

- [54] **SAFETY HELMET WITH RETRACTABLE EYE SHIELD**
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 [22] Filed: **July 18, 1969**
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Related U.S. Application Data

- [62] Division of Ser. No. 609,827, Jan. 17, 1967, Pat. No. 3,495,273.
 [52] U.S. Cl. 2/6
 [51] Int. Cl. A42b 3/00
 [58] Field of Search 2/3, 5, 6, 8, 10; 74/110; 49/363

References Cited

UNITED STATES PATENTS

- | | | | |
|-----------|---------|------------------|--------|
| 972,689 | 10/1910 | Gillespie | 74/110 |
| 1,416,848 | 5/1922 | Lightfield..... | 2/10 |
| 1,423,467 | 7/1922 | Spitzfaden | 49/363 |
| 1,683,170 | 9/1928 | Dicarlo | 2/8 UX |
| 2,445,355 | 7/1948 | Hurt..... | 2/10 |

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|-----------|---------|-------------------|-------|
| 2,590,526 | 3/1952 | Evans..... | 2/8 |
| 2,813,271 | 11/1957 | Finken..... | 2/6 |
| 2,798,221 | 7/1957 | Bailey et al..... | 2/6 |
| 3,110,034 | 11/1963 | Aileo | 2/6 |
| 3,239,843 | 3/1966 | Lobelle..... | 2/6 |
| 3,315,272 | 4/1967 | Olt et al..... | 2/6 X |

OTHER PUBLICATIONS

Visor Problem, Jan. 1966 in Approach.

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[57] ABSTRACT

A safety helmet including a shell to cover the wearer's head, and one or two eye shields mounted on the shell and movable between eye shielding positions and retracted positions. Handles for actuating the shields are located at the sides of the helmet. Releasable locking mechanisms for the shields include push buttons on the handles for releasing the locks.

5 Claims, 21 Drawing Figures

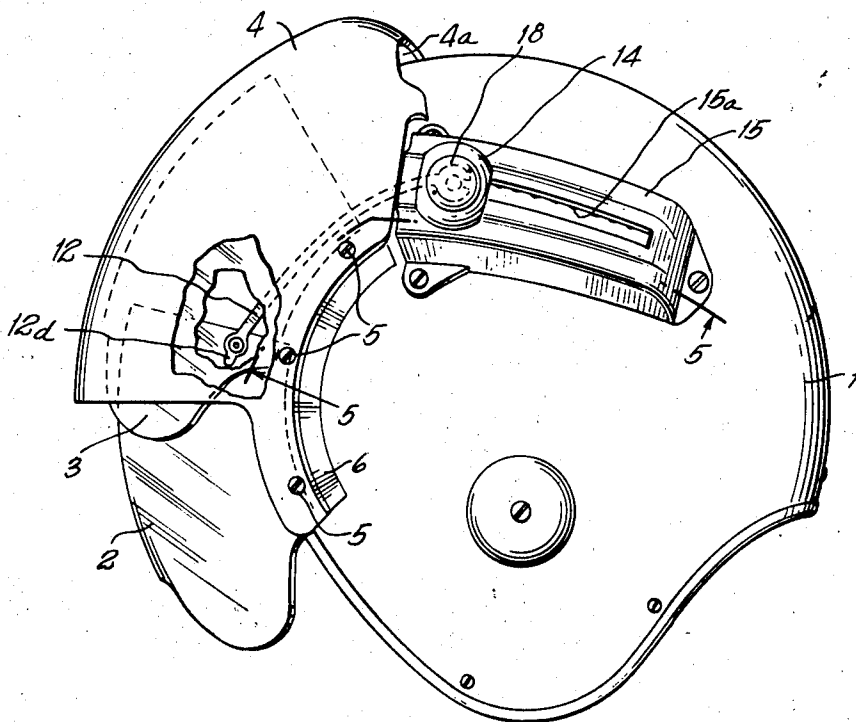


Fig. 3.

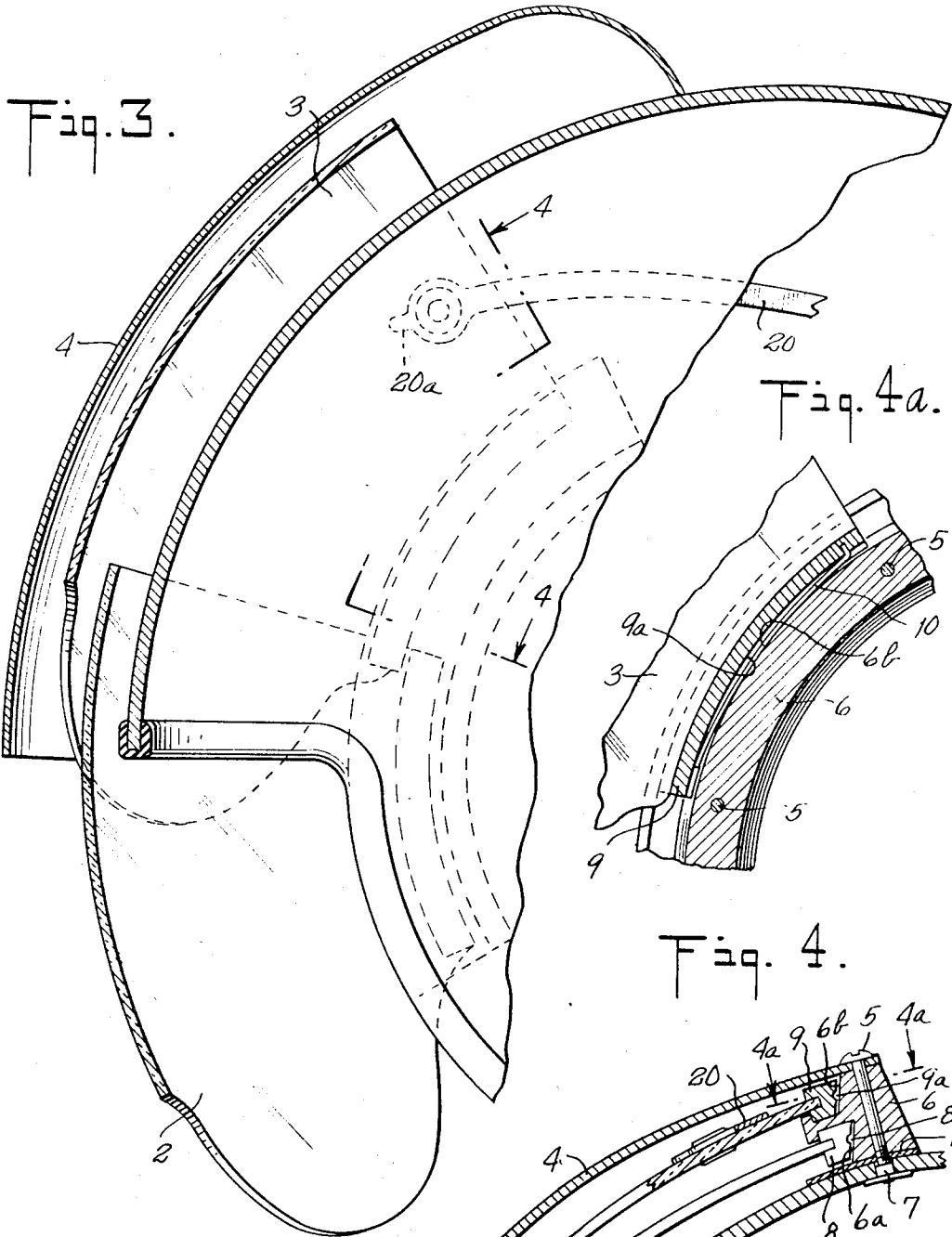


Fig. 4a.

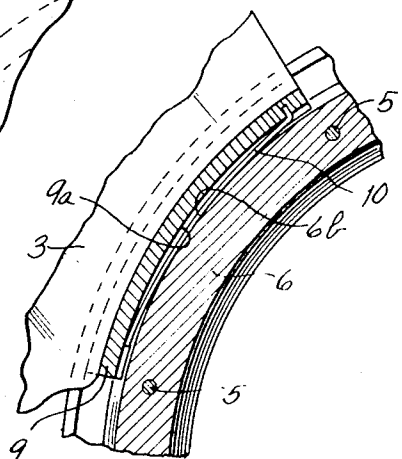
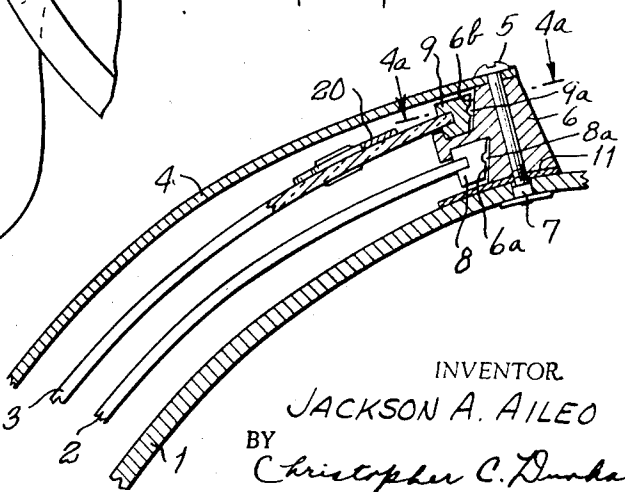
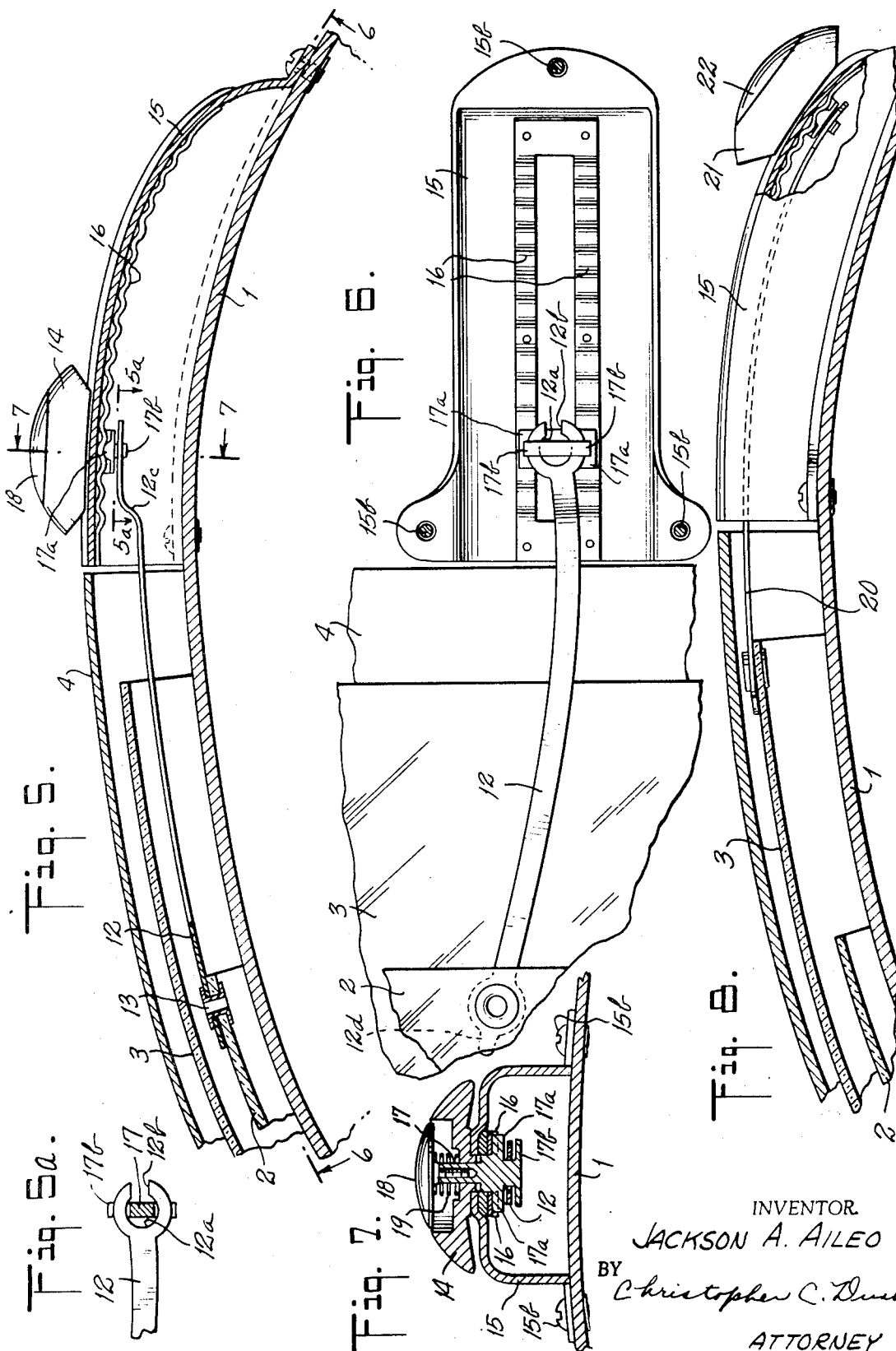


Fig. 4.



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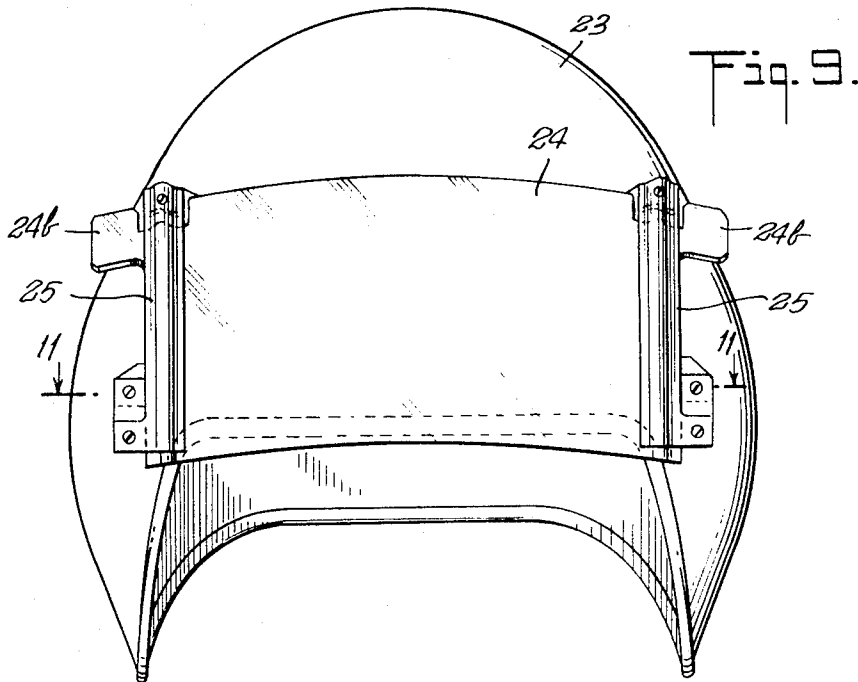


Fig. 9.

Fig. 10.

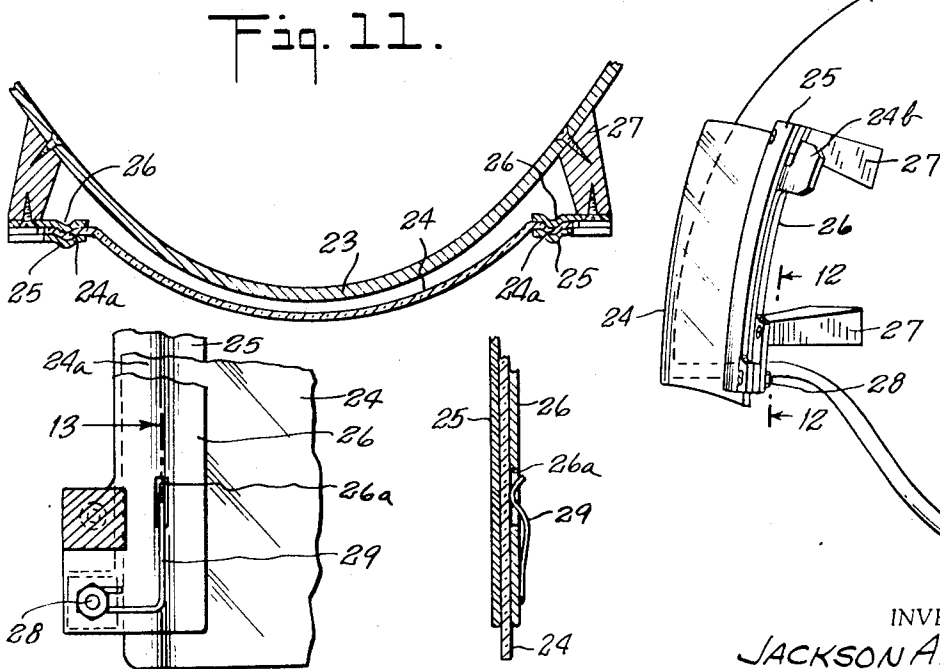


Fig. 11.

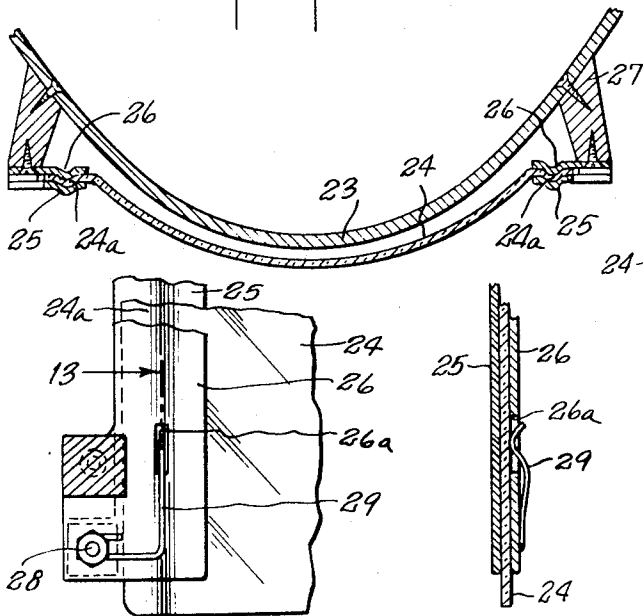


Fig. 12.

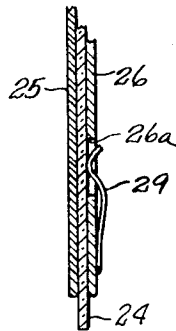
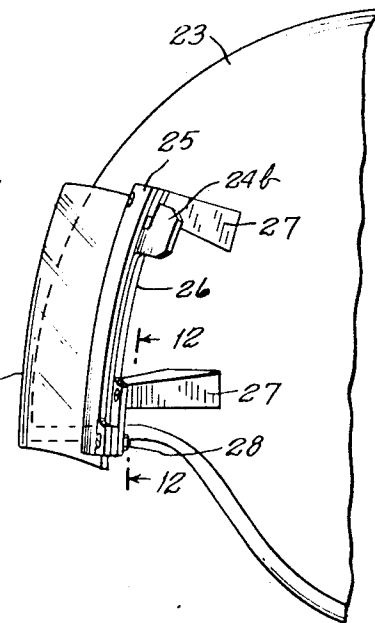


Fig. 13.



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Fig. 14.

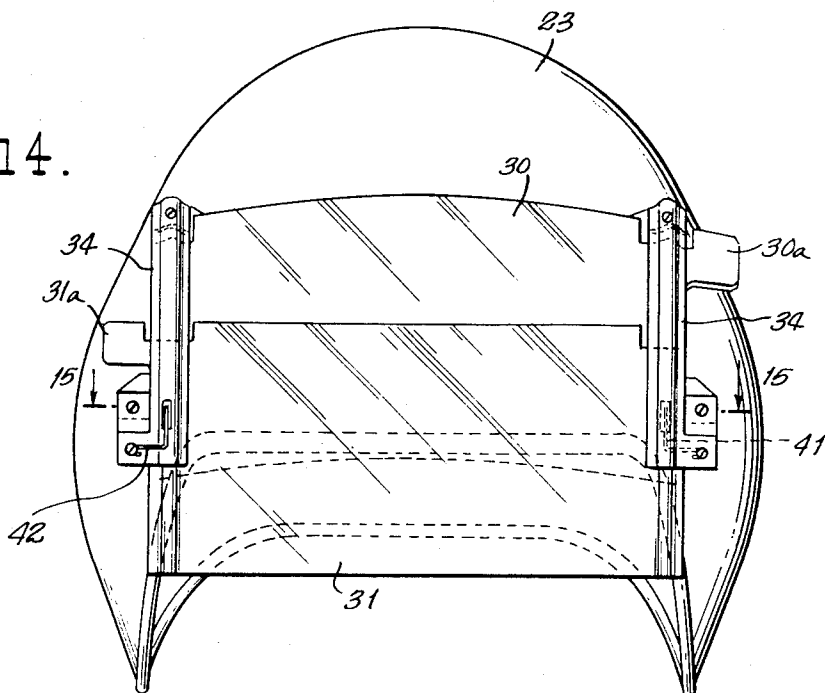


Fig. 15.

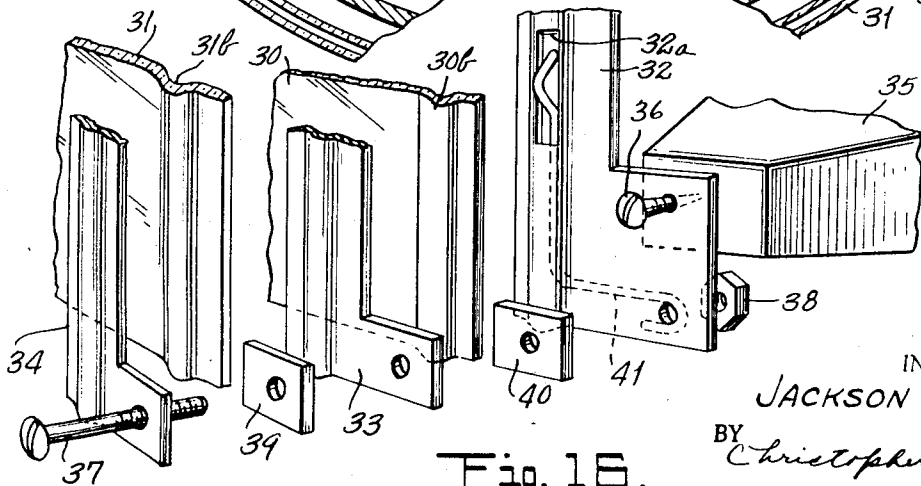
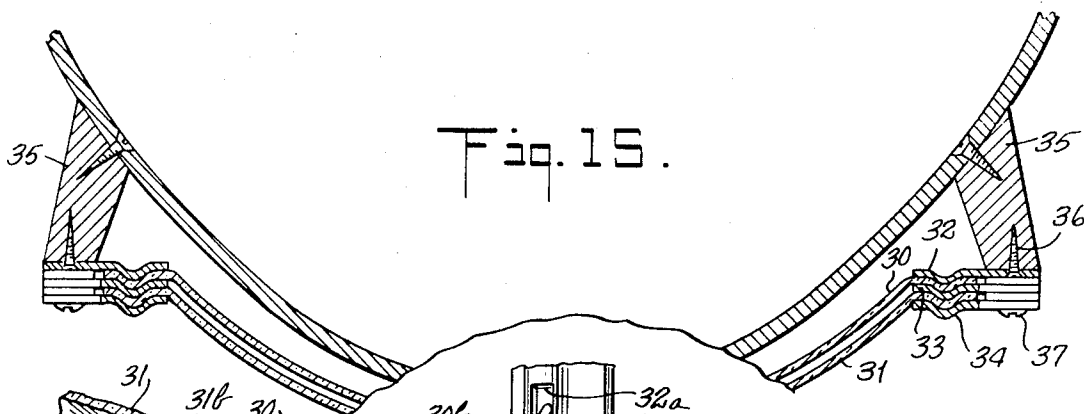
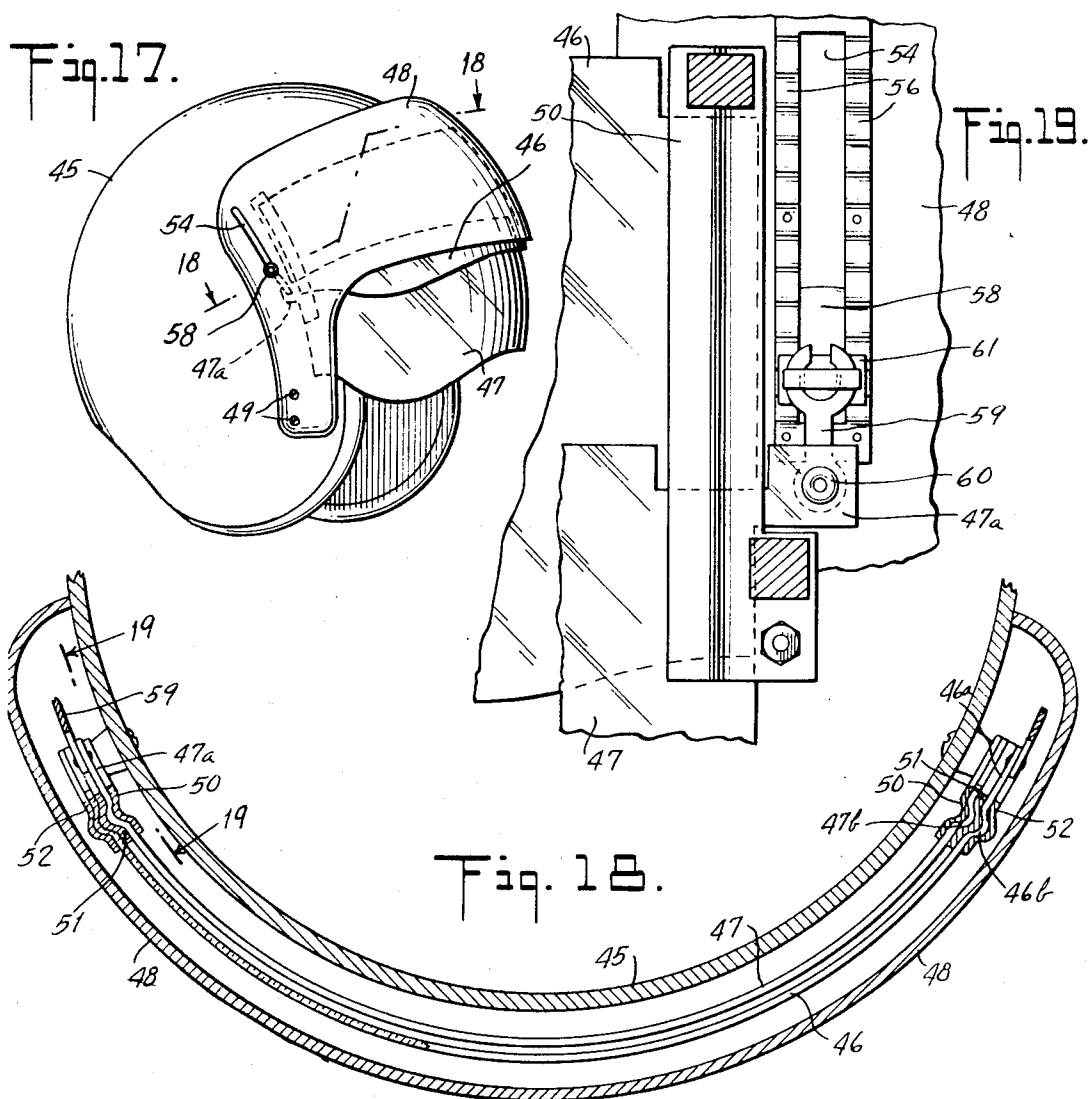


Fig. 16.

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SAFETY HELMET WITH RETRACTABLE EYE SHIELD

CROSS REFERENCE TO RELATED PATENTS AND APPLICATION

This application is a division of applicant's copending application, Ser. No. 609,827 filed Jan. 17, 1967, now U.S. Pat. No. 3,495,273 for Safety Helmet with Retractable Eye Shield.

The invention disclosed herein is related to the inventions disclosed in the patents to Finken, U.S. Pat. No. 2,815,508 and Aileo, U.S. Pat. Nos. 3,066,305, 3,110,034, 3,237,202 and 3,400,407.

BACKGROUND OF THE INVENTION

This invention relates to safety helmets and is particularly concerned with safety helmets having eye shields which are movable between a shielding position in front of the wearer's eyes and a retracted position, commonly above the wearer's forehead.

In the prior art, such eye shields have been manipulated between their two positions either by manually grasping the eye shield directly, as in the Finken U.S. Pat. No. 2,815,508, or by grasping an operating knob located at the middle of the helmet. Both of these manipulations involve the possibility of getting the hand or arm of the wearer into the field of vision, thereby blocking, at least partially, the wearer's view. In many occupations where such helmets are used, for example, the case of the pilot of a jet aircraft, this partial blocking of the field of view can be very hazardous, even though the view is blocked for a very short time. Moreover, a centrally disposed operating knob projects above the helmet at least when the eye shield is in retracted position. In aircraft having limited clearance between the pilot's head and an overhanging canopy of plastic or the like, such upwardly projecting structure on the pilot's helmet is undesirable as it may tend to strike or scratch the canopy.

Apart from the foregoing considerations, stated generally it is desirable that a helmet with retractable eye shield, however constructed, be arranged to enable movement of the eye shield with manipulative ease and at the same time to provide for retention of the eye shield in any of a plurality of positions. It is also often desired that the eye shield be readily removable and replaceable without disassembly of the structure supporting it on the helmet. In some cases, provision of a double eye shield is advantageous, for example to permit the wearer to select a clear or tinted shield, depending on conditions of illumination. Again, it is frequently desired to provide an external cover or housing to protect the eye shield when in retracted position; and in such helmets, it is desirable to avoid aerodynamic effects which might tend to lift or move the eye shield cover.

Elimination of downward or upward movement of the eye shield, especially when the shield is approaching or at its lower, shielding position, is also sometimes desired. For example, it may be advantageous to arrest downward motion of the shield at a predetermined locality selected to position the shield in proper and comfortable relation to the wearer's nose. Locking of the shield against upward movement from shielding position is desirable to prevent lifting of the shield owing to air blast effects.

The state of the art may be exemplified by brief reference to the patents cited above. Aileo U.S. Pat. No.

3,066,305 shows eye shield operating mechanism wherein a spring element connected to the eye shield and having a camming surface is moved along a fixed corrugated strip in camming engagement with the corrugations of the strip to hold the eye shield in any of a plurality of positions. In Aileo U.S. Pat. No. 3,237,202, there are shown arrangements for operating an eye shield in which the manipulated handle is in the form of a knob which is rotated to release the eye shield from a locked position, that release being accomplished by a screw mechanism. Both of the last-mentioned Aileo patents, as also Aileo U.S. Pat. No. 3,400,407, further show arrangements in which the handle or knob is separable from the eye shield by turning of the handle relative to the eye shield, to facilitate removal and replacement of the shield.

It is also old in the art to release a locking mechanism for an eye shield by means of a push button located at the center of such a knob. In the Aileo U.S. Pat. No. 3,400,407, there is described an eye shield knob having a camming surface spring biased into camming engagement with a fixed corrugated strip for holding the eye shield in fixed position relative to the strip and helmet. The biasing force is overcome, to enable movement of the eye shield to other positions, by depression of a push button carried by the knob.

In the Finken U.S. Pat. No. 2,815,508, there is disclosed in FIG. 8 a helmet having two eye shields, one tinted and one clear, which may be selectively moved in front of the wearer's eyes.

Aileo U.S. Pat. No. 3,110,034 shows a helmet having an eye shield retractable to a position inside a cover, in which the cover is provided with vents along its rearward edge to minimize undesirable aerodynamic effects.

SUMMARY OF THE INVENTION

The present invention contemplates the operation of an eye shield between its shielding and retracted positions by means of a handle located at the side of the helmet so that the wearer can readily grasp it without partially blocking his view. In one modification of the invention, two eye shields are provided, one clear and one tinted, and separate handles are provided for operating the respective eye shields, the handles being located on opposite sides of the helmet.

In one modification, the shield is releasably lockable in any of a plurality of positions. Since a screw type of releasing mechanism might confuse the wearer where the two handles are located at the opposite sides of the helmet, the shield releasing mechanism associated with the handle has been provided with a release actuated by a push button located centrally of the knob-shaped handle. The pushing of a button is intuitively the same operation at either side of the helmet, and thus introduces no confusion. Where the wearer is required to turn a knob to operate a screw actuated release, he might turn the knob in the wrong direction, especially where there are two such knobs on opposite sides of the helmet, which are turned in opposite directions to release their respective eye shield locking mechanisms.

In the latter modification, each handle may be located on a housing aligned with one of the rearward vents in the cover. The housing has a slot in which the handle moves, and which also serves to improve the venting effect of U.S. Pat. No. 3,110,034.

Further, each handle may be connected to its associated eye shield by a link extending through the housing. The link pivots freely about its connection to the eye shield to permit sufficient relative angular movement of these elements to enable the handle to move along a straight path while the eye shield moves along a curved path. The connection between the handle and link may be such as to enable separation of the link from the handle by turning of the handle, for removal of the eye shield from the helmet. After such removal, the link — connected to the eye shield but freely pivoted thereon — may be turned into a position in which it extends parallel to the top edge of the shield, to facilitate storage thereof. Also, the eye shield may readily be reassembled with the handle and helmet by manually guiding the link into the housing for reconnection to the handle.

The shield-locking and releasing mechanism may be generally similar to that described in the Aileo U.S. Pat. No. 3,400,407 and thus may comprise a camming surface carried by the eye shield handle and biased by a spring into camming engagement with a corrugated strip fixed in position on the housing in parallel adjacent relation to the housing slot. Depression of the push button overcomes the biasing force of the spring and moves the camming surface away from the corrugated strip to enable free movement of the eye shield.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a helmet having two eye shields and embodying one modification of the invention. Certain parts of the drawing are broken away;

FIG. 2 is a plan view of the helmet of FIG. 1, with parts of the drawing broken away;

FIG. 3 is a fragmentary sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional view taken on the line 4—4 of FIG. 3;

FIG. 4a is a fragmentary sectional view, taken on the line 4a—4a of FIG. 4;

FIG. 5 is a fragmentary sectional view, on an enlarged scale, taken on the line 5—5 of FIG. 1, showing the operating mechanism for one of the two eye shields;

FIG. 5a is a fragmentary sectional view, taken on the line 5a—5a of FIG. 5;

FIG. 6 is a bottom plan view of the eye shield operating mechanism shown in FIG. 5, taken on the line 6—6 of FIG. 5;

FIG. 7 is a sectional view taken on the line 7—7 of FIG. 5;

FIG. 8 is a view similar to FIG. 5, but showing the operating mechanism for the other eye shield located on the opposite side of the helmet;

FIG. 9 shows a front elevational view of a helmet having a single eye shield and incorporating another modification of the invention;

FIG. 10 is a fragmentary side view of the helmet of FIG. 9;

FIG. 11 is a sectional view taken on the line 11—11 of FIG. 9;

FIG. 12 is a sectional view taken on the line 12—12 of FIG. 10;

FIG. 13 is a sectional view taken on the line 13—13 of FIG. 12;

FIG. 14 is a front elevational view of another helmet embodying still another modification of the invention, and incorporating two eye shields;

FIG. 15 is a view taken on the line 15—15 of FIG. 14;

FIG. 16 is an exploded perspective view of an assembly of the eye shield guides and one of the friction springs in the helmet of FIG. 14;

FIG. 17 is a perspective view of a helmet embodying a still further modification of the invention and having two eye shields;

FIG. 18 is a sectional view taken on the line 18—18 of FIG. 17; and

FIG. 19 is a view taken on the line 19—19 of FIG. 18.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 - 8

There is disclosed in these figures a helmet including a shell 1 adapted to be mounted by an internal rigging (not shown) of conventional form, upon the head of a wearer and provided with two eye shields 2 and 3. Each of the two eye shields is adapted to move between an eye shielding position in which it is located in front of the wearer's eye, as shown in the case of the eye shield 2 in FIGS. 1 and 3, and a retracted position in which it is located above the forward part of the shell 1, as shown in the case of the eye shield 3 in FIGS. 1 and 3. Both of the eye shields 2 and 3 are covered, when in their retracted positions, by a cover 4 attached at its edges by means of screws 5 to a mounting strip 6. The screws 5 extend through the mounting strips 6 and cooperate with nuts 7 inside the shell 1, as best seen in FIG. 4. The two mounting strips 6 are provided on their inner surface, i.e., the surface enclosed within the cover 4, with a pair of recesses defining arcuate inner and outer ways, 6a and 6b. Along each lateral edge of each of the eye shields 2 and 3, there is affixed a bead 8, 9 whose contours respectively conform to the ways 6a and 6b. The beads 8 and 9 are provided with grooves 8a and 9a along their outer edges. Each groove receives a spring wire 10 (FIG. 4a) mounted on the bead and self-biased against the associated way to provide sufficient sliding friction to hold the eye shield snugly in place without vibration or rattling. Each of the strips 6 rests upon a plate 11, which is clamped between the strip 6 and the shell 1.

The eye shield 2 is pivotally connected near its upper left-hand corner to a link 12 by means of an eyelet 13. Link 12 overlies the outer surface of eye shield 2 and pivots freely (on the eyelet 13) through a full 360° relative to the shield. As best seen in FIG. 5, the link 12 extends upwardly and rearwardly from the eye shield 2 and is pivotally connected at its opposite end to a knob-shaped actuating handle 14. The mechanism of the handle 14 is shown in detail in FIG. 7. A housing 15 for the actuating mechanism is mounted on the outside of the shell 1 by means of screws 15b. The housing 15 has a rectilinear slot 15a running along its center and extending rearwardly from a position near the top of the eye shield cover 4. On the under side of the housing 15, and on either side of the slot 15a, there are mounted a pair of corrugated springs 16.

The handle 14 is provided with a square aperture at its center to slidably receive a square post 17 (see FIG. 7) which extends through the slot 15a and is formed at the under side of that slot with a pair of laterally pro-

jecting teeth 17a adapted to engage the corrugations in the springs 16. The lower end of the post 17 has another pair of lateral teeth 17b. The post 17 is of oblong cross section between the pairs of teeth 17a and 17b. The end of the link 12 at the post 17 is slotted at 12b to provide a forked end opening into a circular aperture 12a. The oblong section of post 17 may be inserted through the narrow slot 12b and then rotated through 90° in the aperture 12a, so that the post can then not pass out through the slot 12b without further rotation. A button 18 is provided at the center of the handle 14. The under side of the button 18 has a threaded projection received in a corresponding threaded recess in the post 17. The button 18 is normally tightly threaded into the post 17 so that button 18 and post 17 move together. A coil spring 19 encircles the post 17 and is compressed between the bottom of a recess in the handle 14 and the under side of the button 18. The spring 19 biases the button 18 outwardly and thereby biases the projecting teeth 17a into engagement with the corrugations in the springs 16.

The link 12 is provided with a step 12c near its uppermost end, to provide clearance for the outermost eye shield 3. Step 12c, however, is sufficiently limited in extent to permit the link, while attached to shield 2, to pass with clearance between shell 1 and cover 4 when the shield is removed from the helmet.

To operate the shield 2 between its eye shielding position and its retracted position, the wearer depresses the button 18, thereby releasing the handle 14 so that it is free to move along the slot 15a. The wearer may then set the eye shield in any desired new position and release the button 14, whereupon the eye shield is locked in the nearest adjacent recess of the springs 16 in which the teeth 17a fit.

Although the edge of eye shield 2 to which link 12 is connected moves along an arcuate path, the free pivotal action of the link about eyelet 13 together with the pivotal action of the link about post 17 permits such relative angular displacement of these elements as to accommodate rectilinear movement of the handle in correspondence with the arcuate movement of the eye shield. Thus slot 15a may be rectilinear, as shown, facilitating fabrication and assembly of the corrugated springs 16 and assuring the desired cooperation of the handle structure therewith to hold the eye shield in any selected position.

The eye shield 3 is provided with a similar actuating mechanism including a link 20, a handle 21 and a push button 22, as shown in FIG. 8. The construction and operation is the same as that for the actuating mechanism of eye shield 2 except that the link 20 does not have a step corresponding to the step 12c in the link 12. The reason for this is simply that the eye shield 3 is located at a greater distance from the helmet shell 1 than the eye shield 2, whereas the handle 21 and its related parts are located at the same distance from the shell 1 as the handle 14.

The described link and handle construction enables easy removal and replacement of the eye shields without disassembly of the cover 4 and housings 15. Ordinarily the handles 14 and 21 are prevented from rotation in their respective slots by interference between the edges of the slots and the square handle portions projecting therethrough. However, when the post 17 of handle 14 and the corresponding post of handle 21 are released by unscrewing their associated push buttons,

the posts may be rotated 90° to permit disengagement of the links 12 and 20 therefrom, and the eye shields 2 and 3 may then be drawn manually downward, out of the cover 2, to free them from the helmet. After such removal, the links (being still pivotally connected to the eye shields) may be rotated into positions overlying and parallel to the upper edges of the eye shields, to minimize space requirements for storage of the shields.

For reassembly of the eye shields with the helmet, the shield 2 is advanced manually into position beneath the cover 4, with the beads on the side edges of the shield inserted in their respective ways. The pivoted link 12 is guided manually into the housing 15 for re-engagement with post 17 of handle 14. To assist in such guiding, a tab 12d projects from the lower edge of the link adjacent the eyelet 13; as the upper edge of the eye shield is advanced beneath the cover 4 the tab 12d remains accessible to the fingers for final guiding and positioning of the link. Post 17 is then brought into engagement with the slotted upper link end 12b within slot 15 and rotated 90° so as to hold the link; thereafter the handle 14 is reassembled in position. The same procedure is followed for reassembly of the shield 3; as shown, link 20 pivoted on the latter eye shield also bears a downwardly projecting tab 20a to facilitate guiding of the link into position.

The cover 4 is provided along its upper edge with a row of vents 4a, for a purpose described in detail in Aileo U.S. Pat. No. 3,110,034. In the arrangement shown, two of these vents not only serve that aerodynamic purpose, but also provide ready passage for the links 12 and 20 through the upper edge of the cover. Furthermore, the slots 15a in the housings 15 are effective to improve the venting effect of the vents 4a, for equalization of pressure within and outside the eye shield cover 4. That is to say, these slots 15a cooperate with the two vents 4a immediately ahead of the housings to provide a continuous passage for air flow between the interior of the cover 4 and the exterior.

The assembly of the eye shields and their actuating mechanisms is facilitated by making the housings 15 separate from the cover 4. Thus, where the housings 15 are separate, the assembler can turn his attention successively to (1) the cover 4 and eye shields 2, 3 and related parts; (2) one housing 15 and its related handle assembly; and (3) the other housing 15 and its related handle assembly. While working on any one phase of the assembly, the assembler does not have to worry about the other two phases.

It may be seen that each of the two eye shields 2 and 3 may be actuated by manipulation of a handle 14 or 21, located at one side of the helmet and that it is not necessary for the wearer to extend his hand or arm in front of the eye shield in order to move it. Furthermore, the releasing manipulation required for each of the handles 14 and 21 is exactly the same and not readily confused, namely, the pushing of a button at the center of the handle. Since the handles 14 and 21 are located at the sides of the helmet, there is no structure projecting above the helmet such as might tend to strike or scratch an aircraft canopy above the wearer's head.

FIGS. 9 - 13

These figures illustrate a helmet 23 provided with an eye shield 24 of somewhat simpler structure than the eye shields 2 and 3 of FIGS. 1 to 8. The eye shield 24 is provided near its lateral edges with forwardly projecting ribs 24a which ride in ways formed by a pair of

parallel strips 25 and 26. The strips are mounted on the helmet shell 23 by means of posts 27, to which they are attached by screws or the like. From each side of the eye shield 24, near its upper end, there projects one of a pair of handles 24b, which are integral with the eye shield and extend out between the parallel strips 25, 26. Attached to the lower end of the strip 26 by means of a screw 28 is a spring finger 29 whose upper end is bent over and extends through an aperture 26a in the strip 26 so that it frictionally engages the edge of the eye shield 24, so as to hold it in any position to which it may be manipulated through the use of the handles 24b. This spring friction arrangement is similar to that shown in Finken U.S. Pat. No. 2,815,508.

As in the case of the helmet of FIGS. 1 - 8, it may be observed that the eye shield 24 can be manipulated without extending the arm or hand of the wearer into his field of vision, and that there is no upwardly projecting knob structure above the helmet.

FIGS. 14 - 16

These figures illustrate a modification of the eye shield arrangement of FIGS. 9 - 13 incorporating two eye shields 30 and 31, one of which may be clear and the other tinted. The eye shield 30 has an integral handle 30a at its upper right-hand corner, as viewed in FIG. 14. The shield 31 has an integral handle 31a at its upper left-hand corner, as viewed in FIG. 14.

The structure of the ways in which the shields 30 and 31 move is shown in detail in FIGS. 15 and 16. Each of the eye shields 30 and 31 is provided along its lateral margins with forwardly projecting ribs 30b and 31b. These ribs fit between correspondingly formed ribs in a stack of strips 32, 33 and 34. The rib 30b on the eye shield 30 fits between the ribs on the strips 32 and 33. The rib 31b on the eye shield 31 fits between the ribs on the strips 33 and 34. The strips 32 are held in place on posts 35 by means of screws 36. The other strips 33 and 34 are mounted in a stack on the strip 32 by means of a cooperating screw 37 and a nut 38 and spacers 39 and 40. A spring finger 41, corresponding in structure and function to the spring finger 29 of FIGS. 9 - 13, is held in place by the screw 37 and nut 38 and has its end bent over to project through an aperture 32a formed in the strip 32. A similar spring finger 42 is located on the outside of the strip 34 at the opposite side of the helmet and provides a frictional grip on the eye shield 31. The spring finger 41 provides a frictional grip on the eye shield 30. Note that the spring fingers 41 and 42 are located at the same side of their associated eye shields as the handles for those eye shields, thereby minimizing any tendency for the eye shields to jam due to an angular movement thereof when a force is applied to the handles 30a and 31a.

Again, as in the case of the previously disclosed species, note that the handles 30a and 31a may be actuated by the wearer without extending his hand or arm in front of his field of vision, and that there is no central knob projecting above the helmet.

FIGS. 17 - 19

These figures illustrate a further modified embodiment of the invention including a helmet shell 45 having mounted thereon a pair of eye shields respectively designated 46 and 47 both movable between retracted and shielding positions. Both of these eye shields are covered, when in their retracted positions, by a cover 48 attached at its edges to the helmet shell by means of screws 49.

The eye shields 46 and 47 are generally similar in structure and mounting to the shields 30 and 31 of the embodiment shown in FIGS. 14 - 16, except that the edge portions of shields 46 and 47 conform generally to the curvature of the subjacent helmet shell to permit these edges and their associated ways to be enclosed within the cover 48. Specifically, each of the shields 46 and 47, as best seen in FIG. 18, is provided along its lateral margins with forwardly projecting ribs 46b and 47b. These ribs fit between correspondingly formed ribs in a stack of strips 50, 51 and 52 in the same manner as the ribs 30b and 31b of shields 30 and 31 in FIGS. 14 - 16 fit between strips 32, 33 and 34 of the structure there illustrated. The strips are supported in fixed position on the helmet and in spaced relation to each other in the same manner as the aforementioned strips 32, 33 and 34 of FIGS. 14 - 16, to constitute the ways or tracks in which the eye shields move.

Shield 46 has an integral tab 46a at its upper right-hand corner and shield 47 has an integral tab 47a at its upper left-hand corner. It will be understood that the terms "right" and "left" are used in the same sense as in the description of the immediately preceding embodiment - that is to say, as viewed from the front of the helmet looking toward the wearer. These tabs project, on opposite sides of the helmet, through and beyond the spaces between the strips forming the ways.

At the left-hand side of the eye shield cover 48 adjacent the path of movement of the tab 47a, there is provided a slot 54 extending along the cover 48 in the direction of such path of movement. As best seen in FIG. 19, a pair of corrugated strips 56 (similar to the corrugated strips 16 in the helmet of FIGS. 1 - 8) are mounted on the under side of the cover 48 on either side of the slot 54. A handle 58, which may be essentially identical in construction to the handle 14 of the helmet of FIGS. 1 - 8, is positioned for movement along the slot 54 and is connected to the tab 47a of shield 47, inwardly of the slot, by means of a link 59 which is pivotally secured to tab 47a by eyelet 60.

As will be understood, the handle 58 bears a pair of laterally extending teeth 61 (similar to teeth 17a of handle 14 in FIGS. 1 - 8) positioned for engagement with the corrugated spring 56 and spring biased into such engagement to maintain the shield 47 in any desired position in its path of movement. Handle 58 also has a push button (similar to button 18 of handle 14 in FIGS. 1 - 8) which may be depressed to overcome the biasing force on teeth 61 so as to facilitate movement of the eye shield 47 by means of the handle.

In other words, movement of the eye shield 47 is effected in the same manner as movement of the eye shield 2 in the helmet of FIGS. 1 - 8 by the handle 58 moving along slot 54 and engaging corrugated springs 56. An identical arrangement (not shown) for effecting movement of the eye shield 46, including a slot and handle moving along the slot and connected to tab 46a, is provided at the right-hand side of the eye shield cover 48 - that is, at the side of the cover opposite to that at which slot 54 is located.

I claim:

1. A safety helmet comprising
 - a. a substantially rigid helmet shell adapted to receive the head of a wearer;
 - b. first and second eye shields;
 - c. guide means fixed on the shell and receiving the edges of both eye shields for sliding movement of

each eye shield between a shielding position in front of the wearer's eyes and a retracted position above the front part of the shell, said guide means providing arcuate paths of movement for said edges of said eye shields;

- d. a cover affixed to the shell and defining therewith a recess for receiving said eye shields in their retracted positions;
- e. a pair of housings secured to said shell and extending rearwardly from said cover on opposite sides of said shell, respectively, each of said housings having a longitudinal slot;
- f. two handles for manual actuation of the two eye shields respectively between their positions, said handles being respectively mounted in said housings for movement along said slots; and
- g. a pair of members respectively connecting said handles to said eye shields; wherein the improvement comprises
- h. each of said slots having opposite side edges lying in parallel spaced planes so as to provide a rectilinear path of motion for the handle mounted therein; and
- i. each of said members comprising a link pivotally connected at one end to one of said handles, and pivotally connected at the other end to one of said eye shields for unrestricted angular movement of the link relative to the eye shield.

2. A helmet as defined in claim 1, wherein said other end of said link overlies a surface of said last-mentioned eye shield; and further including an eyelet securing said last-mentioned link end to said last-mentioned eye shield, in such manner as to permit angular movement of the link through 360° relative to the eye shield.

3. A helmet as defined in claim 1, wherein the improvement further comprises said cover having at least two apertures along its rearward edge at either side of the fore and aft center line of the helmet, and said housings being separate from said cover, each open at one end with said open ends respectively closely communicating with said apertures in the cover.

4. A helmet as defined in claim 1, further including

- a. a pair of corrugated tracks respectively mounted on said elongated housings and extending along said slots of said housings respectively;
- b. tooth means movable mounted on each of said handles for engaging the corrugations of one of said tracks to lock the handle and the eye shield to which it is connected in any of a plurality of positions along its path of travel;
- c. spring means carried by each of said handles for biasing the tooth means of the handle into engagement with the track; and
- d. manually operable means on each of said handles for overcoming the force of the spring means to disengage the tooth means from the track and thereby to release the eye shield to which the handle is connected from any of said plurality of positions.

5. A safety helmet including:

- a. a shell adapted to receive the head of a wearer;
- b. first and second eye shields, one of said eye shields being colorless and the other tinted;
- c. guide means fixed on the shell and receiving the

edges of both eye shields for sliding movement of each eye shield between an eye shielding position in front of the wearer's eyes and a retracted position above the front part of the shell, said guide means providing arcuate paths of movement for said edges of said eye shields;

- d. a cover affixed to the shell and defining therewith a recess for receiving said eye shields in their retracted positions, said cover having at least two apertures along its rearward edge at either side of the fore and aft center line of the helmet; wherein the improvement comprises:
- e. two handles for manual actuation of the two eye shields respectively between their positions, said handles being located at the sides of the shell and respectively connected to the two eye shields so that either eye shield may be manipulated by the wearer without extending his hand or arm into his field of vision;
- f. a pair of elongated housings separate from said cover, each open at one end and having an elongated rectilinear slot along its top;
- g. means attaching said housings to the shell with said open ends closely communicating with said apertures in the cover, said housings extending rearwardly past the maximum lateral dimension of the helmet so that the slots are effective to increase the venting effect of the apertures;
- h. said handles being mounted in said housings and slidable along said slots;
- i. means extending through said apertures in the cover and the open ends of the shell and connecting said handles to their respective eye shields, said last-mentioned means comprising a pair of links, each of said links having one end pivotally connected to one of said eye shields and another end engaged by one of said handles for movement therewith, said links being pivotable relative to the eye shields to which they are respectively connected through ranges of angles at least sufficient to permit rectilinear movement of said handles along the full length of said slots in correspondence with the arcuate movement of said eye shields while said handles are maintained in continuous engagement with said links, said links being disengageable from said handles by turning of said handles relative to said housings to permit removal of said eye shields from the helmet while maintaining said cover affixed and said housings attached to said shell, said links further being pivotable, relative to the eye shields to which they are respectively connected, from said ranges of angles into positions in which they are substantially parallel to the upper edges of said eye shields;
- j. each of said links having a tab portion projecting beyond the pivotal connection of the link in opposed relation to the major extent of the link, for manually guiding the link into handle-engaging position in one of said housings upon insertion of the edges of the eye shield to which the link is connected into said guide means;
- k. said links being disposed in overlying relation to the outer surfaces of the eye shields to which they are respectively connected.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,748,657 Dated July 31, 1973

Inventor(s) Jackson A. Aileo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Front page, first column, line 4 (Assignee), "Bentex" should read --Gentex-- .

Column 9, line 47, "movable" should read --movably-- .

Signed and sealed this 20th day of November 1973.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents