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(54) Title: HELMET MOUNTED VISOR

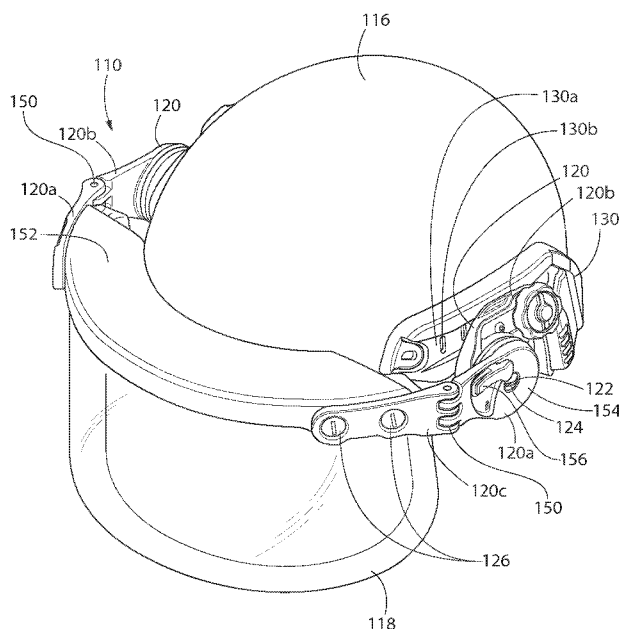


FIG. 9

(57) Abstract: A helmet mounted visor includes a lens that may be configured to extend across substantially all of a user's face. The helmet mounted visor may include a pair of mount arms coupled to the lens and each configured to releasably mount to a mount attached to a helmet. The pair of mount arms may each including first, second and third portions. The first portion may be rotatably coupled to the second portion about a first axis. The first portion may be rotatably coupled to the third portion about a second axis. The second axis may be generally perpendicular to the first axis. A locking mechanism may be provided and configured to selectively retain the first portion relative to the second portion in and between a use position where the lens is positioned in front of the user's face and a stowage position where the lens is positioned proximate the top of the helmet.

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## TITLE OF THE INVENTION

[0001]

Helmet Mounted Visor

## CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] This application claims the benefit of U.S. Provisional Patent Application No.

5 62/061,823 filed October 9, 2014 entitled “Helmet Mounted Visor”, which is incorporated by reference herein in its entirety.

## FIELD OF THE INVENTION

[0003] The present invention generally relates to a helmet mounted visor. In some embodiments, the helmet mounted visor is a ballistic ocular shield that removeably mounts to a  
10 ballistic helmet.

## BRIEF SUMMARY OF THE INVENTION

[0004] In one embodiment there is a helmet mounted visor comprising a lens configured to extend across substantially all of a user’s face; and a pair of mount arms coupled to the lens and each configured to releaseably mount to a mount attached to a helmet. In one embodiment, the pair  
15 of mount arms each include first and second portions, the first portion being rotatably coupled to the second portion. In one embodiment, the first portion is configured to be rotated between and held in two or more positions relative to the second portion. In one embodiment, the two or more positions include a use position where the lens is positioned in front of the user’s face and a stowage position where the lens is positioned over a top surface of the helmet. In one embodiment, the two or more  
20 positions include a middle position where the lens is positioned between the use position and the stowage position. In one embodiment, at least one of the pair of mount arms includes a locking mechanism configured to lock the first portion relative to the second portion. In one embodiment, the locking mechanism includes a drum brake. In one embodiment, the locking mechanism includes a lever configured to selectively lock and release the drum brake.

25 [0005] In one embodiment, the first portion is rotatable relative to the second portion about a first axis and the pair of mount arms each include a third portion, the first portion being rotatably coupled to the third portion about a second axis, the second axis being generally perpendicular to the first axis. In one embodiment, the mount is a rail. In one embodiment, the rail is attached to the helmet using fasteners that extend through existing holes in the helmet. In one embodiment, the pair  
30 of mount arms each include a projection configured to attach to a groove in the mount in a plurality

of positions along the groove. In one embodiment, a position of the projections are adjustable relative to the pair of mount arms. In one embodiment, the lens has a thickness of at least approximately 28 mm. In one embodiment, the lens has a height of at least approximately 127 mm. In one embodiment, the mount arms are configured to mount to the helmet to position the lens at a plurality of distances from the user's face. In one embodiment, a flange is mounted to the top of the lens and extends toward the mount arms.

[0006] In another embodiment there is a helmet mounted visor comprising: a lens; a pair of mount arms coupled to the lens and each configured to releasably mount to a mount attached to a helmet, the pair of mount arms each including first, second and third portions, the first portion being rotatably coupled to the second portion about a first axis, the first portion being rotatably coupled to the third portion about a second axis, the second axis being generally perpendicular to the first axis; and a locking mechanism configured to selectively retain the first portion relative to the second portion in and between a use position where the lens is positioned in front of a user's face and a stowage position where the lens is positioned proximate a top of the helmet.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] The following detailed description of embodiments of the helmet mounted visor will be better understood when read in conjunction with the appended drawings of an exemplary embodiment. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown.

[0008] In the drawings:

[0009] Fig. 1 is a perspective view of a helmet mounted visor and mounting halo as known in the prior art shown mounted to a helmet;

[0010] Fig. 2 is a perspective view of a helmet mounted visor in accordance with an exemplary embodiment of the present invention shown mounted to a helmet and in the use position;

[0011] Fig. 3 is a perspective view of the helmet mounted visor shown in Fig. 2;

[0012] Fig. 4 is a partial left side view of the helmet mounted of Fig. 2 shown mounted to a helmet, in the use position, and with an outer portion of the joint removed for clarity;

[0013] Fig. 5 is a right side view of the helmet mounted visor of Fig. 2 shown in the use position;

[0014] Fig. 6 is a left side view of the helmet mounted visor of Fig. 2 shown mounted to a helmet and in the use position;

[0015] Fig. 7 is a left side view of the helmet mounted visor of Fig. 2 shown mounted to a helmet and in the middle position;

[0016] Fig. 8 is a left side view of the helmet mounted visor of Fig. 2 shown mounted to a helmet and in the stowage position;

5 [0017] Fig. 9 is a perspective view of a helmet mounted visor in accordance with an exemplary embodiment of the present invention shown mounted to a helmet and in the use position;

[0018] Fig. 10 is a perspective view of the helmet mounted visor shown in Fig. 9;

[0019] Fig. 11 is a right side view of the mount arms of helmet mounted visor of Fig. 9 shown in the use position;

10 [0020] Fig. 12 is a partial left side view of the helmet mounted visor of Fig. 9 shown with an outer portion of the joint removed showing the lock in the unlocked position;

[0021] Fig. 13 is a partial left side view of the helmet mounted visor of Fig. 9 shown with an outer portion of the joint removed showing the lock in the locked position;

[0022] Fig. 14 is a left side view of the helmet mounted visor of Fig. 9 shown mounted to a helmet and in the use position;

[0023] Fig. 15 is a left side view of the helmet mounted visor of Fig. 9 shown mounted to a helmet and locked in the middle position; and

[0024] Fig. 16 is a left side view of the helmet mounted visor of Fig. 2 shown mounted to a helmet and locked in the stowage position.

## 20 DETAILED DESCRIPTION OF THE INVENTION

[0025] Referring to Fig. 1, a helmet mounted visor 12, also referred to as ballistic ocular shield or 9 mm ballistic face shield, is designed to protect a user's face and eyes from ballistic projectiles and other objects. In some instances, the helmet mounted visor 12 includes a lens 18 designed to protect a user's face and eyes from a 9 mm, 124 grain full metal jacket (FMJ) projectile. The lens 18  
25 may be designed to protect a user's face from other projectiles such as a 10.9 mm ("44 Mag") projectile. The lens 18 may provide ballistic protection levels of V0 1400 feet per second (FPS), level IIIA velocity or V0 1175 FPS, level II Velocity. The level III A version may also defeat with no penetration V0 the 17 grain fragmentation simulator at a minimum velocity of 2000 FPS. The V0 1400 feet per second lens weighs approximately 54.2 ounces and the V0 1175 feet per second  
30 lens weighs approximately 44.7 ounces.

[0026] The helmet mounted visor 12 attaches to a helmet 16. Traditional helmet mounted visors 12 attach to the helmet 16 via a very bulky "halo" system 14 which includes a plastic band that

wraps around the helmet 16 and is secured to the helmet 16 via a ratcheting band. The halo system 14 does not fit one helmet to the next consistently. Additionally, any mounts such as shrouds and rails must be removed from the helmet 16 before using the halo system 14 which may take time and defeat the ability of the mounts to provide additional helmet utility.

5 [0027] Referring to the drawings in detail, wherein like reference numerals indicate like elements throughout, there is shown in Figs. 2-8 a helmet mounted visor, generally designated 10, in accordance with a first exemplary embodiment of the present invention.

[0028] Referring to Fig. 3, the helmet mounted visor 10 includes a lens 18. In one embodiment, the lens 18 is configured to extend across substantially all of a user's face. In one embodiment, the  
10 lens 18 is curved to extend across the front and sides of the user's face. The lens 18 may be transparent. In other embodiments, the lens 18 has a tint. The lens 18 may be frameless. In other embodiments, the lens 18 may include a frame extending around at least a portion of the outer periphery. In one embodiment, the lens 18 is approximately 28 mm thick, 280 mm wide and 127 mm high. In one embodiment, the lens 18 is approximately 150 mm or approximately 178 mm  
15 high. In one embodiment, the lens 18 is comprised of a ballistic material such as a polycarbonate substrate with an acrylic laminate.

[0029] The helmet mounted visor 10 may include a pair of mount arms 20 coupled to the lens 18 and each configured to releaseably mount to a mount 30 attached to a helmet 16 (see Fig. 2). The pair of mount arms 20 may each include first and second portions 20a, 20b, where the first portion  
20 20a is rotatably coupled to the second portion 20b about joint 22. A fastener 24 may extend through the joint 22. The first portion 20a may rotate relative to the second portion 20b about an axis of the fastener 24. In one embodiment, the first portion 20a is configured to be rotated relative to the second portion 20b between and held in two or more positions. The two or more positions may include a use position where the lens is positioned in front of the user's face (Figs. 2 and 4) and a  
25 stowage position where the lens is positioned proximate the top of the helmet (Fig. 8). The helmet mounted visor 10 may also include a sighting or middle position where the lens 18 is positioned between the use position and the stowage position (Fig. 7).

[0030] Referring to Fig. 3, an end of the first portion 20a may be attached to the lens 18 using one or more fasteners 26. In one embodiment, the first portion 20a is coupled to a rear surface of the  
30 lens 18 and two fasteners 26 extend through the lens 18 to a front surface of the lens 18. The first portion 20a may include one or more apertures 28. In one embodiment, the one or more apertures 28 is generally triangular. The one or more apertures 28 may be included to reduce the weight of the first portion 20a while maintaining its strength. A second end of the first portion 20a may be

coupled to the second portion 20b by joint 22. Second portion 20b may be configured to releaseably attach to a mount 30 (see Fig. 2).

[0031] Referring to Fig. 2, in one embodiment, the mount 30 is a rail. In one embodiment, the mount 30 is attached to the helmet 16 using fasteners that extend through existing holes in the helmet 16. In one embodiment, the mount 30 is attached to the helmet 16 using a helmet cover. In one embodiment, the mount 30 extends only partially around the perimeter of the helmet 16. In one embodiment, the mount 30 is configured to attach additional accessories such as lights, communication devices, and mandible shields, to the helmet 16. The mount 30 may be a rail similar to the rails disclosed in U.S. Patent No. 7,849,517, which is hereby incorporated by reference in its entirety.

[0032] Referring to Fig. 3, the second portion 20b may include a dove tail shaped projection 32 configured slide into and attach to a corresponding dove tail shaped groove in the mount 30. The second portion 20b may be mounted to the mount 30 in one of a plurality of positions along the mount 30 such that the distance between the user's face and the inside surface of the lens 18 is adjustable. In one embodiment, the projection 32 is locked or retained in the groove of the mount 30 by a locking mechanism 34. The locking mechanism 34 may include a leaf spring having a projection 34a that is configured to mate with one of a plurality of indentations along the length of the mount 30 and prevents the second portion 20b from being slid laterally relative to the mount 30. In one embodiment, pulling a tab 34b (see Fig. 5) of the locking mechanism 34 outwardly from the mount 30 releases the locking mechanism 34 (e.g., uncouples the projection 34a from an indentation in the mount 30) and allows the second portion 20b to be slid along the groove of the mount 30.

[0033] In one embodiment, the first and second portions 20a, 20b are comprised of metal. In one embodiment, the first and second portions 20a, 20b are comprised of aluminum. The first and second portions 20a, 20b may be comprised of metal and have a plastic overmold. In other embodiments, the first and second portions 20a, 20b are comprised entirely of plastic.

[0034] Referring to Fig. 4, in one embodiment, at least one of the mount arms 20 includes a locking mechanism 20c configured to lock the first portion 20a relative to the second portion 20b. The locking mechanism 20c may be slideably coupled to the second portion 20b and spring biased toward the first portion 20a. The locking mechanism 20c may be coupled to the second portion 20b by the fasteners 38 and include corresponding apertures 20d that allow for the locking mechanism 20c to slide away from the first portion 20a. The locking mechanism 20c may include a projection 44 that is configured to extend into indentations 46a, 46b, 46c that correspond to the use, middle, and stowage positions of the helmet mounted visor 10 respectively. In one embodiment, the

projection 44 extends into the first indentation 46a in the use position, into the second indentation 46b in the middle position, into the third indentation 46c in the stowage position. To unlock the mount arm 20 from the use position for example, the user pulls the locking mechanism 20c back away from the first portion 20a such that the projection 44 is removed from the first indentation 46a, rotates the first portion 20a clockwise relative to the second portion 20b to the middle position and then releases the locking mechanism 20c such that the spring biases the locking mechanism 20c toward the first portion 20a and the projection is inserted into the second indentation 46b preventing further movement of the first portion 20a relative to the second portion 20b.

[0035] The first portion 20a may include a slot 40 that receives a pin 42 extending from the second portion 20b. The slot 40 and pin 42 may be configured to prevent the first portion 20a from rotating relative to the second portion 20b past predetermined limit angles or positions (e.g., between parallel and perpendicular). The locking mechanism 20c may include a plurality of ridges 48 to provide enhanced grip with the user's hand or thumb while releasing the locking mechanism 20c.

[0036] Referring to Fig. 5, the second portion 20b may include an additional mount portion 36. The mount portion 36 may be attached to the second portion 20b with one or more fasteners 38. The mount portion 36 may include one or more features 36a such as grooves and/or projections that allow for additional accessories to be attached to the second portion 20b. In one embodiment, the one or more features 36a include a plurality of vertical grooves and ridges. In one embodiment, the mount portion 36 includes a portion of a Picatinny rail.

[0037] Referring to Fig. 6, the helmet 16 may be any type of head protection helmet known in the art, for example, those used for sporting, police, or military purposes. In certain embodiments, helmet 16 is a standard infantry ballistic helmet. In some embodiments, helmet 16 is an advanced combat helmet (ACH), a modular integrated communications helmet (MICH), a tactical ballistic helmet (TBH) II helmet, a lightweight marine helmet, a personnel armor system for ground troops (PASGT) helmet or police general duty helmets.

[0038] In some embodiments, by using mount arms 20a, 20b to attach the lens 18 to a mount 30 rather than using a halo system increases stability, reduces bulk, allows for usage with different helmets, and allows for the mounts 30 to remain on the helmet. In addition, a significant weight savings may be achieved. A traditional 9mm visor kit such as the one shown in Fig. 1 weighs approximately 1,464 grams. While, in some embodiments, the helmet mounted visor 10 weighs less than approximately 1,264 grams. In addition, the helmet mounted visor 10 may be operated with

one hand to adjust the lens from a fully closed or use position, to a fully open or stowage position to a middle position.

[0039] Fig. 6 shows the helmet mounted visor 10 in the use position from a side view. In one embodiment, the first portion 20a is generally parallel to the second portion 20b in the use position.

5 As the locking mechanism 20c is moved to the aft position with the user's thumb, the lens 18 can pivot up as shown in Figs. 7 and 8. Releasing the locking mechanism 20c and pivoting the lens 18 can be accomplished with one hand of the user. The thumb of the user pushes back on the release mechanism 20c in the aft direction while the fingers or palm of the hand pivot up the lens 18 relative to the second portion 20b.

10 [0040] Fig. 7 shows the helmet mounted visor 10 in the middle position. In one embodiment, the first portion 20a is approximately 45 degrees relative to the second portion 20b in the middle position. Pivoting up the lens 18 into the middle position may allow the user to partially expose their face and provide partial protection while clearing the lens 18 from moisture or dirt on the inside surface, sighting a weapon, communicating more clearly, donning or doffing a gas mask to  
15 the user's face, or accessing food or drink.

[0041] Fig. 8 shows the helmet mounted visor 10 in the fully upright or stowage position. In one embodiment, the first portion 20a is approximately perpendicular to the second portion 20b in the stowage position. Pivoting up the lens 18 into the stowage position may allow the user to substantially expose their face when the lens 18 is no longer needed but not ready to detach the  
20 helmet mounted visor 10 from the helmet 16. Pivoting the lens 18 to the stowage position allows the user to remove the lens 18 from their field of vision while allowing the lens 18 to be quickly deployed to the use position.

[0042] Once pivoted to the desired position, the helmet mounted visor 10 may remain locked in the use, stowage or middle positions such that the first portion 20a does not move relative to the  
25 second portion 20b until the locking mechanism 20c is released.

[0043] Referring to the drawings in detail, wherein like reference numerals indicate like elements throughout, there is shown in Figs. 9-16 a helmet mounted visor, generally designated 110, in accordance with a second exemplary embodiment of the present invention. One or more of the embodiments discussed in reference to the helmet mounted visor 110 described below may be  
30 combined with one or more desirable features of the embodiments discussed in reference to the helmet mounted visor 10 described above.

[0044] Referring to Figs. 9 and 10, the helmet mounted visor 110 includes a lens 118. In one embodiment, the lens 118 is configured to extend across substantially all of a user's face. In one

embodiment, the lens 18 is curved to extend across the front and sides of the user's face. The lens 118 may be transparent. In other embodiments, the lens 118 has a tint. The lens 118 may be frameless. In other embodiments, the lens 118 may include a frame extending around at least a portion of the outer periphery. In one embodiment, the lens 118 is approximately 28 mm thick, 280 mm wide and 127 mm high. In one embodiment, the lens 118 is approximately 150 mm or approximately 178 mm high. In one embodiment, the lens 118 is comprised of a ballistic material such as a polycarbonate substrate with an acrylic laminate.

[0045] The helmet mounted visor 110 may include a pair of mount arms 120 coupled to the lens 118 and each configured to releaseably mount to a mount 130 attached to a helmet 116 (see Fig. 9).

The pair of mount arms 120 may each include first, second, and third portions 120a, 120b, 120c, where the first portion 120a is rotatably coupled to the second portion 120b about joint 122. A fastener 124 may extend through the joint 122. The first portion 120a may rotate relative to the second portion 120b about an axis  $A_1$  of the fastener 124. In one embodiment, axis  $A_1$  is generally parallel to a plane extending through mount arms 120. In one embodiment, the first portion 120a is configured to be rotated relative to the second portion 120b between and held in two or more positions. The two or more positions may include a use position where the lens 118 is positioned in front of the user's face (Figs. 9 and 14) and a stowage position where the lens 118 is positioned proximate the top of the helmet 116 (Fig. 16). The helmet mounted visor 110 may also include a sighting or middle position where the lens 118 is positioned between the use position and the stowage position (Fig. 15).

[0046] The mount arms 120 may be laterally rotatable relative to the lens 18. The mount arms 120 may be rotatable relative to the lens 18 similar to eyeglasses so that the helmet mounted visor 110 may be used with a variety of different sized helmets 116 and/or the mount arms 120 may be folded inwardly when not mounted to the helmet 116 to reduce the overall size of the helmet mounted visor 110. In one embodiment, the first portion 120a is rotatably coupled to a third portion 120c mounted to the lens 18. The first portion 120a may be coupled to the third portion 120c by a hinge 150 having an axis  $A_2$ . In one embodiment, the axis  $A_2$  of the hinge 150 may be generally perpendicular to the axis  $A_1$  of the fastener 124.

[0047] An end of the third portion 120c may be attached to the lens 118 using one or more fasteners 126. In one embodiment, the third portion 120c is coupled to a front surface of the lens 118 and two fasteners 126 extend through the lens 118 to a rear surface of the lens 118. A flange 152 may be provided on the top of the lens 118 that extends back toward the second portions 120b. The flange 152 may be configured to extend from the top of the lens 118 to the external surface of

the helmet 116 to prevent debris from going between the user's face and the inside surface of the lens 118. In one embodiment, the flange 152 has an outer edge that is curved to generally match the contour of the outer surface of the lens 118 and an inner edge that is curved to generally match the contour of the external surface of the helmet 116. In one embodiment, a portion of the flange 152 wraps around the top edge of the lens 118 and is sandwiched between the ends of the third portion 120c and the outside surface of the lens 118 to fasten the flange 152 to the lens 118.

**[0048]** Referring to Fig. 9, in one embodiment, the mount 130 is a rail. In one embodiment, the mount 130 is attached to the helmet 116 using fasteners that extend through existing holes in the helmet 116. In one embodiment, the mount 130 is attached to the helmet 116 using a helmet cover.

In one embodiment, the mount 130 extends only partially around the perimeter of the helmet 116. In one embodiment, the mount 130 is configured to attach additional accessories such as lights, communication devices, and mandible shields, to the helmet 116. The mount 130 may be a rail similar to the rails disclosed in U.S. Patent No. 7,849,517, which is hereby incorporated by reference in its entirety.

**[0049]** Referring to Fig. 11, the second portion 120b may include a projection 132 configured to extend into the groove 130a in the mount 130. In one embodiment the projection 132 is rectangular shaped. In another embodiment, the projection 132 is dove tail shaped. The second portion 120b may be mounted to the mount 130 in one of a plurality of positions along the mount 130 such that the distance between the user's face and the inside surface of the lens 118 is adjustable. In one embodiment, the projection 132 is adjustable toward and away from the lens 118 relative to the mount arm 120 to provide fine tuning of the distance between the user's face and the inside surface of the lens 118. The projection 132 may be locked in place relative to the mount arm 120 by a fastener 132a. In one embodiment, the projection 132 is locked or retained in the groove 130a of the mount 130 by a locking mechanism 134. The locking mechanism 134 may include a knob 134b having an extension arm 134a that is configured to mate with one of a plurality of indentations 130b along the length of the mount 130 and prevent the second portion 120b from detaching from the mount 130. The extension arm 134a may be generally rectangular in shape. In one embodiment, the extension arm 134a extends into an indentation 130b and then the knob 134b is rotated to rotate the extension arm 134a 90 degrees. In one embodiment, twisting the knob 134b also pulls the extension arm 134a closer to the projection 132 to sandwich the rail 130 between the extension arm 134a and the projection 132. In one embodiment, twisting the knob 134b of the locking mechanism 134 in the opposite direction releases the locking mechanism 134 (e.g., uncouples the extension arm 134a from

an indentation in the mount 130) and allows the second portion 120b to be removed from the mount 130.

[0050] In one embodiment, the first, second, and third portions 120a, 120b, 120c are comprised of metal. In one embodiment, the first, second, and third portions 120a, 120b, 120c are comprised of aluminum. The first, second, and third portions 120a, 120b, 120c may be comprised of metal and have a plastic overmold. In other embodiments, the first, second, and third portions 120a, 120b are comprised entirely of plastic.

[0051] Referring to Figs. 12 and 13, in one embodiment, at least one of the mount arms 120 includes a locking mechanism 154 configured to lock the first portion 120a relative to the second portion 120b. The locking mechanism 154 may selectively lock the first portion 120a relative to the second portion 120b in the use position, the stowage position, and any desired middle position between the use and stowage positions. The helmet mounted visor 110 may include one locking mechanism on either side (e.g., on one mount arm 120 or the other) or a locking mechanism 154 on both sides as shown. The locking mechanism 154 may include a drum brake 158. In one embodiment, the drum brake 158 includes a first shoe 158a rotatably coupled to a second shoe 158b about a pin 158c. The first and second shoes 158a, 158b may each include a brake pad 158d, 158e. The first and second shoes 158a, 158b may be coupled by an actuator 160 such as a weak knee joint. The weak knee joint may include two linkages 158f, 158g that are pivotably connected between the first and second shoes 158a, 158b. In the unlocked position (see e.g., Fig. 12), the drum brake 158 is not engaged and the first portion 120a is free to move relative to the second portion 120b. In the locked position (see e.g., Fig. 13), the brake pads 158d, 158e may be frictionally engaged with the inside surface of the housing 154a of the locking mechanism 154 to prevent or at least strongly resist the first portion 120a being moveable relative to the second portion 120b. A lever 156 may be provided for engaging and disengaging the locking mechanism 154. The lever 156 may include an arm 156a that is coupled to the linkages 158f, 158g. In one embodiment, pulling the lever 156 downwardly pivots the linkages 158f, 158g upwardly and into the locked position. In one embodiment, pushing the lever 156 upwardly pivots the linkages 158f, 158g downwardly and into the unlocked position. The locking mechanism 154 may include one or more limiters, such as a set screw, that is configured to prevent the drum brake 158 from rotating past the use and/or stowage positions.

[0052] Referring to Fig. 14, the helmet 116 may be any type of head protection helmet known in the art, for example, those used for sporting, police, or military purposes. In certain embodiments, helmet 116 is a standard infantry ballistic helmet. In some embodiments, helmet 116 is an advanced

combat helmet (ACH), a modular integrated communications helmet (MICH), a tactical ballistic helmet (TBH) II helmet, a lightweight marine helmet, a personnel armor system for ground troops (PASGT) helmet or police general duty helmets.

[0053] In some embodiments, by using mount arms 120a, 120b to attach the lens 118 to a mount 130 rather than using a halo system increases stability, reduces bulk, allows for usage with different helmets, and allows for the mounts 130 to remain on the helmet 116. In addition, the helmet mounted visor 110 may be operated with one hand to adjust the lens from a fully closed or use position, to a fully open or stowage position to a middle position.

[0054] Fig. 14 shows the helmet mounted visor 110 in the use position from a side view. In one embodiment, the first portion 120a is generally parallel to the second portion 120b (or the groove 130a of the rail 130) in the use position. After the locking mechanism(s) 154 is unlocked by pulling up on the lever 156, the lens 118 can pivot up as shown in Figs. 15 and 16. Releasing the locking mechanism 154 and pivoting the lens 118 can be accomplished with one hand of the user. The thumb of one hand of the user pushes up on the lever 156 and then the fingers or palm of the hand may then pivot up the lens 118 relative to the second portion 120b.

[0055] Fig. 15 shows the helmet mounted visor 110 in the middle position. In one embodiment, the first portion 120a is approximately 45 degrees relative to the second portion 120b (or the groove 130a of the rail 130) in the middle position. Pivoting up the lens 118 into the middle position may allow the user to partially expose their face to clear the lens 118 from moisture or dirt on the inside surface, communicate more clearly, don or doff a gas mask to the user's face, or access food or drink.

[0056] Fig. 16 shows the helmet mounted visor 110 in the fully upright or stowage position. In one embodiment, the first portion 120a is approximately 80 degrees to the second portion 120b (or the groove 130a of the rail 130) in the stowage position. Pivoting up the lens 118 into the stowage position may allow the user to substantially expose their face when the lens 118 is no longer needed but not ready to detach the helmet mounted visor 110 from the helmet 116. Pivoting the lens 118 to the stowage position may allow the user to remove the lens 118 from their field of vision while allowing the lens 118 to be quickly deployed to the use position.

[0057] Once pivoted to the desired position, the helmet mounted visor 110 may remain locked in the use, stowage or middle positions such that the first portion 120a does not move relative to the second portion 120b until the locking mechanism 154 is released.

[0058] It will be appreciated by those skilled in the art that changes could be made to the exemplary embodiments shown and described above without departing from the broad inventive

concepts thereof. It is understood, therefore, that this invention is not limited to the exemplary embodiments shown and described, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the claims. For example, specific features of the exemplary embodiments may or may not be part of the claimed invention and various features of the disclosed embodiments may be combined. Unless specifically set forth herein, the terms “a”, “an” and “the” are not limited to one element but instead should be read as meaning “at least one”.

[0059] It is to be understood that at least some of the figures and descriptions of the invention have been simplified to focus on elements that are relevant for a clear understanding of the invention, while eliminating, for purposes of clarity, other elements that those of ordinary skill in the art will appreciate may also comprise a portion of the invention. However, because such elements are well known in the art, and because they do not necessarily facilitate a better understanding of the invention, a description of such elements is not provided herein.

## CLAIMS

I/we claim:

1. A helmet mounted visor comprising:

a lens configured to extend across substantially all of a user's face; and

5 a pair of mount arms coupled to the lens, each mount arm being configured to releaseably mount to a mount attached to a helmet.

2. The helmet mounted visor of claim 1, wherein the pair of mount arms each include first and second portions, the first portion being rotatably coupled to the second portion.

10

3. The helmet mounted visor of claim 2, wherein the first portion is configured to be rotated between and held in two or more positions relative to the second portion.

4. The helmet mounted visor of claim 3, wherein the two or more positions include a use  
15 position where the lens is positioned in front of the user's face and a stowage position where the lens is positioned over a top surface of the helmet.

5. The helmet mounted visor of claim 4, wherein the two or more positions include a middle position where the lens is positioned between the use position and the stowage position.

20

6. The helmet mounted visor of claim 2, wherein at least one of the pair of mount arms includes a locking mechanism configured to lock the first portion relative to the second portion.

7. The helmet mounted visor of claim 6, wherein the locking mechanism includes a drum  
25 brake.

8. The helmet mounted visor of claim 7, wherein the locking mechanism includes a lever configured to selectively lock and release the drum brake.

9. The helmet mounted visor of claim 3, wherein the first portion is rotatable relative to the second portion about a first axis and the pair of mount arms each include a third portion, the first portion being rotatably coupled to the third portion about a second axis, the second axis being  
5 generally perpendicular to the first axis.
10. The helmet mounted visor of any one of the previous claims, wherein the mount is a rail.
11. The helmet mounted visor of claim 10, wherein the rail is attached to the helmet using  
10 fasteners that extend through existing holes in the helmet.
12. The helmet mounted visor of any one of the previous claims, wherein the pair of mount arms each include a projection configured to attach to a groove in the mount in a plurality of positions along the groove.  
15
13. The helmet mounted visor of claim 12, wherein a position of the projections is adjustable relative to the pair of mount arms.
14. The helmet mounted visor of any one of the previous claims, wherein the lens has a  
20 thickness of at least approximately 28 mm.
15. The helmet mounted visor of any one of the previous claims, wherein the lens has a height of at least approximately 127 mm.
- 25 16. The helmet mounted visor of any of the previous claims, wherein the mount arms are configured to mount to the helmet to position the lens at a plurality of distances from the user's face.
17. The helmet mounted visor of any of the previous claims further comprising:

a flange mounted to the top of the lens and extending toward the mount arms.

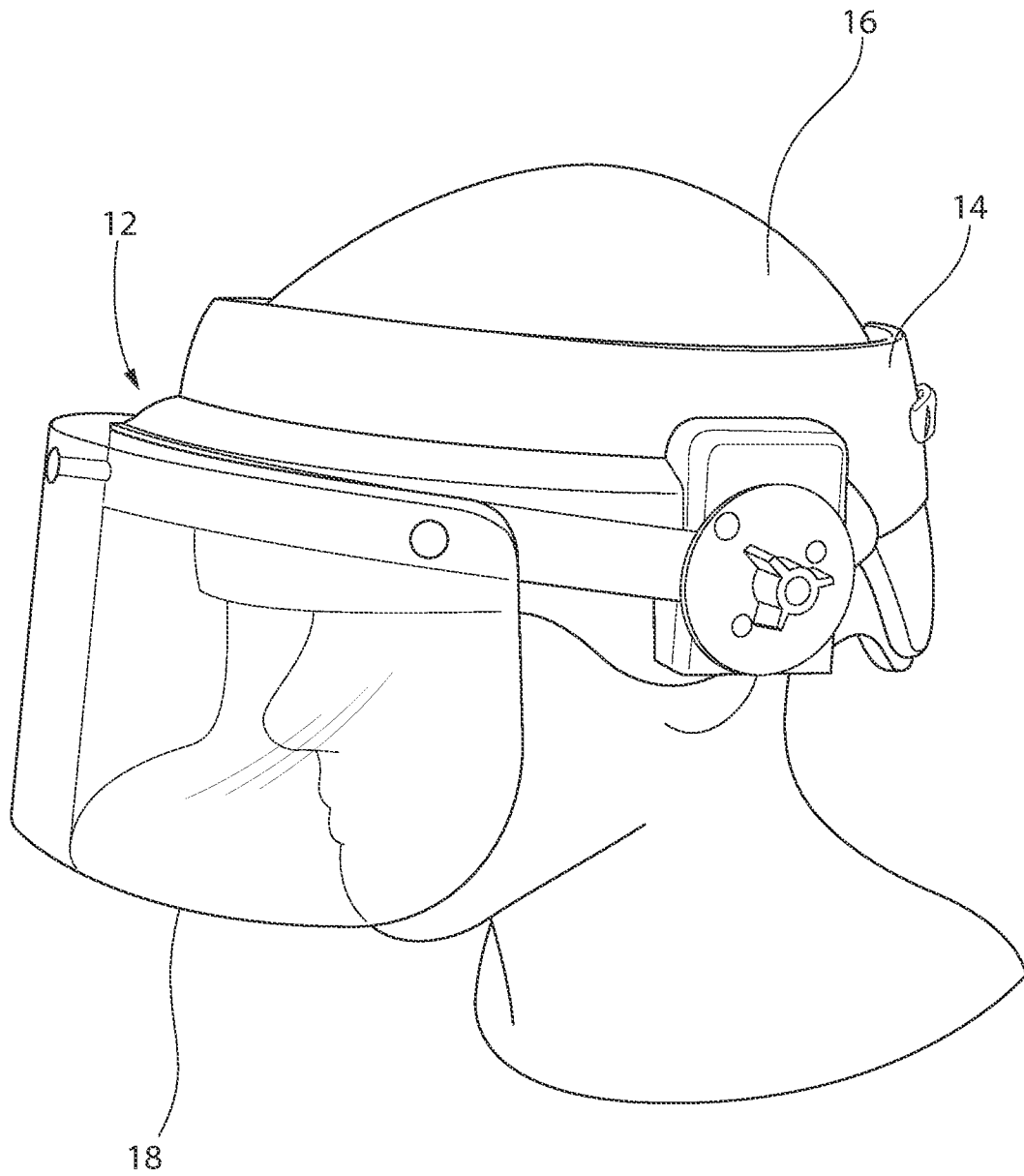
18. A helmet mounted visor comprising:

a lens;

5 a pair of mount arms coupled to the lens, each mount arm configured to releaseably mount to a mount attached to a helmet, the pair of mount arms each including first, second and third portions, the first portion being rotatably coupled to the second portion about a first axis, the first portion being rotatably coupled to the third portion about a second axis, the second axis being generally perpendicular to the first axis; and

10 a locking mechanism configured to selectively retain the first portion relative to the second portion in and between a use position where the lens is positioned in front of a user's face and a stowage position where the lens is positioned proximate a top of the helmet.

1/16



**FIG. 1**  
Prior Art

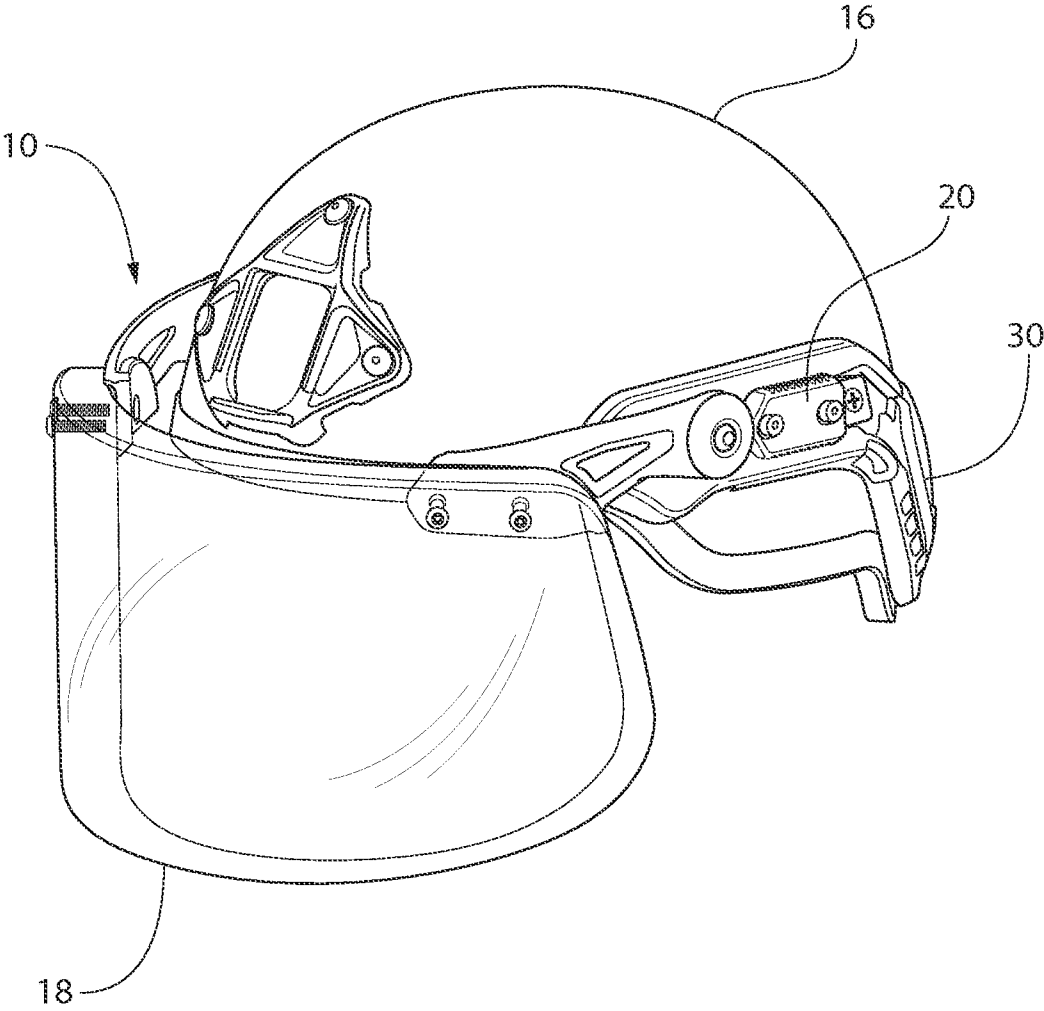


FIG. 2

3/16

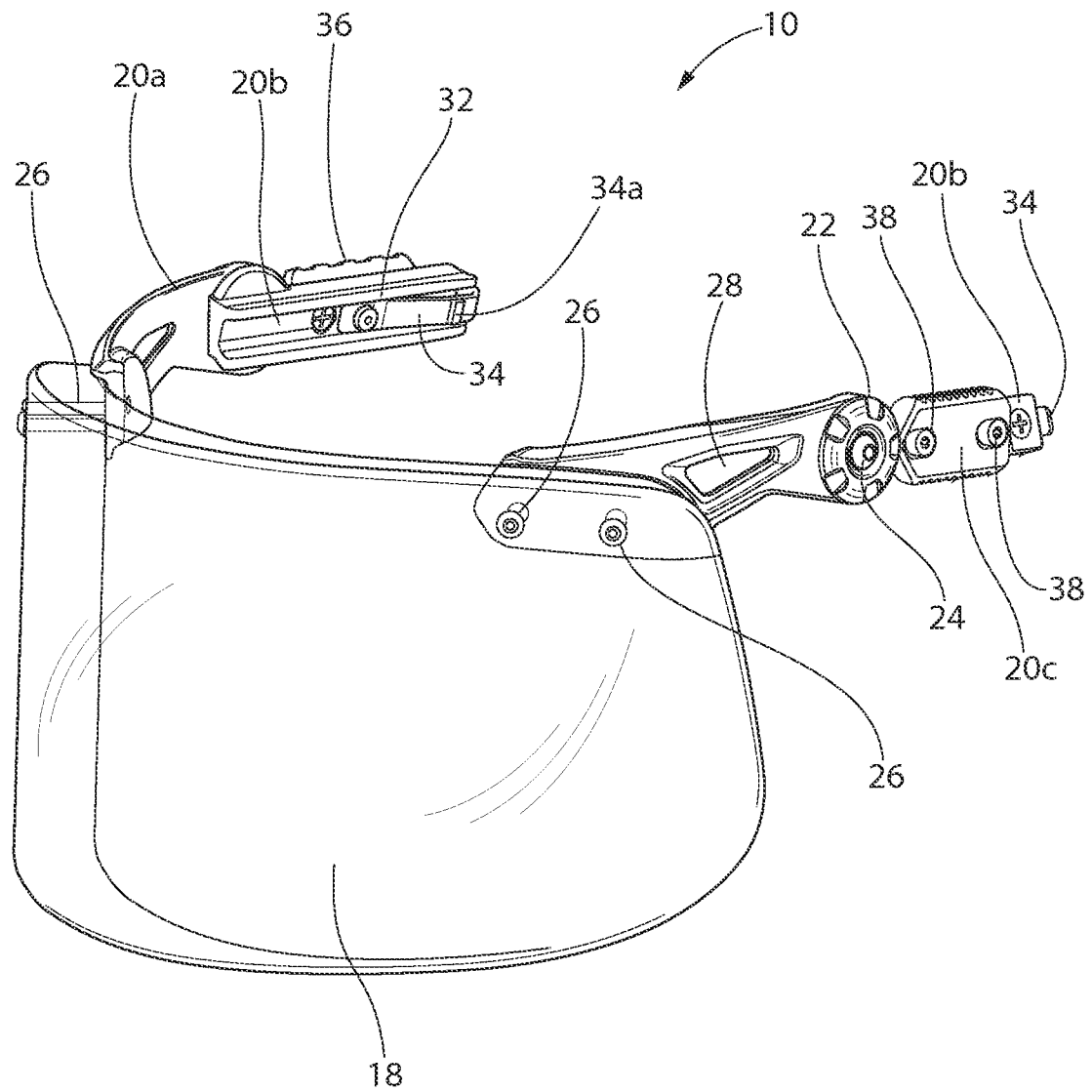


FIG. 3

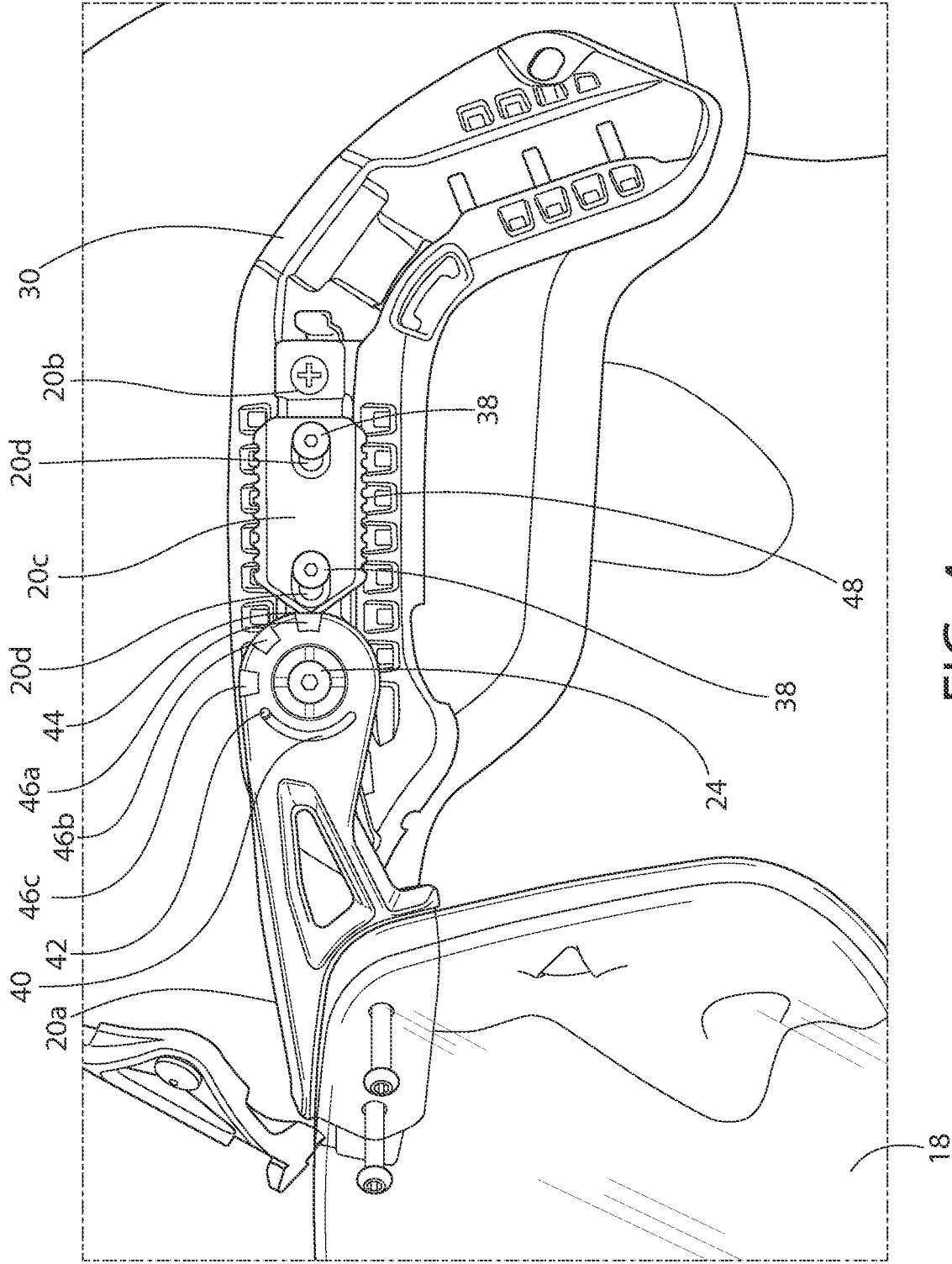


FIG. 4

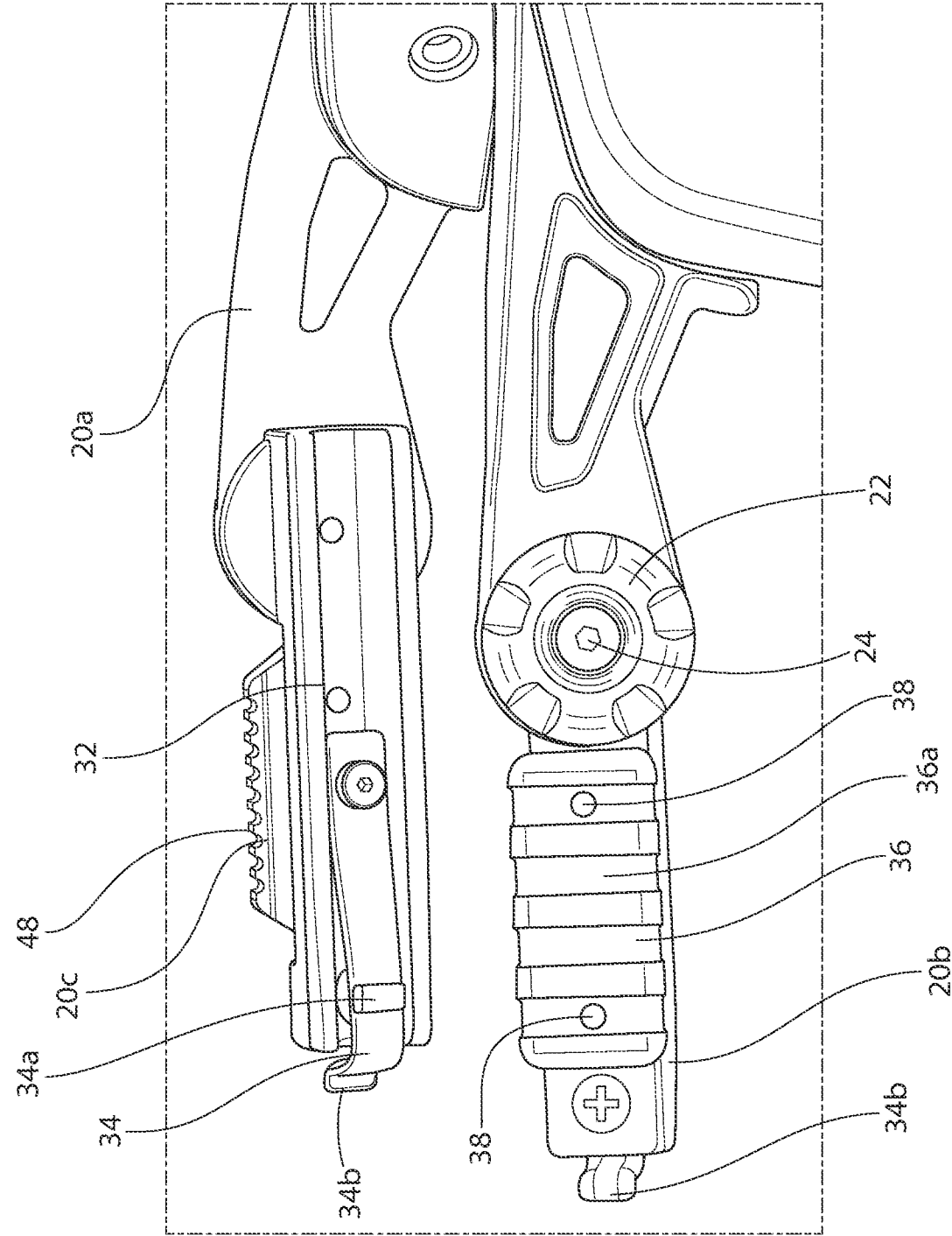


FIG. 5

6/16

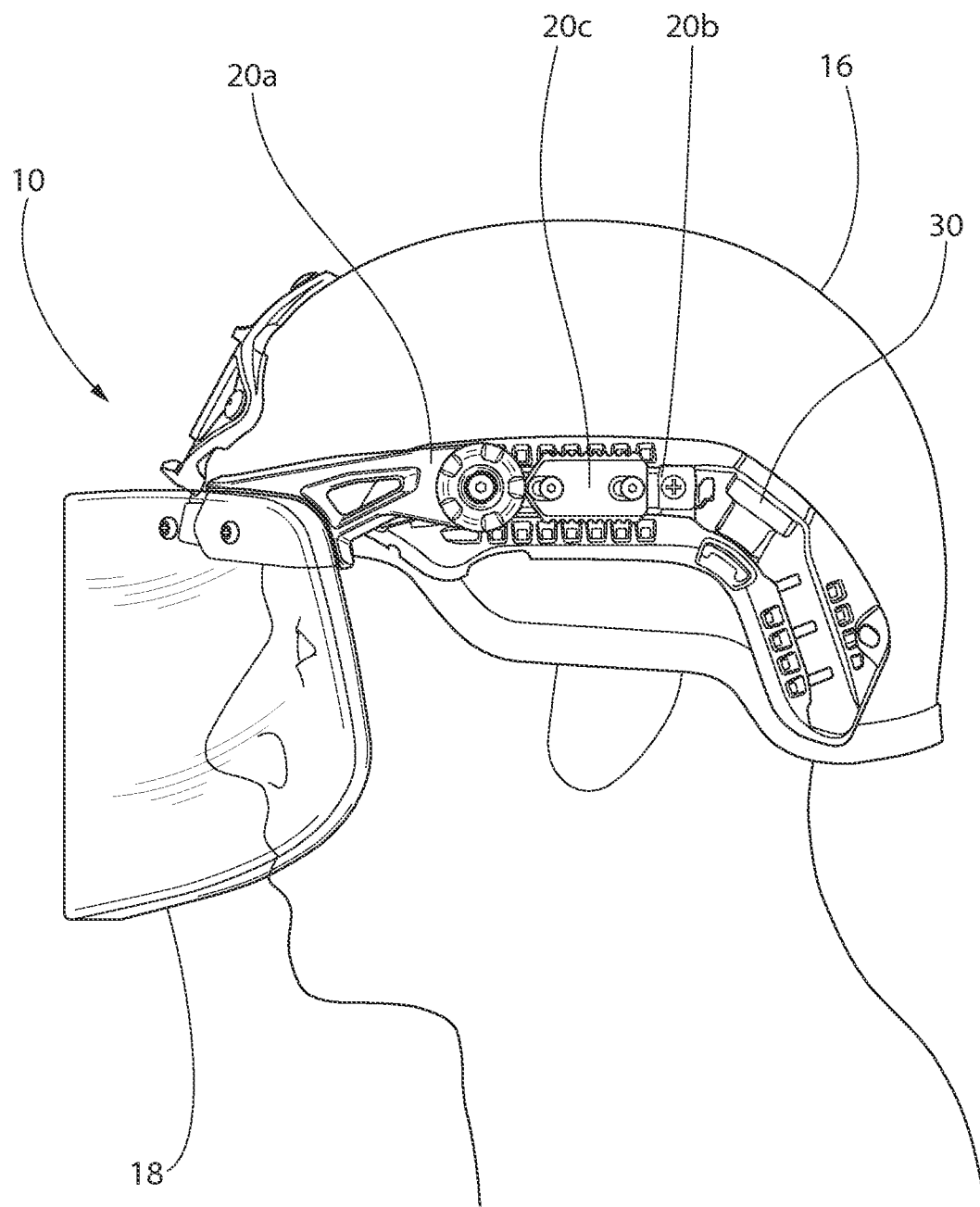


FIG. 6

7/16

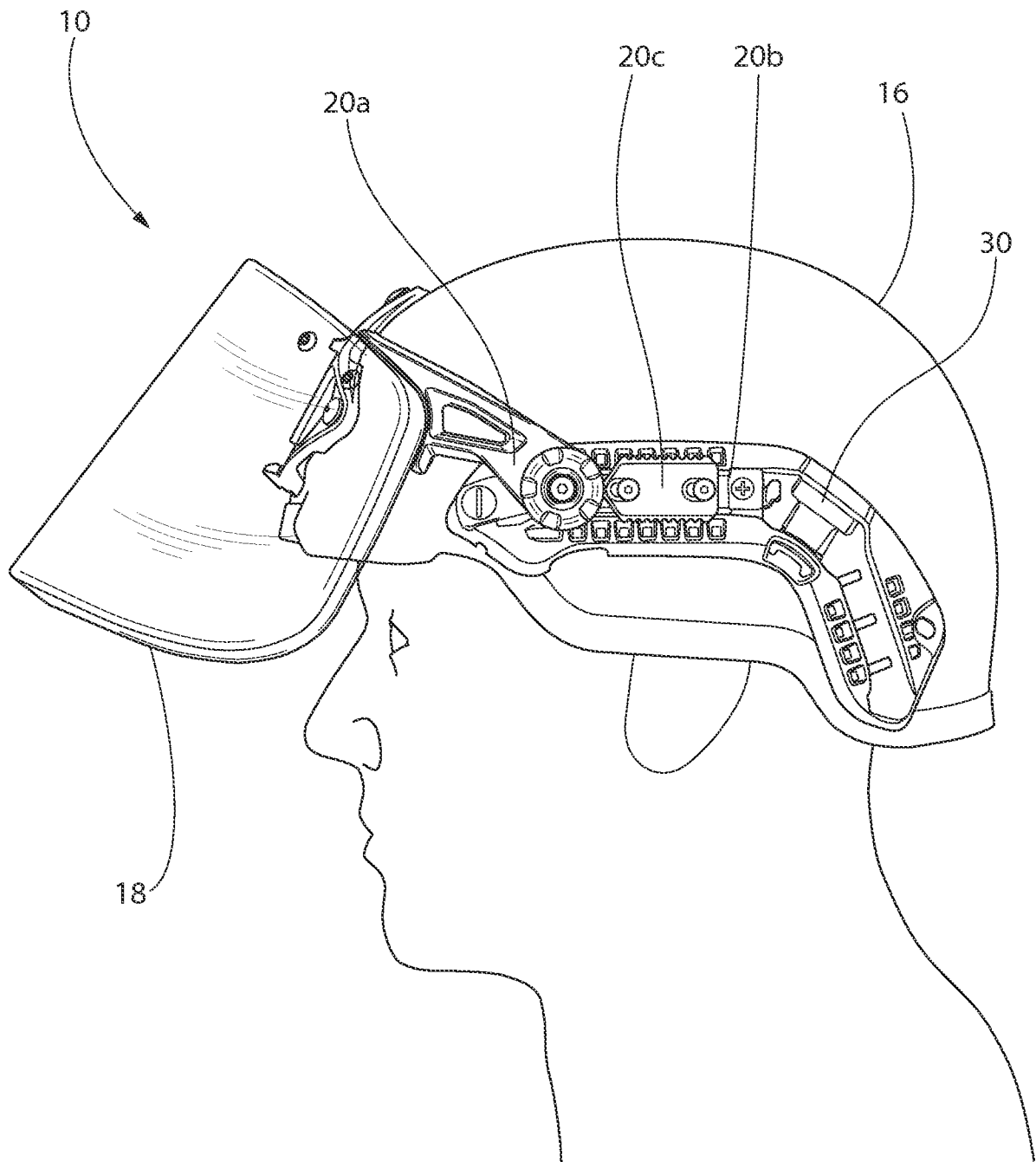


FIG. 7

8/16

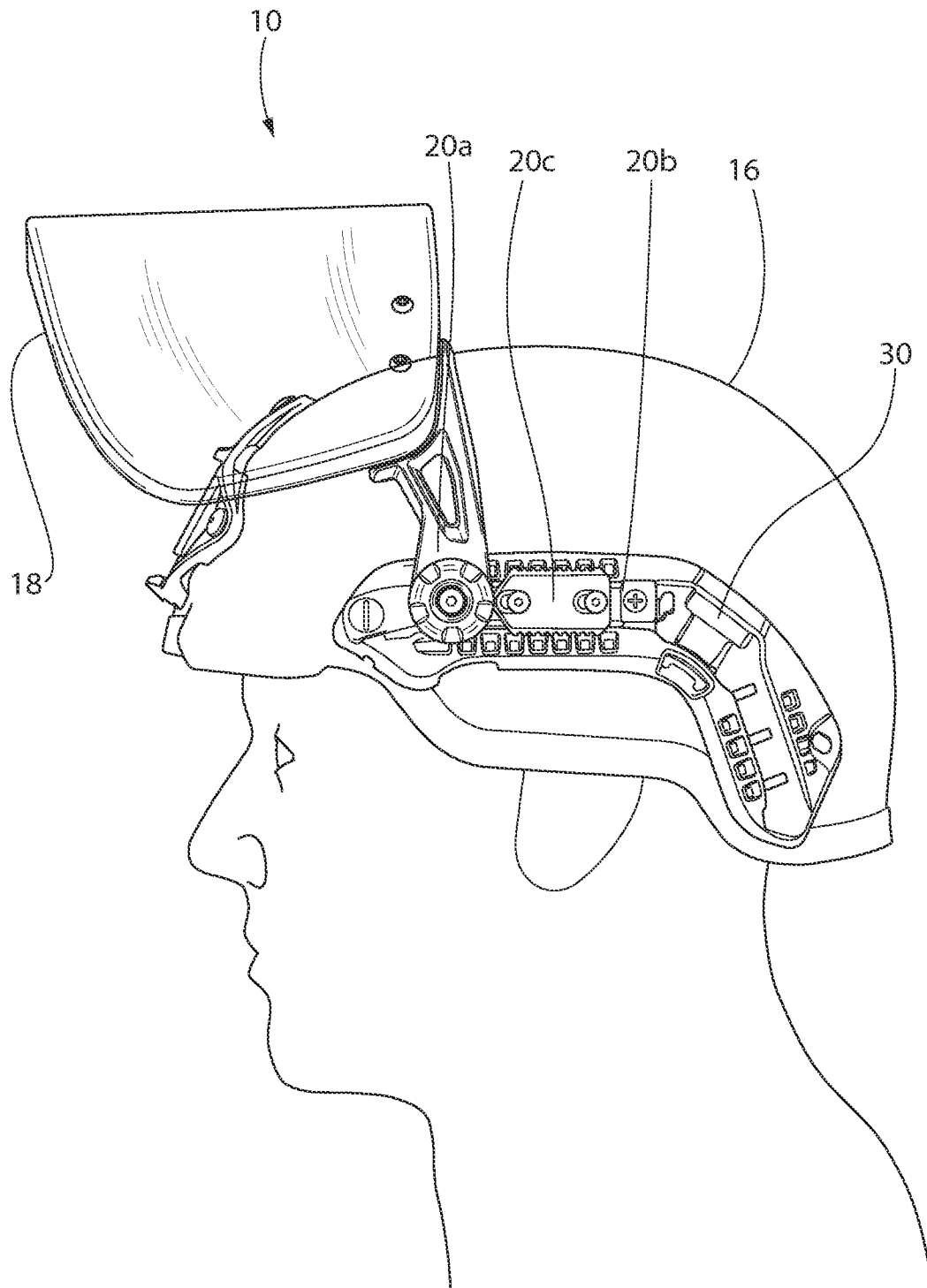


FIG. 8

9/16

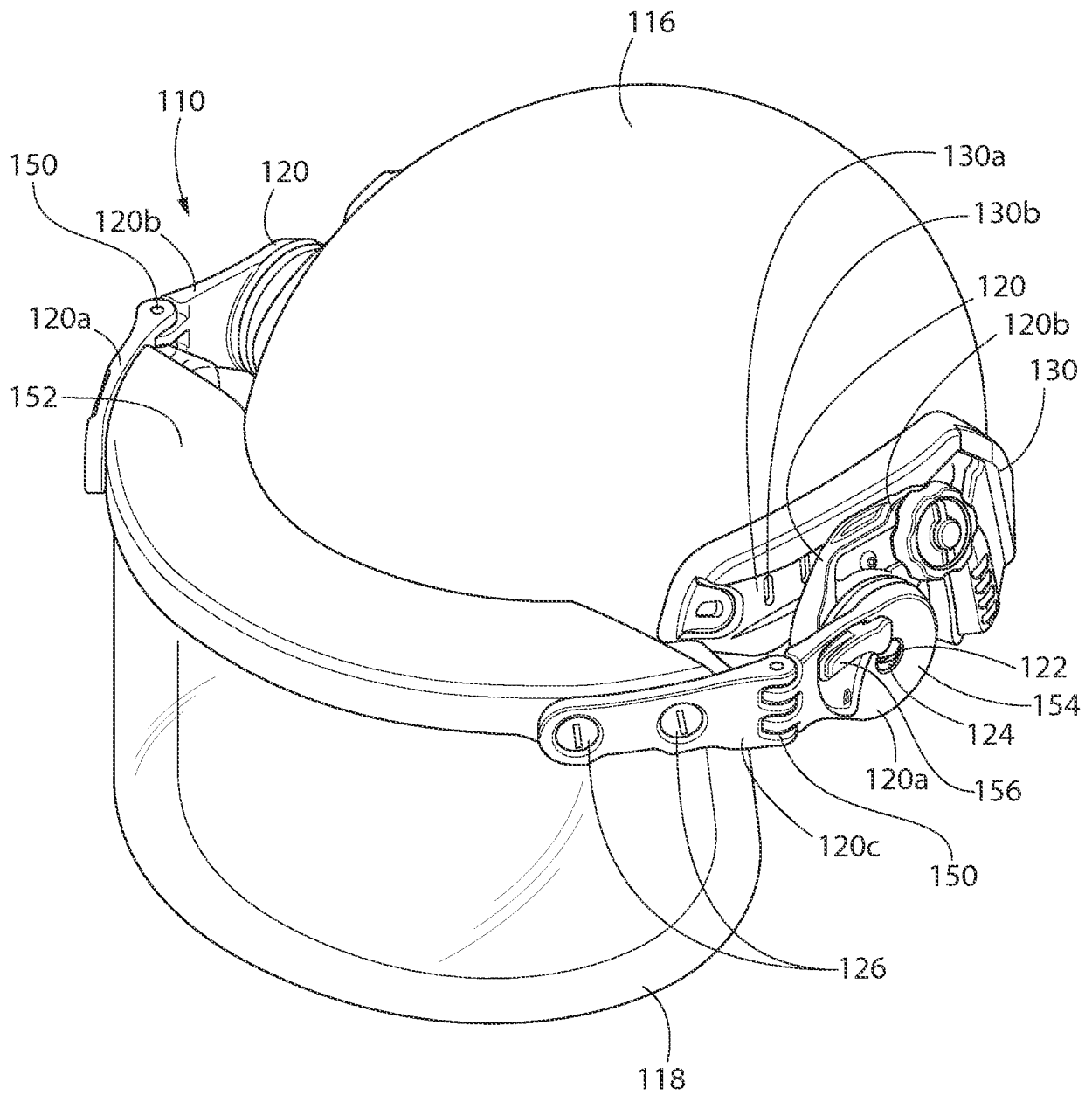


FIG. 9

10/16

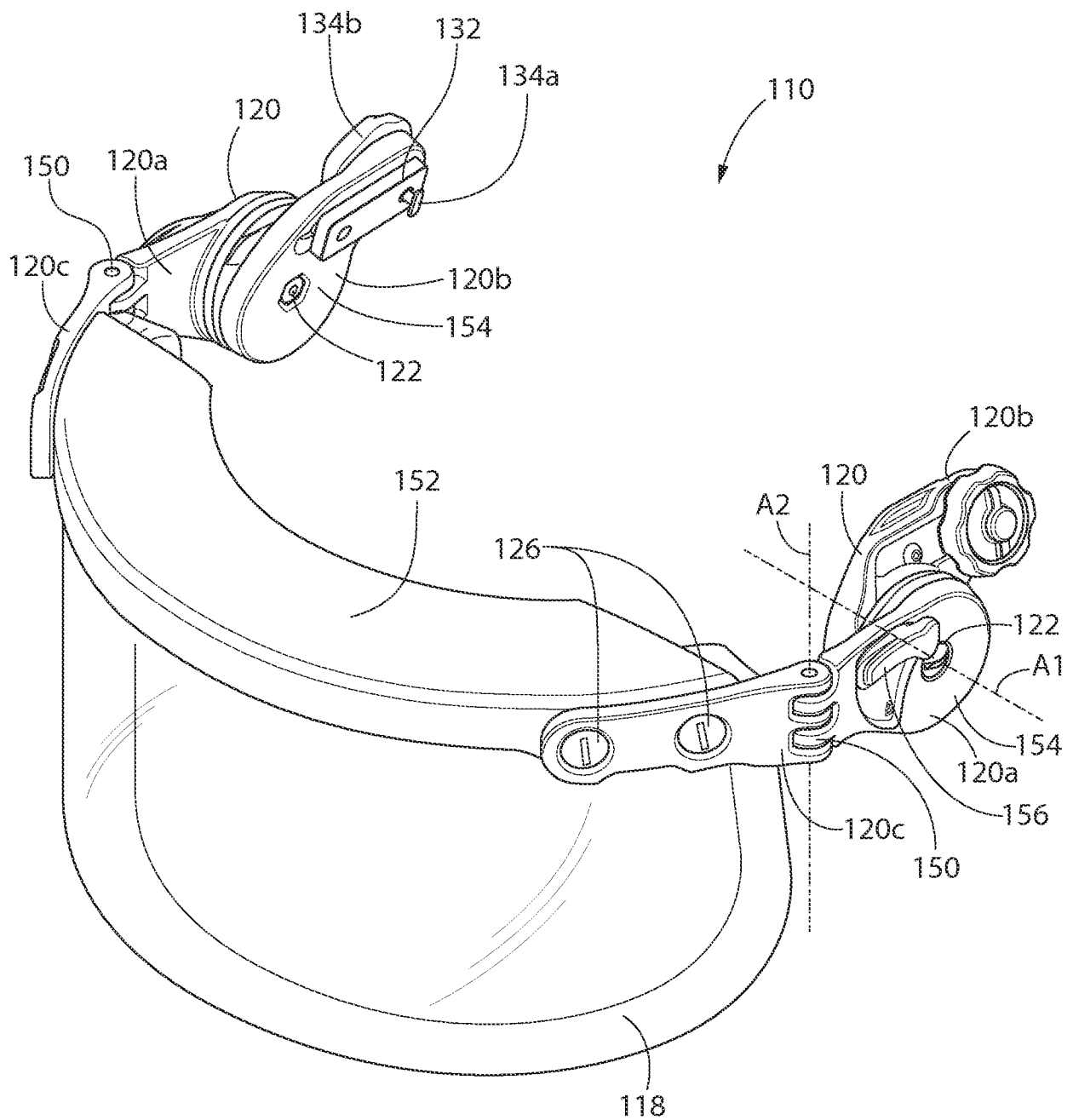


FIG. 10

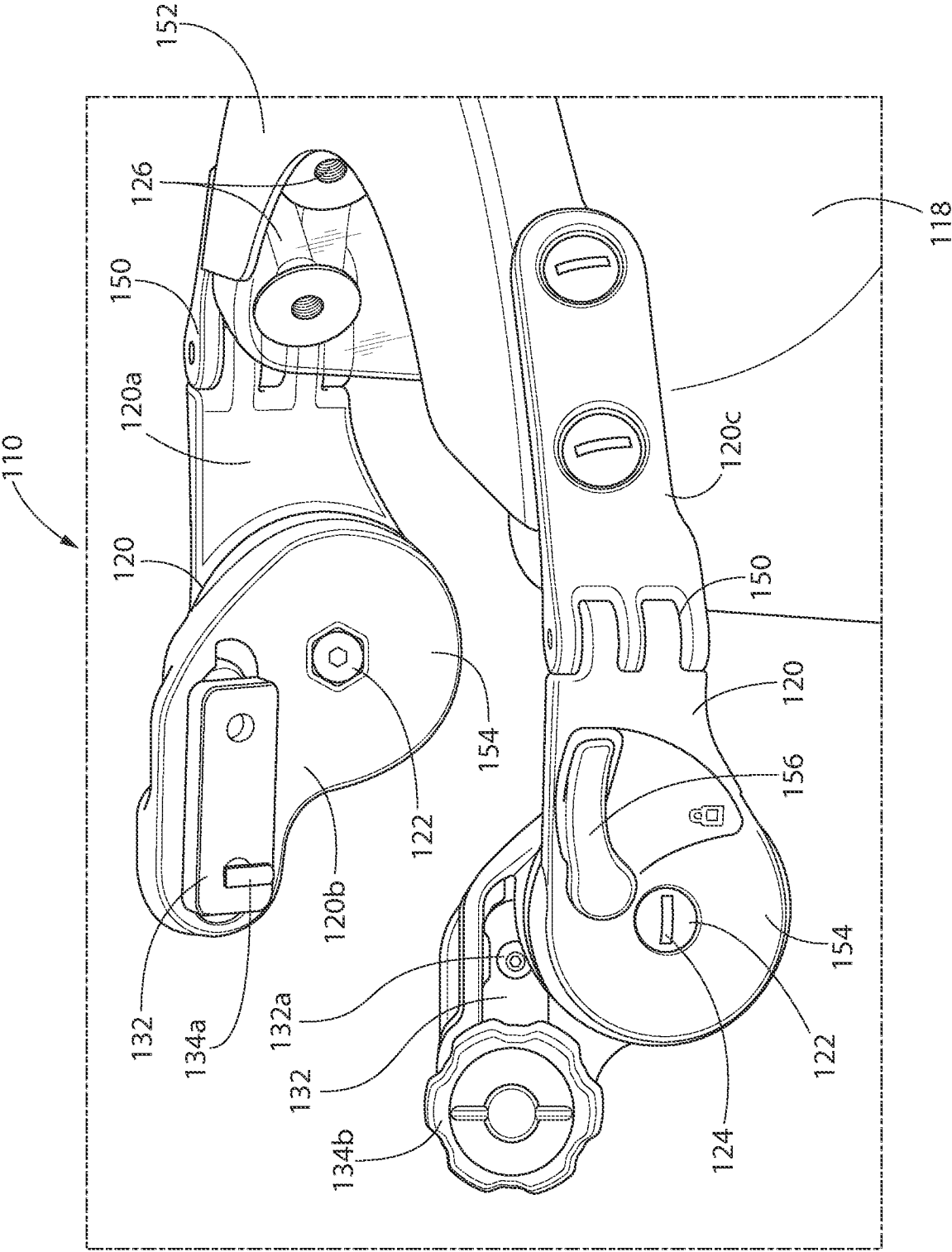


FIG. 11

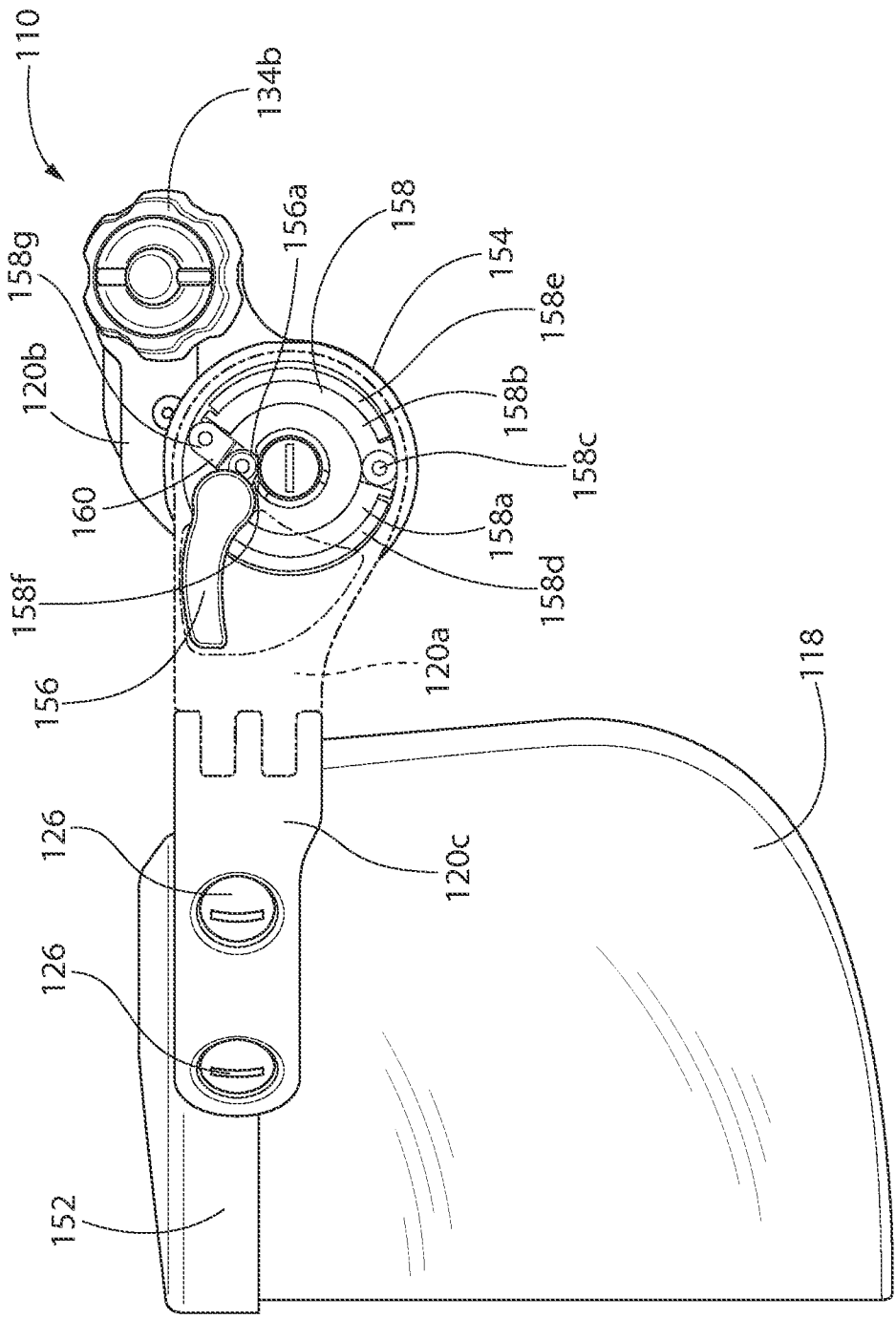


FIG. 12

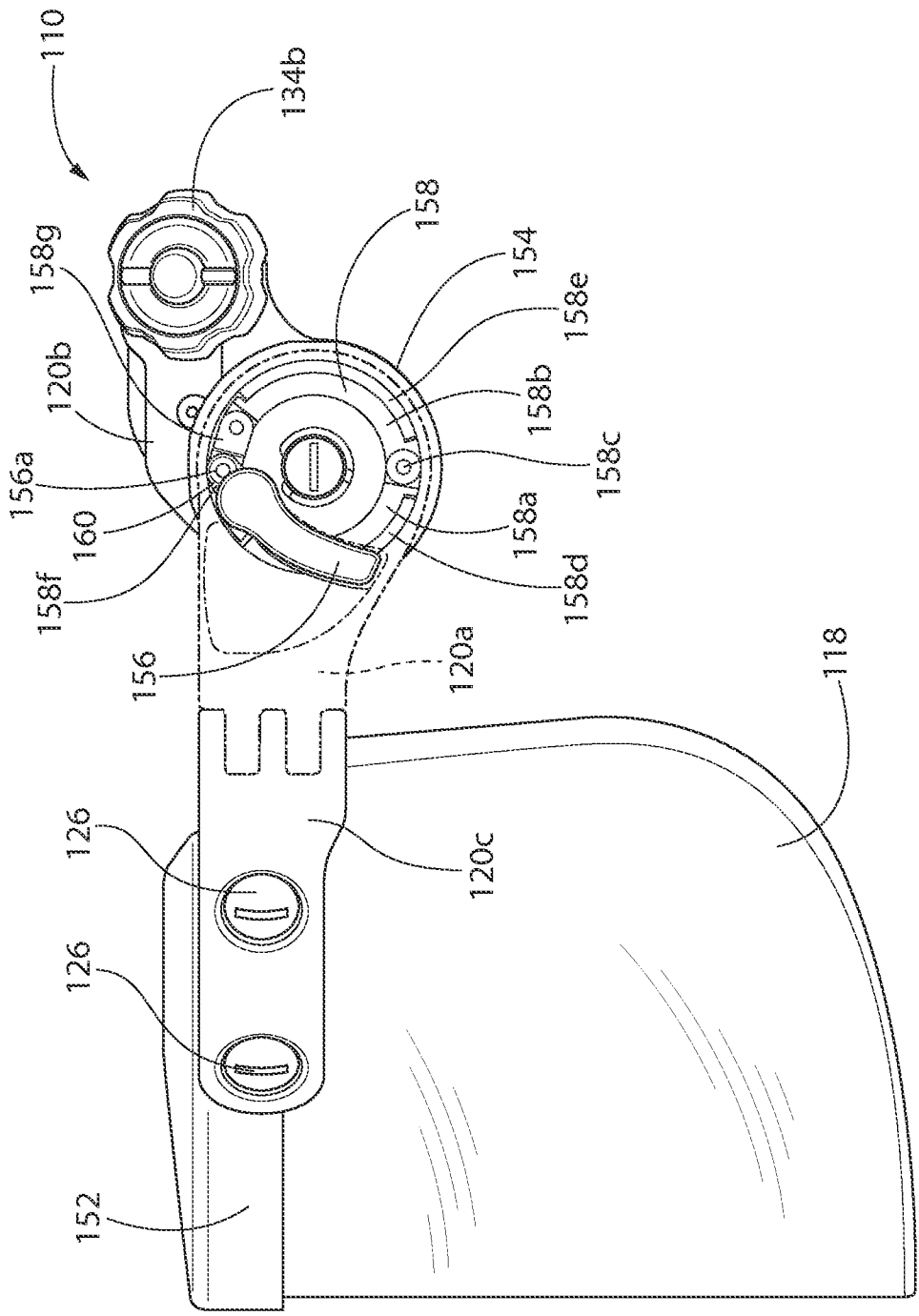


FIG. 13

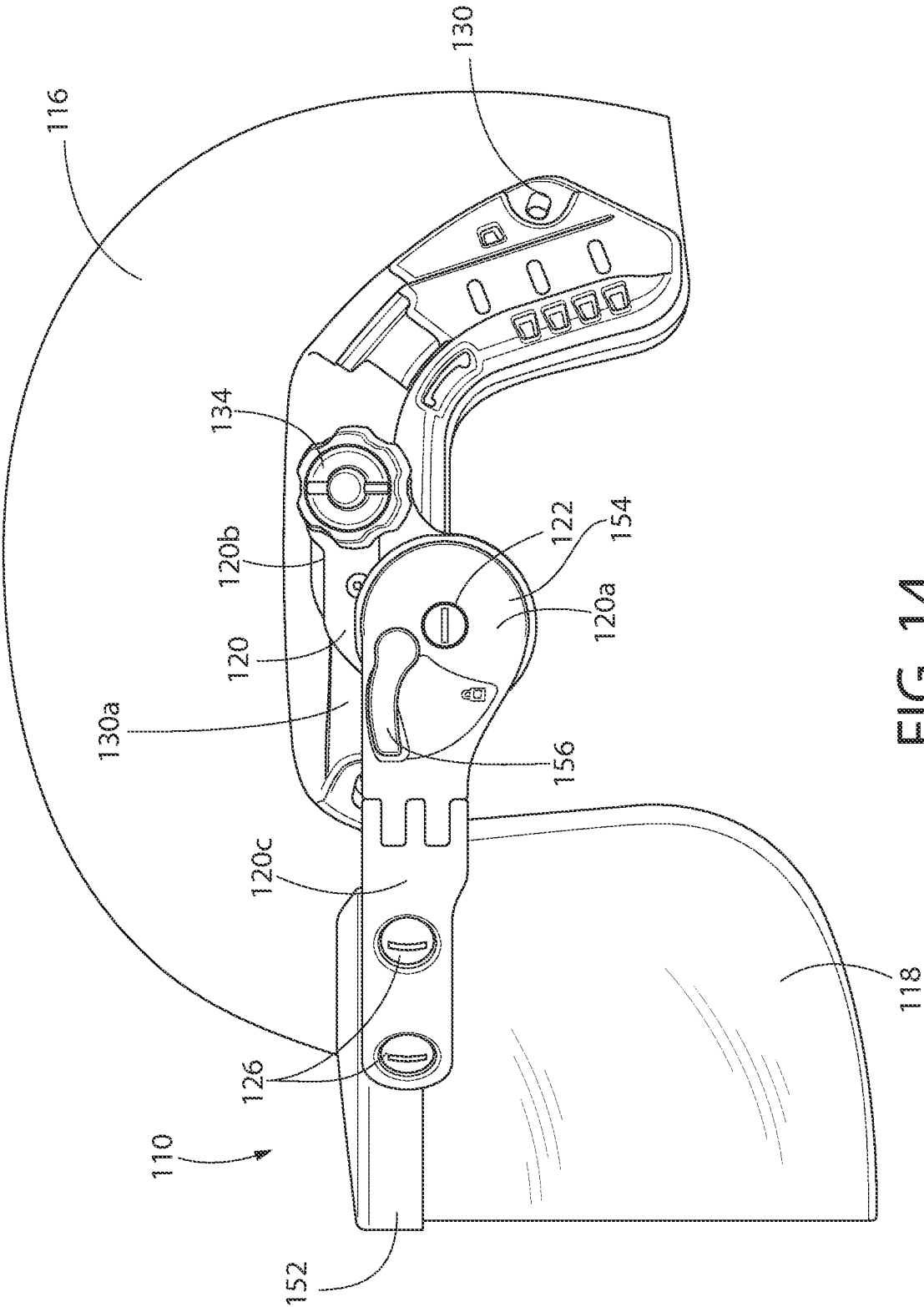
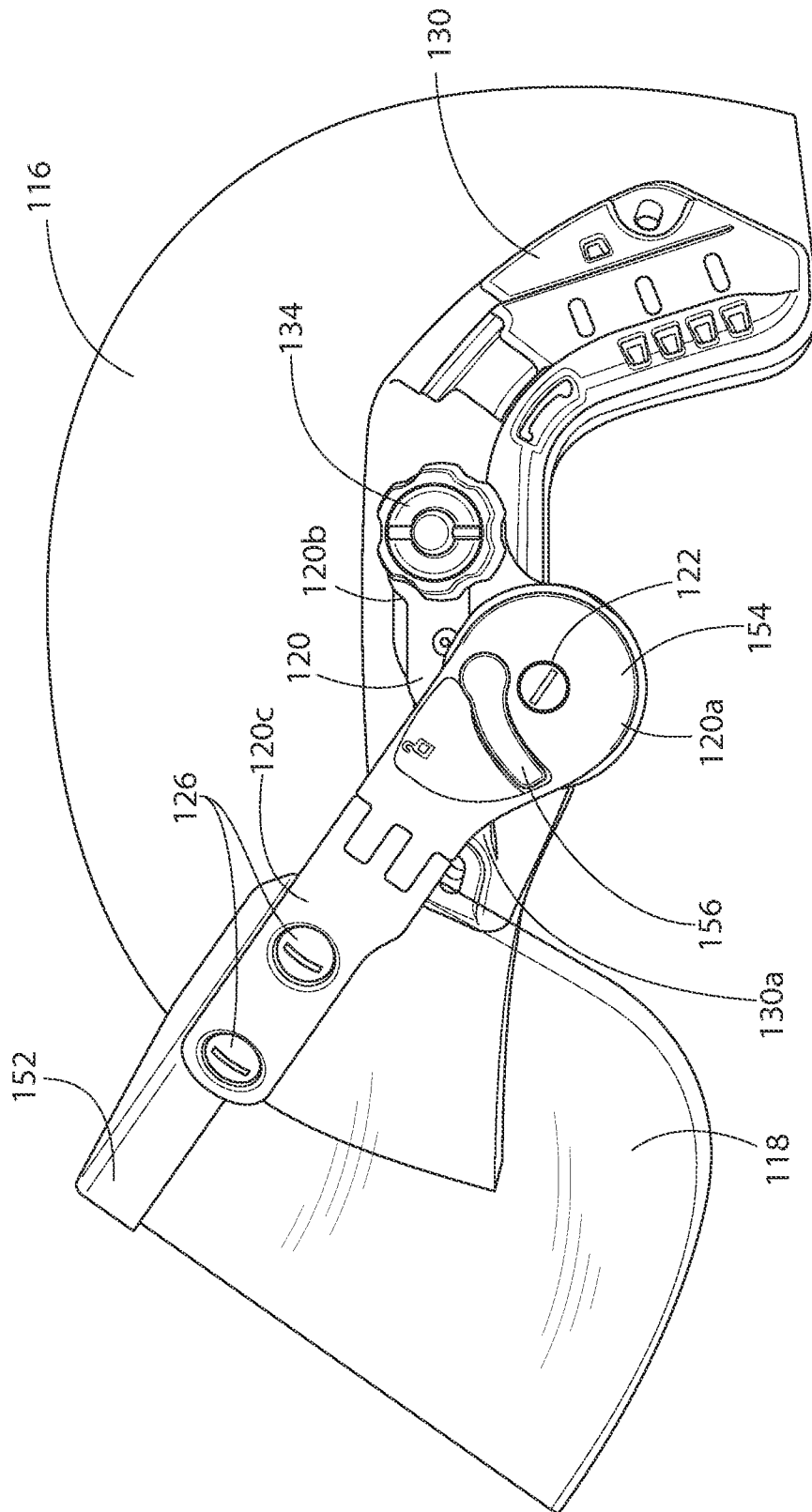


FIG. 14

15/16



5  
1  
6  
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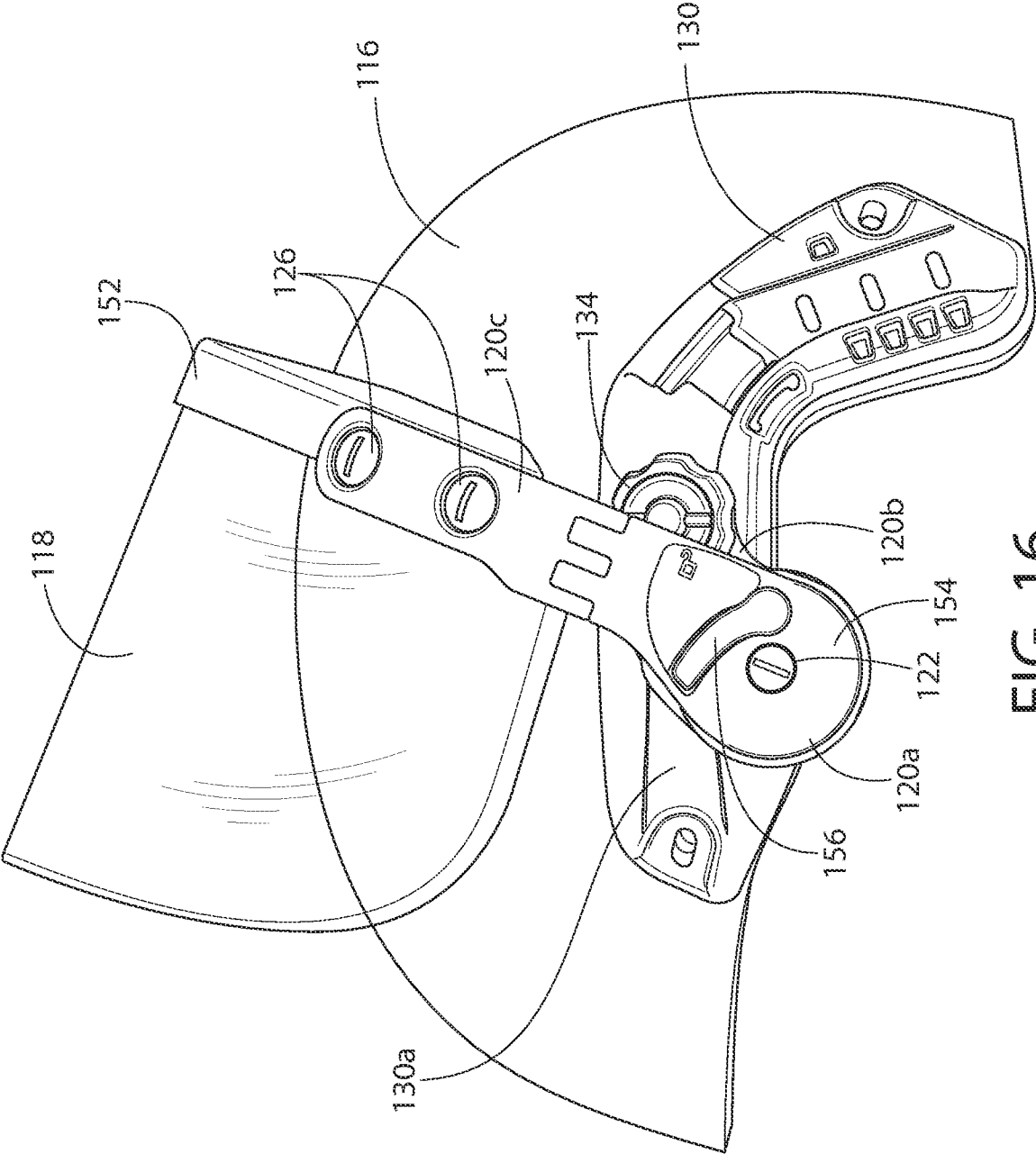


FIG. 16

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2015/054687

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A42B 3/22 (2015.01)

CPC - A42B 3/225 (2015.10)

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - A42B 3/00, 04, 18, 22; G02B 7/00 (2015.01)

CPC - A42B 3/00, 04, 0406, 18, 185, 22, 221, 222, 223, 225; G02B 7/00, 002 (2015.10)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

UC: 2/6.2, 6.3, 6.5, 6.7, 10, 15

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google

helmet, drum brake, lever, visor, locking mechanism, hinged connection, arms, rotation (Keyword delimited)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------|-----------------------|
| X         | US 2,433,164 A (SHIELDS) 23 December 1947 (23.12.1947) entire document               | 1-6                   |
| ---       |                                                                                      | ---                   |
| Y         |                                                                                      | 7-11, 18              |
| Y         | US 5,832,566 A (QUEK et al.) 10 November 1998 (10.11.1998) entire document           | 7, 8                  |
| Y         | US 2008/0092278 A1 (ROGERS et al.) 24 April 2008 (24.04.2008) entire document        | 9-11, 18              |
| P,X       | WO 2014/186682 A1 (GENTEX CORPORATION) 20 November 2014 (20.11.2014) entire document | 1-11, 18              |
| A         | US 2013/0212787 A1 (PFANNER et al.) 22 August 2013 (22.08.2013) entire document      | 1-11, 18              |
| A         | US 5,581,806 A (CAPDEPUY et al.) 10 December 1996 (10.12.1996) entire document       | 1-11, 18              |
| A         | US 4,907,300 A (DAMPNEY et al.) 13 March 1990 (13.03.1990) entire document           | 1-11, 18              |

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

23 November 2015

Date of mailing of the international search report

28 JAN 2016

Name and mailing address of the ISA/

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, VA 22313-1450

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Blaine R. Copenheaver

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PCT OSP: 571-272-7774

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2015/054687

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 12-17  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.