US 20110154551A1

(19) **United States**

(12) **Patent Application Publication**

Spink

(10) **Pub. No.: US 2011/0154551 A1**

(43) **Pub. Date: Jun. 30, 2011**

(54) **HINGE SYSTEM/ VISOR ATTACHMENT**

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(21) Appl. No.: **12/996,577**

(22) PCT Filed: **Jun. 3, 2009**

(86) PCT No.: **PCT/NZ09/00098**

§ 371 (c)(1),
(2), (4) Date: **Mar. 2, 2011**

(30) **Foreign Application Priority Data**

Jun. 6, 2008 (NZ) 568990

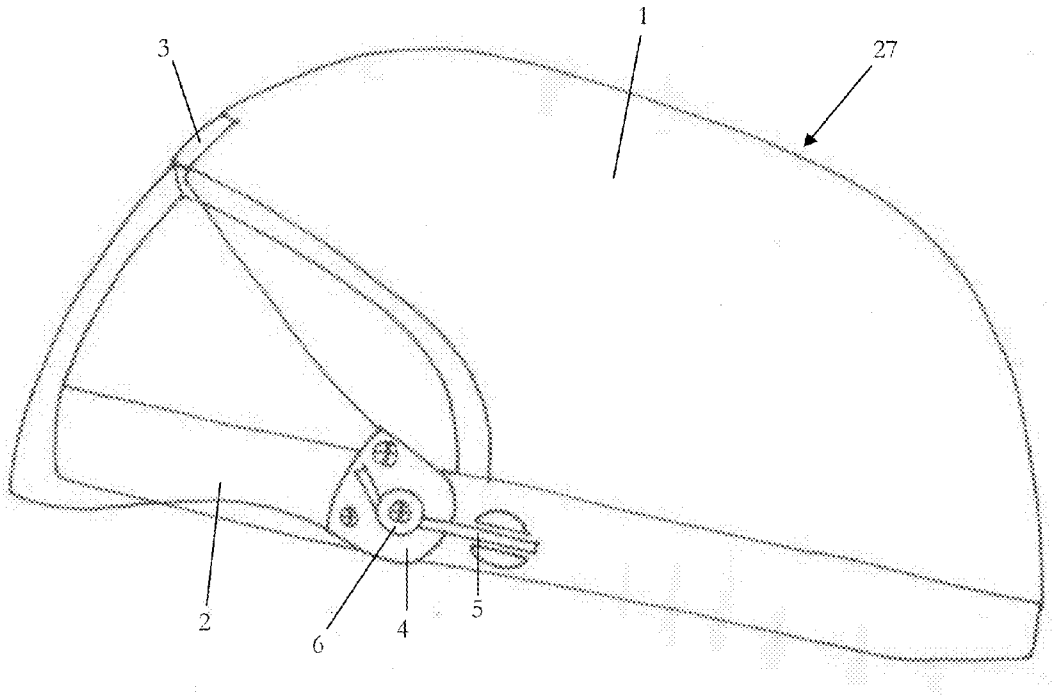
Publication Classification

(51) **Int. Cl.**
A42B 3/04 (2006.01)

(52) **U.S. Cl.** **2/10**

(57) **ABSTRACT**

The invention relates to a visored helmet assembly (e.g. fireman's helmet) of a kind where the visor can be articulated or pivoted between either a raised (retracted) or lowered (operational) condition. The visor is biased to move to either its raised or lowered condition, and has a locking mechanism that can hold the visor captive in one condition (i.e. raised or lowered) when moved in that direction yet can be caused to release the visor from this captive state by the visor being moved further in that same direction. Preferably the visor is biased to the raised condition and the visor is captured in its raised condition yet can be released from such captive state, to then move under the action of the bias, by being pushed upwards.



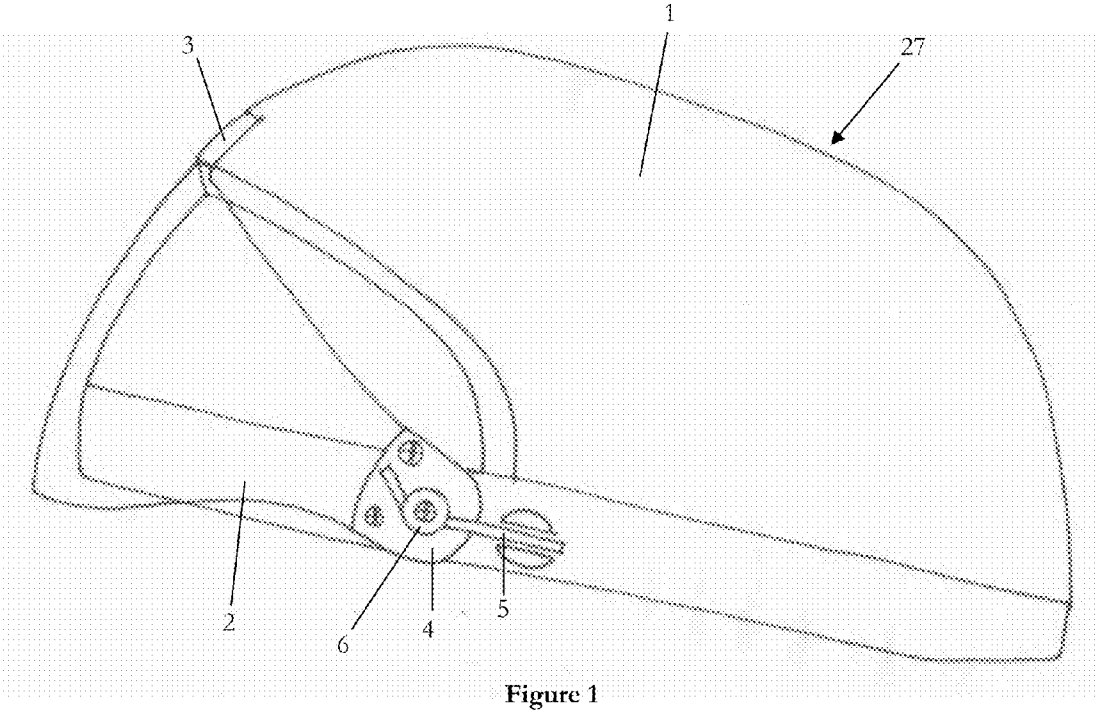


Figure 1

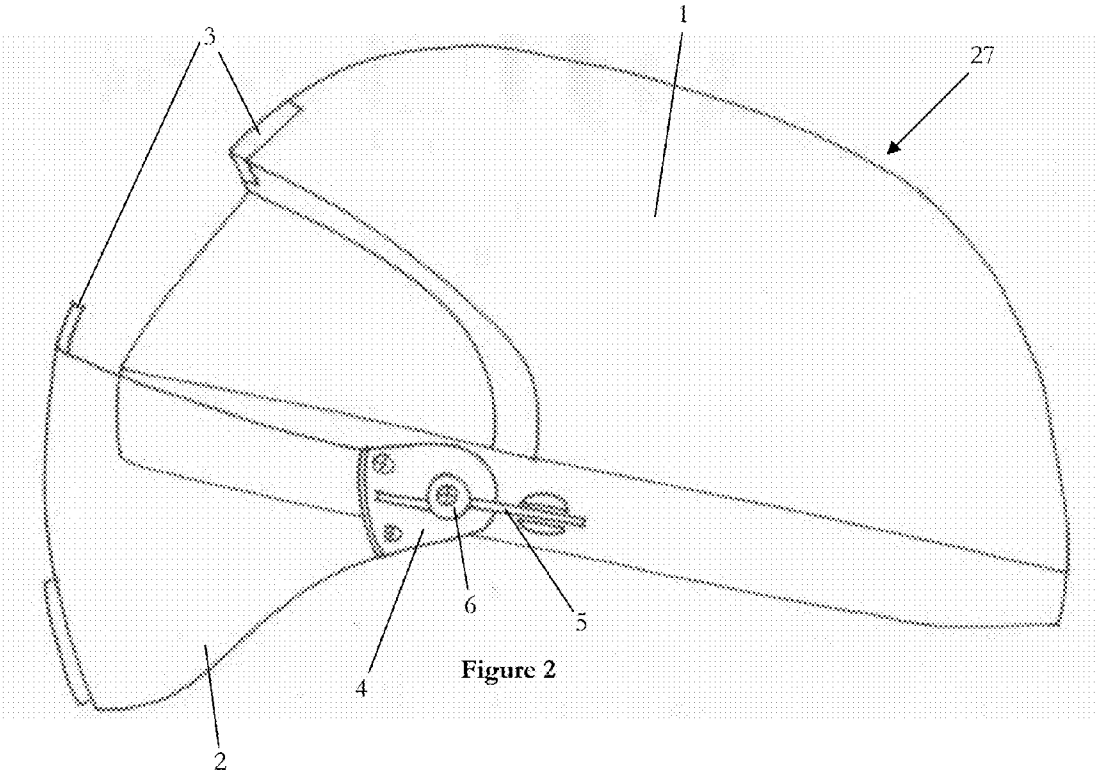
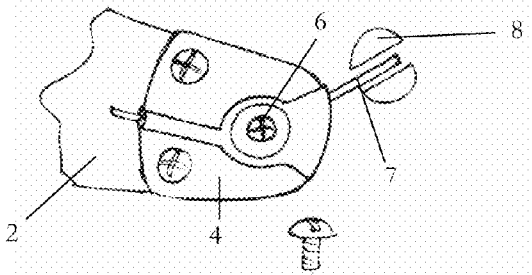


Figure 2

Figure 3A



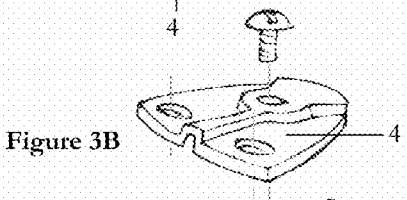


Figure 3B

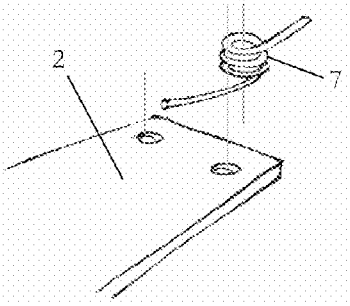
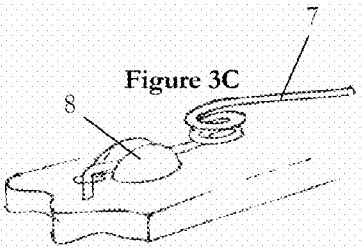


Figure 3D

Figure 3C



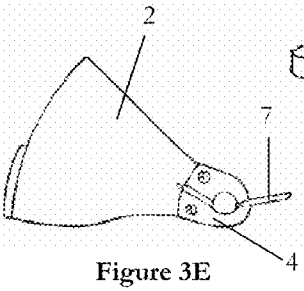


Figure 3E

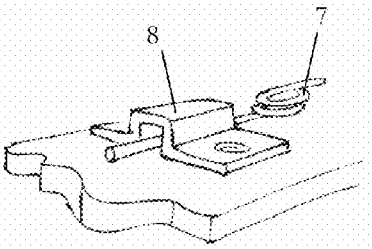


Figure 3F

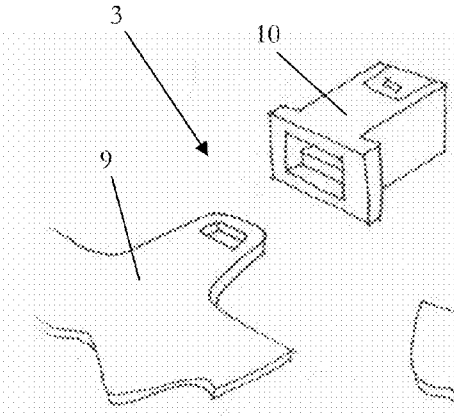


Figure 4A

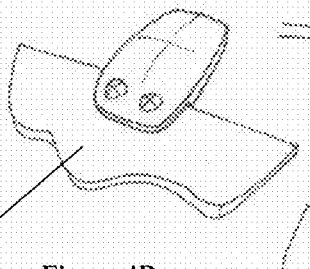


Figure 4B

Figure 4D

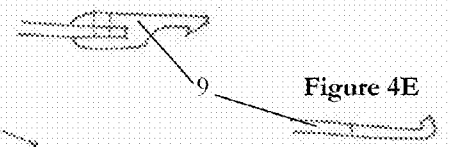


Figure 4E

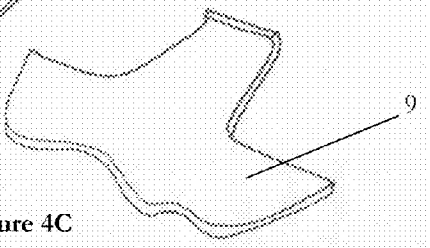


Figure 4C

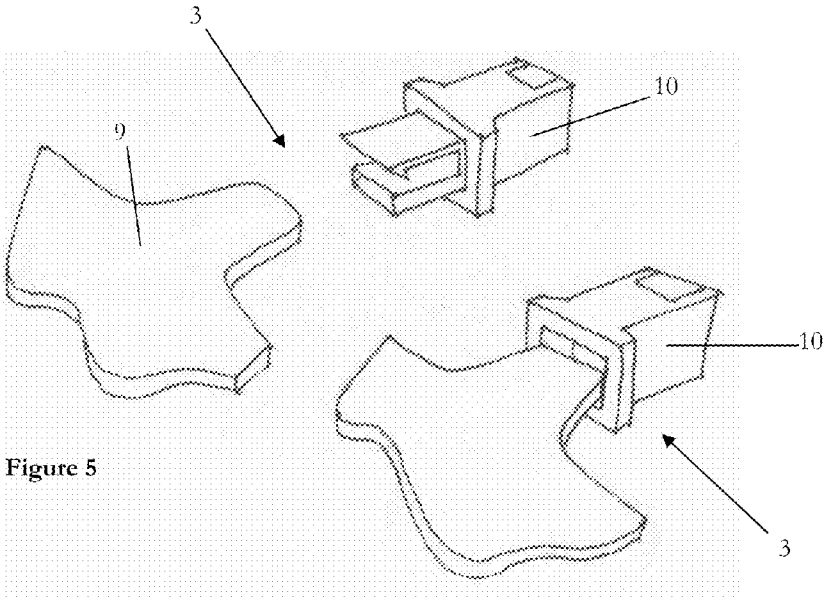


Figure 5

Figure 6

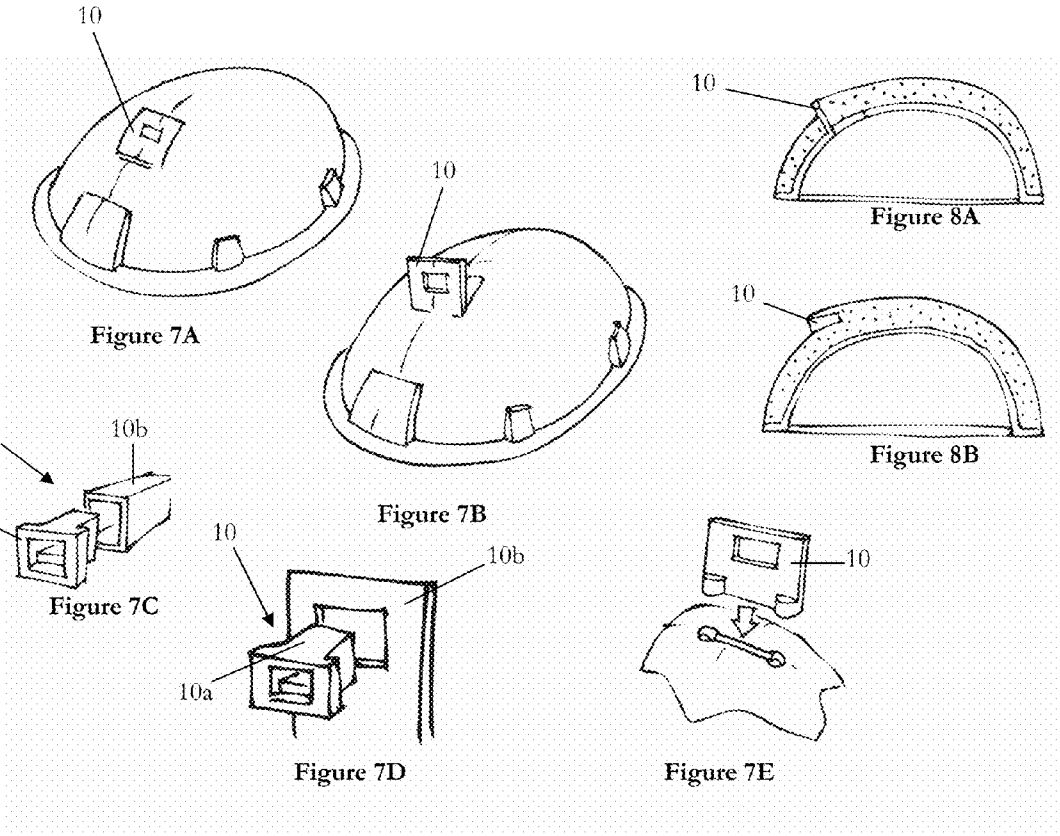


Figure 7A

Figure 7B

Figure 8A

Figure 8B

Figure 7C

Figure 7D

Figure 7E

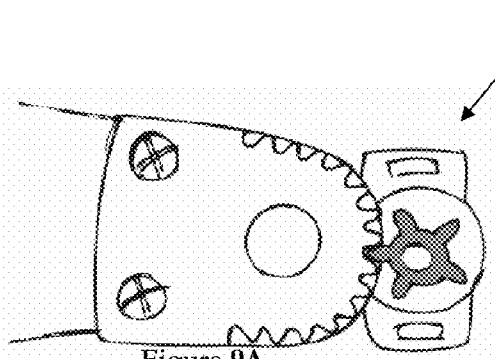


Figure 9A

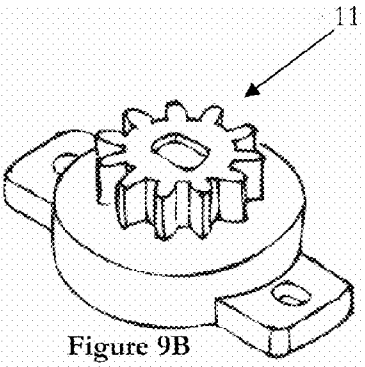


Figure 9B

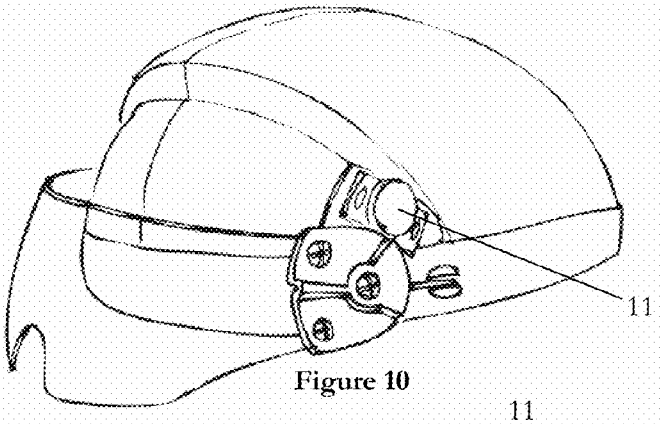


Figure 10

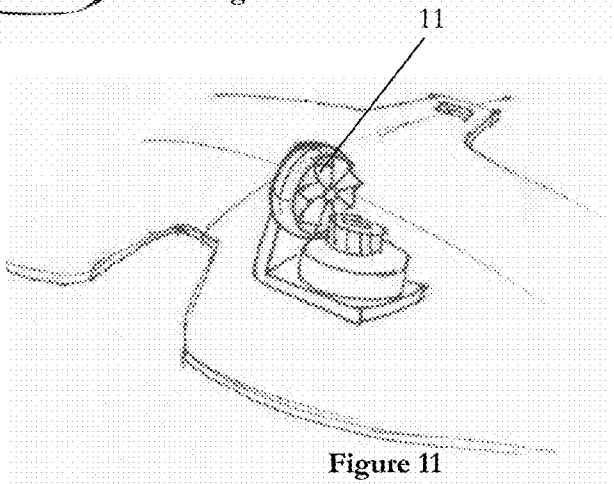


Figure 11

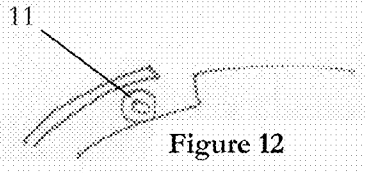


Figure 12

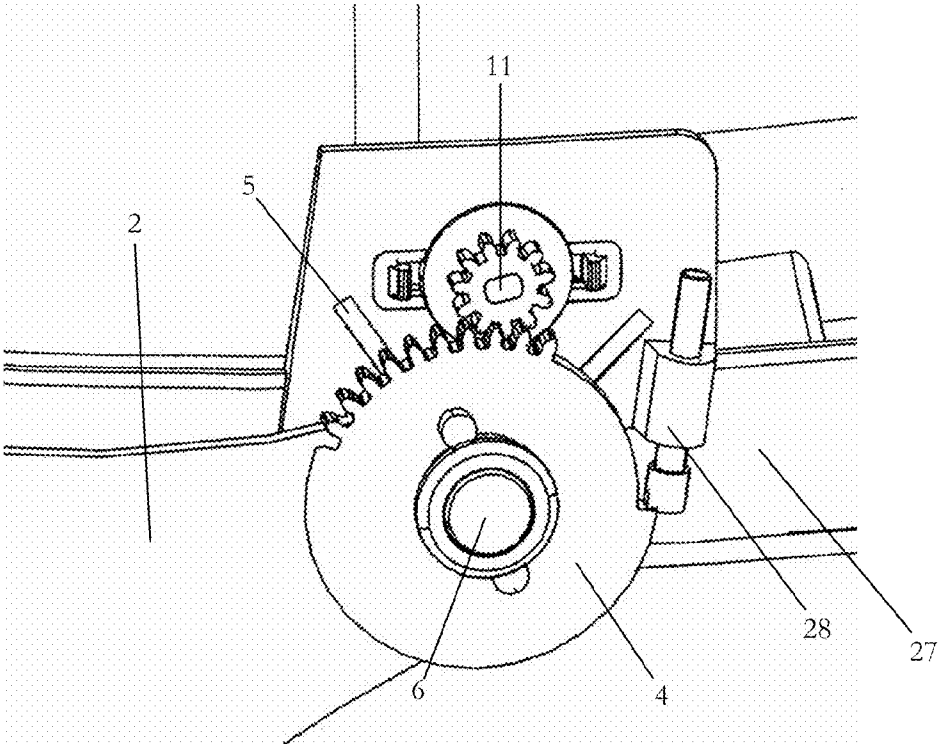


Figure 13

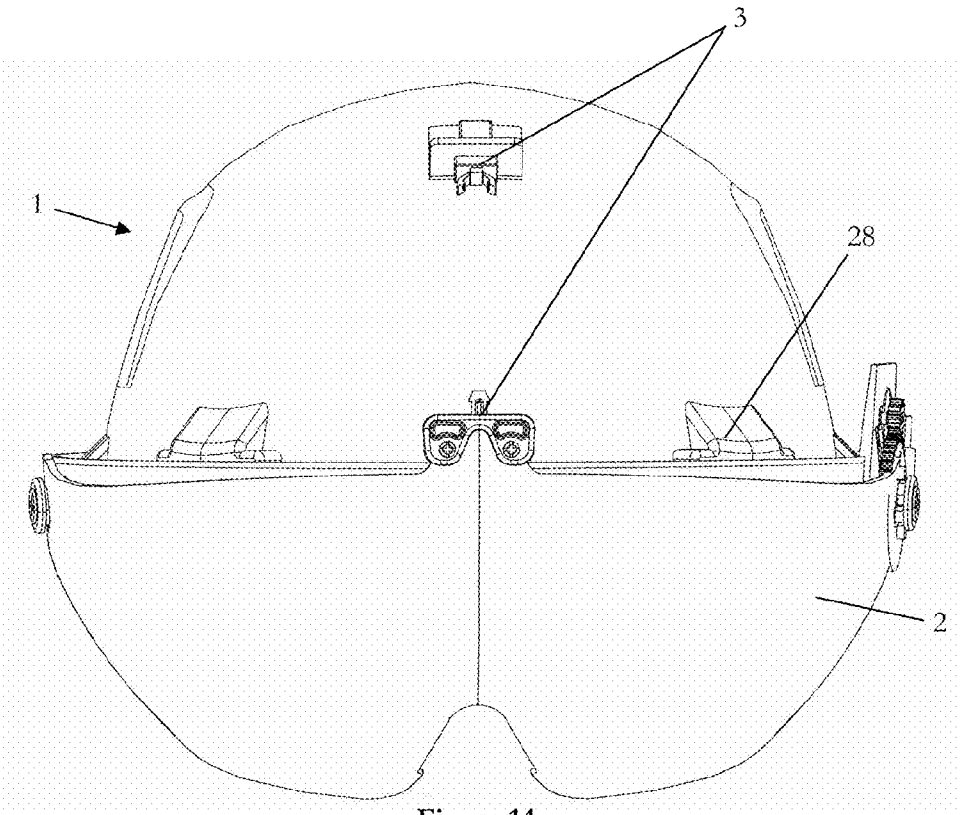


Figure 14

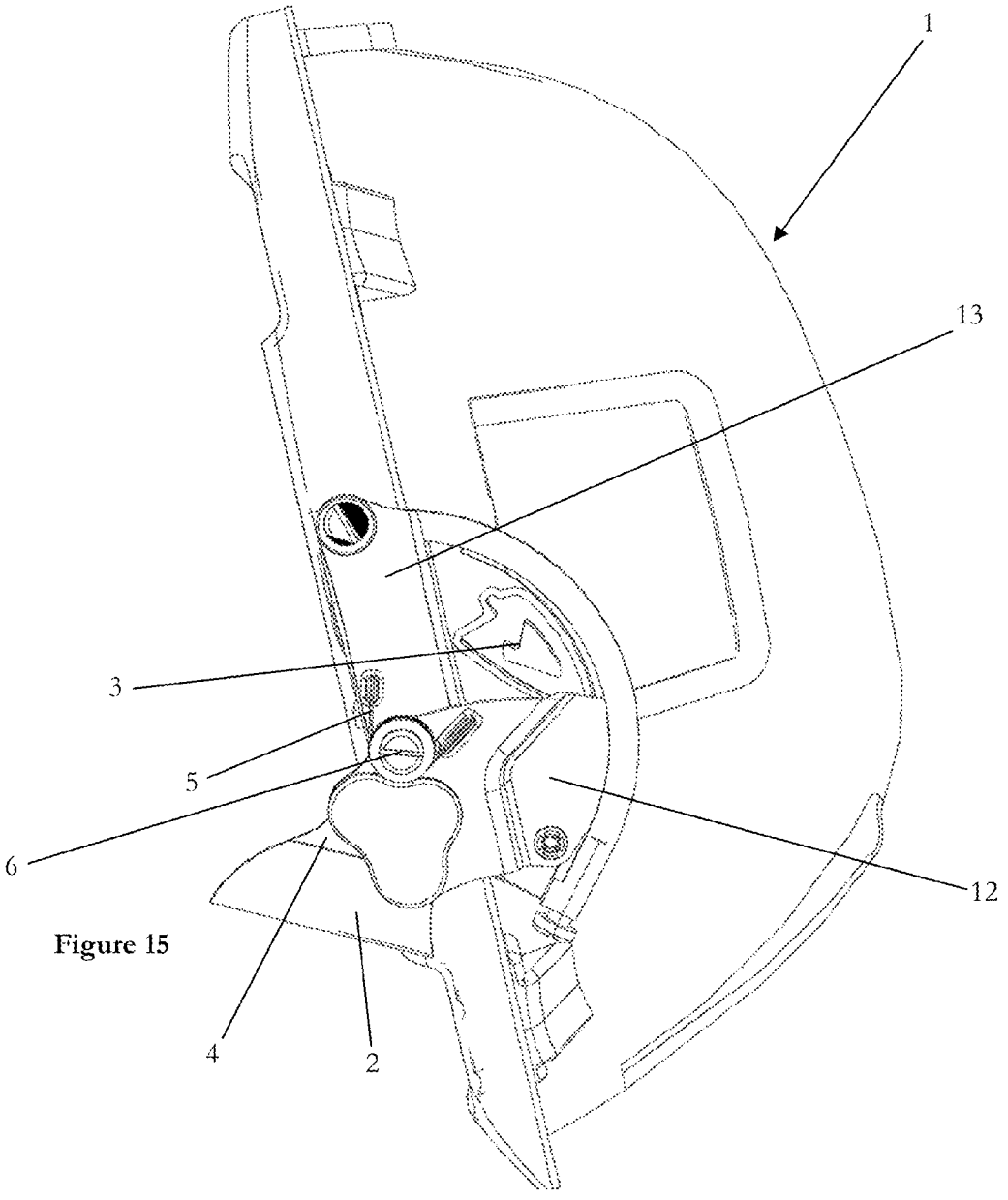


Figure 15

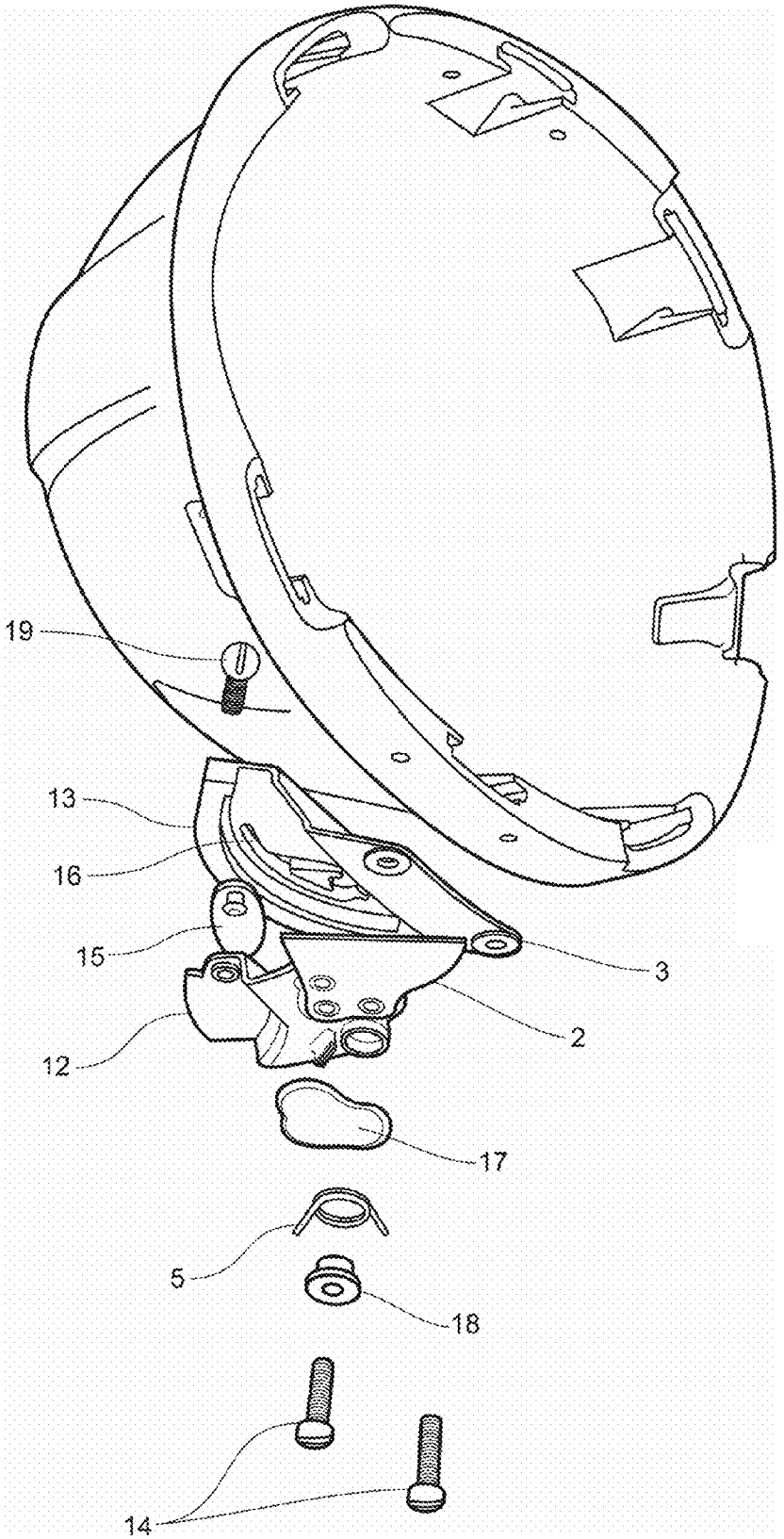


Figure 16

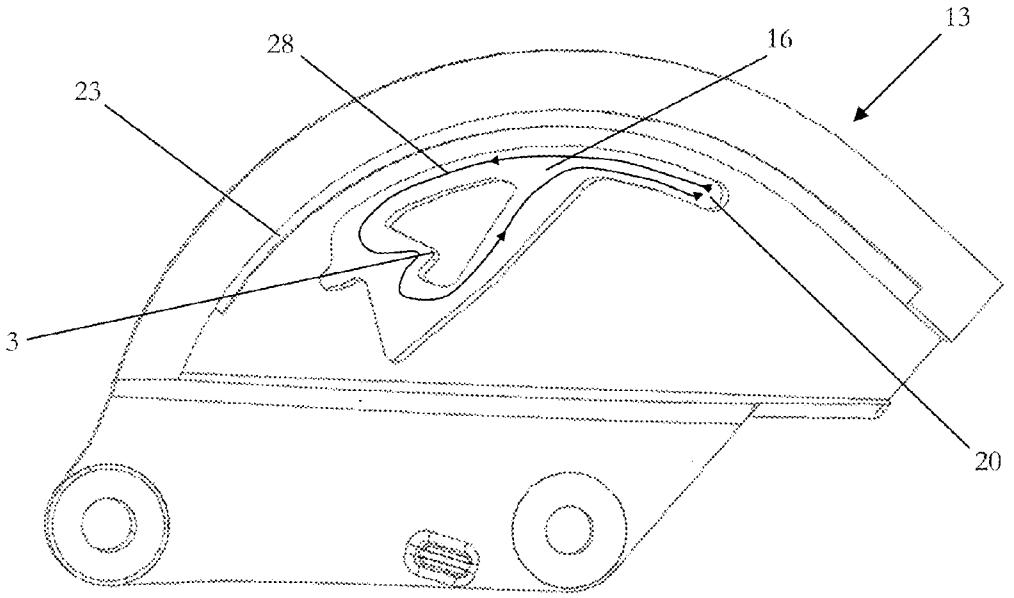


Figure 17A

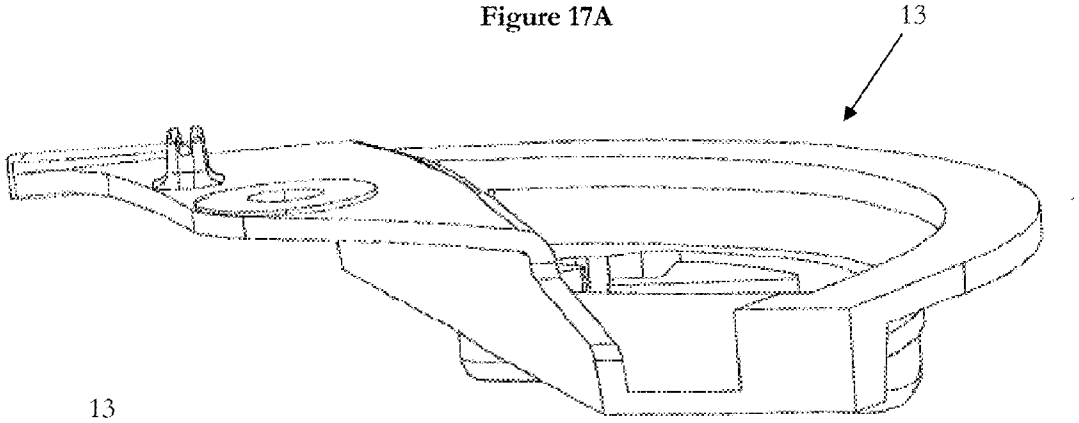


Figure 17B

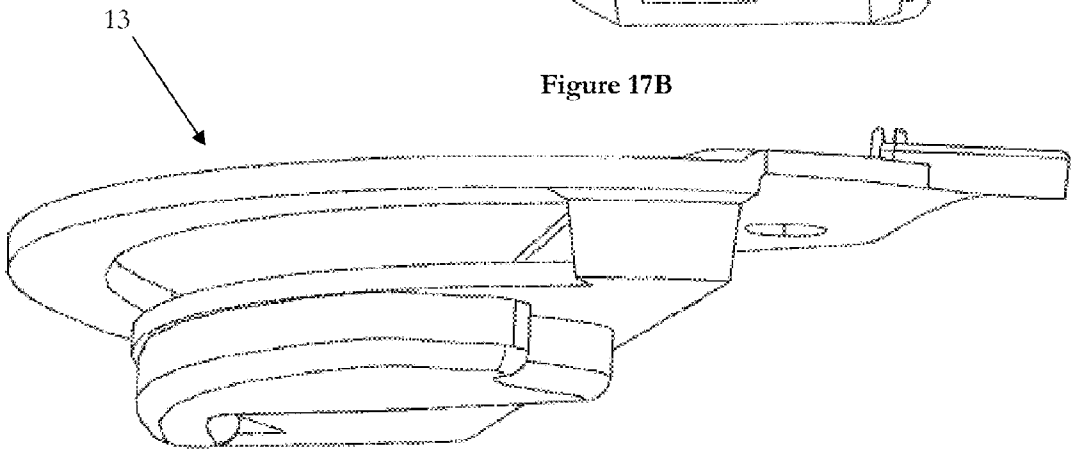


Figure 17C

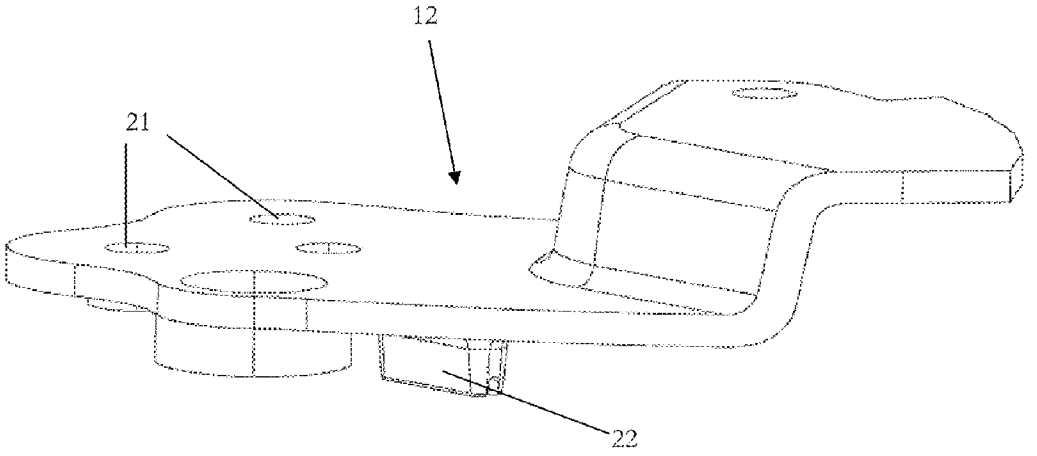
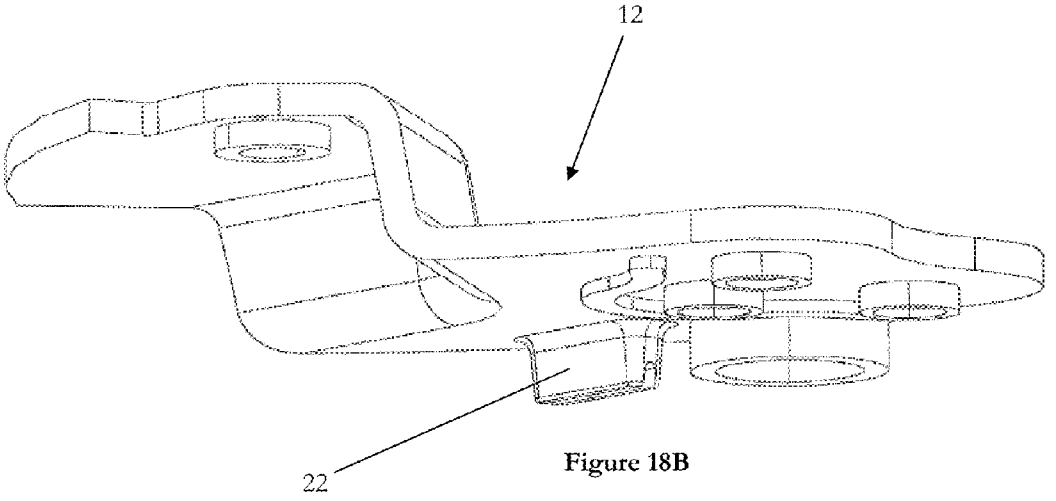


Figure 18A



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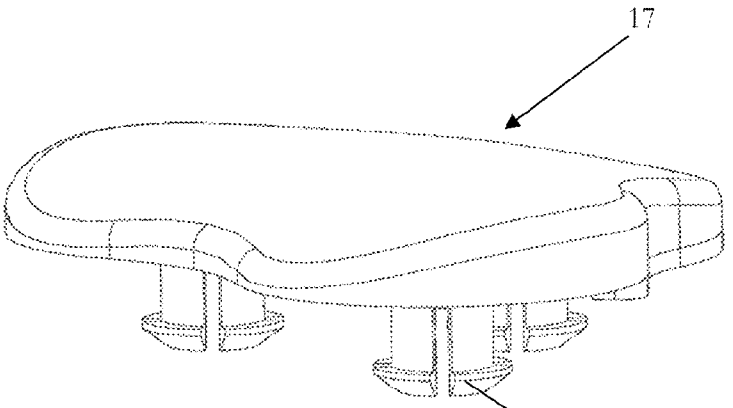
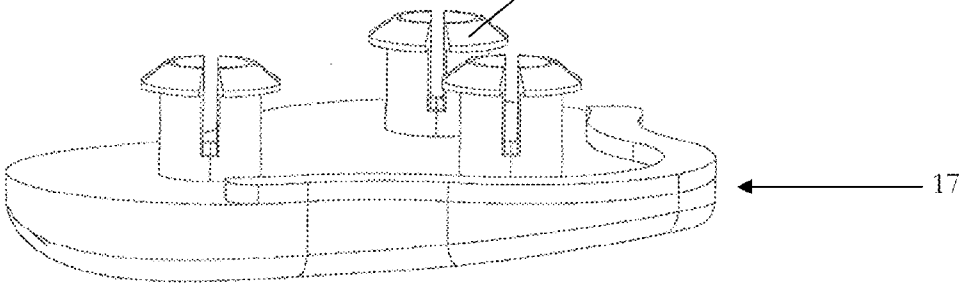


Figure 19A



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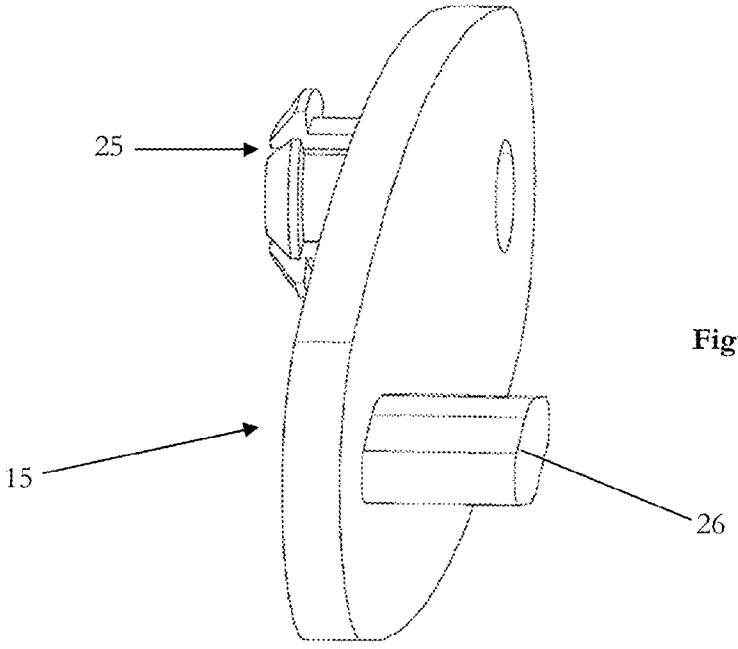

Figure 20

HINGE SYSTEM/ VISOR ATTACHMENT

FIELD OF THE INVENTION

[0001] The present invention relates to a visored helmet assembly. More particularly but not exclusively it relates to a method and apparatus for attaching a visor to a helmet.

BACKGROUND TO THE INVENTION

[0002] Many methods are known for attaching a visor to a helmet so that visors can move between down (operational) and up (withdrawn) states.

[0003] Examples of moveable visor attachments include friction clutches, with (U.S. Pat. No. 3,593,338) or without (U.S. Pat. No. 3,631,540) a mounted tooth rack, the use of resilient deformable indexing mechanism as described in our PCT international publication WO 2007/053043, ratchet mechanisms (U.S. Pat. No. 5,333,329), pivotable spring biased locking cams (U.S. Pat. No. 5,091,997), spring biased detent studs that correspond to indexed recessed positions (U.S. Pat. No. 4,718,127).

[0004] Visors are found on a wide range of different safety helmets including firemen's helmets and motorcycle helmets. In both instances the raising and lowering of the visor can be made more difficult by the user wearing thick protective gloves. In the case of firemen's helmets, the raising and lowering of the visor must be able to be performed with ease owing to the high risk and high stress situations that firemen are placed.

[0005] Current methods of raising and lowering the visors requires the user to either remove their gloves, struggle with friction based mechanisms, or rely on the friction between the glove and the visor. This last method in particular is not exemplary since dirt matter on the gloves can then be transferred to the visor, impairing the sight of a user.

[0006] It is an object of the present invention to provide a visored helmet assembly which overcomes or at least ameliorates some of the abovementioned disadvantages or which at least provides the public with a useful choice.

SUMMARY OF THE INVENTION

[0007] In a first aspect the invention can be broadly stated to be a visored helmet assembly of a kind where the visor can be articulated or pivoted between either a raised (retracted) or lowered (operational) condition, and

[0008] wherein the visor is biased to move to either its raised or lowered condition, and

[0009] wherein the visor has a locking mechanism that can hold the visor captive in one said condition when moved in that direction yet can be caused to release the visor from such captive state by the visor being moved further in that same direction.

[0010] In one embodiment the visor is biased to its lowered condition, such that the visor can be captive in its raised condition yet can be released from such captive state to then move under the action of the bias by being raised beyond its captive raised condition.

[0011] In an alternate embodiment the visor is biased to its raised condition, such that the visor can be captive in its lowered condition yet can be released from such captive state to then move under the action of the bias by being lowered beyond its captive lowered condition.

[0012] In a further aspect the invention can be broadly stated to be a visored helmet assembly of a kind where the visor can articulate or pivot between a captive raised and a operational lowered condition, and vice versa; characterised in that the visor is biased to move to its lowered condition;

[0013] and further characterised in that the visor can be captive in its raised condition yet can be released from such captive state to then move under the action of the bias by being raised beyond its captive raised condition.

[0014] In one embodiment the locking mechanism comprises at least one formation locatable on the visor that is interengagable with one or more complimentary formation locatable on the helmet.

[0015] In one embodiment the helmet and visor formations can be described as (a) male flange and (b) female coupler. Preferable the interengagernent of the male flange with the female couplet affects the capturing of the visor.

[0016] In one embodiment the male flange is locatable on the visor and the female coupler is locatable on the helmet.

[0017] In an alternate embodiment the male flange is locatable on the helmet and the female coupler is locatable on the visor.

[0018] In one embodiment the helmet formation is formed integrally with the helmet. Preferable when formed integrally with the helmet the helmet formation hinges with the helmet by way of a living hinge and can be moved to a locking position. More preferably when in a locking position the complimentary component on the visor can interengage with the helmet component to effect . capture of the visor by the helmet locking component.

[0019] In one embodiment a slot is provided in the helmet into which the helmet formation of the locking mechanism can be affixed. Preferably, once the helmet formation of the locking mechanism is affixed to the helmet the visor locking formation can interact with the helmet formation to affect locking of the visor.

[0020] In one embodiment the locking mechanism is a catch latch.

[0021] In one embodiment the catch latch is located on the helmet and interacts with its corresponding member on the visor. Preferably the corresponding member on the visor is a tab. More preferably the tab is located on the upper surface of the visor.

[0022] In one embodiment the visor is pivoted on a single pivot axis. In other embodiments the articulation can be other than reliant upon a single pivot axis.

[0023] In one embodiment the revision of the helmet is quite distinct in so far as resisting is concerned from the capture arrangement. In other aspects it can be closely related.

[0024] In one embodiment the visor assembly includes a damper. Preferably said damper is interactively adjacent, or part of, the visor pivot point.

[0025] In one embodiment the damper comprises a cog that interacts with a tooth rack on the visor or on a visor attachment plate.

[0026] In one embodiment said damper is a stop damper. Preferably said stop damper is, or comprises, the locking mechanism. More preferably said stop damper is a push push latch.

[0027] In one embodiment the visor includes a visor downwards rotational stop.

[0028] In one embodiment the biasing mechanism is a spring, magnet, compressed fluid, elastic material. Preferably said biasing mechanism is a spring. More preferably said spring biasing mechanism is a coiled spring.

[0029] In one embodiment the articulated or pivot point of said visored helmet assembly comprises said articulated or pivot point and said biasing means. Preferably said biasing mechanism is a spring.

[0030] In one embodiment said articulated or pivot point includes said stop damper.

[0031] In one embodiment said articulated or pivot point includes said locking mechanism. In an alternate embodiment the locking mechanism is separate to the articulated or pivot point.

[0032] In one embodiment of the invention a complex locus of movement of part of one of the visor and the helmet relative to the other of the visor and helmet provides one or both of (a) the bias and/or (b) the capture and release functionality.

[0033] In one embodiment of the invention the bias is quite distinct from a latch mechanism that can capture the visor relative to the helmet but which requires movement of part of the latch further into the latching assembly in order to effect release from the captive state.

[0034] In one further aspect of the invention is a method of using a helmet of the present invention.

[0035] In a further aspect of the invention is substantially described in any of the figures below.

[0036] Other aspects of the invention may become apparent from the following description which is given by way of example only and with reference to the accompanying drawings.

[0037] As used herein, the term "visor" can be used interchangeably with other terms such as "face shield", "eye guard", eye protector", or "face guard".

[0038] As used herein the term "helmet" can refer to either the full helmet (e.g. liner plus shell), or a component of the helmet such as the liner, or even a multi-level shell assembly.

[0039] As used herein, the term "biased condition" means the condition (e.g. raised or lowered visor) that something (e.g. a visor) favours.

[0040] The term "comprising" as used in this specification and claims means "consisting at least in part of". When interpreting statements in this specification and claims which include that term, the features, prefaced by that term in each statement, all need to be present but other features can also be present. Related terms such as "comprise" and "comprised" are to be interpreted in the same manner.

[0041] In this specification, where reference has been made to external sources of information, including patent specifications and other documents, this is generally for the purpose of providing a context for discussing the features of the present invention. Unless stated otherwise, reference to such sources of information is not to be construed, in any jurisdiction, as an admission that such sources of information are prior art or form part of the common general knowledge in the art.

[0042] To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0043] The invention will now be described by way of example only and with reference to the drawings in which:

[0044] FIG. **1** shows a visored helmet assembly of a first embodiment of the present invention with the visor in its raised condition,

[0045] FIG. **2** shows a visored helmet assembly of FIG. **1** with the visor in the lowered (operational) condition,

[0046] FIGS. **3**A-**3**F show a biasing mechanism of the present invention as a spring actuated biasing mechanism,

[0047] FIGS. **4**A-**4**E show a locking mechanism,

[0048] FIGS. **5** and **6** show the actuation of a locking mechanism,

[0049] FIGS. **7**A-**7**E show a locking mechanism with different embodiments of the present invention,

[0050] FIGS. **8** and **8**B show a cross section through a helmet component of the present invention,

[0051] FIGS. **9**A and **9**B show a damper mechanism of the present invention,

[0052] FIG. **10** shows a front perspective view of a helmet utilising a damper mechanism as shown in FIGS. **9**A and **9**B,

[0053] FIG. **11** shows a damper mechanism of an alternate embodiment of the present invention,

[0054] FIG. **12** shows a damper mechanism of an alternate embodiment of the present invention.

[0055] FIG. **13** shows a side view of a protective helmet incorporating a damper mechanism.

[0056] FIG. **14** shows a front view of a protective helmet showing a damper mechanism and a locking mechanism.

[0057] FIG. **15** shows a side view of a protective helmet incorporating a visor attachment mechanism of a second embodiment of the present invention (whole of visor not shown) with the visor in the lowered condition,

[0058] FIG. **16** shows an exploded view of a visored helmet assembly of FIG. **15**,

[0059] FIG. **17**A-**17**C show a base plate of the visored helmet assembly mechanism of FIG. **15**,

[0060] FIGS. **18**A and **18**B show a moving plate of the visored helmet assembly of FIG. **15**,

[0061] FIGS. **19**A and **19**B show a top and bottom view (respectively) of a pivot plate of the visored helmet assembly mechanism of FIG. **15**, and

[0062] FIG. **20** shows a guide tag of the visored helmet assembly mechanism of FIG. **15**

DETAILED DESCRIPTION OF THE INVENTION

[0063] Shown in FIGS. **1** and **2** is a visored helmet assembly **1** comprising a visor **2**, a locking mechanism **3**, a visor attachment **4**, and a biasing mechanism **5**. FIG. **1** shows a helmet visor assembly with the visor **2** in the raised position with the visor captured by the locking mechanism **3**. FIG. **2** shows the visor **2** of the helmet visor assembly in the lowered (operational) position following release by the locking mechanism **3**.

[0064] While FIGS. **1** and **2** show a visor attachment about a single pivot point **6** it should be appreciated that various visor attachment mechanisms could be used, including those having multiple pivoting points or visors that are articulated. The important feature is that the visor **2** can be moved between either a raised or a lowered position.

[0065] The visor attachment **4** shown in FIGS. **1** and **2** is formed by a single plate that is attached to the visor **2** where the visor attachment **4** rotates about the pivoting point **6** which doubles as the attachment to fix the visor attachment **4** to the helmet **27**. It should be appreciated that the visor **2** and visor attachment **4**. could be formed as a single unitary piece.

[0066] It should also be appreciated that the visor **2** (if a unitary piece) or visor attachment **4** can attach to any part of the helmet, so long as the visor can move between the lowered and raised state. For example, the visor **2** or visor attachment **4**, and associated mechanism, could attach to the inner or outer layer of the liner, or the inner or outer layer of the shell.,

[0067] In one embodiment the biasing mechanism **5** moves the visor **2** to either its raised or lowered condition. Various biasing mechanism **5** could be used such as springs, magnets, compressed fluid gravity, and elastic materials. For bias caused by springs, the springs could be compression or tortional springs such as a coil spring or a leaf spring. For a bias mediated by a. magnet it could by through the use of the repulsive force caused when two magnets of the same poles are in close proximation. For elastic mediated bias this could be through the use of elastic materials that are stretched when in the locked position such that when taken out of the locked position the visor moves towards its bias position. It should be appreciated that a person skilled in the art may be aware of other mechanisms that give rise to a movement bias and that any of these other mechanisms could be used.

[0068] Shown in FIGS. **3**A-**3**F is the use of a spring mechanism to operate the visor **2** biasing movement. The mechanism generally consists of the visor **2** that attaches to a visor attachment **4** by fastening means. As stated above, it should be appreciated that the visor **2** and the visor attachment **4** could be formed unitarily, or as multiple pieces as shown in FIG. **3**A.

[0069] Shown in FIGS. **3**A-**3**F, the mechanism includes a pivot point **6** that doubles as the attachment of the visor attachment **4** to the helmet. The spring **7** operates the spring force between the visor attachment **4** and the helmet spring attachment plate **8**.

[0070] FIGS. **3**C and **3**F show two different methods for attaching the spring to the helmet using a spring attachment plate **8** as a sandwiching protuberances that extend either side of the spring with the spring then extending into the helmet as shown in FIG. **3**C, or as a covering plate that sandwiches the spring between the spring attachment plate **8** and the helmet **27**.

[0071] It should be appreciated that the bias mechanism **5** can be designed to bias the movement of the visor **2** to in either the retracted (raised) or lowered (operational) condition.

[0072] FIGS. **4**-**6** show examples of a locking mechanism **3** that can be used to capture the visor when the visor is moved against its bias. Shown in FIGS. **4**A, **5**, and **6** is a touch latch mechanism. These provide for the capture of the visor **2** when inserted into the capturing part of the locking mechanism **3**. The locking mechanism **3** generally comprises a visor tab **9** and a latch **10** into which the tab **9** is inserted for the tab to be captured by the latch **10**. Once captured in place the visor **2** can be pushed further against its bias causing the latch **10** to release the tab **9** allowing the visor **2** to move in a direction of its bias. FIG. **4**A shows a tab utilising a corresponding hole and projection type locking mechanism **3** whereas FIGS. **4**C-**4**F show the use of a tab **9** utilising a hooked end.

[0073] As seen in FIGS. **7**A-**7**F is an alternative embodiment of the locking mechanism. As seen in FIG. **7**A, the latch could be moulded into the helmet such that it can be moved into the "capture" position as shown in FIG. **7**B. By having the mounting moulded into the plastic of the helmet the latch **10** can be attached to the helmet **27** using a living hinge. FIGS. **7**C and **7**D show an alternative locking mechanism where the latch captures a tab which is then internalised into the latch along with the capturing part of the latch **10**. Release of the tab has been mentioned previously wherein the visor tab is pushed in the direction of the latch (i.e. against the bias mechanism) causing the latch **10** to release the tab allowing the visor **2** to move in the direction of its bias.

[0074] FIGS. **7**C and **7**D show a latch formed using a moulded mounting wherein the touch latch **10***a* portion of the latch **10** is inserted into a mounting case **10***b*. This allows the mounting case of the latch to be unitarily moulded with the helmet and the touch latch is later affixed into the mounting case to form the touch latch capturing lock. It should be appreciated that the latch **10** does not have to be unitarily moulded with the helmet and could instead be slotted into the helmet as shown in FIG. **7**E.

[0075] FIGS. **8**A and **8**B show two examples of the mounting onto the helmet **27** wherein the capturing part of the latch **10** can be formed, into the helmet **27** as a unitary piece.

[0076] It should be appreciated that the locking mechanism **3** can be situated anywhere on the helmet that allows the visor **2** to be captured into position when moved against its bias. While FIGS. **1**, **2**, **7**A, and **7**B show the locking mechanism situated on the helmet **27** in the middle of the helmet the locking mechanism **3** could be, for example, formed with the visor attachment **4** and bias mechanism **5** on the side of the helmet. It should be appreciated that the bias mechanisms **5** and locking mechanisms **3** could be part of a single mechanism.

[0077] Likewise, it should be appreciated that the biasing mechanism **5** could be situated anywhere on the helmet. For example, by use of elastic or magnetic bias mechanisms the mechanism could be situated on the upper rim of the helmet **27** where the upper surface of the visor **2** contacts when in the retracted position. Use of an elastic biasing mechanism could bias the visor in the upward position utilising a locking mechanism when the visor **2** is in the lowered (operative) position.

[0078] Alternately, the helmet **27** could utilise a magnetic based biasing mechanism **5** such that when the visor **2** is in the raised position magnets on the top surface of the visor **2** come into close proximity with magnets on the lower edge of the helmet. If these magnets are both of the same pole they will repel each other such that when unlocked the visor **2** will be pushed away from the helmet locking position into the lowered position. In this embodiment the visor **2** would be locked when in the raised position.

[0079] A person skilled in the art should appreciate that various different combinations of biasing mechanisms and locking mechanisms can be utilised whether the visor **2** is biased to the lowered (operational) or raised (retracted) position with locking occurring when either the visor **2** is in the lowered or raised position. The important feature is that the locking occurs when the visor **2** is moved against its bias condition such that when pushed against its bias the visor **2** is released allowing the visor **2** to move towards its bias condition.

[0080] As seen in FIGS. **9**A and **9**B the visor helmet assembly **1** can also utilise a damper mechanism **11** that controls the rate of movement of the visor **2** towards its bias condition.

[0081] As seen in FIG. **9**B the damper **11** could be a rotating damper that operates as a "cog" with corresponding teeth on the attachment plate **4**. FIG. **9**A shows the interaction of the damper **11** with the attachment plate **4**. A damper typically utilises rotational inhibition that lowers the rate of rotation of the damper. The damper **11** can be placed in the same plane as the attachment plate **4** as seen in FIG. **9**A or, it could be placed as a horizontal damper set up as shown in FIG. **11**. Alternatively, the damper **11** could be sandwiched between the visor **2** and the helmet as shown in FIG. **12** such that the visor **2** moves over the damper **11**.

[0082] It should be appreciated that the damper can interact and form part of the attachment mechanism as shown in FIG. **10** or it could be placed on the helmet separate to that of the attachment and bias **5** mechanisms.

[0083] In one embodiment the damper **11** and the spring **5** interacts with the visor attachment **4**. Preferably the damper **11** and the spring **5** are both located on one side of the helmet to interact with the same visor attachment **4**. In an alternate embodiment the damper maybe placed on one side of the helmet to interact with on visor attachment plate **4** and the spring is situated on the other side of the helmet to associate with the other visor helmet attachment plate **4**.

[0084] The mechanism described above comprises the central features of a biasing mechanism **5** and a locking mechanism **3** and wherein the locking of the visor **2** occurs when the visor is moved against its bias.

[0085] The damper mechanism **11** can also incorporate the locking mechanism **3** such that the damper is a stop damper. The advantage of this system is that a single mechanism both dampens movement and captures the visor.

[0086] The further important feature is that the visor **2** is released from the locking mechanism **3** by the user pushing the visor **2** in a direction against its bias that releases the visor **2** and allows it to move towards its bias condition.

[0087] An optional addition is the use of a damper **11** that controls the rate of movement of the visor **2** when moving towards its bias.

[0088] The helmet mechanism may also include a rotational stop **28** that restricts the rotation of the visor. As seen in FIG. **13** the rotational stop could be an adjustable stop or it could be placed on the front edging of the helmet to interact directly with the visor.

[0089] In a second embodiment, as shown in FIG. **15**, the bias **5** and locking mechanism **3** are formed as part of the same mechanism. As seen in FIG. **15**, the visor helmet assembly **1** is formed wherein the visor **2** connects to the pivot point **6**, either as a unitary moulding or as separate pieces, and wherein there is a biasing mechanism **5** that biases the moving plate **12** to either a raised or lowered position by moving the moving plate **12** about the pivot point **6**. As shown in FIG. **15** the moving plate **12** is guided in its movement by a corresponding interaction with a base plate **13**.

[0090] FIG. **29** shows this mechanism as an exploded view having a base plate **13** that attaches to the helmet. The moving plate **12** sandwiches the visor between the moving plate **12** and the base plate **13**. The movement of the moving plate **12** is guided by the base plate **13** and specifically through the use of a guide tag **15** that runs along a track **16** in the base plate. It is the interaction of the guide tag **15** and the track **16** (and more specifically the locking part **3** of the track **16**) that locks the moving platel**2** into position. The mechanism further includes a visor attachment clip **17** that has projections on its underside that locks the visor **2** onto the moving plate **12**. The spring **5** is attached into place using a pivot boss **18** and then fasteners **14** keep the entire assembly together. A visor positioning adjustment screw **19** can be used to adjust the position of the visor **2** in its raised or lowered position. FIGS. **15**A-**17**C show a base plate **13** of this embodiment. As seen within the base plate **13** there is a guiding track **16** in which the guide tag **15** moves. In this particular embodiment the guide tag **15** moves from a lateral position counter clockwise, as shown by the direction arrow **28**, to the locking mechanism and then locks into place. Pressing of the visor against the directional bias disengages the guide tag **15** from the locking portion **3** and allows the guide tag **15** to complete its movement in the counter clockwise **28** direction.

[0091] FIGS. **16**A and **16**B show a moving plate **12** of this particular embodiment. The moving has rivet holes for attachment of the visor attachment clip **17** and it has a track projection **22** that engages into the movement track **23** of the base plate **13** that guides the moving plate as it rotates around the pivot point **6**.

[0092] Seen in FIGS. **17**A and **17**B is a visor attachment clip **17**. The visor attachment clip **17** has projections **24** that engage with the rivet holes **21** of the moving plate **12**. This visor attachment clip **17** holds the visor in fixed connection with the moving plate **12**. It should be appreciated that the moving plate **12** and the visor **2** could be formed as a unitary piece.

[0093] Shown in FIG. **20** is a guide tag **15**. The guide tag has a projection **25** which attaches it to the moving plate. The guide tag **15** has a guiding projection **26** that moves within the guiding track **16** of the base plate **13**. When rotated about the moving track **16** it is the projection **26** that locks into place of the locking portion **3** of the base plate **13**.

[0094] Described above in the second embodiment of the invention is a mechanism that is assembled together that comprises each of the biasing mechanism **5**, the attachment mechanism **4**, and the locking mechanism **3**. It is the movement of the guide tag **15** about the movement track **16** as the visor **2** is raised and lowered which also provides for the locking mechanism **3**, as the guide projection **26** interacts with the locking part **3** of the base plate **13**. Movement of the visor **2** against its bias (i.e. in the upwards direction) disengages the guiding projection **26** from the locking portion **3** of the base plate **13** allowing the guide tag **15** to continue its anti clockwise movement **28** about the guiding track **16** towards the lateral position **20** which equates to the lowered position of the visor **2**.

[0095] In one embodiment the visor includes a visor downwards rotational stop. This can be used to allow a wearer to adjust the extent of downwards movement of the visor. Preferably the visor downwards rotational stop is accessible to the user when the helmet is being worn. More preferably the visor downwards rotational stop is locatable and accessible on the outside of the helmet.

[0096] In one embodiment the visor downwards rotational stop is a screw.

[0097] In one embodiment the visor downwards rotational stop is located between the helmet liner and the shell of the helmet. More preferably the visor downwards rotational stop is located just on the inside edge between the helmet liner and the shell of the helmet.

[0098] The components can be formed from various materials. For example, the spring can be formed from a metal or in fact from a resilient plastic. The visor and helmet are formed from materials which can vary from country to country depending on the particular standards enforced in those countries for safety equipment. The use of plastic injection moulding to form the various components of the helmet and visor assembly could be used. Alternatively, metal components could be used a more robust mechanism was desired.

[0099] The visor helmet assembly of the present application could be used in conjunction with multilevel helmet assembly such as that described in our PCT international application WO 2005/120265 and WO 2006/000283. The

helmet could also be used in combination with support and rotatable holder assemblies as described in our PCT application WO 2006/000076.

[0100] The advantage of the present invention is that it allows a user to rotate the visor **2** between a raised or lowered position by merely pushing the visor against its bias.

[0101] In one embodiment the visor is biased to its lowered (operational) position and is locked when it is in its raised position. A user such as a fireman wearing heavy gloves can raise the visor by merely pushing up on the lower edge of the visor until the visor locks into place. To lower the visor the user merely needs to once again push on the lower surface of the visor, against the bias, which disengages the visor from the touch latch allowing the visor to move downwards into its operational position. Furthermore, the use of a damper can control the descent of the visor. The system is clearly advantageous over known systems as it does not require the user to manipulate a dial or the like and merely requires the user to push on the visor. This has many clear advantages and applications, especially when in a safety situation when raising or lowering the visor is required quickly. The main advantage is it does not require the user to manipulate mechanisms that are not easily manipulated when the user is wearing heavy gloves. This mechanism also makes redundant the provision of oversize dials or levers on the side of helmets which have been utilised to allow easy manipulation by users wearing gloves. Such projections, while making it easy of the user to move the visor into a raised or lowered position, can create safety problems when, for example a fireman, is moving in a dangerous environment.

[0102] It should also be appreciated that a ratcheting mechanism could be incorporated into the above mechanism. For example, when in the lowered (bias) position a ratchet mechanism could be utilised whereby the user could raise the visor successively between indexed positions until it reaches a locked position.

[0103] As mentioned above, the above invention gives provision for mounting the various components within the helmet structure itself or attached to the outside of the helmet. Various parts of the component could be unitarily moulded with the helmet further reducing the cost of the components and making manufacturing easier. For example, the locking mechanism could be unitarily moulded onto the helmet.

[0104] The helmet is preferably designed to provide protection for those types of rescue and fire fighting commonly known as bushfire, RTA (road transport accident), USAR (urban search and rescue/civilian rescue operations) MEDIVAC (medical rescue and evacuations) etc, where the risk of serious impacts or high risk fire and/or thermal threats are relatively low. To these common low level fire and rescue threats, the helmet preferably specifically adds protection from head injuries in the event of accidents involving emergency services vehicles.

[0105] In a preferred form the purpose of the visor mechanism is to easily facilitate the rotation of the visor from a stored position to an "in-use" position by the helmet wearer so that in doing so the use of the visor is quickly, and in the most practical manner, made ready for use.

[0106] Because most visors in the "in-use" position are very close to the face, and may even touch the face around the wearers eyes (in order to prevent injury), the control of the rotation to the correct "in-use" position is very important. Frequently rescue workers are under extreme pressure and have only moments to adjust their PPE (Personal Protective Equipment) in order to protect themselves. Therefore, the activation and rotation of the visor to its correct "in-use" position while wearing other PPE (gloves etc) and with the minimum of thought and preparation on the part of the wearer is vital. This invention relates to a method of hinging the visor and controlling the method of rotation so that:

[0107] (1) At all times when not in use the visor stands ready for activation,

[0108] (2) A simple touch by the wearer activates the visor to move to an "in-use" position.

[0109] (3) The rotation of the visor to the "in-use" position is such that it both lowers in an automated manner and is controlled both as to speed, and final resting position as pre-determined by the wearer, and

[0110] (4) When no longer required in the "in-use" position can be returned to the stored position by the wearer, ready to be activated again when required.

[0111] Dependent upon the requirements of safety standards in the relevant jurisdiction, and the operational requirements of the user themselves, attachments and other components can be provided including a Level 2 shell, lighting, (hands-free torch or flash-light), rank markings, reflective trims etc.

[0112] The addition of further levels of protection is dependant on the circumstances of the emergency call-out. Once again, the principle is that additional protection can be added to the basic helmet without the requirement to discard earlier protective components. Not only is the wearer able to retain the lower levels of helmet on their head at all times, but the additional levels of protection can be selected or even discarded as the scene changes or evolves.

[0113] Although the invention has been described with reference to particular embodiments, it is to be understood that modifications and/or improvements may be made without departing from the scope or spirit of the invention.

1-21. (canceled)

22. A visored helmet assembly of a kind where the visor can be articulated or pivoted between a raised or lowered condition, and

wherein the visor is biased to move to a lowered condition, and

wherein the visor has a locking mechanism that can hold the visor captive in one said condition when moved in that direction yet can be caused to release the visor from such captive state by the visor being moved further in that same direction.

23. A visored helmet of claim **22** wherein the visor can be captive in its raised condition yet can be released from such captive state, to then move under the action of the bias, by being raised beyond its captive raised condition.

24. A visored helmet of claim **22** wherein the locking mechanism comprises at least one formation locatable on the visor that is interengagable with one or more complimentary formation locatable on the helmet.

25. A visored helmet of claim **24** wherein the helmet and visor formations can be described as (a) male flange and (b) female coupler.

26. A visored helmet of claim **25** wherein the male flange is locatable on the visor and the female coupler is locatable on the helmet.

27. A visored helmet of claim **25** wherein the male flange is locatable on the helmet and the female coupler is locatable on the visor.

28. A visored helmet of claim **25** wherein the helmet formation is formed integrally with the helmet.

29. A visored helmet of claim **22** wherein the locking mechanism is a catch latch.

30. A visored helmet of claim **29** wherein the catch latch is located on the helmet and interacts with its corresponding member on the visor.

31. A visored helmet of claim **22** wherein the visor assembly includes a damper.

32. A visored helmet of claim **31** wherein the damper is interactively adjacent, or part of, the visor pivot point.

33. A visored helmet of claim **31** wherein the damper comprises a cog that interacts with a tooth rack on the visor or on a visor attachment plate.

34. A visored helmet of claim **31** wherein the damper is a stop damper.

35. A visored helmet of claim **22** wherein the biasing mechanism is a spring, magnet, compressed fluid or elastic material.

36. A visored helmet of claim **22** wherein the articulated or pivot point of said visored helmet assembly comprises said articulated or pivot point and said biasing means.

37. A visored helmet of claim **22** wherein the articulated or pivot point includes the locking mechanism.

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