United States Patent [19]

Franklin et al.

[11] **3,886,596**

[45] **June 3, 1975**

[54] **FACE GUARD FOR A BASEBALL HELMET OR THE LIKE**

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[73] Assignee: **Cav, Inc.**, Bent Mountain, Va.

[22] Filed: **Jan. 8, 1973**

[21] Appl. No.: **321,745**

[52] **U.S. Cl.** **2/9**; 2/10

[51] **Int. Cl.** **A41d 13/00**

[58] **Field of Search** ..... 2/9, 10, 3 R; 151/33, 37

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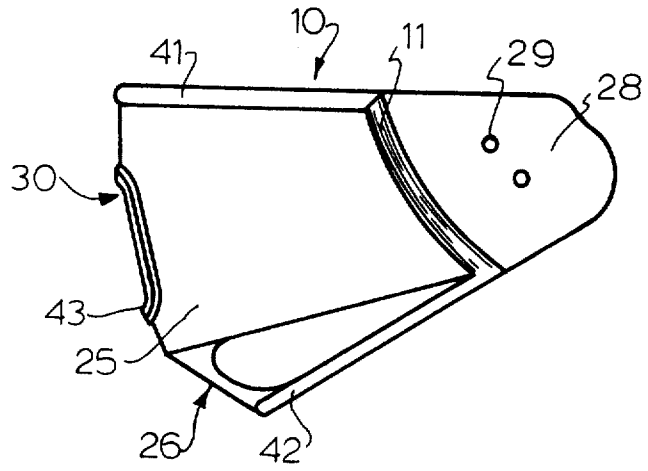
Primary Examiner—Paul R. Gilliam

Assistant Examiner—Peter Nerbun

[57] **ABSTRACT**

A protective face guard for a helmet is disclosed and comprises a specially formed and ribbed sheet of material which is able to withstand the impact of a hit ball and which is fastened to the helmet by novel ribbed connector means through which the force of impact is distributed over a substantially large area of the helmet.

3 Claims, 25 Drawing Figures



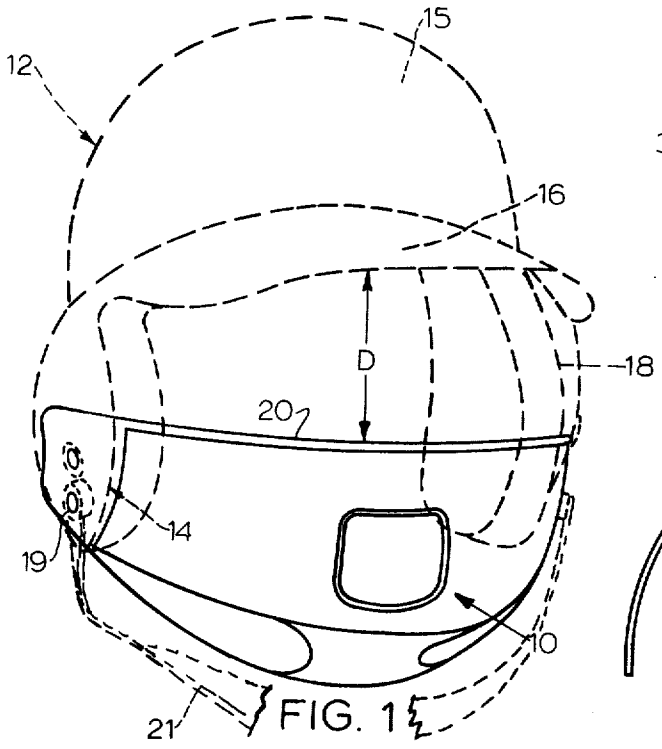


FIG. 1

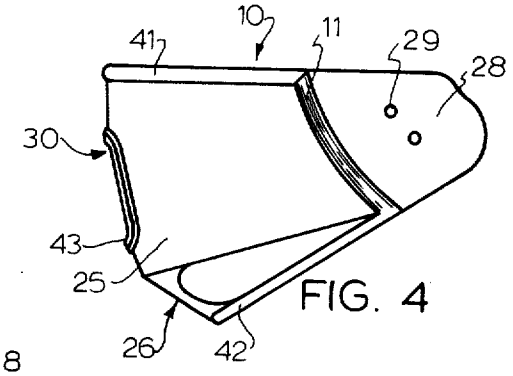


FIG. 4

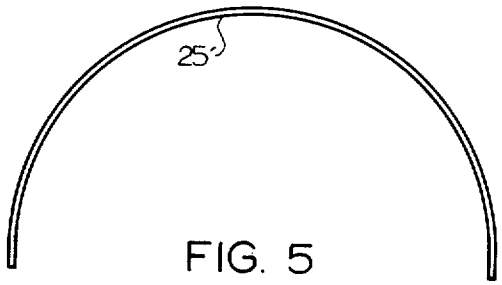


FIG. 5

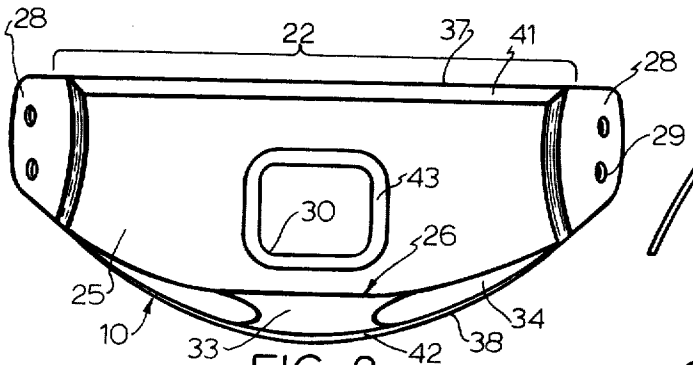


FIG. 2

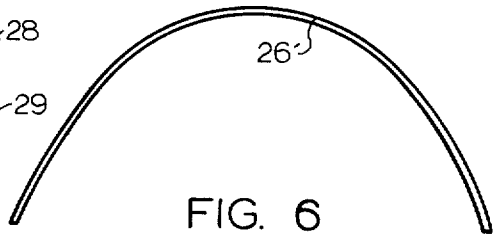


FIG. 6

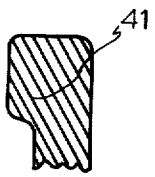


FIG. 7

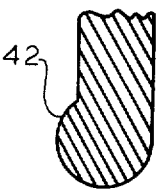


FIG. 8

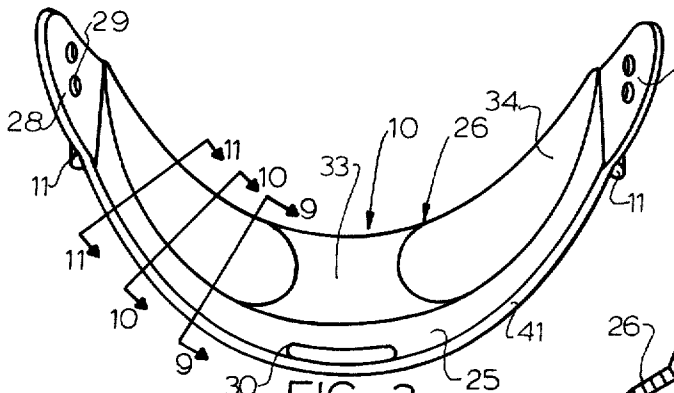


FIG. 3

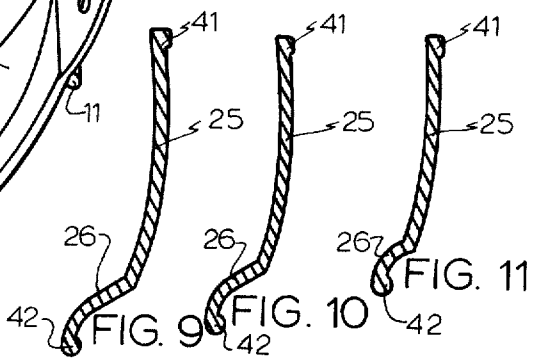


FIG. 9 FIG. 10 FIG. 11

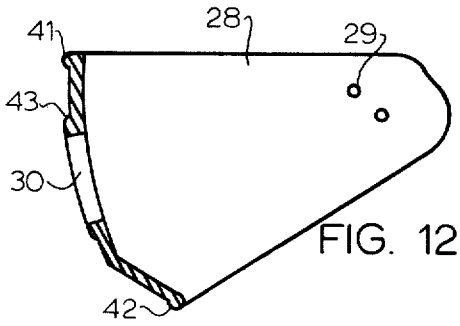


FIG. 12

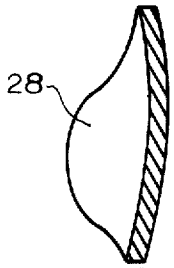


FIG. 13

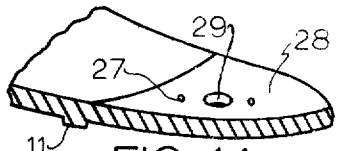


FIG. 14

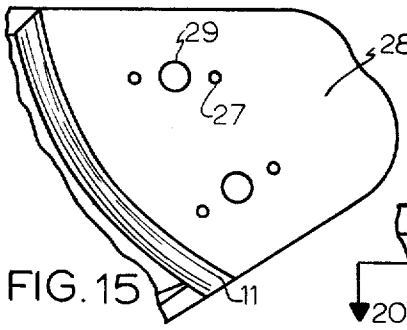


FIG. 15

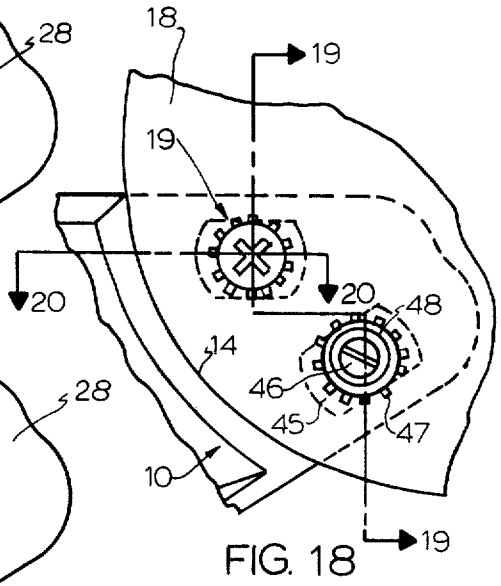


FIG. 18

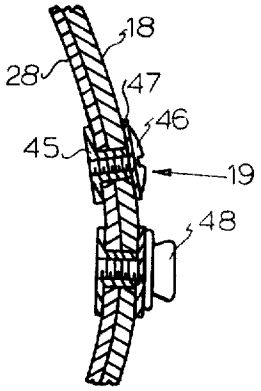


FIG. 19

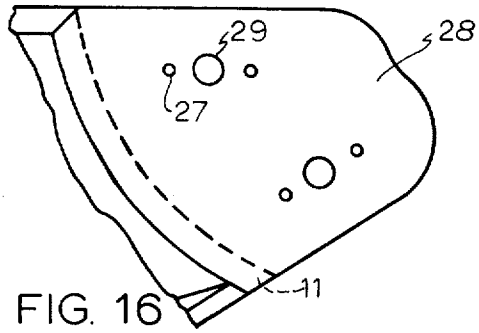


FIG. 16

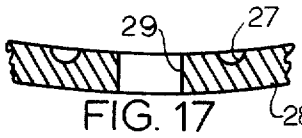


FIG. 17

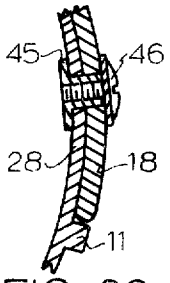


FIG. 20

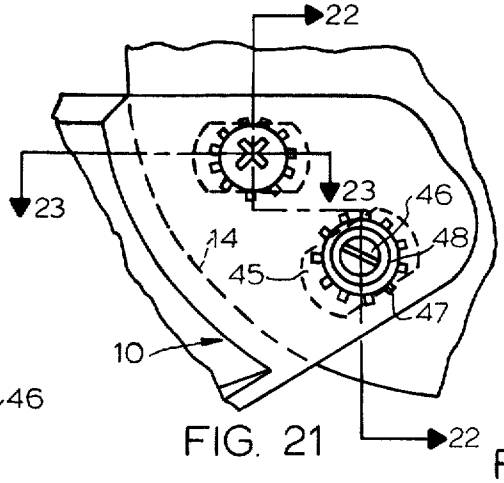


FIG. 21

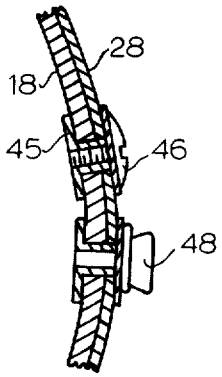


FIG. 22

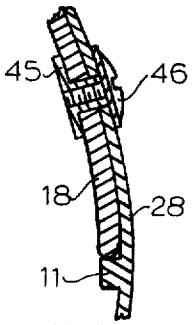


FIG. 23

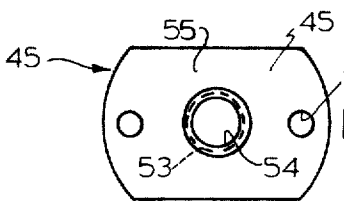


FIG. 24

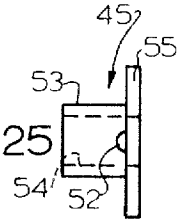


FIG. 25

FACE GUARD FOR A BASEBALL HELMET OR THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to face guards for helmets and particularly for baseball helmets.

2. Description of the Prior Art

There are serious problems with accidents in all sports, especially in baseball for young children, where the force of a hit or deflected ball can inflict facial injury.

In general the prior art has provided various face guard configurations for use with batter's helmets and the like which make use of a relatively stiff guard member rigidly secured to the helmet and which serves to deflect hit or thrown balls from the face of the wearer. Representative prior art patents includes U.S. Pat. No. 3,067,427. Other prior art has been directed to protective mask structures for use exclusive of such helmets. Representative face masks include U.S. Pat. Nos.: 3,196,485, 2,616,081 and 1,488,812. Typically, however, such face masks and face guards for use with helmets are suited to batting or catcher protection only and are undesirable for headgear to be worn in the field since the conventional face masks or guards are either bulky to maneuver, undesirable in appearance or serve to unduly obstruct the player's vision. Moreover, while prior art face guards for use with helmets have provided protection to the eyes, nose, and mouth, they have not provided adequate protection to the chin and neck areas. Furthermore, attachment of such rigid face guards have generally been made at only one point on each side of the helmet. Thus, the shock transmitted by the impact of a hit ball is distributed over a relatively small area of the helmet and can seriously jar the player. Such rigid face guards in the past have been formed of nylon, cast aluminum, etc., and have been characterized by frequent breakage and failure at points of connection to the helmet.

SUMMARY OF THE INVENTION

The invention is directed to a lightweight and visually pleasing protective face guard for a baseball helmet specially formed from a relatively thin section of plastic having high impact strength. The face guard is preferably transparent and incorporates a suitable breathing aperture. Mechanical connector means are incorporated into the face guard at the point of connection with a helmet to transmit high impact forced from the guard to the helmet in such a manner as to distribute the force of impact over a wide area of the helmet and thus reduce the force received at any one point of the skull.

In a preferred embodiment the invention face guard is fastened to the inside of the helmet earpieces. The uppermost edge of the guard preferably resides below a player's sight line. The invention contemplates use of a high impact strength plastic such as found in polycarbonate and ABS monomers and which is reinforced by a novel design incorporating different surface curvatures together with beading at edge portions of the guard. Proximate a point of connection of the improved face guard with a helmet earpiece is a ribbing structure which corresponds to the adjacent curvature of the helmet earpiece. Upon impact of a baseball

against the invention face guard, force of the impact is transmitted to the helmet earpiece along substantially the length of the ribbing structure, thereby evenly distributing the force over a large area of the helmet.

A preliminary object of the invention is to provide a visually pleasing protective face guard for baseball players, particularly young people who play Little League ball and other types of baseball and football games.

Other objects include protection on riot helmets, hockey helmets, and the like, wherever facial injuries are possible by hard blows from balls, missiles, bats and sticks, etc.

Still another object of the invention is to provide a strong and lightweight face guard for a helmet wherein the force of a blow received by the face guard is mechanically distributed over a large area of the helmet to lessen the force exerted against any one point of the skull.

A further object of the invention is to provide a face guard for a helmet which provides upper throat protection in addition to face protection.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a protective face guard constructed in accordance with the invention shown in position on a typical baseball helmet (indicated by dashed lines).

FIG. **2** is a front view of the invention face guard showing a typical breathing hole.

FIG. **3** is a top view of the invention face guard showing lines through which various cross sections of the face guard are taken.

FIG. **4** is a side view of the face guard of the invention.

FIG. **5** is a true perspective of the top view, showing full curvature of the face guard.

FIG. **6** is a true perspective of the bottom view, showing full curvature of the face guard.

FIG. **7** is a partial cross-sectional view of stiffening beading along a top edge of the invention face guard.

FIG. **8** is a partial cross-sectional view of stiffening beading along a bottom edge of the invention face guard.

FIGS. **9, 10** and **11** are cross-sectional views taken through the respective sections **9—9, 10—10** and **11—11** indicated in FIG. **3.**

FIG. **12** is a cross-sectional view taken through the invention face guard showing details of the breathing aperture.

FIG. **13** is a cross-sectional view taken vertically through the invention face guard showing the curvature proximate the points of mounting to a helmet earpiece.

FIG. **14** is a lateral cross-sectional view taken through a portion of the invention face guard showing a force transmitting rib member.

FIG. **15** is a partial side view of the invention showing details of a mounting hole configuration for attaching the invention face guard to a helmet earpiece.

FIG. **16** is a partial side view of the invention face guard showing an alternate mounting hole configuration for attaching the invention face guard to a helmet earpiece.

FIG. **17** is a partial cross-sectional view through the invention face guard mounting hole configuration showing recessed detent means provided to prevent

fastening devices used to secure the invention face guard to a helmet from pivoting during securement.

FIG. **18** is a partial side view showing typical details of mounting the invention face guard to the inside of a helmet by appropriate fastening means.

FIG. **19** is a partial cross-sectional view taken along line **19—19** indicated in FIG. **18**, showing details of fastening means for securing the invention face guard inside a helmet earpiece.

FIG. **20** is a partial cross-sectional view taken along lines **20—20** indicated in FIG. **18** to show details of a force transmitting ribbing structure used to distribute force over a large area of a helmet earpiece when mounting the invention face guard inside a helmet earpiece.

FIG. **21** is a partial side view showing typical details of mounting the invention face guard to the outside of a helmet by appropriate fastening means.

FIG. **22** is a partial cross-sectional view taken along line **22—22** indicated in FIG. **21** showing details of the fastening means used for securing the invention face guard outside a helmet earpiece.

FIG. **23** is a partial cross-sectional view taken along line **23—23** indicated in FIG. **21**, showing details of a force transmitting ribbing structure, used to distribute force over a large area of a helmet earpiece when mounting the face guard outside a helmet earpiece.

FIG. **24** is a plan view of a T-nut used to fasten the invention face guard to a helmet earpiece.

FIG. **25** is a side view of a T-nut showing projections which engage detents adjacent the face guard mounting holes during securement of a face guard to a helmet earpiece.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1** in a preferred embodiment, the instant invention is directed to a protective face guard, generally designated **10**, for use with a baseball helmet **12** (shown in dashed lines) or the like. A suitable helmet, for example, is the type which has been made required headgear for Little League players at bat by Little League, Inc., Williamsport, Pa., and which is available from a number of well-known manufacturers. Typically, such helmet **12** includes a padded dome portion **15**, a bill **16**, padded earpieces **18** and a chin strap **21**. In a preferred mounting position the guard of the instant invention is secured to helmet **12** in a manner such that the uppermost edge **20** of face guard **10** resides below the wearer's normal sight line. In addition, uppermost edge **20** of face guard **10** cooperates with helmet bill **16** such that the distance D is always sufficiently less than the diameter of a baseball so as to prevent a moving baseball from striking the upper features of the wearer's face. Note should be made that while the description is primarily concerned with the sport of baseball, that for other forms of athletic use, e.g., ice hockey, lacrosse, etc., the distance D can be sized accordingly. It is contemplated that face guard **10** comprises a considerable amount of surface area as shown in FIG. **1**, so as to provide a substantial area of face protection. It is therefore preferred that face guard **10** be formed from a transparent high impact plastic material, e.g., polycarbonate, ABS monomers, to afford the wearer good visibility.

Referring now to FIGS. **2**, **3** and **4**, face guard **10** includes a central body portion **22** comprising a first specially curved surface **25** designed to protect the mouth, nose and cheeks, and a second specially curved surface **26** extending beneath and angled slightly rearward of said first specially curved surface **25**, and which is designed to protect the jaw and lower pallet areas. Also included are a pair of specially shaped end pieces **28** each provided with suitable apertures **29** and force transmitting ribs **11** for securing face guard **10** against either the inside or outside surface of earpieces **18** as later described. A breathing aperture **30** is centrally located in said first curved surface **25**. Breathing aperture **30** serves primarily to provide an adequate supply of oxygen to the wearer and is large enough to insert the top of a soft drink bottle so that the wearer can drink without removing the mask, if desired. Aperture **30** furthermore serves as an antifogging device so as not to obstruct the transparency of the clear plastic face guard. Aperture shapes other than the rectangular one shown and multiple apertures may be provided requiring only slight modifications known to those skilled in the art.

In a preferred form of the invention, the uppermost **37** and lowermost **38** edges of face guard **10** receive reinforcing beading **41** and **42**, respectively. The beading used is preferably twice the average thickness of face guard **10** and may comprise an auxiliary beading strip slid over each edge or may be integrally formed as shown. The use of such beading enables the invention to use relatively thin sheets of plastic, e.g., 0.062 inch, yet to maintain sufficient structural integrity to prevent breaking when struck by a baseball traveling at high speed, e.g., 120 m.p.h. Uppermost edge beading **41** is additionally important to provide sufficient circumferential strength so that face guard **10** will not bend and "bottom" against the face when struck with an object such as a baseball. Similarly, breathing aperture **30** receives reinforcing beading **43** in the preferred embodiment, best shown in FIG. **12**, which prevents cracking or breaking at the center of the face guard despite the opening for a breathing aperture. With further reference to the above, FIGS. **7** and **8** show respective typical cross-sectional views of the uppermost face guard edge beading **41** and lowermost face guard edge beading **42**. The invention contemplates use of smooth beading at least for the lowermost edge of face guard **10** since said edge is exposed when a player puts on and takes off his helmet, and therefore should not present abrupt or sharp edges.

Referring next to FIGS. **4**, **5** and **6**, as previously mentioned the invention face guard **10** includes first and second specially curved surfaces. First curved surface **25** is preferably formed having a substantially semicircular curvature represented by **25'** of FIG. **5**. Second curved surface **26** is preferably formed having a substantially parabolic curvature represented by **26'** of FIG. **6**. Second curved surface **26** is furthermore preferably adapted to include a central relatively flat section **33**, best shown in FIG. **2**, for chin protection, and which can be padded, if desired, and teardrop shaped inwardly curving sections **34** formed adjacent said central flat section for increased strength. Note particularly FIGS. **9**, **10** and **11** which are cross-sectional views taken through the invention face guard along lines **9—9**, **10—10** and **11—11**, and which show the relative shape and curvature of a typical inward curving section **28**. Slight shape variations of the above disclosed first and second curved surfaces may be used

in forming the invention face guard and the use of greater thicknesses of plastic may not require the additional use of reinforcing beading. It should be noted, however, that the combination of the above described first and second different curved surfaces and beading reinforcement effectively strengthens the invention face guard and permits utilization of a relatively thin plastic sheet to form a lightweight yet extremely strong face guard.

Continuing with the description, the instant invention provides an improved mechanism of impact force transmittal and distribution from a face guard to a helmet, which depends on a novel form of securing the invention face guard **10** to helmet earpieces **18.** Referring again to FIGS. **2** and **3,** a specially shaped force transmitting rib **11** is formed in each face guard end piece **28** proximate the area of securement of said end piece **28** with a helmet earpiece **18.** Each rib **11** is formed to substantially correspond to the curvature of the helmet earpiece forward edge **14** (see FIG. **1**), and is adapted to abut said edge **14** when securement of face guard **10** is made to helmet **12,** best shown in FIGS. **18** and **21,** by novel connector means **19.** Ribs **11** may be formed on either side of face guard **10** depending upon whether it is desired to secure end pieces **28** outside or inside of helmet earpieces **18.** It should also be noted that alternatively the formation of a vertical curved step (not shown) in each end piece provides a force transmitting surface equivalent to rib **11.**

Referring now to FIGS. **15** and **18** which show a preferred embodiment end piece **28** mounting configuration for mounting the invention face guard to the inside surfaces of helmet earpieces **18,** each end piece **28** is provided with apertures **29** for receiving novel connector means **19.** Connector means **19** comprises a specially formed T-nut **45** best shown in FIGS. **24** and **25,** bolt **46** and washer **47.** Assembled connector means **19** is adapted to secure face guard end piece **28** to a portion of helmet ear piece **18** but to prevent the two pieces **28** and **18** from being tightly secured together. This novel arrangement prevents tight securement over a relatively small area of the preferred polycarbonate or like plastic material and thus does not cause such material to cold flow which would weaken the connection and would be the case with a completely tight securement.

Referring to FIGS. **24** and **25,** a "T-nut" according to the invention comprises a head portion **55** and a shank portion **53.** Head **55** is provided with a pair of relatively small round pins **52.** During securement of connector means **19** pins **52** are adapted to seat in detents **27** which are formed in each end piece **28** adjacent each aperture **29** in order to prevent rotation of T-nut **45** while it is being tightened. Shank portion **53** is adapted to correspond to the diameter of apertures **29** and has a length equivalent to the combined thickness of end piece **28** and ear piece **18.** Therefore, bolt **46** is effectively prevented from over tightening the face guard to the helmet since bolt **46** and washer **49** seat on T-nut **45.** A threaded aperture **54** is provided internally of said shank **53** to receive bolt **46.** Note particularly in FIG. **19** that a snap portion **48** may be additionally secured to said connector means **19** to enable snap securement of a chin strap shown in FIG. **1.** A pair of connector assemblies **19** are utilized in each end piece **28** to prevent the invention face guard from pivoting.

Referring to FIGS. **21, 22** and **23** in an alternate embodiment the invention face guard is adapted to mount to the outer side of helmet earpieces **18.** In this particular embodiment, end piece **28** receives a specially curved force transmitting rib **11** along an inside surface opposite from that shown in FIG. **18** and which abuts the forward edge **14** of earpiece **18.** Comparing FIGS. **20** and **23** which separately show the two above described embodiments, it will be apparent that the force of a blow to the invention face guard is transmitted via force transmitting rib **11** to a substantial area of each helmet ear piece **18** equally as effectively in either described mounting embodiment. By utilizing a force transmitting rib to transmit the force of a blow, connector means **19** need only support substantially the weight of face guard **10** and only minor stresses, e.g., when a helmet is dropped, while maintaining such face guard in a stationary position with respect to the helmet.

Based on the above, it is apparent that the instant invention provides an extremely strong yet lightweight face guard for baseball helmets and the like. Substantial protection to the face is provided by a novel design which is structurally functional in reinforcing and strengthening the face guard. Furthermore, through a novel form of mounting the invention face guard to a helmet the force of a blow is transmitted to a broad area of the helmet and is greatly reduced. At the same time, a visually pleasing substantially clear face guard is provided for butting as well as fielding headgear.

What is claimed is:

1. In a protective face guard for a game using a ball or like struck play piece in combination with an integral helmet having a protective dome, a bill and a pair of ear pieces, each having a forward outwardly curved edge and a plurality of apertures behind such edge, comprising:

a. a relatively thin lightweight sheet of molded transparent thermoplastic material having:

1. an upper section protective of the mouth, nose and cheeks of the wearer providing an unbroken exterior surface of predetermined generally outward curvature and including a centrally disposed breathing aperture and

2. a lower section protective of the jaw and lower pallet areas of the wearer providing an unbroken exterior surface of predetermined generally outward curvature depending beneath and angled rearwardly from said first section and formed integral therewith;

b. end pieces located at respective opposite ends of and molded integral with said first and second curved sections and each having plural mounting apertures, said end pieces being formed with inwardly curved force transmitting and distributing ledge surfaces mating with said forwardly outwardly curved helmet ear piece edges with said end pieces plural mounting apertures being located behind said ledge surfaces and mating with said helmet ear piece apertures; and

c. connector means mounted in said apertures and securing said face guard end pieces adjacent said helmet ear pieces, each said inwardly curved face guard end piece force transmitting ledge surface mating with and engaging a respective one of said outwardly curved helmet ear piece edges and being plurally secured at points behind said ledge surfaces and in such engagement wherein the force of

impact of the play piece on either of said sections is transmitted through said engaged curved end piece and helmet ear piece surfaces.

2. In a protective face guard as claimed in claim 1 wherein said upper curved section is formed with substantially semicircular lateral cross-sectional curvature, and wherein said lower curved section is formed with substantially parabolic lateral cross-sectional curvature.

3. In a protective face guard as claimed in claim 1 wherein said lower section includes a central relatively flat surface and having a pair of horizontally extending oppositely located tear shaped concave surface deformations extending from said central relatively flat surface to a point proximate each said end piece.

* * * * *