

March 17, 1970

NORIMOTO OTSUKA
PROTECTIVE HELMET

3,500,475

Filed March 1, 1968

2 Sheets-Sheet 1

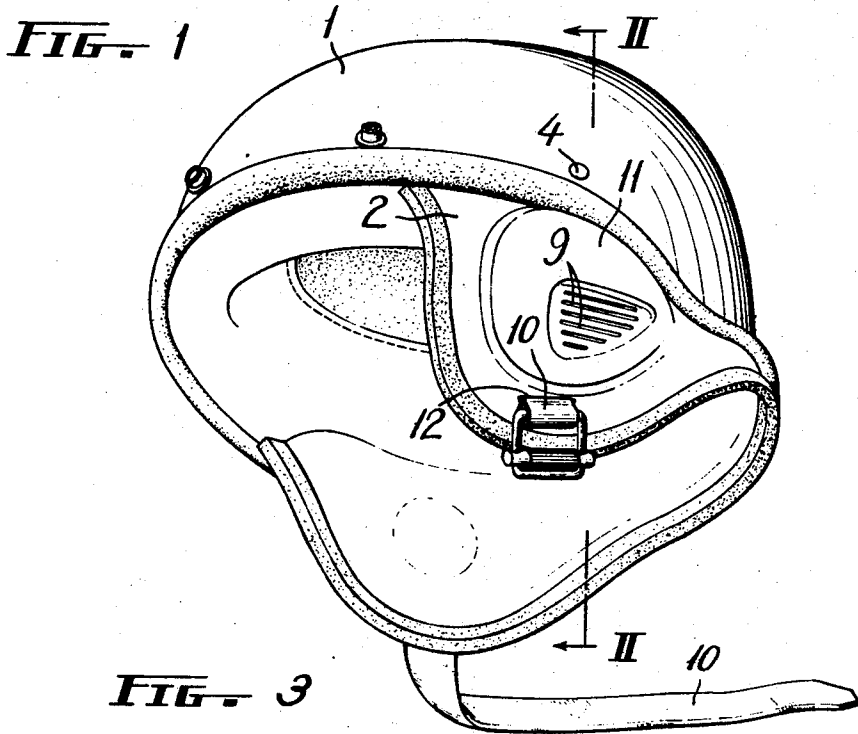


FIG. 3

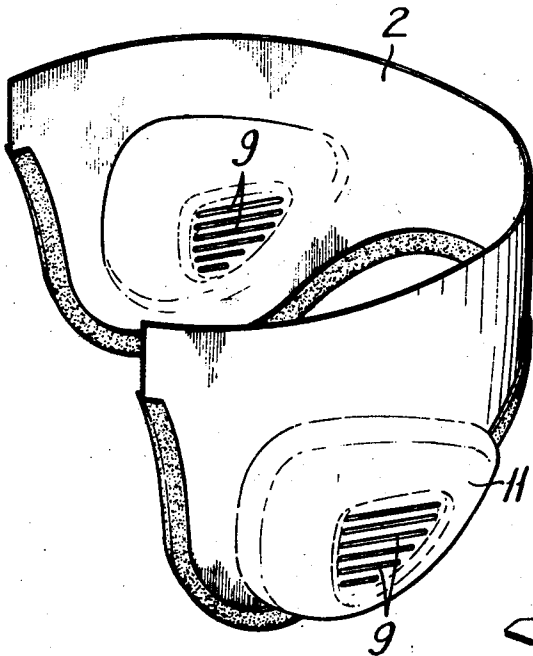
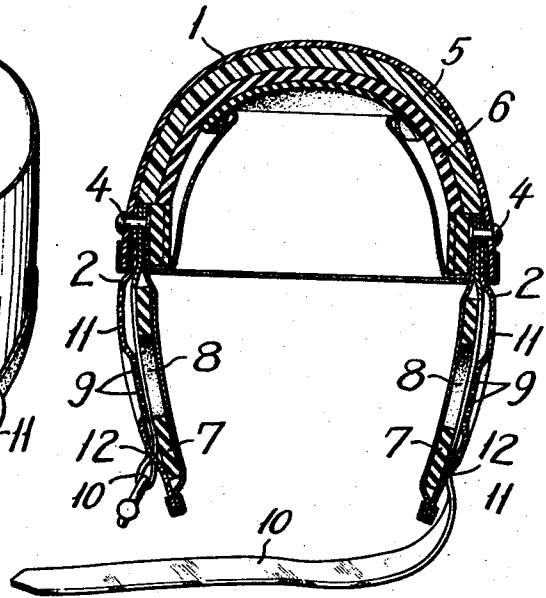


FIG. 2



INVENTOR.

Norimoto Otsuka

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FIG. 4

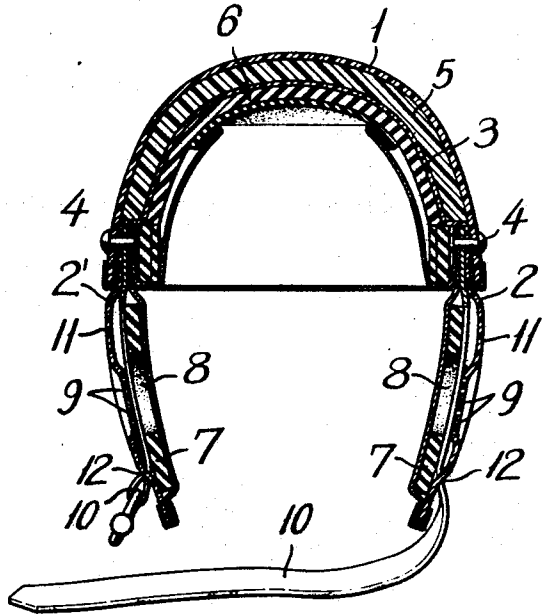
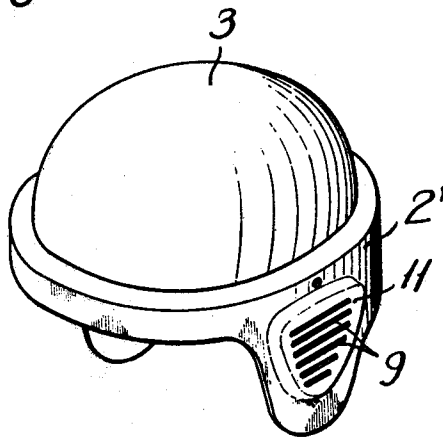


FIG. 5



INVENTOR.

Norimoto Otsuka

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Norimoto Otsuka, Tokyo, Japan, assignor to Kabushiki Kaisha Honda Gijutsu Kenkyusho, Saitama-ken, Japan

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Int. Cl. A42b 3/02

U.S. Cl. 2—3

8 Claims

ABSTRACT OF THE DISCLOSURE

A helmet having an outer shell body constituted of rigid synthetic resin and an inner shell body secured to the outer body at the lower edge thereof and depending therefrom, the inner shell body being constituted of a synthetic resin having a larger bending flexibility and serving to protect the ears of the wearer.

BRIEF SUMMARY OF THE INVENTION

This invention relates to a helmet and particularly to a helmet adapted to be worn by motorcycle drivers. The helmet serves the function of a crash helmet since it affords substantial protection to the user. The helmet resembles the type employed by jet pilots.

An object of the invention is to provide a helmet which has crash protective value for the skull of the user and which is easy to put on and remove.

Another object of the invention is to provide a helmet which is durable and not subject to wear or damage in use.

In accordance with the invention there is provided an outer shell body of rigid material which provides the major protection against the application of impact forces to the head of the wearer and an inner shell body connected to the outer shell body and depending therefrom to cover the ears of the user. The inner shell body is constituted of material which has a larger bending elasticity compared to the material of the outer body. Thereby, the inner body will enable the helmet to be easily put on and removed from the head of the user. Moreover, the flexibility of the inner body will enable the helmet to conform to different head sizes and shapes. The bodies are both constituted of synthetic resin material and preferably the outer body is reinforced.

The inner body may be only part circular which furnishes maximum flexibility and requires a minimum use of material. The inner body may also be an annular body with an integral shell thereon. This affords maximum protection for the wearer since two shell bodies in spaced relation surround the head. A lining of soft material of comparatively small restorability is preferable sandwiched between the spaced shell bodies for comfort and additional protection.

The inner shell body has local projections defining cavities for the ears and the outer body has openings into said cavities to enhance sound transmission into the helmet.

The helmet is provided with a strap constituted by a pair of strap portions which are secured to the inside of the outer body and extend along the inside surfaces of the inner body in the region of the ear cavities, each strap portion extending to the exterior of the helmet through a respective opening in the lower portion of the inner body.

BRIEF SUMMARY OF THE DRAWING

FIGURE 1 is a perspective view of a helmet according to the present invention;

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FIGURE 2 is a sectional view taken along the line II—II in FIG. 1.

FIGURE 3 is a perspective view of an earpiece shell body portion of the helmet;

FIGURE 4 is a sectional view of another embodiment of the helmet according to the present invention; and

FIGURE 5 is a perspective view of an earpiece shell body portion of the helmet of FIG. 4.

DETAILED DESCRIPTION

In the drawing there is shown a helmet adapted for use by motorcycle drivers, and the helmet comprises a shell body 1 in the form of a bowl and made of a hard, rigid reinforced synthetic resin and an earpiece shell body 2 made of a synthetic resin having a large bending elasticity compared to the shell body 1. The body 2 is connected to the body 1 along the lower edge of the latter to project downwardly therefrom. The earpiece shell body 2 may be half circular in form as shown in FIG. 3, lacking a forehead portion, or it may be of annular form as shown at 2' in FIG. 5 extending over the entire inner circumference of the bowl body 1.

Additionally, the shell body 2' may have a shell body 3 extending therefrom, similar in shape to the shell body 1 and positioned adjacent the inner surface of the shell body 1. This construction of the shell body 3 combines high strength and flexibility, as will be discussed later.

The two shell bodies 1 and 2 or 2' are connected together by means of rivets 4. The shell body 1 is provided with a lining comprising a soft layer 5, comparatively small in restorability such as sponge styrol or polystyrene foam and a soft layer 6 comparatively large in restorability such as foam rubber or a soft synthetic resin such as polyurethane foam or the like.

The earpiece shell body 2 has local outward projections 11 at each side to form a cavity for each ear. In the interior of each projection 11 is a lining composed of a soft layer 7 comparatively large in restorability. Each layer 7 is provided with an opening 8 for an ear, and the shell body 2 or 2' is provided with sound openings 9 in the projections 11 for sound transmission purposes.

A pair of fastening straps 10 are provided, each being connected at its base end to the inner surface of the shell body 1 and the strap extends downwardly along the inner surface of the earpiece shell body 2 or 2' and passes externally of shell 2 or 2' through openings 12 in the lower portion of the shell 2 or 2' so as to enable connection of the free ends of the strap 10.

In the helmet in FIGS. 4 and 5, the lining 5 is sandwiched between outer body 1 and dome 3 and the continuity of body 1 and dome 3 affords great strength and maximum protection for the wearer against impact forces.

There have hitherto been known helmets wherein an outer shell body and an earpiece shell body, both made of a rigid material are formed integrally or attached together. In another known helmet an ear flap made of comparatively pliable material such as leather, hangs from the lower edge of an outer shell body of rigid material. The first known embodiment has the disadvantage that due to its rigidity, it is inconvenient to put the helmet on and take it off, and additionally it does not conform with different size and shape heads. The second mentioned known helmet has the disadvantage that it provides insufficient protection to the ear, while the ear flap itself is subject to wear and damage.

The helmet of the present invention overcomes these disadvantages. Namely, since the outer shell body is made of a hard reinforced synthetic resin and the earpiece shell body is separate therefrom and is made of a synthetic resin larger in bending elasticity than the outer shell body, therefore the resultant assembled helmet is

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soft and flexible for being put on and taken off. Moreover, it accurately and comfortably fits all sizes and shapes of heads and insures protection of the ears while it is robust and not subject to wear and breakage under even extreme conditions of use.

The composition of the outer shell body and the earpiece shell body may be freely selected from the wide range of available resins as those skilled in the art will readily understand. As an example, the outer shell body may be composed of fiberglass reinforced plastic (FRP) using a polyester resin as the plastic whereas the earpiece shell body may be ABS resin.

In order to enhance the increased rigidity of the outer shell body relative to the earpiece shell body, the thickness of body 1 may be greater than body 2 and 2'. In a practical embodiment, the body 1 has a thickness of 4 mm. and the body 2 or 2' a thickness of 2 mm.

What is claimed is:

1. A protective helmet comprising an outer shell body constituted of a hard reinforced synthetic resin, an earpiece shell body constituted of a synthetic resin having a larger bending elasticity compared to the outer shell body, means rigidly and permanently securing the earpiece shell body to the outer shell body along the lower edge thereof, a pair of fastening straps each rigidly secured to the lower edge of the outer shell body and extending downwardly along the inner surface of the earpiece shell body and passing externally of the earpiece shell body through openings provided in the lower portion of said earpiece shell body, and a pair of ear pads, each being positioned on the inside of the earpiece shell body to sandwich a respective strap between the associated pad and the earpiece shell body.

2. A helmet according to claim 1, wherein each said strap has an upper end and the earpiece shell body has

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an upper end, which ends are secured in common to the lower edge of the outer shell body by said means which secures the earpiece shell body to the outer body, the latter means comprising a rivet.

3. A helmet according to claim 1, wherein each said pad is provided with a large sound opening and the earpiece shell body is provided with a plurality of small sound openings adjacent said sound opening in each pad.

4. A helmet according to claim 3, wherein said earpiece shell body has an inwardly concave wall portion in the region of said small sound openings.

5. A helmet according to claim 1, wherein the earpiece shell body has a semi-circular form.

6. A helmet according to claim 1, wherein the earpiece shell body has an annular form.

7. A helmet as claimed in claim 6, wherein said earpiece shell body has a dome portion which extends in spaced relation from the outer shell body, and a lining comprised of a soft material sandwiched between the outer shell body and said dome portion.

8. A helmet as claimed in claim 7 comprising a layer of soft material internally on said dome portion, the latter said layer having comparatively large restorability.

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JAMES R. BOLER, Primary Examiner