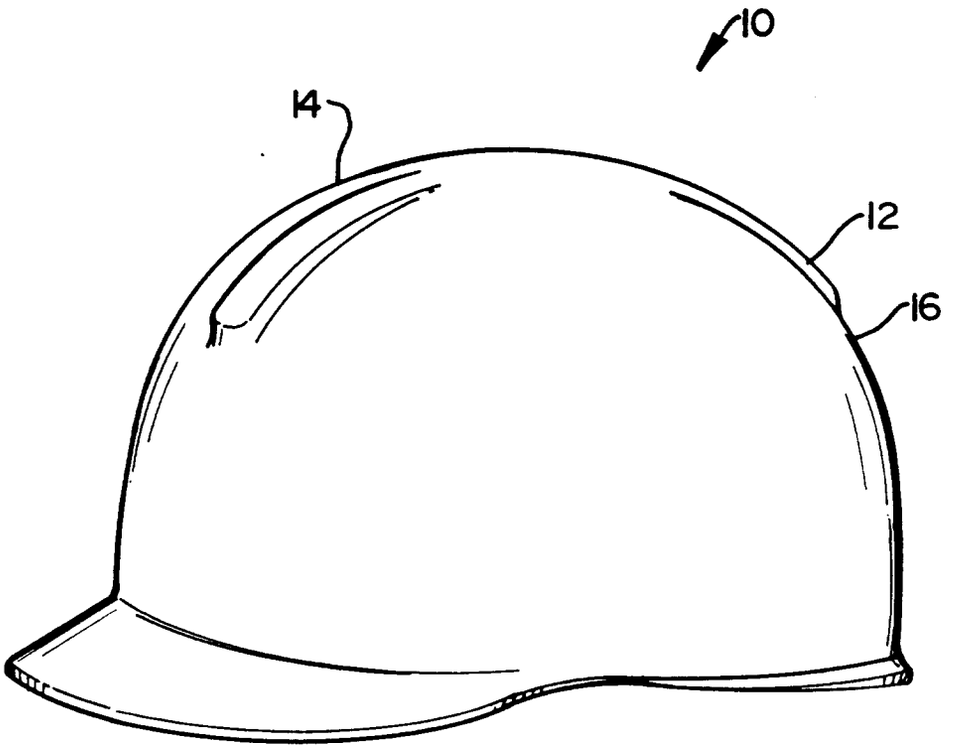


FIG 1

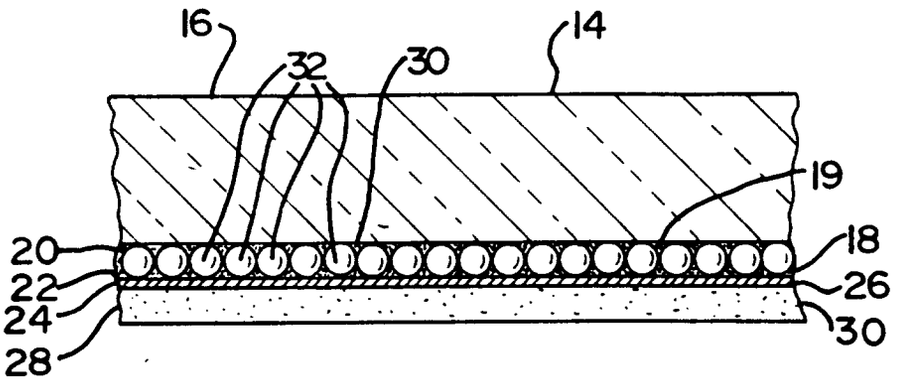


FIG 2