United States Patent [19]

Fisher

[11] **3,727,235**

[45] **Apr. 17, 1973**

[54] **RETRACTABLE FACE PROTECTIVE ASSEMBLY**

[75] Inventor: **John Fisher,** Dover, Del.

[73] Assignee: **ILC Industries, Inc.,** Dover, Del.

[22] Filed: **Jan. 13, 1972**

[21] Appl. No.: **217,558**

Related U.S. Application Data

[63] Continuation of Ser. No. 833,551, June 16, 1969, abandoned, which is a continuation-in-part of Ser. No. 719,183, April 5, 1968, abandoned.

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

[51] **Int. Cl.** **A61f 9/04**

[58] **Field of Search** 2/3, 6, 8, 9, 10, 2/5, 14.1, 14.10; 128/141, 142, 142.2–142.7

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Primary Examiner—James R. Boler
Attorney—Donald D. Denton

[57] **ABSTRACT**

Retractable face protective assembly, having a face shield and means to mount it on a support to be worn on the head. The mounting means are oppositely opposed guide means fixed or removably fixed on the support. A pair of tracks, one at each side of the shield, are adapted to frictionally slide about the guide means which sliding action directs shield movement for selective repositioning and holding the shield at desired positions relative to the support with shield movement controlled by its continuous sliding over the guide means when positioning force is applied to the shield.

7 Claims, 22 Drawing Figures

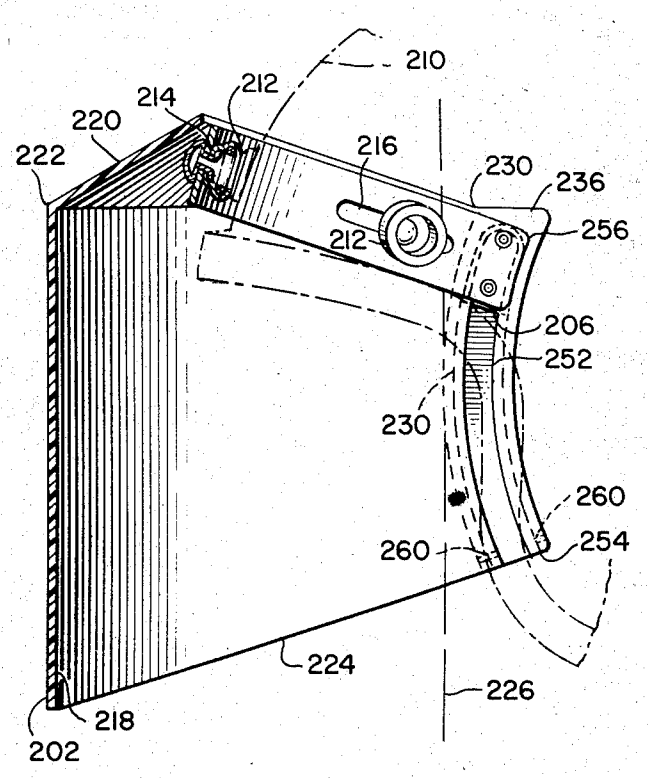
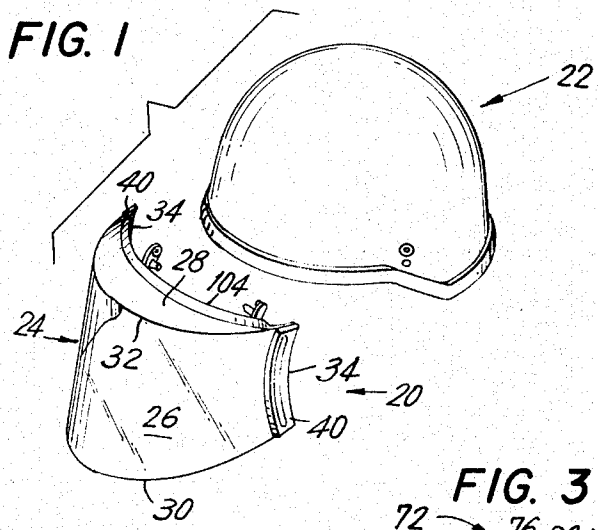


FIG. 1



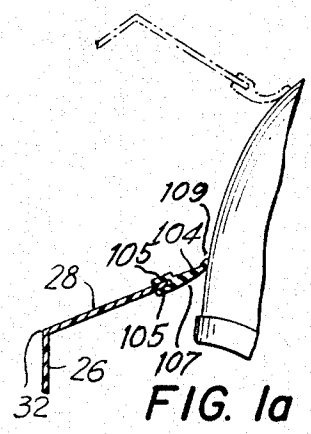


FIG. 1a

FIG. 2

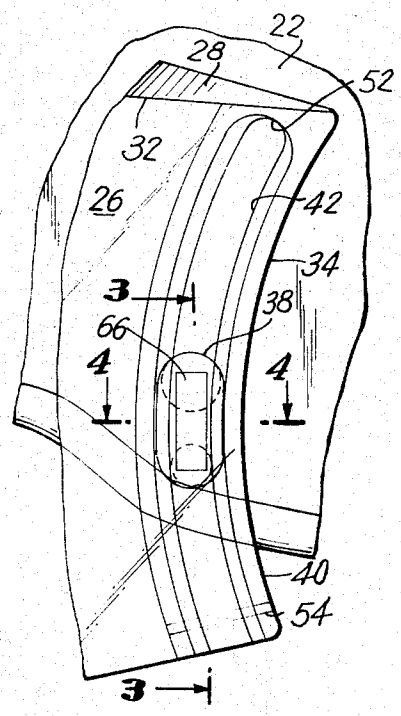


FIG. 3

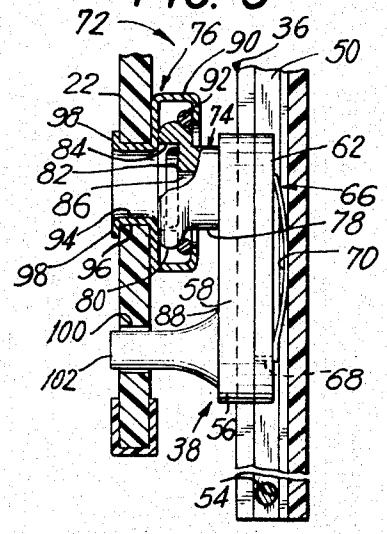


FIG. 4

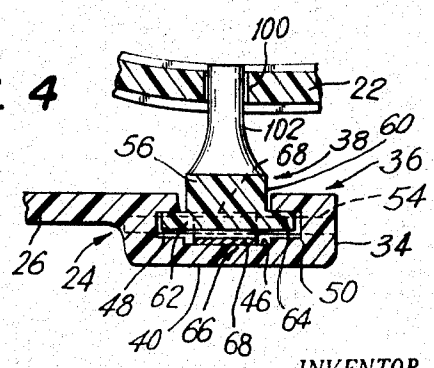


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FIG. 5.

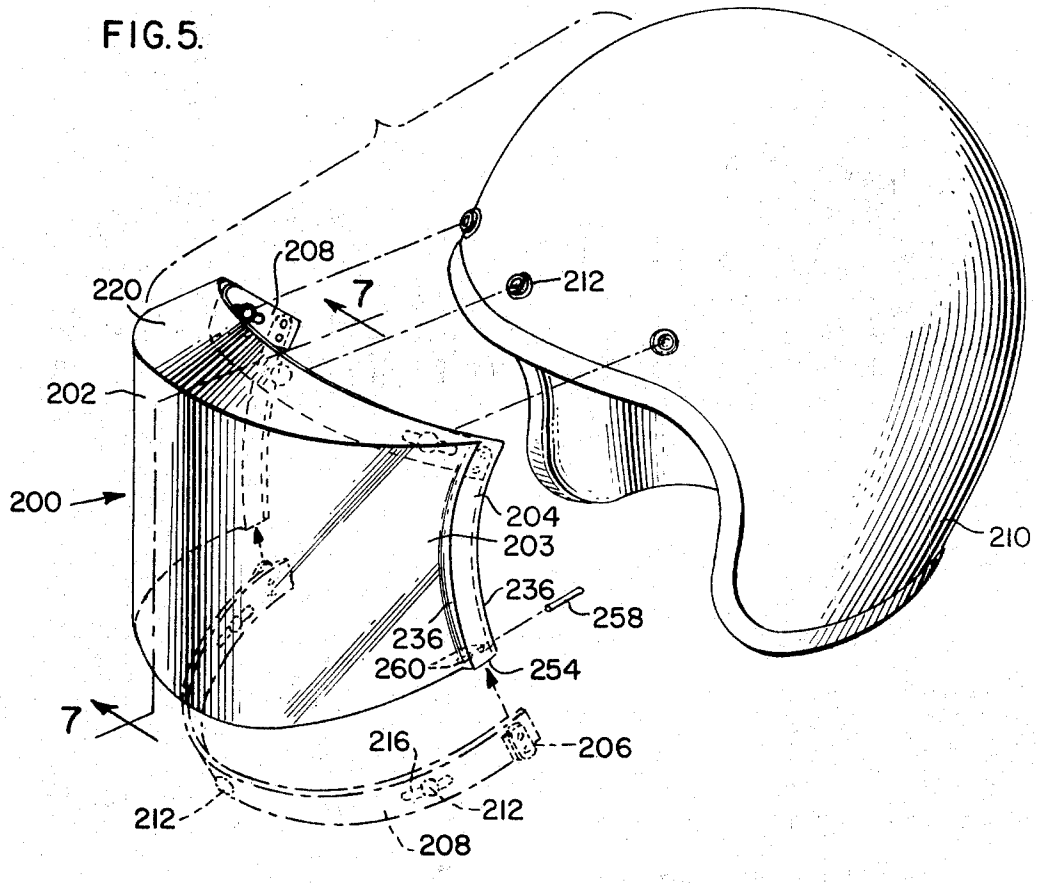
208
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FIG. 6.

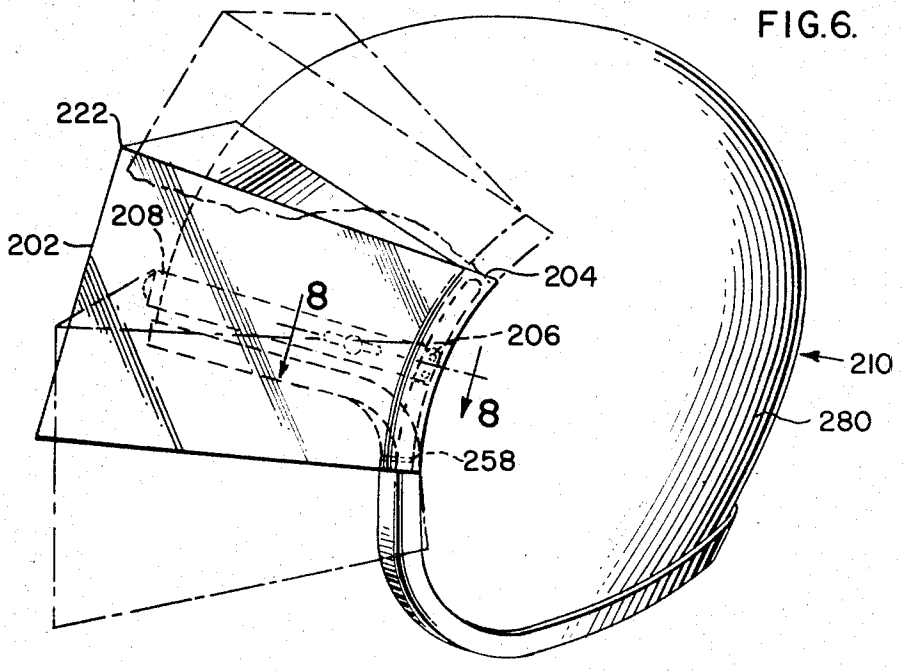
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FIG.7.

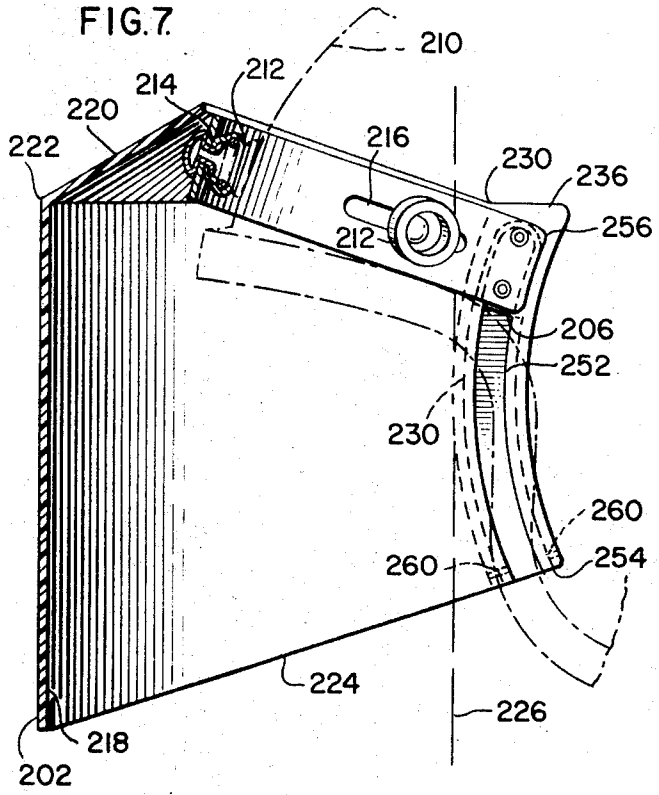


FIG.8.

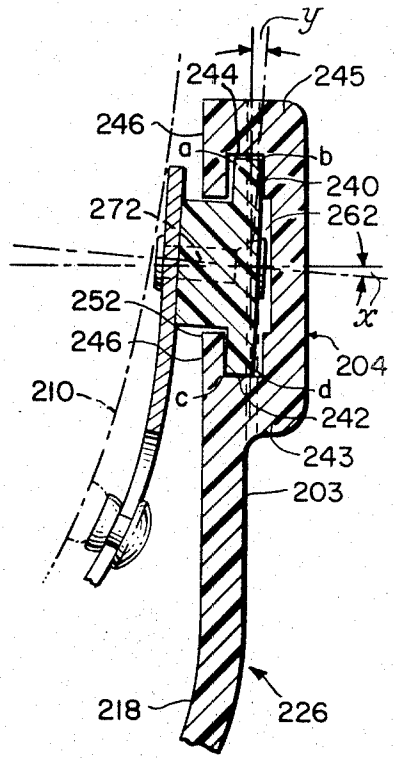


FIG.9.

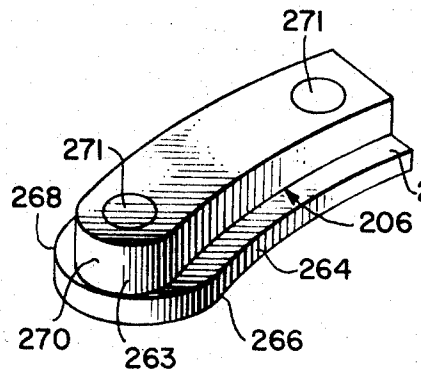


FIG.10.

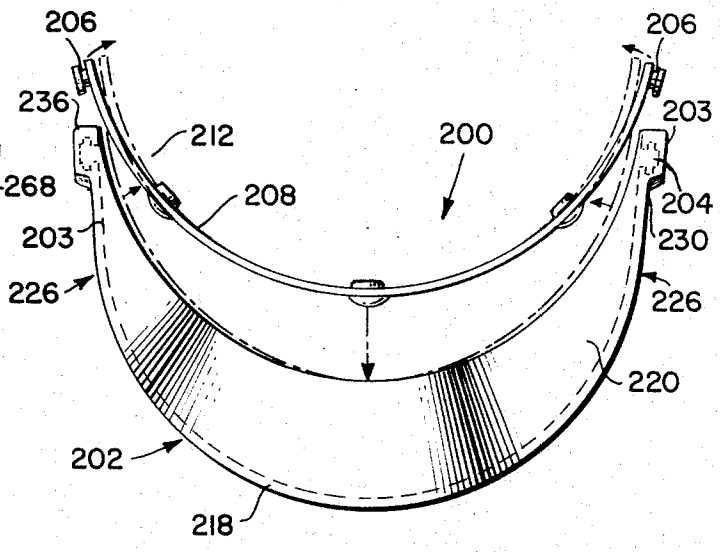
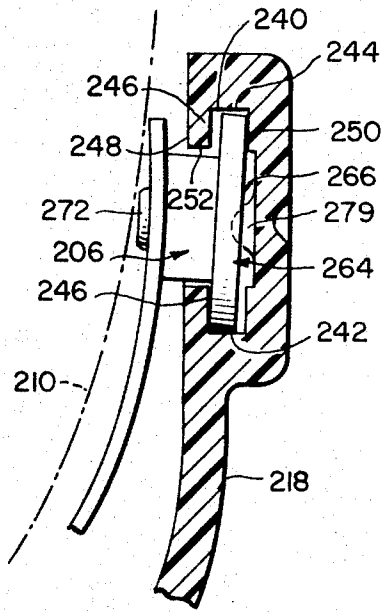


FIG.11.



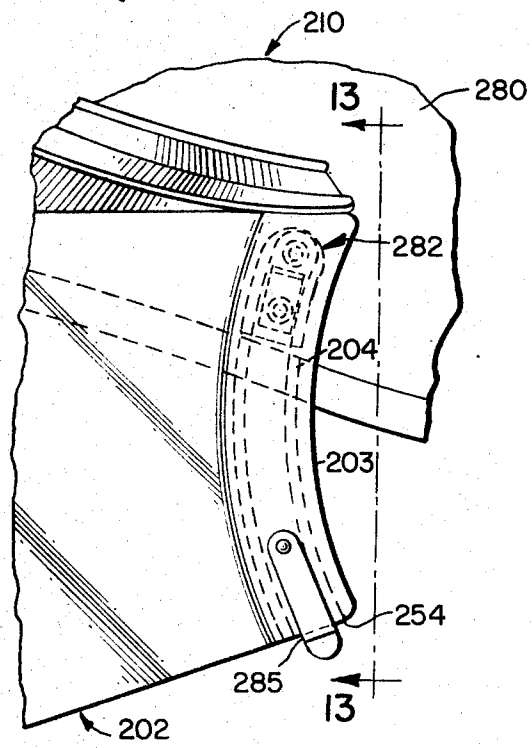


FIG.13.

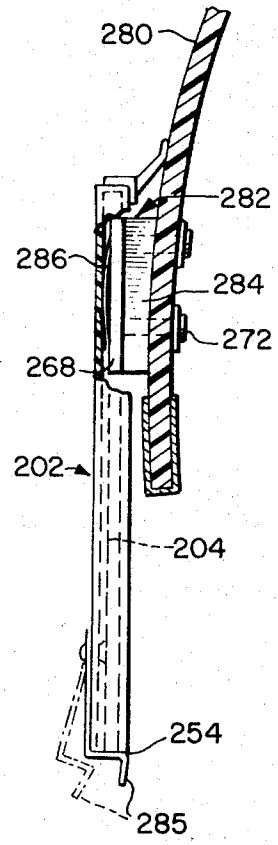


FIG.12.

FIG. 14

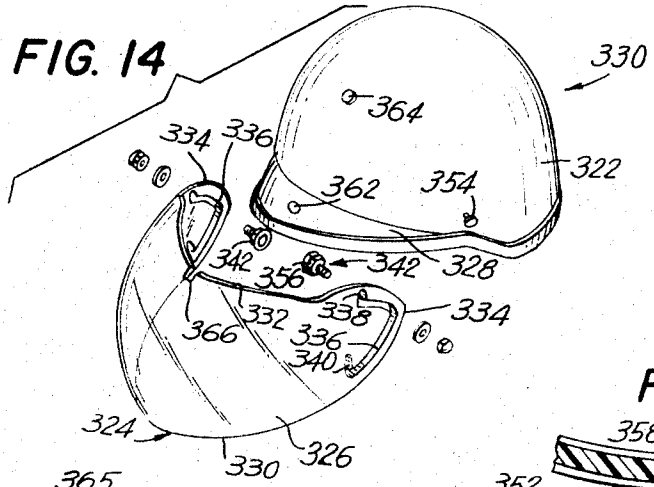


FIG. 15

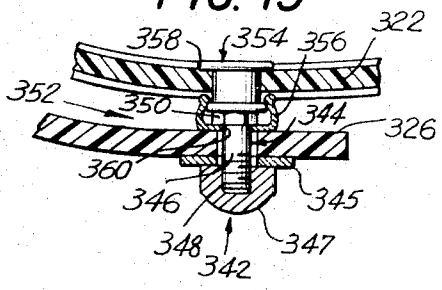


FIG. 16

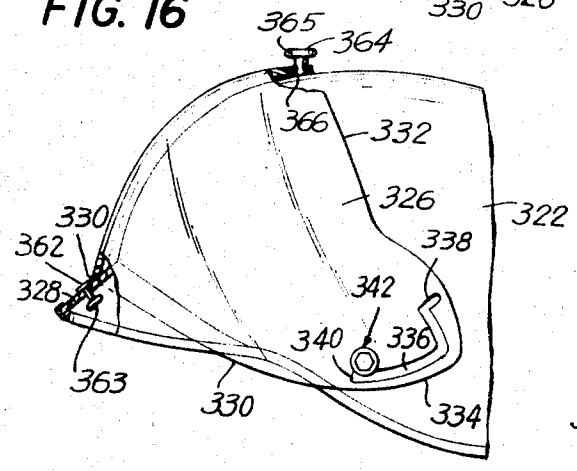


FIG. 17

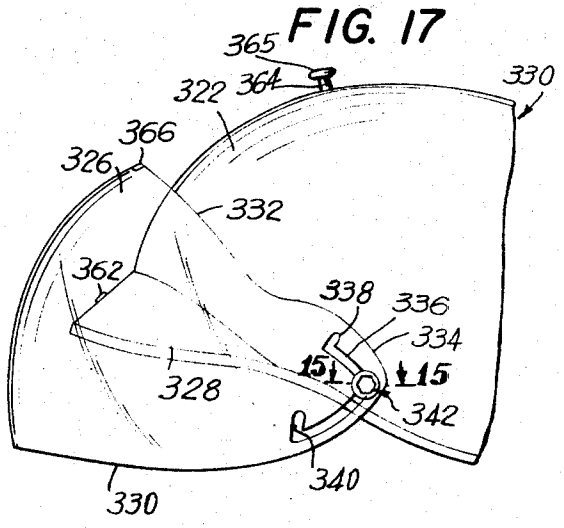


FIG. 18

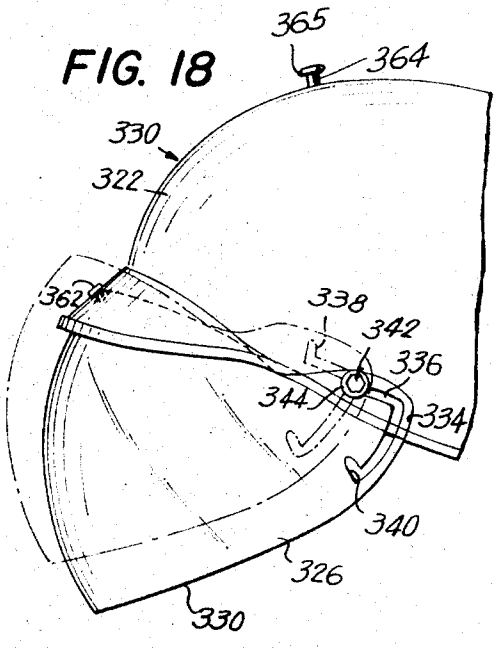


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FIG. 19

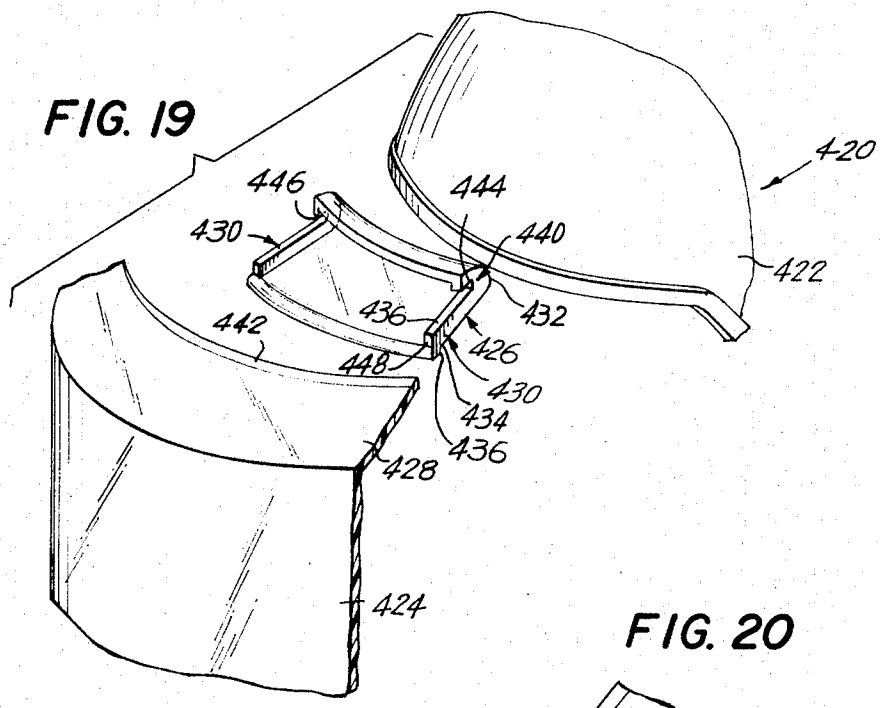


FIG. 20

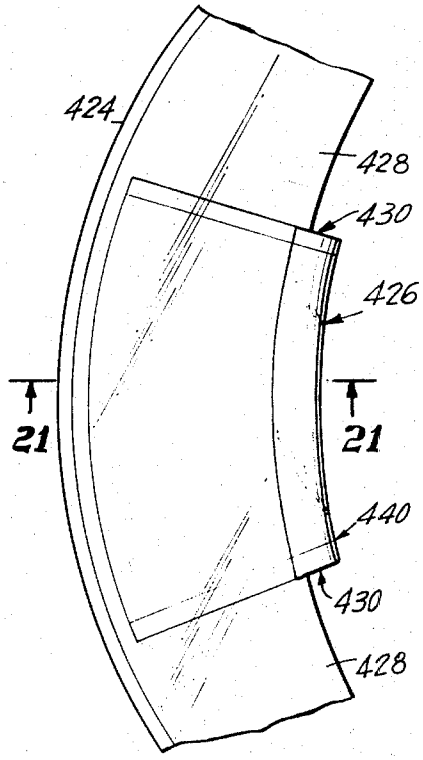
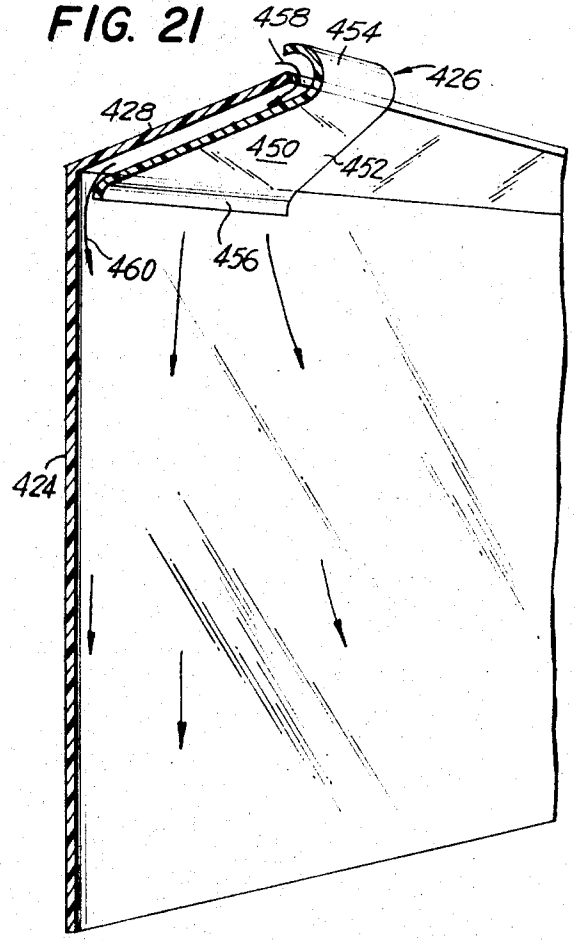


FIG. 21



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RETRACTABLE FACE PROTECTIVE ASSEMBLY

CROSS-REFERENCES TO RELATED APPLICATIONS

This is a continuation of application Ser. No. 833,551 filed June 16, 1969, now abandoned, which is a continuation-in-part of my copending application Ser. No. 719,183, filed Apr. 5, 1968, now abandoned, and entitled "Virtual Pivot Visor."

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to protective assemblies and, more particularly, to attachments therefor. The present invention provides novel and improved attachments for protective assemblies and finds particular utility with protective headgear. Further, the present invention provides novel and improved face shield, peaks, and face shield defogging means and means to mount them on protective assemblies.

The novel and improved headgear of this invention is classifiable in Class 2 of Patent Office patent classification systems.

2. Description of the Prior Art

Many of the numerous attempts to produce satisfactorily movable face shields for use with headgear have been impositive in their action or have not been easily mountable and demountable from the headgear or have required structure detracting from the appearance of the headgear or have required excessive parts. The present invention overcomes the disadvantages of such prior face shields and particularly those requiring a complicated, nonpositive or slow action for moving the shield between over-the-face and off-the-face positions which can be dangerous in use when attempts are made to reposition the shield during certain fast moving situations, as for example, during a motorcycle ride.

This invention contemplates a face protective assembly including a face protecting shield means which has in each of its spaced apart outer edges a configured track means for frictionally engaging over a pair of guide means which can be point or block type and which are fixed relative to the support to control the path of movement of the shield means. When force is applied to reposition the shield means the shield means is moved relative to the support by the continuously controlled sliding movement of the tracks over the guide means and when the force is removed the track has moved to a new position by traversing about the guide means with sufficient frictional contact between the track and the guide means to maintain positively the shield means in its new position when the force has been removed.

When the guide means are a pair of point-type sliders or slider blocks frictionally associated with the shield and mounted spaced on opposite sides of a headgear type of support means held in place on the head of a wearer, the shield means is force movable between a protective position over the face and a position over the crown of the head by a continuous tracking of the shield means about the two points provided by the sliders as they frictionally engage the shield in a continuous positive tight gripping action during sliding. Thus, the shield means will be instantly movable about the sliders by simple hand-applied force to change its position and also will be held in fixed position in a positive manner on removing such positioning force after it has been tracked between one or more selected positions relative to the sliders. The guide means or sliders are advantageously capable of quickly removable attachment to the support means which can be, for example, a protective helmet, or if the sliders are permanently secured to the headgear the shield can be provided with means to quickly detach its tracks from engagement over the sliders.

Advantageously the sliders are secured to one or more mounting means which can be quickly connected and disconnected to the support means or headgear. The mounting means can with advantage be an attachment band provided with means for quickly attaching it to the headgear over the area of the wearer's forehead providing for simultaneous locating of the sliders in correct fixed position relative to the headgear. Such a band can be made flexible and stiffly resilient and provide extensions held out from its attachment to the headgear. The guide means or sliders can then be mounted on the extensions free of direct attachment to the support means worn on the head. Accordingly, given sufficient flexibility, the band can provide for mounting the assembly onto headgear of different curvatures, i.e., helmet shells of varying sizes so the shield can be used with a variety of head sizes.

It has been found that very good results are obtained when the frictional engagement between the track and the guide means or sliders is produced by a tight biasing fit there-between such as by providing the biasing of the sliders against surfaces of the track. When the biasing means is a spring means associated with the sliders it can be made slideable therewith in the track in which case the spring can have a surface portion slideably pressing against a surface of the track and another portion engaging against the guide means.

The structure of a preferred embodiment advantageously provides for positioning the sliders relative to the tracks out of relative axial alignment so as to cause a slight twisting of the sliders in the tracks which wedges them tightly against the track inner surfaces and utilizes the biasing effect produced by slight flexibility of the shield due to its construction. If the point-type guide means or sliders are made elongated, increased surface contact will be achieved between guide means and track providing somewhat steadier support of the shield relative to the sliders and thus to the headgear. Advantageously, the sliders and tracks each also can be made to have generally rectangular co-acting cross sectional configurations with their adjacent longitudinal surfaces parallel. This provides for a high degree of tracking stability when a slider of sufficient length is used with the tracks and provides for the contact to be along a plurality of narrow line-like surfaces which produces a smooth and steady slide tracking movement of the tracks about the sliders.

Advantageously, the tracks may be configured so as to have one or more curved portions therein which may form a bow, or an arc, which if it is an arc of constant curvature, such as the arc of a circle, provides a track which can be smoothly directed or controlled by the guide means in its movement under the force of a substantially unidirectional pressure applied by hand to the shield means for the repositioning of it.

It has been found that in the case of a track which is the arc of a circle considerable advantage is obtained when the point-type sliders or guide means are slightly elongated and curved to generally the same degree as the track so their longitudinal axes are substantially congruent. This construction provides for track movement or tracking about the sliders to be along an arc coincident with the curvature of the track and produces a stable and easy tracking movement by the sliding of the track along its own arc of curvature.

It will be appreciated that the guide means or sliders can be individually separate and each mountable directly to the headwear or headgear type support means and in or out of parallel alignment with vertical axes bisecting the headgear and provided with the function of a spring-like biasing means to effect the friction gripping between guide means and track. When such separate biasing means is not used with this construction then advantageously the longitudinal axis of the tracks on the shield means, or more properly, a line of tangent at about the midpoint of the track curvature, can be aligned approximately parallel to the axis of revolution of the cylinder wall portion at the shield and sliders attached directly to the headwear and similarly disposed and the fore and aft and transverse axes (or in some cases the vertical axes of the sliders) angularly cocked or out of alignment with respect to the described line of tangent to the line of the tracks. This arrangement produces the relative axial twist effect between track and guide means for tight frictional contact between them, which is effective to hold the shield means at a desired position relative to the guide means, as by levering action.

It will be appreciated that the improved protective face assembly may have an associated air scoop means operatively connected to the top portion of the shield and where a peak is provided on the shield the air scoop can be operatively connected to it. The air scoop means of this invention provides for the prevention of fogging of the inner surface of the shield, thus assuring clear visibility at all times during use by the wearer.

The present invention resides in the combination, construction, arrangement and disposition of the various component parts and elements incorporated in improved protective assemblies constructed in accordance with the principles of this invention. The present invention will be better understood and objects and important features other than those specifically enumerated above will become apparent which consideration is given to the following details and description, when when taken in conjunction with the annexed drawing describes, discloses, illustrates and shows certain preferred embodiments or modifications of the present invention and what is presently considered and believed to be the best mode of practicing the principles thereof. Other embodiments or modifications may be suggested to those having the benefit of the teachings herein, and it is intended to include such other embodiments or modifications within the scope of the invention.

In the drawings:

FIG. 1 is an exploded pictorial illustration of a protective assembly constructed in accordance with the principles of the present invention;

FIG. 1*a* is an enlarged partial cross-sectional illustration of the protective assembly of the preceding figure in the assembled configuration thereof;

FIG. 2 is an enlarged side elevational view of a portion of the protective assembly of the preceding figure;

FIG. 3 is a partial cross-sectional elevational view taken along line 3—3 of FIG. 2;

FIG. 4 is a partial cross-sectional plan view taken along line 4—4 of FIG. 2;

FIG. 5 is a partially exploded view in perspective of an embodiment of a face protective assembly of this invention showing the face shield or visor assembled to a band-like mounting means which holds the slider blocks, and showing in broken lines the position of the band prior to its assembly with the shield by forced entering of the slider blocks into the tracks on the shield;

FIG. 6 is a side view in elevation of the face protective assembly of FIG. 5 mounted on a helmet showing the shield at an intermediate position and with upper and lower positions of the shiled indicated by broken lines;

FIG. 7 is a side view in elevation, partly in section, as would be seen from a plane taken along line 7—7 of FIG. 5 and with a helmet partly shown in broken lines to indicate the position of the assembly when mounted thereon with the shield in its lower position;

FIG. 8 is a plan view in section taken along a plane through line 8—8 of FIG. 6, then rotated 90° counterclockwise, and with the helmet shell indicated in broken lines for clarity;

FIG. 9 is a view in perspective of the slider blocks of FIGS. 5 through 11;

FIG. 10 is a plan view seen from above, of the assembly shown in FIG. 5 with the mounting or attachment band behind the shield to indicate their relative configurations prior to assembly, pairs of blocks being mirror opposites;

FIG. 11 is a view similar to FIG. 8 showing an alternate means for retaining the slider blocks in the tracks;

FIG. 12 is a partial side view in elevation of an alternate embodiment of an assembly of shield and slider blocks mounted on a helmet with the blocks attached directly onto the helmet shell;

FIG. 13 is a rear elevational view, partly in section, taken along line 13—13 of FIG. 12;

FIG. 14 is an exploded pictorial illustration of yet another protective assembly constructed in accordance with this invention;

FIG. 15 is an enlarged cross-sectional partial plan view taken along line 15—15 of FIG. 17;

FIG. 16 is a partial side elevational view of the assembly of the preceding figures showing the visor in one position thereof;

FIG. 17 is a partial side elevational view of the assembly of the preceding figures showing the visor in another position thereof;

FIG. 18 is a partial side elevational view of the assembly of the preceding figures showing the visor in still another position thereof;

FIG. 19 is an exploded partial pictorial illustration of yet still another protective assembly constructed in accordance with this invention;

FIG. 20 is a partial top plan view of a portion of the assembly of the preceding figure; and

FIG. 21 is a partial side elevational cross-sectional view taken along line 21—21 of FIG. 20.

With reference now to the drawings, and particularly to FIGS. 1–4 thereof, wherein there is shown and illustrated protective assemblies constructed in accordance with the principles of the present invention and designated generally by the reference character 20, the protective assembly 20 may, for example, comprise protective headgear, such as a helmet shell 22 and an attachment therefor, such as a shield assembly 24. The shield assembly 24 may further comprise a generally transparent visor or face plate portion 26 adapted to be operatively positioned in general transverse alignment with a wearer's face and eyes and a peak portion 28 which may be constructed and arranged to reduce or inhibit the passage of light therethrough and adapted to be operatively disposed extending generally outwardly over the wearer's face and eyes.

At the outset, it is to be expressly understood that, while the present invention is herein described, disclosed, illustrated and shown applied to visor and peak assemblies for protective headgear such as helmets, the invention is not to be deemed limited thereby. Rather, the present invention is herein described, disclosed, illustrated and shown as applied to visors and peaks for helmets by way of example only and as an aid in pointing out the novel features thereof. However, it is to be expressly understood that the present invention is equally applicable to substantially any attachment for substantially any protective assembly wherein it is desirable to provide improved mounting for relative movement therebetween. For example, the present invention is equally applicable to protective shields mounted with headbands, such as, for example, welders' or machinists' face masks, to protective shields disposed at other locations, such as to protect the neck, to protective shields adapted to be disposed relative to other portions of the body than the head, or to protective shields adapted to be disposed relative to protective or supportive structures which need not necessarily be worn upon a body but, which, may be, rather, adapted to be worn, adapted to be mobile, or adapted to be generally fixed at a given location.

Furthermore, for convenience in description, the terms "front," "rear," "forwardly," "rearwardly," "upper end," "lower end," "inner," "outer," and derivatives thereof will have reference to the protective assembly and its geometric center as appearing in FIGS. 1 and 2. Moreover, such terms as used in the ensuing description and the subjoined claims, along with other similar directional terms and terminology is to be construed and interpreted in the normal and accepted sense thereof. However, such terms and terminology is not to be construed or interpreted in a limiting sense either in the ensuing description or the subjoined claims, since the same is used merely to facilitate an understanding of, and to clearly set forth and particularly define the present invention.

Having in mind the foregoing, the visor or face plate portion 26 of the shield assembly 24 may be of substantially any desired configuration and, as shown, may comprise a generally cylindrical surface, that is, a surface generated by a straight line moving always constantly parallel to itself. The visor or face plate portion 26 may, for example, be defined by a lower edge or margin 30, an upper edge or margin 32 and a pair of rearward edges or margins 34 which, may, for example, be of generally arcuate configuration, as shown.

The shield assembly 24 may further comprise track means 36 adapted for sliding engagement with slider means 38 adapted to be positioned relative to the helmet shell 22. The track means 36 may be separately formed and secured with the visor or face plate 26 in any desired manner, as by means of adhesives, fasteners, or the like, or may be, as shown, integrally formed therewith. The track means 36 may, for example, comprise an elongate generally arcuate boss 40 extending adjacent each rearward edge 34 and generally outwardly of the visor or face plate 26 and provided with an elongate generally arcuate slot 42 extending generally inwardly of the inner surface 44 of the visor or face plate 26 and terminating at a bottom wall 46 generally within the boss 40. The generally arcuate slot 42 may be generally concentric with the adjacent rearward edge 34. The track means 36 may be further provided with slots 48 and 50 extending generally forwardly and rearwardly of the slots 42 generally medially of the inner surface 44 of the visor or face plate 26 and the bottom wall 46 of the slot 42. The upper end portion of the slots 42, 48 and 50 may be terminated within the track means 36 generally adjacent the upper edge 32 to define an upper stop portion 52 for the slider means 38. The lower end portion of the slots 42, 48 and 50 may extend entirely to the lower edge 30 of the shield assembly 24 to enable the slider means 38 to be inserted into and engaged with the track means 36 therethrough.

Lower stop means, such as a pin 54 may be provided extending generally transversely of the slots 42, 48 and 50, as shown, to form an abutment for the slider 38 to preclude the slider 38 from being inadvertently disengaged from the track means 36.

The slider means 38 may comprise a main body portion 56 which may have a generally rectangular cross section and comprise a generally convex forwardly directed side 58 and a generally concave rearwardly directed side 60. The sides 58 and 60 may be of generally arcuate configuration and generally concentric with the slot 42. The slider means 38 may further comprise a generally convex forwardly directed flange 62 extending generally outwardly of the side 58 adapted to be disposed within the slot 48 of the track means 36 and a generally concave rearwardly directed flange 64 extending generally outwardly of the side 60 adapted to be engaged or disposed within the slot 50 of the track means 36. The flanges 62 and 64 may, further, be of substantially the same depth and width as the cooperating slots 48 and 50. Accordingly, the track means 36 and the slider means 38 may be slideably moved relative to one another along an arcuate path, that is, relative rotation therebetween about a common center which is exterior to both. Yet, the mating configurations thereof, and particularly, the generally concentric-positioning of the body 60 and flanges 62 and 64 of the slider means 38 within the slots 42, 48 and 50 of the track means 36 will effectively preclude any relative rotation therebetween about any axis other than the aforesaid common axis. Accordingly, the track means 36 and slider means 38 will enable rotation about a virtual pivot defined by the center of the concentric circular edges thereof.

While the upper stop means **52** and the lower stop means provide limitations on the relative movement between the track means **36** and the slider means **38**, it is desirable that means be provided for retaining the track means **36** and the slider means **38** securely positioned relative to one another at at least the limits positions and, preferably, at any position intermediate thereof. Accordingly, there may be further provided spring means engaged with both the track means **36** and the slider means **38** for frictionally retaining the track means **36** and the slider means **38** at any of the relative positions thereof. The spring means may, for example, comprise a spring member **66** disposed therebetween. The spring member **66** may, for example, comprise a tang portion **68** for enabling structural association of the spring member **66** with the slider means **38**, as by being press fit into a mating aperture provided therein. The spring member **66** may further comprise a bowed portion **70** adapted to slidably frictionally engage the bottom wall **46** of the slot **42**. Hence, the track means **36** and slider means **38** may be easily and readily slidably moved relative to one another while being yet firmly retained at any relative disposition therebetween by the engagement of the spring member **66** therebetween.

As heretofore pointed out, the present invention is particularly adapted to be easily and quickly mounted or dismounted from a protective structure, such as a helmet shell, either during the initial fabrication thereof or to be mounted therewith at an attachment at substantially any later date.

Accordingly, there may be provided fastener means, such as that generally designated by the reference character **72** for enabling the removable mounting of the slider means **38** with the helmet shell **22**. The separable fastener means **72** may, for example, comprise male and female snap fastener elements **74** and **76**, respectively. The male member **74** may, for example, comprise a stem portion **78** and an enlarged head portion **80** and may be provided with a generally axial bore **82** extending through the stem portion **78** and terminating at the bottom of an enlarged recess **84** generally concentric with the head portion **80**. The male member **74** may be fabricated of substantially any desired material and, for example, may be fabricated of **2024** aluminum T4 anodized.

The slide means **38** may further comprise a stud member or portion **86** integrally formed therewith and extending generally perpendicularly outwardly of the inner surface **88** thereof, that is, the surface generally parallel with the outer surface **90** adjacent to which the spring member **66** is secured. The stud member or portion **86** may be inserted through the axial bore **82** of the fastener male member **74** and peened into the recess **84**, as shown, to position and retain the separable fastener male member **74** mounted with the main body portion **56** of the slider means **38**.

The female separable fastener member **76** may be structurally associated with the helmet shell **22** generally at the temples thereof in substantially any manner, either during initial fabrication of the helmet or at any later date. The separable fastener female member **76** may, for example, comprise a shell portion **90** adapted to encompass the enlarged head portion **80** of the separable fastener male member **74** and spring means **92** for grippingly engaging the enlarged head **80** of the separable fastener male member **72** for removably retaining the male and female members **74** and **76**, respectively, secured together. The separable fastener female member **76** may further comprise a stem portion **94** extending generally axially oppositely to the opening defined by the spring member **92** and adapted to be engaged with the helmet shell **22** through an aperture **96** provided therein. The inner end portion of the stem **94** may, for example, be peened or rolled over and outwardly to an enlarged flange **98** to clamp portions of the helmet shell adjacent the aperture **96** between the flange **98** and the shell **90**.

It is to be expressly understood, however, that it is within the scope of the present invention to structurally associate the male separable fastener member with the helmet shell and to structurally associate the female separable fastener member with the slider member. Moreover, the male and female members may be associated with the slider means **38** and the helmet shell **22** by other means, such as by screws, separate rivets, adhesives, or the like.

The helmet shell **22** may be further provided with apertures **100** extending therethrough adjacent the apertures **94** for a purpose to be described in more detail hereinafter.

The slider means **38** may further comprise an alignment pin or stud **102** extending generally perpendicularly from the inner surface **88** thereof in generally parallel relationship to the stud member or portion **86**. The alignment pin or stud **102** is disposed relative to the stud member or portion **86** at such a distance and at such an angular orientation as to have the outboard end portion thereof disposed within the aperture or hole **100** of the helmet shell **22** when the separable fastener male and female members **74** and **76** are interengaged. Hence, the slider means **38** will be precluded against rotation relative to the helmet shell **22** while being constructed and arranged for fast, simple, easy and positive mounting and dismounting relative to the helmet shell **22**. Moreover, the above-described fastening arrangement enables the provision of a degree of floating between the slider means **38** and the helmet shell **22**. That is, the separable fastener means **72** will retain the male and female members **74** and **76** thereof interengaged and secured together even in the presence of substantial axial or angular movement therebetween since, the dipping action results from the constriction of the circular spring **92**. Accordingly, even if one or more portions of the separable fastener male member **74** should be moved relative to the separable fastener female member **76** so that the spring **92** is opened partially radially outwardly, so long as the widest portion of the enlarged head **80** of the separable fastener male member **74** is still within the shell **90** and behind the spring **92**, then the separable fastener means will continue to remain engaged and, in fact, will provide a biasing force towards full interengagement. Similarly, it is believed readily apparent that such separable fastener means are capable of undergoing rotation between the male and female members **74** and **76** without separating or unfastening. So long as the alignment stud or pin **102** is sufficiently long to remain engaged or disposed within the aperture **100** of the helmet shell **22** regardless of the angular orientation of the mating separable fastener members **74** and **76**, then the

slider means **38** will float relative to the helmet shell **22** without becoming accidentally disengaged. Moreover, the degree of floating action may be readily controlled by the relative diameter of the aperture **100** and the alignment pin or stud **102** and the dimensions of the separable fastener male and female members **74** and **76**.

Such floating action is desirable for a number of reasons. Since the slider means **38** may float relative to the helmet shell **22**, the distance between the apertures **96** and **100** need not be determined to too high an accuracy. Similarly, the helmet shell need not be exactly vertical at the region where the apertures **96** and **100** are positioned. The opposite sides of the helmet may, in fact, be substantially non-parallel, the floating action of the slider means **38** being effective to render such inaccuracies of minimal consequence. Similarly, the track means **36** need not be exactly parallel or vertical. Moreover, the distance between the track means at the two rear edges may differ or vary in spacing. Hence, the present invention may be utilized with substantially any helmet or other protective assembly and is simple and easy to install.

The rear edge of the peak **28** may be further provided with beading **104**, fabricated of rubber, plastic, or the like. The shield assembly **24** may be fabricated of substantially any desired material, and may, for example, comprise lexan. The slider means **38** may similarly be fabricated of any desired material, and may, for example, be fabricated of nylon with the spring **66** being fabricated of any desired spring material.

It will be appreciated that the protective assembly of the present invention is suitable for use with face shields or visors of substantially any configuration, including but not limited to face shields or visors configured to a generally cylindrical surface, as heretofore described and disclosed or to visors or face shields configured to a complex curvature. Furthermore, protective assemblies may be fabricated with a peak either fixed relative to the helmet shell or movable relative thereto either independently or conjointly with movement of the visor or face shield.

The protective assembly of this invention, because of its simplicity and uniqueness of construction, finds particular use in motorcycle riders' and police riot helmets. Also this protective assembly may be used for industrial purposes such as for welding and cases where the face must be protected from a worker's environment.

With particular reference now to FIGS. **5–13**, there is shown and illustrated another protective assembly for covering the face constructed in accordance with the principles of the present invention and designated generally by the reference character **200**. This face protective assembly comprises a visor or face shield **202** having a pair of spaced apart outer edges or wing portions **203** each carrying one of a pair of slide tracks **204**. The tracks can be slideably engaged over a pair of guide means or sliders **206**, and each slider is respectively affixed to one end of an attachment band **208** that provides for mounting the assembly on a headgear type of support such as the helmet **210**. Mating pairs of snap fasteners **212** are provided for the wearer to make the attachment of the band to the helmet whenever it is desired to mount the assembly thereon or to remove it.

The attachment band **208** is a stiffly resilient flat metal strip bent into a curvature of constant radius and defining centrally of its length a small hole **214** and spaced therefrom and inwardly of the ends of the band are one each of a pair of elongated apertures **216**. Firmly secured in the small hole is the female element of a snap fastener **212** and female elements of snap fasteners are also loosely secured to the band and slideable therein along the length of their associated elongated apertures. The fixed position of the center one of the female snap fastener elements provides for centering the attachment band and thus the assembly and its shield over the forehead portion of the helmet and it, with the female elements near the ends of the band, since they are slideably adjustable in their distance from the central female element, provides for quickly mounting the entire assembly to a helmet which is normally provided with the mating male elements of snap fasteners **212** which are set in fixed position into the forehead portion of the helmet as shown. The sliders or slider blocks **206** for guiding the tracking of the shield, being carried on the band, can thus be quickly but detachably mounted simultaneously onto the helmet by attachment of the band thereto by pressure engagement between the respective pairs of snap fastener elements, with the sliders fixed spaced off of the helmet.

The face shield **202** is formed in its entirety from a single molding of a plastic material so as to produce a transparent cylindrical wall portion **218** for covering the face, and a curved, crescent-shaped protective peak portion **220** integrally formed therewith. A polycarbonate plastic material sold under the trade name "Lexan" has been found well suited for this use and provides a shield that is resistant to abrasion and scratching. The wall portion is formed as a cylinder of constant wall thickness which provides for reducing optical distortion of transmitted light rays reaching the eyes of the wearer and may be further trued by machine turning and polishing after molding. The cylindrical wall portion **218** has a wall upper edge **222** formed at right angles thereto and has a wall lower edge **224** which is angled upward and to the rear away from the forward center section of the wall portion. The wing portions **203**, which form a part of the shield, extend rearward from the cylindrical wall portion **218** along planes tangent to the curvature of the wall portion beginning from along tangent lines **226**.

It will be seen that the peak portion **220** forms a partial surface of a cone which connects to the cylindrical wall portion along its wall upper edge **222** and forms with it an obtuse angle. The peak thus angles upward from the front or forward center section of the shield to above the wall upper edge at the front and then tapers from its highest point downward to the side and rear where it terminates in the wing portions **203** at about the forward or leading edge **230** of tracks **204** (see FIGS. **7** and **10**). This type of construction produces a desirable protective peak which can be tinted, painted, or frosted to block or reduce transmittal of light rays and provide protection from rain and wind which might otherwise enter between the helmet and the shield and strike the face of the wearer.

The tracks **204** are integrally molded with the shield for which purpose the wing portions are provided with an arcuate portion **236** of increased thickness for form-

ing the tracks therein. It will be appreciated that the tracks can be formed and then attached to the body of the shield such as by cementing, riveting, or the like. Each track may be formed as a T-shaped track slot **240** defining oppositely confronting forward and rear track grooves **242**, **244** closed to make front and rear end walls of the tracks. The grooves are further defined by a pair of oppositely directed overhanging lips **246** which together provide a track inner wall **248** and a closed track outer wall **250**, both track walls being provided with inner surfaces which are planarly flat and smooth. It will be appreciated that the slot produced by molding can, if desired, be formed by machining. The inner track wall defines an elongated arcuate slot opening **252** having a constant curvature which is the arc of a circle. This produces the slot-like tracks **204** which can be slideably engaged over one of the sliders or slider blocks and guided and controlled thereby for a steady tracking movement along the track arc of curvature. The tracks are open through the lower end wall **254** thereof for inserting the sliders into the slots **240** and the upper end of the track slot, closed over by a track upper end wall **256** arched upward at its inner surface acting as an upper travel limit stop when engaged by the slider.

The tracks **204** are arranged in the shield so a line of tangent to about the midpoint of the arc of curvature of each track is approximately parallel to the vertical axis of revolution of the cylindrical wall portion **218**. This construction provides for the shield wall portion, when the assembly is properly positioned on the helmet and the shield in its lowered face protective or use position, to be in the most direct position for use for good visual images to be seen therethrough.

After the sliders are assembled into the tracks the lower end wall **254** may have operatively associated therewith blocking means to prevent removal of the sliders from the track. The blocking or stopping means may be in the form of a pin **258** insertable after assembly through aligned pin holes **260** drilled in the front and rear end walls **243** and **245** which are the fore and aft edges of the tracks **204** (see FIG. **5**). The tracks are also provided in the inner face or surface of track outer walls **250** with a slight depression **262**.

As to construction of the slider blocks or sliders **206**, over which the track slides, each has a T-shaped cross section with right angled or rectangular configurations and with the outer dimensions of its transverse section somewhat smaller than the inner dimensions of slot **240** forming the slide portion of tracks **204**. Each slider is formed with a matching curvature in its longitudinal dimensions to that of the tracks. Thus, the vertical longitudinal axes through the slots **240** and the sliders lie on an arc of the same circle. Each block has a central body **263** and a wide slide portion **264** having a wide flat outer face **266** and a pair of side flanges **268** arranged on opposite sides of a stem portion **270** which is of narrower dimension than the slide portion and extending the length of the slider. The entire upper or insertion end of the slider is rounded for easily inserting the sliders into the slideways formed by the slot **240**. (See FIGS. **8** and **9**.) The central portion or body of the slider also defines through its upper and lower ends rivet apertures **271** for each to receive a rivet **272** by which the sliders are secured to the band **208** so they are substantially parallel to its squared-off ends. Right and left hand sliders **206** are mirror opposites.

In assembling together the components making up the face protective assembly **200** for installation and operation on a helmet or other headwear support, a slider **206** is attached by rivets **272** near each respective opposite end of the attachment band **208** with the stem of the slider **206** engaging the outwardly facing or convex surface of the band **208** and with the curved end of the slider uppermost. In some cases other types of securing means than the rivets **272** can be used, as for example, adhesives, clips, brads, or the like or the sliders can be formed integrally with the band. The sliders are so located on the band that a line of tangent to the arc of curvature of the slider is approximately normal to the upper and lower edges of the band. Also, each flat pg,**25** outer face **266** of the sliders is respectively parallel with a plane in surface contact with the band and that may lie along the band surface or be tangent to a bend in the band at its connection to the slider. Thus the sliders are spaced apart on the ends or end extensions of the band a distance which locates the sliders over forwardly converging portions of the head or the headgear. Also, the band attaches to the helmet with the band tilted upward at its forward position and downward toward its ends. Thus, the sliders are tilted rearwardly with their lower front edges forward of their upper front edges when the band is mounted on a helmet in place on the head. This provides for the sliders to direct the tracks in parallel for shield movement up and to the rear over the crown of the head when retracting it to a new position or downwardly over the face when oppositely moved. Also, the flat outer surfaces **266** of the sliders will be canted outwardly and to the rear of the wearer's head so as to be forwardly converging and rearwardly diverging when considered in relation to a fore and aft vertical plane through about the center of the wearer's head or the headgear. Thus the rear outer edges of the sliders are spaced outward from such vertical plane more than the forward outer edges and this produces a slanting of the sliders relative to the tracks in the shield to provide an advantageous frictional gripping between slider and track when they are assembled.

Then, with the sliders attached to the band and the band in about the position below the shield indicated by broken lines in FIG. **5**, the band and the shield are slightly bent or sprung relative to one another so that the sliders can be operatively inserted into the tracks by hand and after insertion the sliders and band are moved upwardly as indicated by the arrows in FIG. **5**, thus carrying the sliders in frictionally fitting engagement up into the tracks. The sliders are then moved to above the pin holes **260** after which the roll pins **258** are inserted in the pin holes where they are held secured by expanding in the holes. The pins provide a lower travel limit stop means and thus also act to retain the sliders within the tracks.

The relative configurations of band and shield prior to assembly is indicated in solid lines in FIG. **10**. Since the perimeter of the cylindrical portion of the shield defined between the location of tangent lines **226** is slightly less than a half section of its cylinder it can be seen that wing portions **203** which are straight extensions rearwardly from the tangent lines, the tracks **204**

are canted outward to the rear similarly to the outward slant or cant of the sliders **206** but slant to a lesser degree than the sliders which provides for the frictional fit between them when they are assembled together as shown and held by the relative twisting or rotational effect resulting from the flexible springy nature of the materials of the shield and/or the band. Differently stated, the forward outer edges of the sliders are canted forward and inward toward the center front of the head or the headgear somewhat more than their corresponding tracks and rearward directed edges of the slider are canted outward and to the rear, with respect to the head or headgear, somewhat more than the rearward edges of the tracks.

Thus, after assembly, under effect of the relative pressures of track against slider due to surfaces of the one being relatively more canted than the other, their relative dimensions and the tension forces applied by the resistance of the materials of band and shield to deformation under the strain in which they operate when assembled, each slider and track are held together in operationally stable engagement with their transverse horizontal axes angularly offset as indicated by angles *x* and *y* in FIG. **8**. This construction will also accomodate for any wear between the parts by providing a continuous frictional relationship between the slider and the track.

One method of assembly of the sliders into the tracks of the band is indicated by the arrows in FIG. **10** in which the unassembled band and shield are shown in at-rest positions in solid lines. Thus, simultaneous insertion of both sliders into the tracks can be accomplished by an inward flexing of both shield and band (also turning the angle of the sliders) in the direction of the arrows to positions indicated by broken lines. This alters the relative slant or angular offset as between track and slider by reducing the relative angle made between their frictionally confrontable planar surfaces, by an amount sufficient to permit insertion of the sliders in the tracks, after which the flexing forces are removed and friction gripping of the tracks about the sliders occurs as the one is tended to be revolved with respect to the other, as by lever action.

By another method of assembly, the tip of one slider can first be loosely started into its track and the wing portion **203** at the other side then flexed outward to change its alignment sufficiently to enter the slider of that side into its track.

Where the band has a very high resistance to flex it may tend to somewhat straighten the wing portions and tracks fore and aft along the head or helmet somewhat as indicated in FIG. **8** and if the band has greater resilience, as in the preferred embodiment, the slight outward and rearward canting of the wings of the shield is maintained when the band is assembled in the shield which provides a neat fit of the assembly along the front of the helmet when it is of eliptical or ovoid figuration.

It will be appreciated that the strength of the shield and its track means relative to the strength of the band is such that the flanges **268** of the slider are maintained, under a slight twisting or rotating effect, which is wedged against inner surfaces of the tracks **204** so that with it the slider flange directed rearward makes a frictional gripping contact along two spaced lines corresponding to rear corner edges *a* and *b* and additional frictional gripping along lines corresponding to forward corner edges *c* and *d* of the forwardly directed flange of the slider (see FIG. **8**). The balance of the surfaces of the slider are thus substantially free of contact with the track means with the depression **262** accomodating for the slightly raised heads of rivets **272**. In this way, there are four spaced lines of slide contact, one each fore and aft and at each side, between each slider and its track and thus on each side of the headgear or support means. This construction provides for a firm gripping of the slider against the track for a steady, easy tracking movement of the shield as it is directed up or down about the sliders by hand movement to push the shield down over the face or up off the face to a position over the crown of the helmet. The construction further provides secure friction gripping which holds the shield in a positive manner at whatever desired down or retracted up position to which it is moved.

In a modification providing economies of production, after the sliders have been inserted into the tracks, each can have a blocking or stop means to prevent overtravel of the track by its engagement against a slider, through providing a protuberance **279** extending from a wall of the track and so formed thereon as to block the open lower (or upper) portion thereof which prevents accidental removal of the slider block from the track. Advantageously this can be accomplished by dimpling through the outer surface of the track using a cold forming operation in which the wall is struck with a pointed instrument so as to deform the wall inward into the slot **240**. This procedure is effective to cold flow the molded or cast plastic of the track sufficiently to produce the desired protuberance extending into the opening or slot formed by the track walls. (See FIG. **11**).

A modification of the invention is shown in FIGS. **12** and **13** indicating an alternate mounting direct to the helmet of a shield and guide means therefor without use of extensions or arms, as by attachment band type support means, for holding and placing the guide means at their spaced points in relation to the helmet. In this modification a helmet shell **280** has directly attached in the vicinity of its opposite temple portions, a pair of spaced guide means, each in the form of an angled or tapered slider block or slider **282** which is similar to the slider **206** heretofore described except that it has a stem **284** tapered in cross section, i.e., it is thicker through its upper portion and thinner through its lower portion and use of spring biasing is shown. This construction provides for the tapered slider to have its stem fitted to the angle or curvature of the helmet shell and to have its flat outer face and side flanges in substantially vertical position parallel to a vertical fore and aft plane taken through the center of the helmet or the head of the wearer. This construction, as in the other embodiments, provides for the tracks to be maintained well parallel for straight tracking movement between lower and upper positions of the shield so it tracks easily and smoothly about the sliders and is removable by spring clips **285** closable over wall **254**.

With the foregoing embodiment these can be a flat leaf spring **286** held in the slider for effecting a pressure engagement between sliders and tracks. In alternate embodiments (not shown) the tapered sliders can be so

located direct on the helmet as indicated as to be slanted outward and rearward from front to back in a manner heretofore described with reference to the embodiment in which sliders are carried on the outer ends or extensions of an attachment band in order to produce an angled relationship of sliders to tracks, as suggested in FIG. **11**. This can be accomplished in one such embodiment by mounting the tapered sliders directly to the helmet on forwardly converging portions of the helmet shell, or in another (not shown) the stem **284** can also be tapered front to back so as to provide for the angling of the slider with respect to the tracking. Thus in these latter instances the frictional engagement of the angled slider with the track of the visor is obtained by the angular offset or twisting about the slider produced by the shield in resistance to deformation by the fit of the tracks and the sliders.

It will be appreciated that various modifications can be made, for example, by having the sliders reversely canted to that heretofore described, that is, angled outward towards the front of the head or headgear instead of toward the rear to effect the friction fit. Also the tracks can be constructed to permit inserting the sliders down through the top of them and the sliders can be held to a helmet in other ways, for example, by straps and hooks which would grip the edge of the helmet, or in other ways, or can be mounted on one or more attachment bands held to the helmet in other ways than by snap fasteners.

It will be appreciated that when the sliders are mounted to extensions, e.g., on an attachment band attached to an article of headwear, the attachment of the extension to the headgear can be such as to effect a levering of the slider or guide means with respect to the tracks in the shield to effect or to increase the angular offset producing the frictional fit. Also, other arrangements of tracks and sliders which would produce a relative offset for their cooperative frictional engagement may occur to those having the benefit of the teachings herein.

It will also be appreciated that the sheld of this invention tracks about two fixed points located, in use, on a transverse axis with respect to the head of a wearer or to the headgear so as to provide for bodily repositioning the entire shield in relation thereto as it is tracked about the points in being moved between lowered and retracted positions.

It will be further appreciated that the steadying guide means of this invention provides with the tracks, a positive steadiness of control of tracking movement of the shield for positioning it without wobble or unwanted loss of a desired shield position to which it may be moved by hand during use, and band and shield can have the same or varying resilience. Also, shield travel can be limited in other ways, e.g., by contact, in downward travel, of an inner edge of the peak on a top edge of the band.

With reference now to FIGS. **14** and **15**, there is shown and illustrated yet another protective assembly constructed in accordance with the principles of the present invention and designated generally by the reference character **320**.

The protective assembly **320** may, for example, comprise a helmet shell **322** and a shield assembly **324**. The shield assembly **324** may comprise, in turn, a visor or face shield **326** and the helmet shell **322** may comprise, in turn a peak **328**. The shield **326** may be of substantially any desired configuration and, as shown, may comprise a surface of generally convex configuration in a plurality of directions, that is, having curvature in both the horizontal and vertical planes. The shield **326** may be defined, for example, by a lower edge or margin **330**, an upper edge or margin **332** and a pair of rearward edges or margins **334**. The edges or margins **330**, **332** and **334** may be of substantially any desired configuration. For example, the upper edge or margin **332** may be of generally upwardly convex and outwardly concave configuration or contour; the lower margin **330** may be of generally downwardly convex and outwardly concave configuration or contour; and the rearward edges or margins **334** may be of generally rearwardly and outwardly convex configuration or contour.

The shield **326** may be provided with track means, such as an elongated slot extending generally curvalinearly along a generally rearwardly convex path adjacent each rearward edge or margin **334**. The elongated slot **336** may be provided, at either end portion thereof, with generally upwardly directed slot end portions **338** and **340** for enabling or aiding in the retention or latching of the shield **336** when in the retracted or inoperative and extended or operative positions thereof.

The shield assembly **334** may further comprise slider means adapted for sliding engagement with the tracks or elongated slots **336** and generally designated by the reference character **342**. The slider means **342** may be adapted to be removably positioned relative to the helmet shell **322**. The slider means **342** may comprise, for example, a generally cylindrical medial portion **346** provided with screw threads **348** on the outer end portion thereof and an enlarged head portion **350** extending generally radially outwardly from the inner end portion thereof. Accordingly, the shield **326** may be disposed on the cylindrical medial portion **346**, with the slider body portion **344** extending through the elongated slot thereof. The slider body portion **344** may be fabricated of such a material, such as a material having the characteristics of nylon, and to such dimensions as to be frictionally engaged with the shield **336** so as to enable relative movement therebetween only upon the application of a definite force thereto. If desired, additional resilient means, such as a spring or bellville washer may be disposed between the face shield **326** and the slider body portion **344** to provide increased friction therebetween or, the dimension and materials of the slider body portion **344** may be chosen so as to enable free relative movement therebetween without hindrance. The slider body portion **344** may, if desired, be fabricated of substantially any other desired material, such as a metal, plastic, or the like. A washer **345**, which may be either of a flat configuration or may be provided with a shoulder extending over the slider body portion **346** and within the elongated slot **336** may be provided disposed over the threaded end **348** of the slider body **346** and a nut **347** may be provided to retain the washer **345** in position. The frictional engagement or restraining force of the slider means **342** may, if desired, be adjusted by the relative tightness of the nut **347**.

The shield assembly **324**, as heretofore pointed out, may be particularly adapted to be readily and easily mounted with the helmet shell **322** either at the time of initial fabrication thereof or at any later time; to be utilizable with substantially any helmet shell; to be readily removable therefrom; and to breakaway therefrom upon impact, or the like; all without adversely affecting the structural and aesthetic integrity thereof. To this end, the shield assembly **324** may be removably mounted with the helmet shell **322** by separable fastener assemblies **352** comprising, for example, mating separable fastener members **354** and **356** structurally associated with the helmet shell **322** at the temples thereof and with the shield assembly **324** at the slider means **342** thereof. By way of example, the separable fastener member **354** may comprise a male snap fastener member and the member **356** may comprise a female snap fastener member. The male snap fastener member **354** may be structurally associated with the helmet shell **322** in any convenient manner, as by means of threaded fasteners, adhesives, or may be riveted or eyeleted thereto by means of a rim or flange **358** integrally formed therewith. Similarly, the female snap fastener member **356** may be structurally associated with the slider means **342** in any convenient manner, as by means of threaded fasteners, adhesives, rivets, eyelets, or the like, or may be provided with an aperture or hole **360** through which the slider body portion **344** is particularly adapted to be disposed with the enlarged inner head portion **350** thereof being positioned generally interiorly of the female snap fastener member **356**.

There may be further provided fastener structure comprising, for example, a lower stud **362** structurally associated with the peak portion **328** of the helmet shell **322** and extending generally downwardly and inwardly thereof at a frontal portion and provided with an enlarged head portion **363**, spaced apart from the interior surface of the peak **328** and an upper stud **364** structurally associated with the helmet shell **322** at a frontal portion thereof and provided with an enlarged head portion **365** generally spaced apart from the outer surface of the helmet shell **322**. The upper edge or margin **332** of the face shield **326** may be provided with a generally downwardly extending slot **366** adapted to be selectively engaged with the studs **362** and **364** generally between the enlarged portions **363** and **365** thereof and the adjacent surfaces of the helmet shell **322** to aid, as will be hereinafter more fully described, in retaining the face shield **326** in the upper, retracted or inoperative and lower, extended or operative positions thereof.

The lower stud **362** may be disposed generally medially of the peak **328** of the helmet shell **322** so that the face shield **326** will be disposed in the proper operating position thereof when the lower stud **362** is engaged within the slot **366** of the visor or face plate **326** and the slider body portion **344** is disposed within the upper slot end portion **338**. The stud **364** may be disposed relative to the helmet shell **322** generally above the stud **362** at such a location that the face shield **326** will be in a fully retracted position thereof above the peak **328** when the stud **364** is engaged within the slot **366** of the face shield **326** and the slider body portion **344** is disposed within the lower slot and end portion **340**.

The operation of the protective assembly is now believed to be readily obvious. The face shield **326** may be readily and simply retained in the upper or retracted position thereof by engaging the stud **364** in the slot **366** and disposing the slider body portion **344** within the lower slot end portion **340**. When the face shield **326** is so positioned, it is believed readily obvious, and as clearly shown in FIG. **16**, that the visor or face shield **326** is precluded from inadvertent movement out of that position. The engagement of the stud **364** within the slot **366** prevents the face shield **326** from pivoting generally upwardly of the slider means **342**. The peak **328** engaged with the lower edge **330** of the face shield **326** precludes the face shield **326** from rotating generally downwardly about the slider means **342**. The engagement of the slider body portion **344** of the slider means **342** within the lower slot end portion **340** precludes any relative movement between the rearward end portion of the face shield **326** and the helmet shell **322** in any direction other than upwardly, which would be against the force applied thereto by gravity. Hence, the face shield **326** will be securely retained against inadvertent movement out of the upper, retracted or inoperative positions thereof shown in FIG. **16**.

When it is desired to move the face shield **326** from the upper, retracted or inoperative position thereof shown in FIG. **16**, such movement is readily permitted, even though the face shield **326** is securely positioned against inadvertent movement thereof. To move the face shield **326** from the upper, retracted or inoperative position thereof to the lower, extended or operative position thereof, the rearward end of the face shield **326** would be lifted generally upwardly so as to dispose the slider body portion **344** at the juncture between the medial portion of the elongated slot **336** and the slot end portions **340**. With the slider body portion **344** disposed in general alignment with the elongated slot **336**, the face shield **326** may then be moved generally forwardly to a position generally forwardly and outwardly of the peak **328** of the helmet shell **322** and then moved generally downwardly and forwardly past the peak **328** until the slider body portion **344** is disposed in the rearmost portion of the elongated slot **336**, as shown in FIG. **17**.

The face shield **326** may then be pivoted generally downwardly about the slider body portion **344** until the upper edge or margin **332** of the face shield **326** is generally below and in a position to clear the peak **328**. The face shield **326** may then be slid generally rearwardly with the slider body portion **344** generally sliding within the upper portion of the elongated slot **336**, as shown in FIG. **18** until the face shield **326** is wholly within and beneath the peak **328** of the helmet shell **322**. With the face shield **326** disposed beneath the peak **328**, the face shield **326** may then be pivoted generally upwardly about the slider body portion **344**, with the slider body portion **344** disposed generally at the intersection of the upper slot end portion **338** and the generally C-shaped elongated slot **336** until the lower stud **362** is engaged within the slot **366** of the face shield **326**. The rearward end portion of the face shield **326** is then lowered to dispose the slider body portion **344** within the upper slot end portion **338** as shown in FIG. **18** to latch the face shield **326** against inadvertent movement from the lower, extended or protective position thereof.

The face shield **326** may be readily and easily moved, by a reversal of the above steps, from the lower, extended or protective position thereof to the upper, retracted or inoperative position thereof.

Hence, the face shield **326** may be readily and simply retained in the upper, retracted or inoperative position thereof and in the lower, extended, protective or operative position thereof while being yet easily movable between such positions. The friction between the slider means **342** and the face shield **326** may be controlled or adjusted by the materials and dimensions of the slider body portion **344**, washer **345** and snap member **356** together with the pressures applied therebetween by the nut **347**. If desired, additional resilient means, such as a spring or bellville washer may be disposed between the face shield **326** and the slider means **342** to provide increased friction therebetween.

It is believed readily apparent, therefore, that each of the embodiments or modifications of the present invention heretofore described, disclosed, illustrated and shown fulfill all of the functions hereinbefore ascribed to the present invention. The face shield assemblies may be readily and easily mounted or associated with helmet shells of substant any configuration readily, easily, simply, and quickly either at the time of initial fabrication thereof or at any later time. Since the only permanent structure required to be affixed with the helmet shell are the snap fastener members disposed at the temples thereof, it is not necessary that the sides of the helmet be of any particular configuration.

Moreover, since only a relatively small number of relatively small holes or apertures need be provided in the helmet shell, the structural and aesthetic integrity of the basic helmet shell would not be adversely affected thereby. Moreover, the present invention may be utilized with helmets having peaks or helmets without peaks. Further, the snap fastener structure provides the face shield assembly with a break-away securement or mounting with the basic helmet shell, enabling the face shield to be automatically disassociated therefrom upon impact, or the like. With the face shield removed from the helmet shell, there are no substantial projections extending from the helmet shell to provide dangerous impact locations, further adding to the safety of the assemblies.

Yet still further, the face shield of the present invention may be of substantially any desired contour, for example, the face shield may comprise a generally cylindrical surface, a generally spherical surface or substantially any other plain or curvalinear, simple or complex surface configuration.

Yet further, the snap fastener means securing the face shield with the helmet shell provides a certain degree of floating action therebetween, providing easy movement therebetween and compensating for any variations or inaccuracies thereof.

The full face shields of the present invention, while providing a maximum degree of facial protection may, under certain circumstances of use, and particularly, when the protective assemblies are utilized as crash helmets exhibit a tendency to fog. That is, under certain circumstances of use, especially when utilized outdoors during cold weather, the wearer's breath may condense upon the interior surface of the face shield. Hence, it is desirable that some means be provided to preclude such condensation or to de-fog the face shield. The face shields of the present invention are particularly adapted to enable the provision of relatively simple yet novel de-fogging means.

Accordingly, with reference now to FIGS. **19–21**, there is shown and illustrated another and yet still further protective assembly designated generally by the reference character **420**. The protective assembly **420** may, for example, comprise a helmet shell **422**, a face plate or shield assembly **424** and de-fogging means **426**.

The face shield **424** may be of substantially any desired configuration and may, for example, be provided with a peak portion **428** extending generally upwardly and rearwardly thereof or may, as heretofore pointed out, be provided with a peak portion which extends generally forwardly thereof, or the peak portion may be omitted. For illustrative purposes only, the embodiment or modification shown in FIGS. **19–21** includes the peak **428** as extending generally rearwardly and upwardly of the face shield or visor **424** and the de-fogging means **426** is particularly constructed and arranged for association with such shield. However, it is to be expressly understood that similar de-fogging means may be permanently structurally associated with the face shield or, preferably, may be removably structurally associated therewith to enable selective utilization or non-utilization thereof depending upon the operating conditions and depending upon whether or not such de-fogging is required under any particular set of operating conditions.

The de-fogging means **426** may comprise a pair of spaced apart side members **430** adapted to be snap fit with the peak **428** to retain the de-fogging means **426** removably disposed thereon. The side members **430** may, for example, be defined by generally semi-circular rear edges **432** extending into general alignment with generally forwardly and downwardly extending lower edges **434**. The side members **430** may further comprise a generally curved forward edge **436** extending generally forwardly and downwardly from general alignment with the lower edges **434**. The side members **430** may further comprise a generally upwardly and rearwardly extending upper edge **438** disposed in generally parallel spaced apart relationship to the lower edges **434** adapted to be disposed adjacent and in engagement with the interior surface of the peak **428**. The upper edges **438** may be of substantially the same longitudinal dimension as the mating portion of the peak **428** adjacent thereto and terminate at a generally vertically extending rearward edge **440** adapted to abut the rearward edge **442** of the peak **428**. The side members **430** may be further defined by slot defining edges **444** extending generally forwardly of the vertically extending rear edge **440** and generally parallel with the upper edge **438** adapted to define therewith a slot **446** within which the rearward edge **442** of the peak **428** is particularly adapted to be disposed and gripped therein. The side members **430** may yet still further be defined by a generally straight forward edge **448** adapted to be engaged with the face shield **424**.

The de-fogging means **426** may further comprise airflow directing panel means **450** comprising, for example, a generally planar portion **452** extending generally between the lower edges **434**; a first curved portion **454** of generally semi-circular cross section extending between the semi-circular rear edges **432** and a second

curved portion **456** extending between the curved forward edges **436**.

Accordingly, with the de-fogging means **426** disposed on the peak portion **428** of the face shield **424**, the first curved portion **454**, in combination with the peak **428** may define a scoop having an inlet **458** disposed generally centrally above the peak **428**. The first curved portion **454**, the planar portion **452**, and the second curved portion **456** may define, in combination with the peak **428**, conduit means connected with the inlet **458** for directing a flow of air generally therethrough during relative movement between the helmet **422** and the atmosphere, particularly in a forward direction. The second curved portion **456** may, in combination with the face shield **424** define an outlet **460** for directing the flow of air generally downwardly across the interior surface of the face shield **424** to provide de-fogging thereof.

The beading **104** (see FIG. **1***a*), as heretofore pointed out, may be fabricated of rubber, plastic, or the like. The beading **104** may function solely as a protective edging for the visor **28** or may, additionally, provide for a seal between the visor **28** and the helmet shell **22**, particularly when the visor is in the protective configuration or position thereof as shown in solid lines in FIG. **1***a*. When the visor is in the retracted or non-protective position, as shown in phantom in FIG. **1***a*, it is not necessary that the beading **104** provide for a tight sealing with the helmet shell **22**. Moreover, the beading **104** preferably is exceedingly flexible, so that the shield may be moved between the protective and non-protective positions thereof readily and easily even though the distance or spacing between the peak **28** and the helmet shell **22** may vary during such movement and, whether or not the exterior surface of the helmet shell **22** is smooth or rough. To function as such a seal, the beading **104** may, accordingly, be of a generally Y-shaped configuration, comprising a plurality of legs **105** adapted to be engaged on opposite sides of the visor or peak **28** and a sealing portion **107** provided with a bead **109** extending rearwardly thereof and adapted to engage the surface of the helmet shell **22**. The portion **107** of the beading **104** may, for example, be of tapered configuration, as shown, to provide maximum sealing and give to the beading **104** both when in position and during movement relative to the helmet shell **22**. The beading **104** should preferably be fabricated of a material which is capable of withstanding long term exposure to weather conditions, without drying or losing its flexibility and be fabricated of a chemically resistant material which will not be deleteriously affected either by various atmospheric conditions or by any other natural or chemical agent with which it may come in contact.

While the invention has been described, disclosed, illustrated and shown in terms of certain preferred embodiments or modifications which it has assumed in practice, the scope of the invention should not be deemed to be limited by the precise embodiments or modifications herein described, disclosed, illustrated or shown, such other embodiments or modifications as may be suggested to those having the benefit of the teachings herein being intended to be reserved especially as they fall within the scope and breadth of the claims here appended.

What is claimed is:

1. A protective face shield assembly detachably positioned on a helmet comprising: a helmet having a plurality of spaced fixed fastening means; a thin flexible band means having a plurality of spaced helmet fastening means engaging said fixed fastening means; a pair of spaced slider means, one each positioned at each end of said band means; a face shielding means having a pair of track means therein; said track means spaced one from the other and in registry with and slideable over said spaced slider means; each of said track means and said slider means having a cross-sectional configuration and contacting surfaces that prevent track rotation about said slider means and present frictional contact areas between said slider means and said track means, whereby an application of force to said shielding means causes movement of said shielding means from or to various face-protecting positions as said track means is slideably moved over said slider means.

2. The protective face shield assembly of claim **1** wherein each said spaced slider means is canted in its respective track means to provide a continuous frictional relationship between each of said slider means and said track means.

3. The protective face shield assembly of claim **1** wherein said track means and said slider means define generally arcuate paths, enabling said face shielding means to be moved through a curved path relative to the outer surface of the top portion of said headgear structure.

4. A face protective assembly releasably mountable on headgear structure and movable relative thereto to and from a face shielding position comprising: a face shield assembly having positioned therein a face shielding means; slide track means positioned on said face shielding means; a releasable headgear structure attachment means operatively connected to said slide track means having means therein for fixedly attaching said face shield assembly on a headgear structure; and slider means secured to said attachment means and operative in said track means, said slider means and said track means each having cross-sectional configuration and contacting surfaces that prevent track rotation about said slider means and present frictional contact areas between said slider means and said track means, said face shielding means being curved and having a peak means extending inwardly from its uppermost edge and defining a free curved edge generally contoured to the forehead of a wearer, and a flexible and resilient seal means positioned on said free curved edge extending generally outwardly thereof, whereby said face shielding means can be moved by a touching force to various face protecting positions as said track means is slideably moved over said slider means.

5. A protective face shield assembly adapted to be detachably positioned on a helmet comprising: A thin flexible band means having a plurality of spaced helmet fastening means adapted to detachably engage mating fixed fastening means on a helmet; a pair of spaced slider means, one each positioned at each end of said band means; a face shielding means having a pair of track means therein; said track means spaced one from the other and in registry with and slideable over said spaced slider means; each of said track means and said slider means having a cross-sectional configuration and contacting surfaces that prevent track rotation about said slider means and present frictional contact areas

between said slider means and said track means, whereby an application of force to said shielding means causes movement of said shielding means from or to various face-protecting positions as said track means is slideably moved over said slider means.

6. The protective face shield assembly of claim 5 wherein each said spaced slider means is canted in its respective track means to provide a continuous frictional relationship between each of said slider means and to respective track means.

7. The protective face shield assembly of claim 5 wherein said track means and said slider means define generally arcuate paths, enabling said face shielding means to be moved through a curved path relative to the outer surface of the top portion of said headgear structure.

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