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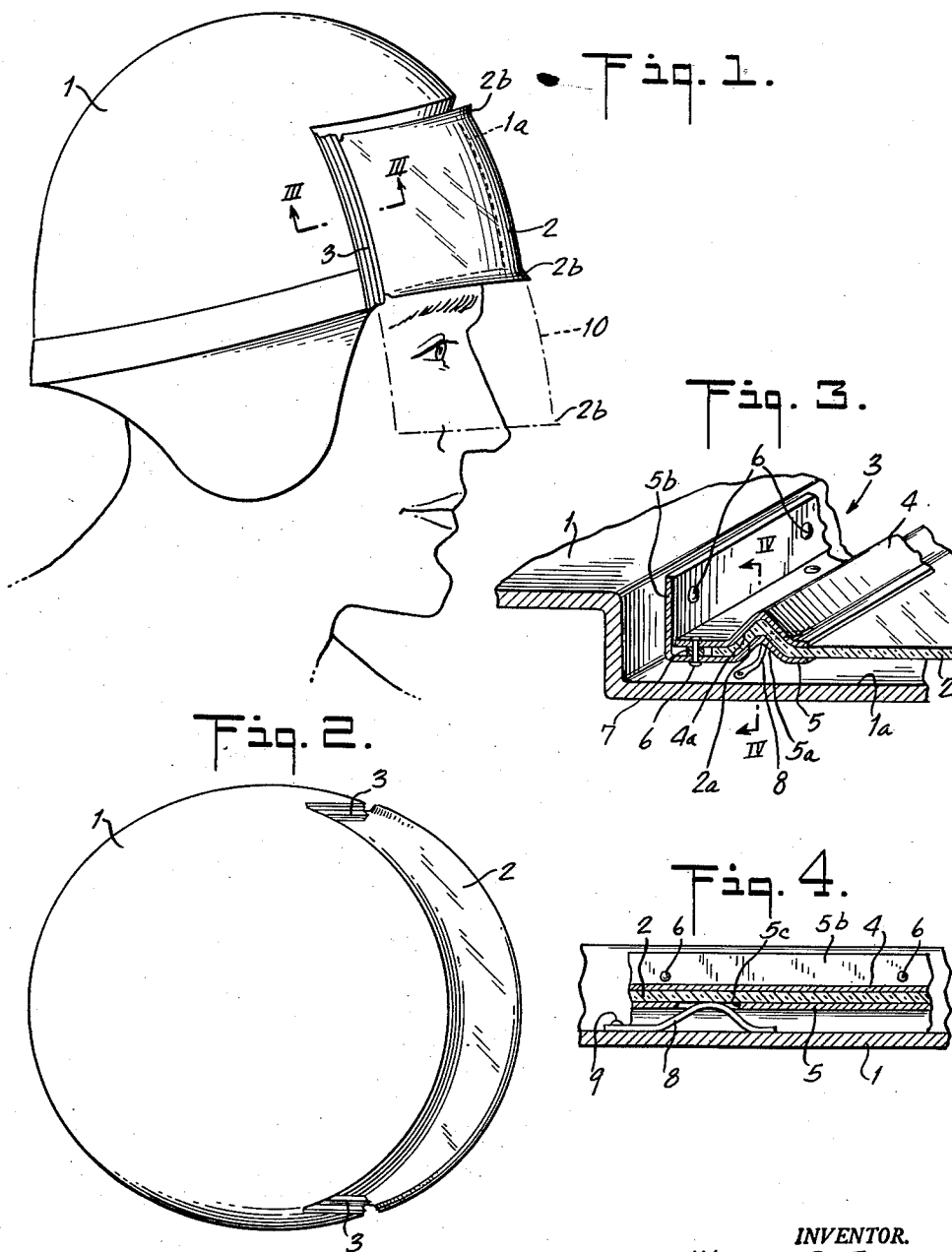
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2,815,508

HELMET WITH RETRACTABLE EYE SHIELD

Filed Nov. 15, 1954

2 Sheets-Sheet 1



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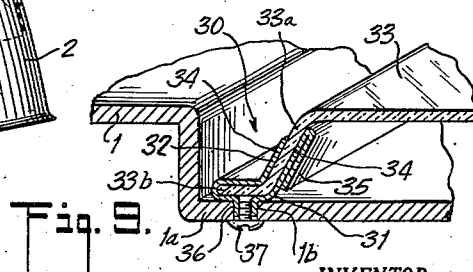
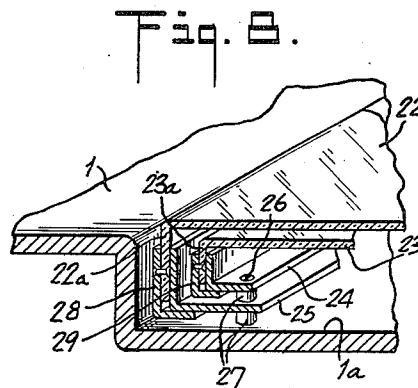
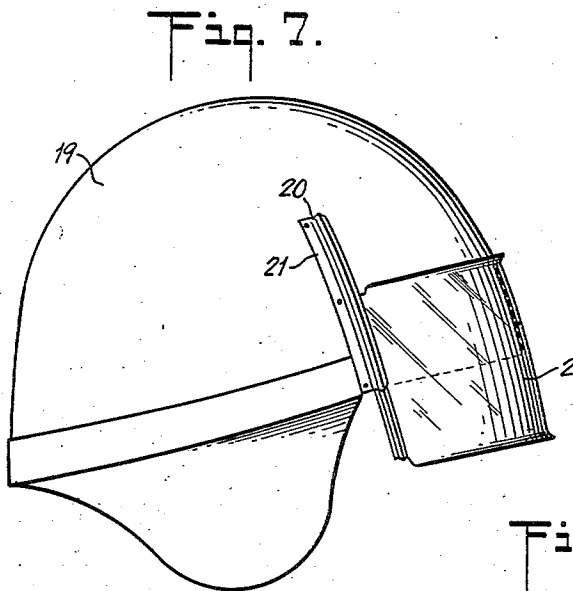
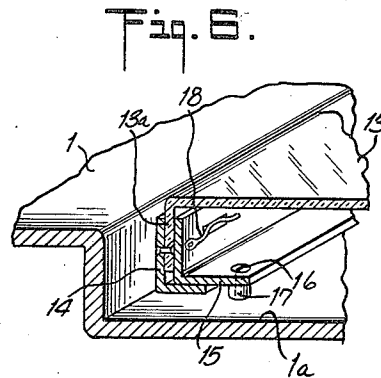
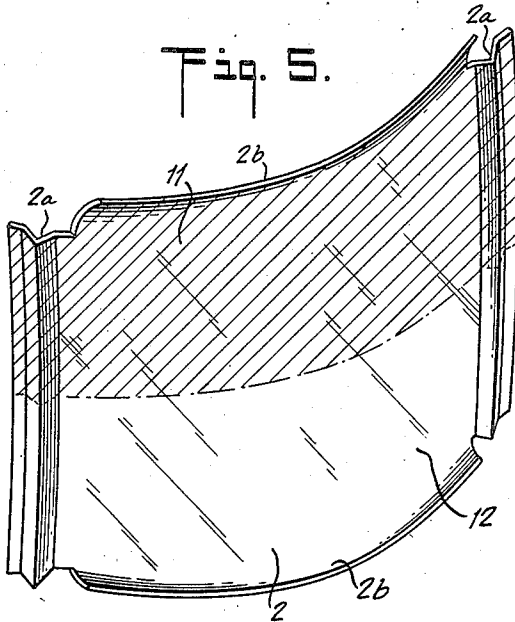
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HELMET WITH RETRACTABLE EYE SHIELD

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2 Sheets-Sheet 2



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HELMET WITH RETRACTABLE EYE SHIELD

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8 Claims. (Cl. 2—3)

This invention relates to eye shields or visors, and particularly to eye shields mounted on a rigid helmet shell and rapidly and easily movable between a shielding position and a retracted position.

Persons engaged in certain occupations are required to wear safety helmets which comprise an outer rigid shell mounted on a rigging so that the shell is spaced from the wearer's head, and effective to protect the head from blows and shocks from external objects. At times, in certain of those occupations, the workers are also required to wear an eye shield. The shield may be either of the type which is tinted to reduce the glare, or it may be a clear shield designed to prevent particles, for example, oil or dust particles, from getting into the wearer's eyes. In many instances, it is highly desirable to be able to remove the shield quickly when it is not needed. In some occupations, for example, in the case of aircraft pilots, the slightest difficulty or delay in the removal of the shield may be very hazardous.

Where shield structures have been adapted for use on helmets of the prior art, it has been customary to hold the shield in place by means of elastic webbing members. The use of such a supporting arrangement for the shield presents a possible hazard during the time of removing the shield. For example, if the person removing the shield grips it only lightly, his hand may slip, in which case the elastic webbing will tend to snap the shield back to a shielding position. This undesired movement of the shield may be very distracting to the person wearing the shield and it may occur at a highly critical instant, for example, in the operation of an aircraft in combat, with resulting danger to the wearer.

An object of the present invention is to provide an improved helmet and shield structure, with improved means for movably supporting the shield in either a shielding position or a retracted position.

Another object is to provide a helmet and shield structure of the type described, in which the shield is frictionally supported in either of its positions.

Another object is to provide a helmet structure in which the helmet shell has a recess for receiving the shield in its retracted position.

Another object is to provide an eye shield and supporting means therefor which is adapted for mounting on a helmet shell of standard contour.

Another object is to provide, in a device of the type described, improved cooperating structures for the shield and for the ways in which it slides.

Another object is to provide, in a device of the type described, a dual shield arrangement so that the wearer may select either a clear or a tinted shield.

Another object is to provide an improved shield structure of the type described, including means for providing an air cushion over the outer surface of the lens to retard airborne particles approaching the lens. A further object is to provide improved means for inhibiting entry of airborne particles behind the edges of the shield.

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The foregoing objects are attained in the embodiments of the invention described herein, by attaching to the outside of a brimless helmet shell structure, two sets of ways extending upwardly from the lower rim of the shell at either side of the front. An eye shield contoured to extend generally parallel to the shell is slidable in the ways between a shielding position in which the shield extends downwardly in front of the wearer's eyes and a retracted position in which it lies close against the shell. Each set of ways is provided with means for frictionally engaging the edges of the shield to hold it firmly in any position to which it may be manually moved, while allowing it to be readily and quickly moved to another position.

In one modification of the invention described herein, the helmet is provided with a recess in the same shape as the shield so that the shield in its retracted position does not present any substantial projection beyond the normal helmet contour. In another modification, the shield and its mounting structure are adapted for attachment to the exterior of a helmet of standard contour.

The edges of the shield are provided with forwardly projecting flanges which, when the wearer is facing a blast of air, will produce reverse countercurrents of air near the edges of the shield, thereby inhibiting the entrance of airborne particles behind the shield. These flanges are also effective under the conditions described to produce a cushion of relatively high-pressure, low velocity air over the entire surface of the shield, which cushion is effective to retard airborne particles moving toward the shield, thereby inhibiting the marring of the shield by such particles.

Two modifications of dual shield structures are described. In one modification, a single shield is provided with two fields of vision, one clear and one tinted. Either field may be selected by appropriately positioning the shield on the helmet. In another modification, two shields are provided, each slidable on its own set of ways, one shield being tinted and the other clear.

Other objects and advantages of the invention will become apparent from a consideration of the following specification and claims, taken together with the accompanying drawings.

In the drawings:

Fig. 1 is a side elevational view of a helmet and shield constructed in accordance with the invention and mounted on the head of a wearer;

Fig. 2 is a top plan view of the helmet and shield of Fig. 1;

Fig. 3 is a view, partly in section on the line III—III of Fig. 1 and partly in perspective, illustrating a detail of the shield and way construction;

Fig. 4 is a fragmentary sectional view taken on the line IV—IV of Fig. 3, showing a detail of the way construction;

Fig. 5 is an elevational view of the shield alone;

Fig. 6 is a view similar to Fig. 3, showing a modified form of shield and way structure;

Fig. 7 is a view similar to Fig. 1, showing a shield and way structure mounted on a helmet of conventional form;

Fig. 8 is a view similar to Fig. 6 showing a modification including two shield members; and

Fig. 9 is a view similar to Fig. 3, showing another modified form of shield and way structure.

Figures 1 to 5

These figures illustrate a helmet shell 1 having a generally hemispherical brimless contour and having a recess 1a formed in the shell above the wearer's forehead, for at times receiving a shield 2.

At each side of the recess 1a, there is mounted a set of ways generally indicated by the reference numeral 3.

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Each set of ways extends upwardly from the lower edge of the helmet to a point near the top of the recess 1a.

The details of the structure of a set 3 of ways are best illustrated in Figs. 3 and 4. Each set 3 comprises an outer way 4 and an inner way 5. The ways 4 and 5 are provided with wide V-shaped grooves 4a and 5a for receiving between them a correspondingly grooved portion 2a of the shield 2. The ways 4 and 5 are held together by a plurality of rivets 6 which extend through spacers 7, the spacers being effective to maintain the ways 4 and 5 spaced apart by a sufficient distance to receive the shield 2 between them. The inner way 5 is provided with a flange 5b along one side, which is attached, as by rivets 6, to the helmet shell 1, at a side wall of the recess 1a. Mounted on the helmet shell 1 inside the lower way 5 are a plurality of spring fingers 8 having portions which extend outwardly through openings 5c in the lower way 5 and engage the surface of the shield 2 in the bottom of its groove 2a, forcing it upwardly into frictional engagement with the outer way 4. This arrangement is best seen in Fig. 4. The spring fingers 8 may be attached to the shell 1 by any suitable means, as for example, rivets 9.

The recessed portion 1a of the helmet 1 is generally similar in contour to the hemispherical shell 1. The shield 2 is preferably made of a similar contour, so that when it is in its retracted position, shown in full lines in Fig. 1, it lies closely against the helmet shell, with no substantial projection outside the shell.

The shield 2 may be moved from the full line position shown in Fig. 1 to the dotted line position indicated at 10, wherein its lower portion extends downwardly in front of the eyes of the wearer. At least one of the spring fingers 8 at each side of the helmet should be close to the lower end of the ways 3, so that they are effective to hold the shield when the latter is in its lowermost position.

The shield 2 is provided adjacent its lower and upper edges with forwardly projecting curved flanges 2b. When the shield is in its shielding position and the wearer is facing a blast of air, for example, the airstream of an aircraft, the flanges 2b tend to produce counter currents in the air adjacent the edges of the shield, which inhibit the passage of airborne particles behind the shield.

As illustrated in Fig. 5, the shield may have an upper tinted or smoked portion 11 for the reduction of glare, and a lower clear portion 12, which simply performs the function of protecting the eyes from rapidly moving air and airborne particles. It will be readily understood that the shield 2 may be quickly positioned either to place the clear portion 12 in front of the wearer's eyes or to place the tinted portion 11 in front of his eyes, depending upon the particular atmospheric conditions encountered. Furthermore, the shield may be quickly moved to the retracted position shown in Fig. 1, wherein the shield is completely removed from the wearer's field of vision.

Figure 6

This figure illustrates a modified form of shield and way structure which may be used in place of the shield 2 and ways 4 and 5 illustrated in Fig. 3. In Figs. 6, a shield 13 is provided at its lateral edges with an inwardly projecting flange 13a, to which is riveted an angle member 14, with the innermost web of the angle member 14 extending parallel to the main portion of the shield 13. Mounted on the bottom of the recess 1a of shell 1 is a rail or way 15. As shown, the mounting of the rail 15 may be by means of rivets 16 which extend through spacers 17 so that the rail 15 is supported above the bottom of recess 1a. Angle member 14 slides between the bottom of rail 15 and the bottom of the recess 1a. A plurality of spring fingers 18 are mounted on the side of the rail 15. These spring fingers act through holes in the rail 15 against the flange 13a of shield 13, thereby frictionally retarding the sliding movement of the shell.

It will be readily understood that the shield 13 is readily

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adjustable between various positions in the same manner as the shield 2 of Figs. 1 to 5.

Figure 7

This figure illustrates a helmet 19 of more conventional contour than the helmet 1 of Figs. 1 to 5. On the helmet 19 are mounted two sets of ways, one of which is seen at 20, for supporting a shield 2 which may be the same as the shield 2 of Figs. 1 to 5. The ways 20 of Fig. 7 differ from the ways 4 and 5 of Fig. 3 in that the outwardly projecting flange 5b of Fig. 3 is replaced by a flange 21 extending substantially parallel to the grooved portion of the way 5 and inwardly so that it is adapted for mounting on the helmet shell 19. The arrangement of Fig. 7 is desirable to adapt shields and ways constructed in accordance with the present invention for use on existing helmets.

Figure 8

This figure illustrates a modified form of way structure similar to that of Fig. 6, but adapted for use where two shields are to be selectively moved to their shielding positions. For example, one shield 22 may be tinted or smoked and the other shield 23 may be clear, the two shields replacing the dual purpose shield of Fig. 5.

The double set of ways in Fig. 8 includes two rails or ways 24 and 25, of L-shaped cross-section, the rail 24 being smaller than the rail 25. Both rails are supported on the bottom of the recess 1a by means of rivets 26 and spacers 27. The arrangement is such that the rail 25 is spaced above the bottom of the recess 1a, and the rail 24 is spaced above and nested within the rail 25.

The outer shield member 22 has a downwardly projecting flange 22a, on which is riveted an angle member 28 whose lower web projects inwardly under the lower rail 25. The inner shield 23 has a similar downwardly projecting flange 23a, on which is riveted an angle member 29 which projects under the rail 24. Suitable springs, such as springs 18 of Fig. 6, are provided for both the shields 22 and 23, but have been omitted from Fig. 8 in order to clarify the drawing.

It is considered that the operation of the double shield arrangement of Fig. 8 is obvious. The wearer can select either or both of the shields 22 or 23 for movement to their shielding positions or to their retracted positions, as existing conditions may warrant.

Figure 9

This figure illustrates another modified form of shield and way structure which may be used either with a recessed helmet as shown in Fig. 1 or with a helmet of conventional form as illustrated in Fig. 7. The helmet shell illustrated in Fig. 9 is the recessed type, but the way and shield structure illustrated may with equal facility be used with a conventional helmet shell.

In Fig. 9, a set of ways generally indicated at 30 includes an inner way 31 and an outer way 32. These two ways are preferably formed from a single sheet of flexible material, such as sheet steel.

Between the inner way 30 and the outer way 32 is inserted the marginal portion of a shield 33. The marginal portion includes a beveled or chamfered portion 33a, extending diagonally toward the shell 1 from the face of the shield 33, and terminating in a flange 33b, which is parallel to the bottom of the recess 1a. The inner and outer ways 31 and 32 are contoured to be generally parallel to the marginal portions 33a and 33b of the shield 33.

It is preferable that the way structure 30 be formed of yieldable material, and that the ways 31 and 32 be self-biased to yieldably and frictionally engage the surface of the shield 33, as shown at 34 in the drawing. If the ways are so constructed, there is no need for additional spring means or other structure to provide the

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necessary friction to retard the sliding of the shield. The inner way 31 is provided on its inner side with a reinforcing fold or flange 35 of the sheet material. The flange 35 stiffens the structure and makes it less subject to deformation in use.

The beveled flange portion 33a of the lens 33 is effective to deflect outwardly blows against the shield from a lateral direction, so that such blows are less likely to deform the shield or way structure.

The way structure 30 may be fastened to the helmet shell 1 in any suitable manner. The arrangement shown in Fig. 9 is preferred. In that arrangement, a plurality of sleeves 36 are stamped from the material of the way structure 30 and project downwardly through holes 1b formed in the bottom of recess 1a. Button head screws 37 extend into the holes 1b from the interior of the helmet shell, and are threaded into the sleeves 36.

While I have shown and described certain preferred embodiments of my invention, other modifications thereof will readily occur to those skilled in the art, and I therefore intend my invention to be limited only by the appended claims.

I claim:

1. A helmet including a rigid shell having a generally hemispherical contour with a pair of indentations integrally formed in the outer surface of the shell at either side of the front thereof and extending upwardly from the lower rim of the shell, a pair of elongated track means respectively mounted on the shell in said indentations, an eye shield, and a pair of elongated slider means extending along the edges of the eye shield and slidably received on said track means, said slider means supporting said shield for movement between a retracted position spaced from and parallel to the front of said shell, and a shielding position wherein it extends in front of the wearer's eyes.

2. A helmet as defined in claim 1, in which said shell includes an integrally formed recess extending between said indentations across the front of said shell, said recess at least partially receiving said shield in its retracted position.

3. A helmet as defined in claim 1, in which said eye shield in its shielding position is spaced forwardly from the shell, and said shield has a central portion having a contour geometrically similar to that of the shell, and upper and lower marginal portions outwardly concavely curved from said central portion to provide forwardly directed flanges, said flanges being effective when the shield is in its shielding position and the wearer is facing a strong current of air, to produce forwardly directed countercurrents in the neighborhood of the edges of the shield, said countercurrents being effective to inhibit the entrance of airborne particles behind the shield.

4. A helmet as defined in claim 1, in which each said track means comprises an inner track having an outwardly facing surface of L-shaped cross-section, an outer track of L-shaped cross-section, means supporting said outer track with its inner surface spaced outwardly from the

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L-shaped surface of the inner track, said tracks defining between them an L-shaped groove, and said slider means comprises flanges along the edges of the eye shield and having an L-shaped cross-section, said flanges interfitting with the grooves in said track means to permit sliding movement of the shield between a shielding position wherein it protects the eyes of a person wearing the helmet and a retracted position.

5. A helmet as defined in claim 4, in which said shield extends over said outer track, and including spring means anchored on said outer track and acting against said shield and effective to retard frictionally the sliding movement of the shield.

6. A helmet as defined in claim 1, in which each said track means comprises opposed outer and inner ways of yieldable material biased toward one another, and said slider means comprises lateral marginal portions to said shield received between said sets of ways and slidable therein between a shielding position and a retracted position, said biased ways being effective to engage said marginal portions frictionally and hold said shield in either of said positions.

7. A helmet as defined in claim 1, in which said eye shield includes a central portion contoured similarly to the front portion of the shell, internal marginal portions extending diagonally toward the shell from said central portion and effective to space the central portion outwardly from the shell, and flange portions at the edges of said marginal portions and extending parallel to the shell, and said slider means extend along said flange portions.

8. A helmet including a rigid shell, two sets of ways on the outer surface of said shell at either side of the front thereof and extending upwardly from the lower rim of the shell, each set of said ways comprising outer and inner ways having aligned grooves, an eye shield having along its side grooves interfitting with the grooves in said ways to permit sliding movement of the shield between a shielding position wherein it protects the eyes of a person wearing the helmet and a retracted position, the way nearest the shell including an aperture, and spring means anchored on the shell and extending through said aperture and engaging the shield to hold it frictionally in engagement with the other way.

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