May 16, 1967 F. R. DUNNING 3,319,261

FACE MASKS

Filed Jan. 29, 1965

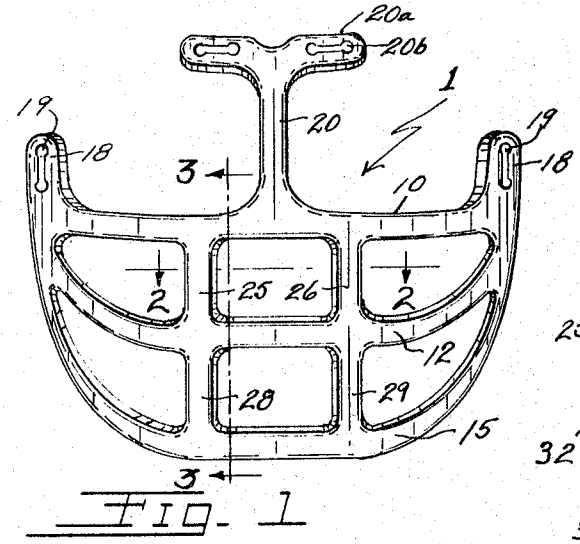


FIG. 1

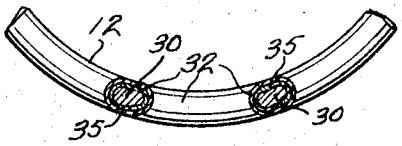


FIG. 2

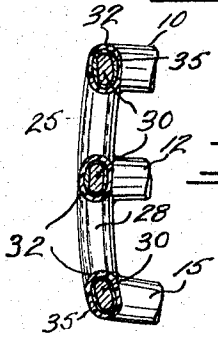


FIG. 3

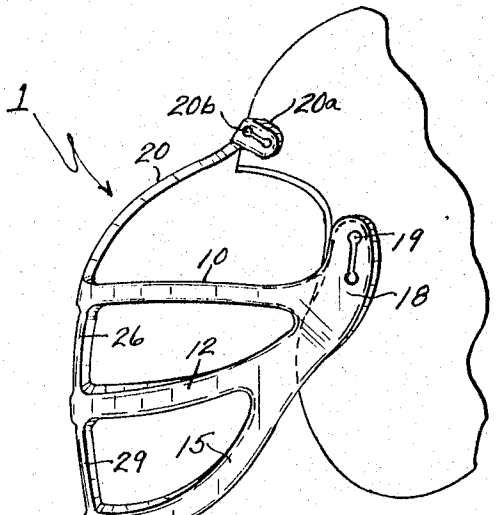


FIG. 4

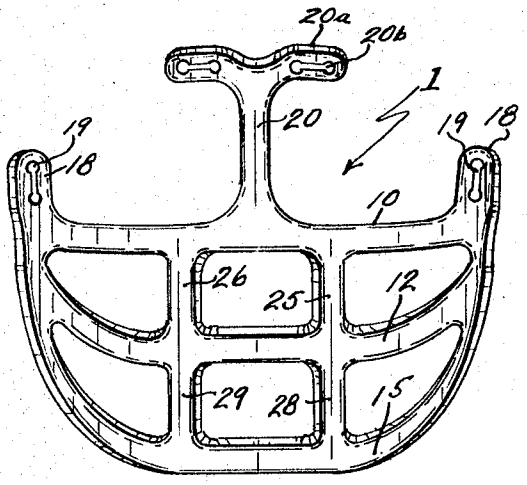


FIG. 5

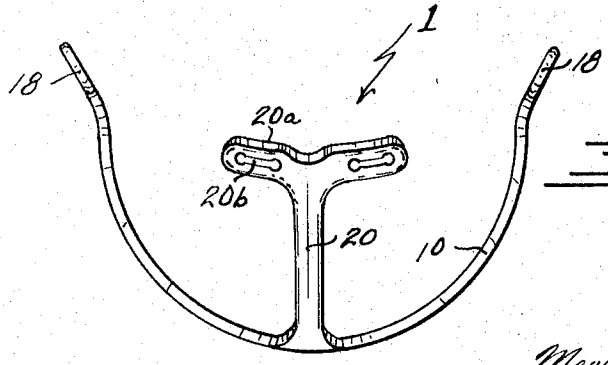


FIG. 6

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United States Patent Office 3,319,261 Patented May 16, 1967

3,319,261

FACE MASKS

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Filed Jan. 29, 1965, Ser. No. 429,039
6 Claims. (Cl. 2—9)

The present invention relates to face masks for attachment to football helmets to protect the faces of players wearing the same.

It is an object of the present invention to provide a face mask that is strong, lightweight and durable.

It is an object of the present invention to provide a face mask of a strong, economical, one-piece integral construction, the mask being durable and lightweight and formed from a stamped aluminum alloy protected by a thin hard plastic coating.

It is an object of the present invention to provide a face mask of a one-piece integral construction, the mask being strong, durable, lightweight and made of plastic-coated aluminum, the plastic coating being a thin polyvinyl chloride coating put on by a fused powder coating process that provides a hard covering that also very uniformly covers any sharp edges on the stamped core.

These and other objects will become apparent from the specification that follows, the appended claims, and the drawings in which:

FIGURE 1 is a front elevational view of a face mask embodying the present invention;

FIGURE 2 is a sectional view taken along the line 2—2 indicated in FIGURE 1;

FIGURE 3 is a sectional view taken along the line 3—3 indicated in FIGURE 1;

FIGURE 4 is a side elevational view of the face mask of FIGURE 1 and showing the mask attached to a football helmet;

FIGURE 5 is a back elevational view of the face mask of FIGURE 1; and

FIGURE 6 is a top plan view of the face mask of FIGURE 1.

The present invention provides a strong, economically made face mask of an integral one-piece construction of plastic-coated aluminum. The mask of the present invention has many advantages, one of which is its very light weight which contributes to the speed and endurance of the player wearing said mask.

As seen in the drawings a face mask **1** is provided for attachment to a helmet **5**, the mask comprising an upper arcuately curved bar **10**, a middle arcuately curved bar **12** and a lower arcuately curved bar **15**. The bars **10**, **12** and **15** extend across the face opening of the helmet to protect the face of the player, the side ends of the bars converging together to define a pair of integral side fastening ears **18**, each ear having elongated generally vertically disposed slots **19** therein. The ears **18** of the mask are operatively attached to the helmet on the front side thereof by suitable means such as rivets which are disposed in enlarged portions of the slot and clamp the mask ears to the helmet.

A top T-shaped fastening member **20**, integral with the top bar **10**, is disposed upwardly therefrom for rigid attachment to the top front of the helmet **5**. As seen in the preferred embodiment in the drawings, the top portion of the forehead member **20** has two projections **20***a* having elongated slotted openings **20***b* therein for attachment to the helmet by suitable means.

Also integral with the bars, the ears and T-shaped member of the mask, are upper vertical reinforcing bars **25** and **26** that are spaced between upper bar **10** and middle bar **12**. The bars **26** and **27** prevent penetration between the horizontal bars **10** and **12** and are spaced apart about the same distance as said bars which is approximately the width of the top of the T-bar member **20**.

As readily seen in the drawings, a pair of short generally vertical bars **28** and **29** are provided between the middle bar **12** and the lower bar **15**, the bars **28** and **29** being preferably vertically aligned with the upper vertical bars **25** and **26**.

As best seen in FIGURES 2 and 3, the mask is made of a stamped aluminum alloy core **30** that is coated with a tough durable plastic coating **32** which is softer than the aluminum metal core.

The aluminum core material is preferably a high strength, durable, shock resistant, stampable, aluminum alloy of a high aluminum content such as aluminum alloy 2024 T–3. The designation 2024 T–3 is used to indicate that a flat sheet of 2024 has been heat treated by the supplier. The 2024 aluminum alloy has the following alloying elements in the approximate percentages—4.5% copper, 1.5% magnesium, and 0.6% manganese.

The plastic coating is preferably a thin, hard coating of plasticized polyvinyl chloride that uniformly covers the stamped core of the mask, the coating covering any possible rough or sharp edges that develop in the stamping operation. For the best results, the polyvinyl chloride coating is applied to the aforesaid light metal core by a fused powder coating process in which the stamped metal is heated and dipped in a fluidized bath of powdered polyvinyl chloride particles. The mask can be heated and immersed in hot fine polyvinyl chloride powder several times to build up the desired thickness coating. Preferably, a prime coating **35** is used on the core **30**, the primer comprising a solution of polyvinyl chloride resin in a suitable solvent that is used to help adhere the thin plastic coating to the metal.

The resultant polyvinyl chloride coating is thinner, harder and more uniformly spread over a stamped core than an otherwise seemingly similar coating formed from a plastisol. The hardness of the resultant fused powder coating is in the range of at least 90 durometer on the Shore A scale up to about 40 to 50 on the D scale. The harder coating thus provided apparently has more abrasion resistance than a more resilient, softer coating that, for instance, is applied by a polyvinyl chloride plastisol composition. The resultant fused powder coating is strong and has adequate elongation, the tensile strength being in the neighborhood of 15,000 to 17,000 p.s.i. and preferably about 16,000 p.s.i.

The above described polyvinyl chloride coating is, for best results, used with the aforementioned aluminum alloy 2024 T–3. The previously described chemical composition of the alloy is preferred, although the range of copper can vary from about 3.8 to 4.9% by weight, the range of manganese can vary from about 0.3 to 0.9%, and the range of magnesium can vary from about 1.2–1.8%. Other elements can be present in the alloy in very small amounts such as iron in an amount of about 0.5%, silicon in an amount of about 0.5%, chromium in an amount of about 0.1%, and zinc in an amount of about 0.25%.

It will be understood, of course, that modifications of the face masks shown and described herein can be made without departing in scope and spirit from the invention herein set forth.

What is claimed is:

1. A face mask for a helmet, the mask being of an integral one-piece construction of a light metal core and a plastic coating therefor, the mask consisting of a one-piece stamping and comprising an upper arcuately curved bar, a middle arcuately curved bar, a lower arcuately curved bar, said upper, middle and lower bars adapted to extend across the face opening of the helmet and converging on each other at each end thereof to form integral ears for operable attachment to the helmet, an integral

T-shaped member projecting upwardly from the central portion of the upper bar and having a pair of projections at the top thereof adapted for operative connection to the top forehead portion of said helmet, and there being a plurality of integral short reinforcing bars connected between said middle and upper bars and said middle and lower bars, the reinforcing bars being located generally in a position perpendicular to said upper, middle and lower bars.

2. A face mask for a helmet, the mask being of an integral one-piece construction of an aluminum core and a plastic coating therefor, the mask consisting of a one-piece stamping and comprising an upper arcuately curved bar, a middle arcuately curved bar, a lower arcuately curved bar, said upper, middle and lower bars adapted to extend across the face opening of the helmet and converging on each other at each end thereof to form integral ears for operable attachment to the helmet, an integral T-shaped member projecting upwardly from the central portion of the upper bar and having a pair of projections at the top thereof adapted for operative connection to the top forehead portion of said helmet, and there being a plurality of integral short reinforcing bars integrally connected between said middle and upper bars and said middle and lower bars, the reinforcing bars being located generally perpendicular to said upper, middle and lower bars.

3. A face mask for a helmet, the mask being of a stamped integral one-piece construction of an aluminum core and a thin hard polyvinyl chloride coating therefor that uniformly covers said core including any sharp edges thereon, the mask comprising an upper arcuately curved bar, a middle arcuately curved bar, a lower arcuately curved bar, said upper, middle and lower bars adapted to extend across the face opening of the helmet and converging on each other at each end thereof to form integral ears for operable attachment to the helmet, an integral T-shaped member projecting upwardly from the central portion of the upper bar and having a pair of projections at the top thereof adapted for operative connection to the top forehead portion of said helmet, and there being a plurality of integral short reinforcing bars integrally connected between said middle and upper bars and said middle and lower bars, the reinforcing bars being located generally perpendicular to said upper, middle and lower bars.

4. A face mask for a helmet, the mask being of an integral one-piece stamped construction of a light metal core and a polyvinyl chloride coating that uniformly

covers said core including any sharp edges thereof, the light metal being an alloy of aluminum and the major portion of which is aluminum, a primer coat of a vinyl polymer being applied to the core for bonding said polyvinyl chloride to said alloy, the mask comprising an upper arcuately curved bar, a middle arcuately curved bar, a lower arcuately curved bar, said upper, middle and lower bars adapted to extend across the face opening of the helmet and converging on each other at each end thereof to form integral ears for operable attachment to the helmet, an integral T-shaped member projecting upwardly from the central portion of the upper bar and having a pair of projections at the top thereof adapted for operative connection to the top forehead portion of said helmet, and there being a plurality of integral short reinforcing bars integrally connected between said middle and upper bars and said middle and lower bars, the reinforcing bars being located generally in a position perpendicular to said upper, middle and lower bars.

5. A face mask for a helmet, the mask being of an integral one-piece stamped construction of a light metal core and a plastic coating therefor, the mask comprising an upper arcuately curved bar, a lower arcuately curved bar, said upper and lower bars adapted to extend across the face opening of the helmet and converging on each other at each end thereof to form integral ears for operable attachment to the helmet, and there being a plurality of integral short reinforcing bars connected between said upper bar and said lower bar, the reinforcing bars being located generally in a position perpendicular to said upper and lower bars.

6. A face mask as defined in claim 5 in which the light metal core is a stamped core of an aluminum alloy and the plastic coating is a thin hard coating of polyvinyl chloride that uniformly covers said core and covers any sharp edges thereon.

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