Oct. 19, 1971 R. S. HILL 3,613,115

DETACHABLE FACE SHIELD SUPPORT FOR A HELMET

Filed Aug. 20, 1969 2 Sheets-Sheet 1

FIG. 1

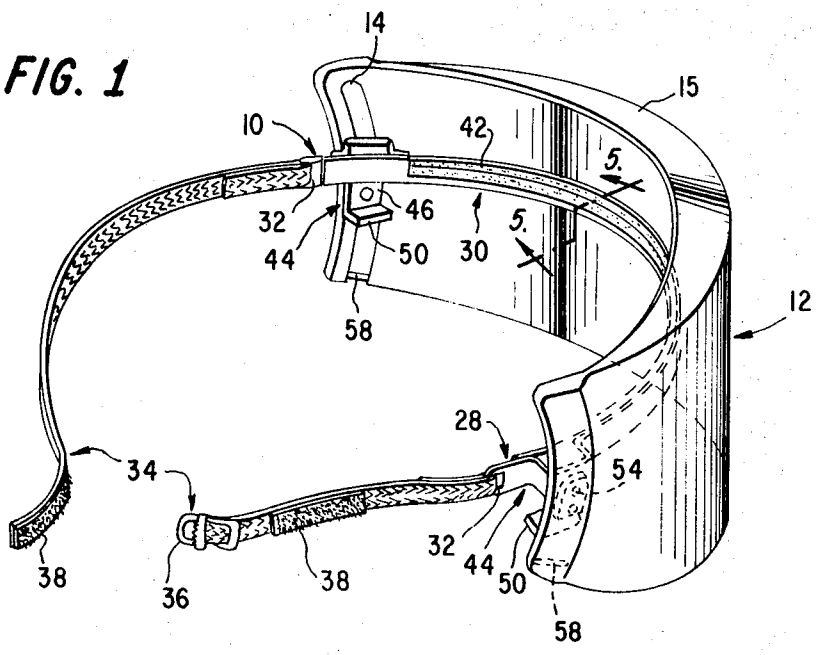


FIG. 2

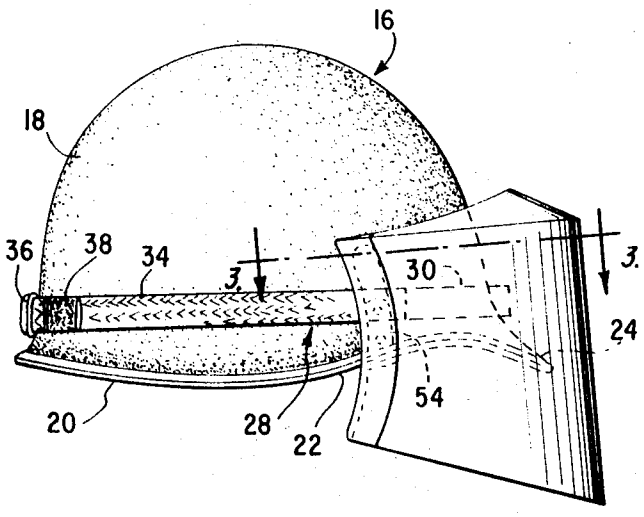
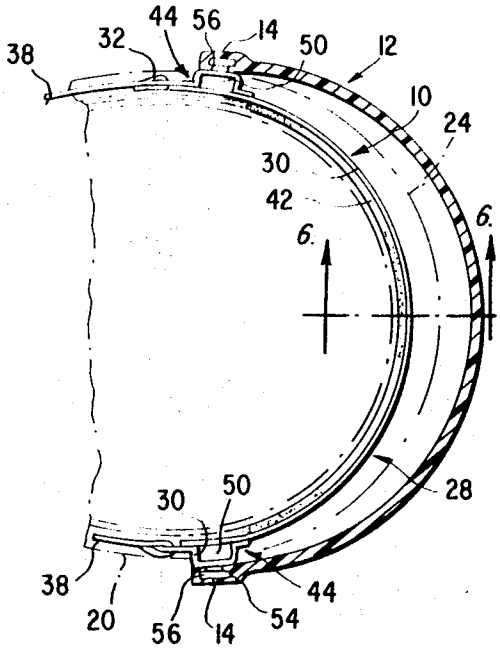


FIG. 3



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DETACHABLE FACE SHIELD SUPPORT FOR A HELMET

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FIG. 4

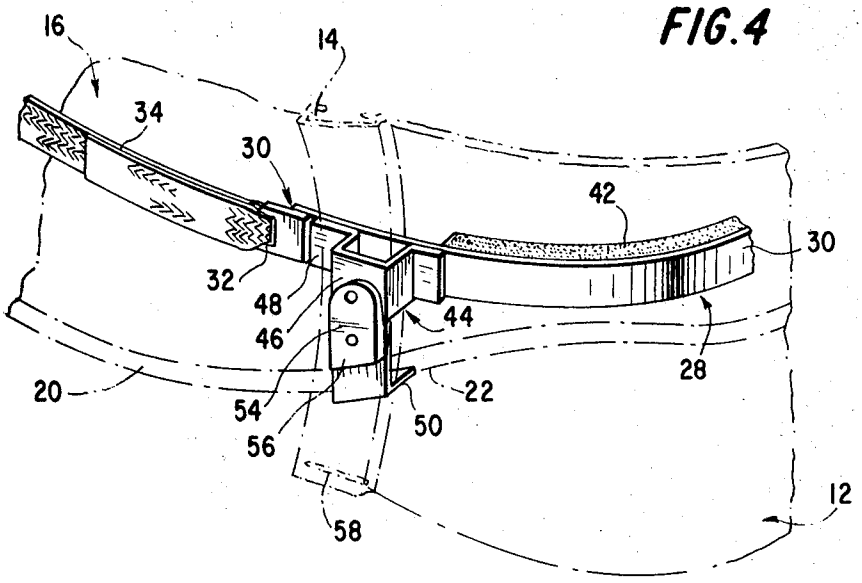


FIG. 5

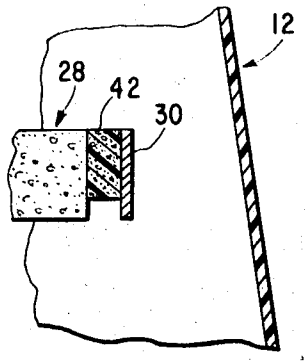
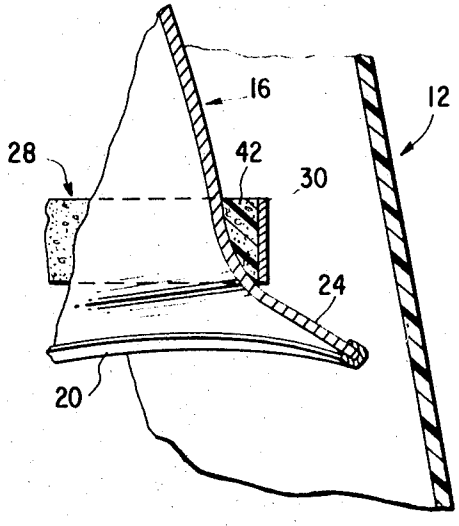


FIG. 6



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3,613,115

DETACHABLE FACE SHIELD SUPPORT FOR A HELMET

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Int. Cl. A61f 9/04
U.S. Cl. 2—10 17 Claims

ABSTRACT OF THE DISCLOSURE

An attachment device for removably securing a retractable face shield assembled therewith, supported on a protective helmet. The device utilizes a band horizontally encircling the helmet near its edge with gripping clips located on opposite sides of the band that engage under edges of the helmet and cooperate with front portions of the band to position and anchor the device securely in place for good operation of the face shield. At the front portion of the band there is a yoke-like bracket which includes a gasketed gripping strip that fits horizontally around the front edge of the helmet with the clips mounted on side ends of the strip to both support slide blocks for carrying the face shield and provide, when the band is tightened, for the front edge of the helmet to be wedged in a sling-like gripping action between the band at the front and the clips at the sides of the helmet.

CROSS REFERENCE TO RELATED APPLICATIONS

Reference can be had for additional details of certain features of a face shield that is useful in a preferred embodiment of this invention to the disclosure in patent application, Ser. No. 833,551, filed June 16, 1969, entitled Retractable Face Protective Assembly.

BRIEF SUMMARY OF THE INVENTION

Discussion of the prior art

Personnel that require helmets for combat type operations have need for a removable face shield that can be easily assembled on or removed from the helmet. Removable face shields or visors heretofore provided for use with protective helmets, often have not provided the most desirable combination of structural and operational simplicity to produce a secure mounting coupled with positive shield action and convenience of quick attachment and detachment of the face shield to the helmet. This has been the case particularly in the use of such structures for standard military type helmets, for example, such as with the U.S. type M–1 combat helmet.

BRIEF DESCRIPTION OF THE INVENTION

The present invention provides an improved and simplified attaching and gripping device, or support, or detachably mounting a retractable face shield to a helmet and assemblies thereof. The device is easily produced and operationally positive and secure under rugged conditions of in-the-field use. It is particularly adaptable for such use on, but not limited to, military type protective helmets, for example, those used by combat type personnel. With the device of this invention a face shield can be quickly and easily mounted on or detached from a helmet to provide a secure, reliable mounting and operation of the shield on the helmet during field operations, so the shield can be moved between multiple face-protective and off-the-face positions in a positive trouble-free manner until it is desired to remove the shield from the helmet.

Accordingly, this invention contemplates a support device for detachably mounting a face shield to a helmet or headwear support structure in which a helmet-encircling

support band, that has means to support the shield, is provided with means to grip the side edges of the helmet, so that when fitted to the helmet the forward edge thereof is gripped between portions of the band over the front and grips at the sides by tightening of the band around the helmet.

Advantageously, the band is arranged horizontally around the edge of the helmet, the rear portion of the band being flexible, as by one or more straps for tightening the band to the helmet, with the front portions of the band resiliently stiff to provide gripping means for engaging the front of the helmet, such as by a pre-contoured gripping strip that has the side edge grips formed as clips or hooks which connect to the ends of the strip. This construction provides a toe-like yoke or bracket that can be slipped shoe-like over the front and sides of the helmet with the strip at the front available to grip above the helmet front edge and the clips at the sides to have their hook-like portions engaged under the helmet side edges. Thus, on tightening of the band around the back the forward edge of the helmet, when inserted between the clips below and the strap above is drawn into the bracket and firmly gripped by the band action, wedging the front of the helmet sling-like between the strip and the side clips, thereby securing the device in place on the helmet.

The gripping strip forming the front portions of the band advantageously is a narrow bendable band or strap fitting continuously to the helmet shell above its front edge and extending around over the sides of the helmet while the flexible rear portion of the band is advantageously a pair of flexible fabric straps that have their forward ends connected respectively to one of the rearward ends of the gripping strip with a buckle arranged in one of the straps for completing and tightening the band around the helmet.

The gripping strip, where it engages against the helmet crown advantageously can have associated with it a resilient gasket-like friction means which can be a band or pad of plastic foam compressible against the helmet for frictionally gripping against a surface area of it when the band is tightened which acts to maintain the band securely positioned in place during face-covering and retracting movements of the shield.

The side grips or clips advantageously extend down from the band in opposite arrangement angled with respect to each other and a front to rear vertical plane through the helmet. In this arrangement their forward portions are converged faced in towards the front and their rearward edges diverged outward with hook-like lower ends that catch under the forward and/or downward directed edges of the helmet shell for firmly wedging the support device thereto. Also with advantage, the hook-like lower ends can be slanted downward to the rear so the band can apply a horizontally rearward and slightly upward force component against the forward directed edge of the shell. These arrangements provide when in place on the helmet for the front beak or lip edge of the helmet to be wedged both horizontally and vertically between the portion of the band at the front and the hook portions of the gripping clips at the sides to provide a positive securement of the device on to the helmet.

The angling of vertical sides of the clips also can provide for them to carry slide blocks for a sliding support of the face shield connected thereby to each side of the support device and angled with respect to tracks provided in edges of the face shield. This construction provides for frictional gripping between slider blocks and tracks for smooth positive sliding action of the shield, so it is held by the blocks in any position to which it is adjusted.

These and other objects and advantages of the invention will become more apparent by reference to the appended drawings and description which are presented as illustrative of the inventive concepts herein and not by way of limitation thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side perspective view of the detachable face shield support or device of this invention having a face shield assembled thereto;

FIG. 2 is a side elevational view of an assembly of a face shield and face shield support of this invention shown installed on a protective helmet;

FIG. 3 is a plan view of an assembly of the face shield and support, taken along line 3—3 of FIG. 2 with the relative position of the helmet shown in broken lines for clarity;

FIG. 4 is a partial perspective view of the face shield support of this invention shown in its installed position on a helmet, and with its assembled face shield, and the helmet shown in broken lines for clarity;

FIG. 5 is a partial side elevational view, partly in section, showing the front portion of the support band, with its friction means and taken along a plane through line 5—5 of FIG. 1; and

FIG. 6 is a partial elevational view, partly in section, taken along line 6—6 of FIG. 3, to indicate the position of the band when it is frictionally gripped against the front of the helmet.

Referring to the drawings briefly described above, the face shield attaching and gripping or support device of this invention is generally indicated by numeral **10** in FIG. 1, where it is shown carrying a face shield or visor **12**, that has arc-like slide tracks **14** located in its opposite side edges and an upper peak **15**. The tracks slidably support the shield on the device **10** for shield movement arcing about virtual pivot points (not shown) located to the rear of the tracks. Reference to FIG. 2 shows an assembly of the face shield and the support device with the assembly securely mounted on a U.S. type M–1 combat helmet **16**. The helmet has a shell that includes a crown portion **18**, and a peripheral edge **20** which has at each opposite side of the helmet a slightly forward directed edge portion **22**. The edge **20** converges from the sides towards the front where the helmet and edge **20** form a peak or beak **24**.

The face shield support device is constructed in the form of a support belt or band **28** for encircling the helmet horizontally near its edge. The band is provided with a slightly flexible forward portion or gripping strip **30** that is stiffly resilient, curved to fit the helmet crown and has its ends terminating in a pair of apertures or eyes **32**. The band has a flaccid rear portion or tightening band in the form of a pair of woven non-stretchable flexible fabric straps **34** which are respectively attached to the rear ends of the strip **30** by being looped through the aperture **32** and sewn. The free ends of the straps can be secured together to tighten the band around the helmet by a buckle **36** positioned near the free end of one of the straps and the free ends of the straps then further secured together by mating fabric fastener pads **38** of material sold under the trademark "Velcro" which add fastening security and neatness when the device is tightly buckled around the helmet.

Gripping strip **30** is preferably a thin narrow strip of metal, a very slightly springy stainless steel having been found suitable, and is provided on its inner surface with means as a friction pad or gasket **42** of stiff but compressible plastic resilient foam material preferably cemented to the strip but which can be attached in any other suitable way as for example by stapling. The gasket extends substantially around the entire inner surface of the strip **30** for compressibly fitting and frictionally gripping to the curvature of the front and side outer surfaces of the helmet above the edge thereof. It will be seen that the lower edge of the gasket terminates slightly above the lower

edge of the strip which leaves a desirable area for gasket expansion when the strip is engaged against the helmet surface.

A pair of rigid C-shaped anchoring clips or stops **44** respectively are affixed rigidly to the outward directed surface of the strip **30** near each end thereof. Each clip has an upper portion or arm extendings horizontally out away from the outward directed surface of the band or strip near the helmet surface, depending downward therefrom at a right angle so as trimly to bracket the helmet edge and reach below it at its opposite sides.

Each of the clips **44** is a mirror opposite to the other and has a vertical leg **46** secured to the outer surface of the strip **30** near its rearward ends and positioned outwardly from the surface thereof by a pair of spaced-apart clip angles **48** which form the clip upper arm and connect between upper sides of the leg **46** and the strip **30**. It will be seen that the length of the strip is somewhat less than a half-circle with the clips positioned on the strip so that forward edges of their vertical legs **46** slant slightly in toward the front center of the helmet and their rearward edges slant outward towards the rear. The vertical legs thus provide forward stops at the sides between which converging forward edges of the helmet can be engaged on wedged and held by the tightening together of the straps **34**.

The lower end of each leg **46** also is angled upwardly toward the front and has connected to its lower edge a hook stop or finger **50** which is directed inward at about a right angle, and is slanted upward towards the front and downward towards the rear for gripping under a respective side edge of the helmet.

It will be understood that the inward slant to the front of the legs **46** and the upward slant of the fingers or lugs **50** provides for engaging beneath the helmet edge at about its upwardly angled edge portion **22** in a wedging action both up from beneath and rearward against the forward directed component of the helmet edge at its portion **22**. The helmet edge or rim has a portion in each side of the helmet that forms a vertical component of curvature so as to assist in the locking of the clips or clamps to the edge of the helmet. The construction and positioning of the clips with respect to the band thus provides for a horizontal clamp-type gripping or wedging of the helmet between left and right sides between the legs **46**, and vertical clamp-type gripping or wedging between the upper surfaces of fingers **50** and the strip **30**, as the straps are tightened in a horizontal bridle-like gripping from front to back with the helmet front edges thereby pressed forward to wedge both against the upwardly slanted fingers and the strip **30**. The clips **44**, the fingers **50** of which act against upward displacement of the bracket or yoke, are formed of substantially non-resilient material such as a suitable steel or other material that provides with the strip **30** a substantially rigid structure having the strength, when the device is secured on a helmet, for the fingers **50** and strip **30** to firmly grasp beneath and above the helmet edges so the bracket is clamped thereto by the tightening of the band.

One each of a pair of mirror oppositely arranged slider blocks **54** are firmly secured as by rivets or other fastener means to the outward vertical surface of the vertical legs **46** of the clips and are attached vertically thereto in order to support the face shield **12** steadied on device **10** in a secure and operationally positive manner. The slider blocks each have a projecting flange **56** extending from the body thereof which is adapted to fit within one of the respective left or right tracks **14** of the face shield and be held therein angled with respect to the track so that together, the slide blocks are frictionally engaged in the tracks of the shield by a slight relative twisting or wedging effect. This is accomplished by providing for the tracks in the shield to be generally vertically arranged with each having a close to rectangular cross-section and the plane of its major axis disposed generally parallel with a front to rear plane through the center of the helmet. This ar-

rangement provides for the face shield to be hand positioned to and maintained at any face protecting or off-the-face position about the tracks at which it may be placed by sliding about the blocks. The slide blocks are retained within the open ends of the tracks by means of stop pins **58**, although spring clips or other stop or retaining means for blocking removal of the slide blocks from the tracks can be used. Further explanation of these and other details of the construction and operation of this preferred embodiment of a face shield sliding arc-like about the slider blocks can be had by reference to U.S. patent application, Ser. No. 833,551, filed June 16, 1969, referenced above.

In the use of the support device **10** it will be understood that preferably the face shield **12** first is assembled therewith by engaging the slider blocks **54** into the respective tracks **14** of the shell through their open ends after which the stop pins **56** are inserted to close over the track open ends to maintain the shield assembled to the support. Inserting of the blocks in the tracks is accomplished by manually deforming the flexible strip **30** or by flexing the face shield, or both, so as to wedge the slider blocks tightly within the tracks in the manner indicated above. When the material of the strip or the face shield or both returns to about its at rest position or when on the helmet the slider blocks will be suitably angled with respect to the tracks to provide good sliding and positioning of the shield on the helmet when the band is positioned and tightened around it. It will be understood that the strip **30** may have slightly greater curvature that is, a smaller radius, than that of the forward portion of the helmet shell against which it engages. Thus when drawn against the surface of the helmet the flexibility of the strip, with that of the shield, can provide an optimum positioning of the slide blocks with respect to the tracks so they are properly offset relative to one another about their common longitudinal axes to have good sliding and positioning of the shield on the support device.

To install the support device **10** or an assembly of the support device and face shield on a helmet the strip **30** is arranged centered over the upper edge or rim of the helmet at the front and the beak or front and side edges or lip thereof is inserted into the toe or shoe-like bracket or yoke that is produced by the construction of the strip with the inward directed clips **44**. The straps **34** are then buckled together around the lower rear of the helmet and pulled up tight so that the sponge gasket **42** is further compressed against the front of the helmet between it and the strip **30** with the lower edge of strip **30** engaged on the helmet crown acting with the clips **44** against downward and rearward displacement of the bracket. The Velcro pads are then fastened together to hold the free end of the straps neatly which attachment can also supplement the tightening and holding by the buckle. Thus positioned on the helmet, the assembly of face shield and support device has the helmet front edges wedged or clamped between the lower edge of the strip **30** and upper directed surfaces of the fingers **50** that converge up towards the strip thereby and also between the forwardly converging vertical legs of the clips by the tightening and locking together of the straps **34**, thus locking the assembly to the helmet.

It will be appreciated that the gasket **42** provides a substantial gripping surface to frictionally grip the front of the helmet which assists to minimize and in most cases prevent any tendency for sidewise or vertical displacements of the strip **30** to occur as the face shield is moved about its points of sliding on the slider blocks with the result that a positive securement to the helmet and good operation of the face shield is achieved.

If desired, a rubber strip or edging can be attached to inner edges of the peak **15** so as to move along the surface of the helmet during the movement of the shield and prevent entrance from above of wind, rain and the like.

It will be understood that the strip **30** of this invention can be made quite thin and produced from any stiffly flexible material that is sufficiently resilient to maintain the slider blocks **54** offset or twisted with respect to the tracks in the shield so as to maintain them together when assembled. Suitable materials are the stainless or other steels which can retain their shapes under deformation forces so that in some cases plastics may be suitable. It will also be understood that the tightening of the straps **34** around the helmet conforms the strip **30** over the helmet outer surface so as to properly grip the front portions of it between the strip and the clips at the sides at the same time positioning the slider blocks **54** and the shield **12** for good sliding of the shield on arc tracks about virtual pivot points behind the tracks.

The shield may be made of any plastic which is sufficiently strong and resiliently flexible that when formed into the shield, in the preferred embodiment illustrated, the tracks are held angled with respect to the slider blocks. Such material is preferably a polycarbonate plastic although other plastics may in some instances be suitable.

It will be appreciated that friction means for engaging against the front of the helmet can be provided as an integral part of the band or strip **30** such as by embossing or knurling or can be formed with advantage as one or more separate members attached to the band and formed from a variety of materials such as stiffly resilient or other quality foams of plastic or other materials that will provide for the frictional engagement of the support band against the helmet in a positive manner. When the friction means is a foam-like material, the band is accommodated to variations in contour of the helmet which assists to produce a firm tightening of the band against the helmet shell particularly where the outer surface of the helmet may be roughened. Suitable plastics for forming the preferably stiff resilient foam friction means of this invention are urethanes, vinyls, polyethylenes, neoprenes or the like.

It will be appreciated that the band can be formed in one or more pieces in any suitable manner that provides for the support of the face shield and over the edge and under the side gripping or clamping to the helmet when tightened from around the back, and the clips at the sides in some instances can be extended or positioned further to the front or the rear of the helmet although the narrow clips with their rather short fingers or lugs, which are illustrated, are preferred as they provide a minimal obstruction. Also the support device of this invention can provide for support of either retractable or non-retractable visors and whether of the slide or pivot type for supporting them securely to a helmet.

The support device and assemblies of the face shields thereto of this invention can be used with various types of helmets such as military, police, riot and others or with other suitable type headgear or support structures to be worn on the head as will be appreciated.

When the lower edge of the helmet or headgear is an outwardly flaring rim the device of this invention provides for the bracket or yoke at the front to be positioned out of the way above the rim with minimal portions projecting outwardly of the rim and also prevents the band from slipping down out of position.

It will be appreciated that various other embodiments or modifications than here specifically described will occur to those having the benefits of the teachings herein.

What is claimed is:

1. A protective assembly adapted to contain a movable face shielding means and to be attached to a headwear support structure having a crown, the lower portion of which is bordered by a downwardly and outwardly dependent edge rim having a vertical component of curvature at each side of said structure comprising: a curved rigid band member adatped to fit about the front outer surface of the crown above said edge rim; a plurality of spaced apart clamping means dependent from said rigid band member and adapted to engage the underside edge of said rim; a transparent face shielding means; means

for pivotally securing said face shielding means to said rigid band member to provide rotational movement about the outer surface of said support structure, and securing means operatively connected to the ends of said rigid band member and adapted to engage the lower back portion of the crown of said support structure for holding said rigid band member against the crown and the spaced clamping means against the underside edge of said rim and locked against the portion of said edge rim forming said vertical component of curvature when the assembly is in fixed position on said support structure; whereby when said protective assembly is attached to said support structure said assembly is maintained securely locked in a fixed position thereon during all movements of said face shielding means.

2. The protective assembly of claim 1 wherein said means for securing said face shielding means to said band member is provided on said spaced apart clamping means.

3. The protective assembly of claim 1 wherein said spaced apart clamping means comprise two clamps each having means thereon for attaching said face shielding means for effecting a pivoting of the face shielding means about the outer surface of said support structure.

4. The protective assembly of claim 1 wherein said securing means is a flexible fabric strap.

5. The protective assembly of claim 1 wherein said spaced apart clamping means are two opposed clamps depending from said band member over the area of the temples and engaging the underside of said edge rim when the assembly is worn and are toed in toward the front of said support structure whereby the lower portion of the support structure is adapted to be wedged between said clamps and said rigid band member when the said securing means is holding said rigid band member against the crown so as to fix the assembly on said support structure.

6. The protective assembly of claim 4 wherein said band member has its rigid curved portion cushioned on the inner surface thereof and adapted to fit against the outer periphery of the front portion of said helmet; two fabric straps each attached at one of their ends to one of the ends of said rigid curved portion, one of the fabric straps having a buckle closing means thereon and the other a free end for lockingly engaging said buckle closing means so as to position the band means in tight engagement around the outer periphery of said helmet.

7. The protective assembly of claim 6 wherein said cushioning on said rigid curved portion is a stiffly resilient material providing substantial friction gripping against the front portion of said headwear support structure.

8. The protective assembly of claim 6 wherein the outer surface of the said fabric strap adjacent to said buckle closing means and the inner surface of said fabric strap adjacent to its free end, each has an adhering means thereon for releasably securing the free end of said one fabric strap to the other when the band means is drawn in tight engagement about the lower periphery of said helmet.

9. A protective assembly adapted to contain a movable face shielding means and to be attached to a headwear support structure having a crown, the lower portion of which is bordered by a downwardly and outwardly dependent edge rim thereon comprising: a curved rigid band member adapted to fit about the front outer surface of the crown above said edge rim; a pair of spaced apart clamping means dependent from said rigid band member one of each positioned at substantially one of the temple areas of the wearer and adapted to engage the underside edge of said rim; a transparent face shielding means having an arcuate track means therein; means for slidably securing said arcuate track means to said clampling means to provide rotational movement of the face shielding means about the outer surface of said support structure; and securing means operatively connected to the ends of said rigid band member and adapted to engage the lower back portion of the crown of said support structure for holding said rigid band member against the crown and the spaced clamping means against the underside of said edge of said rim when the assembly is in fixed position on said support structure; whereby when said protective assembly is attached to said support structure said assembly is maintained securely locked in a fixed position thereon during all movements of said face shielding means.

10. The protective assembly of claim 9 wherein said securing means is a flexible fabric strap.

11. The protective assembly of claim 9 wherein said spaced apart clamping means are two opposed clamps depending from said band member and engaging the underside of said edge rim when the assembly is worn and are toed in toward the front of said support structure whereby the lower portion of the support structure is adapted to be wedged between said clamps and said rigid band member when the said securing means is holding said rigid band member against the crown so as to fix the position of the assembly on said support structure.

12. The protective assembly of claim 9 wherein said band member has its rigid curved portion cushioned on the inner surface thereof and adapted to fit against the outer periphery of the front portion of said helmet; two fabric straps each attached at one of their ends to one of the ends of said rigid curved portion, one of the fabric straps having a buckle closing means thereon and the other a free end for lockingly engaging said buckle closing means so as to position the band means in tight engagement around the outer periphery of said helmet.

13. The protective assembly of claim 9 wherein said cushioning on said rigid curved portion is a stiffly resilient material providing substantial friction gripping against the front porton of said headwear support structure.

14. The protective assembly of claim 9 wherein the outer surface of the said fabric strap adjacent to said buckle closing means and the inner surface of said fabric strap adjacent to its free end, each has an adhering means thereon for releasably securing the free end of said one fabric strap to the other when the band means is drawn in tight engagement about the lower periphery of said helmet.

15. A protective helmet having a releasable face shielding assembly, said helmet having a crown, the lower portion of which is bordered by a downwardly and outwardly dependent edge rim having a vertical component of curvature at each side of said helmet comprising: a helmet; a curved rigid band member positioned about the front outer surface of the crown above said edge rim; a plurality of spaced apart clamping means dependent from said rigid band member and engaging the underside edge of said rim; a transparent face shielding means; means pivotally securing said face shielding means to said rigid band member to provide rotational movement of the shielding means about the outer surface of said helmet; and securing means operatively connecting the ends of said rigid band member and engaging the lower back portion of the crown of said helmet to hold said rigid band member against the crown and the spaced clamping means against the underside edge of said rim and locked against the portion of said edge rim forming said vertical component of curvature; whereby said protective assembly is maintained in a securely locked position on said helmet during all movements of said face shielding means.

16. The protective helmet of claim 15 wherein said face shielding means is slidably adjustable about the helmet by said pivotal securing means.

17. A protective helmet having a releasable face shielding assembly, said helmet having a crown, the lower portion of which is bordered by a downwardly and outwardly dependent edge rim thereon comprising: a helmet; a curved rigid band member positioned about the front outer surface of the crown above said edge rim; a pair of spaced apart clamping means dependent from said rigid band member one each positioned at substantially one of the

temple areas of the wearer and engaging the underside edge of said rim; a transparent face shielding means having arcuate track means therein; means slidably securing said arcuate track means to said clamping means to provide rotational movement of the face shielding means about the outer surface of said helmet; and securing means operatively connecting the ends of said rigid band member and engaging the lower back portion of the crown of said helmet to hold said rigid band member against the crown and the spaced clamping means against the underside of said edge of said rim; whereby said protective assembly is maintained in a securely locked position on said helmet during all movements of said face shielding means.

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