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HELMET CHEEK PADS

- (57)

A helmet is provided. The helmet includes a cheek pad (200) having a projecting fastener (208). The helmet also includes a receiving fastener (116) to receive the projecting fastener (208). The projecting fastener (208) and the receiving fastener (116) can be engaged to selectively retain the cheek pad (200) to the helmet. The projecting fastener (208) and the receiving fastener (116) can be disengaged to release the cheek pad (200) from the helmet.

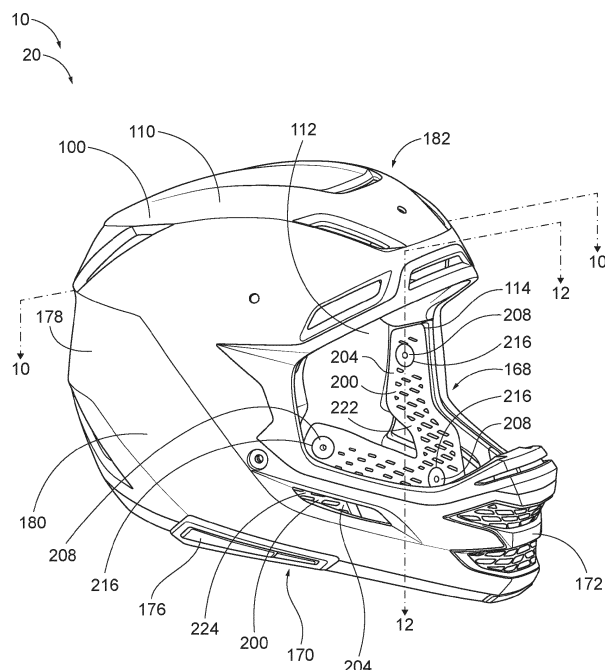


FIG. 1

Description

FIELD

[0001] The present invention relates to a helmet, and systems and methods for removing a cheek pad of a helmet.

BACKGROUND

[0002] Full-face helmets can be used by wearers to protect their heads while participating in sporting activities or riding on motor vehicles, such as motorcycles. Some helmets can include face shields such that nearly the entire head of a wearer is contained in a helmet. Helmets can also include cheek pads located at internal portions of a helmet adjacent the cheeks and/or chin of a wearer. Cheek pads can contact the wearer's face to provide cushioning and comfort to the wearer while the helmet is worn. By surrounding the wearer's cheeks and/or chin, cheek pads can also function to cradle the wearer's face. Accordingly, helmets having cheek pads can support providing a secure fit while a helmet is worn.

SUMMARY

[0003] Embodiments provide a helmet. The helmet can include an outer shell, a cheek pad including a cheek pad material configured to receive one or more projecting fasteners, and an inner lining disposed within the outer shell. The inner lining can include one or more receiving fasteners configured to receive the one or more projecting fasteners. Each receiving fastener can include an upper opening configured to engage a corresponding projection fastener in a snap-fit arrangement and a lower opening disposed below the upper opening. The lower opening can be configured to disengage the corresponding projecting fastener from the snap-fit arrangement. Each receiving fastener can also include a ramped inner surface including one or more sloped portions and configured to guide the projecting fastener from the snap-fit arrangement.

[0004] In some embodiments, the upper opening is smaller than the lower opening.

[0005] In some embodiments, each projecting fastener includes a first end and a second end opposing the first end, the first end being configured to be received within a corresponding receiving fastener. In some embodiments, the cheek pad material is disposed between the first end and the second end. In some embodiments, the first end is configured to pass through the lower opening of the corresponding receiving fastener but not the upper opening of the corresponding receiving fastener. In some embodiments, each projecting fastener includes a stem connecting the first end and the second end. At least a portion of the stem extends beyond a front face of the corresponding receiving fastener when the projecting fastener is in the snap-fit arrangement with the receiving

fastener.

[0006] In some embodiments, at least one sloped portion in the one or more sloped portions is at an angle between 30 degrees and 60 degrees from an axis corresponding to a front face of the receiving fastener.

[0007] In some embodiments, the cheek pad material includes an opening. The projecting fastener is configured to be disposed through the opening.

[0008] Embodiments provide a helmet cheek pad and fastener system. The helmet cheek pad and fastener system can include a projecting fastener including a first end and a second end opposing the first end, a cheek pad including a cheek pad material configured to receive the projecting fastener, and a receiving fastener configured to receive the first end of the projecting fastener to selectively retain the cheek pad. The receiving fastener can include a tapered opening disposed in an outer frame. The tapered opening can include an upper opening; a lower opening disposed below the upper opening, the lower opening being larger than the upper opening; a tapered portion disposed between the upper opening and the lower opening; and an inner surface configured to guide the first end of the projecting fastener within the tapered opening.

[0009] In some embodiments, the inner surface includes a flat portion and a sloped portion. In some embodiments, a transition between the flat portion and the sloped portion is curved. In some embodiments, the inner surface further includes a lower bracket configured to extend below the sloped portion. In some embodiments, the sloped portion is positioned behind the lower opening, the slope configured to guide the first end of the projecting fastener from the upper opening to the lower opening.

[0010] In some embodiments, the cheek pad material includes an opening having a first diameter smaller than a second diameter of the first end and a third diameter of the second end such that the cheek pad material retains the projecting fastener.

[0011] In some embodiments, the outer frame includes a cutout adjacent the upper opening, the cutout configured to facilitate flexing of the outer frame to receive the first end.

[0012] Embodiments provide a helmet. The helmet can include an outer shell, a cheek pad including a cheek pad material, a projecting fastener configured to selectively retain the cheek pad material to the outer shell, and a receiving fastener configured to receive the projecting fastener. The receiving fastener can include a front face including a first opening configured to engage the projecting fastener to retain the cheek pad to the outer shell and a second opening adjacent the first opening, the second opening configured to disengage the projecting fastener; and a ramped inner surface, the ramped inner surface including a sloped portion disposed behind the second opening, the sloped portion configured to guide the projecting fastener from the first opening to the second opening.

[0013] In some embodiments, the front face includes

a tapered portion extending into the first opening and the second opening. In some embodiments, the tapered portion is configured to retain the projecting fastener in the first opening.

[0014] In some embodiments, the ramped inner surface further includes a top end and a bottom end opposing the top end, the ramped inner surface being coupled to the front face at the top end and the bottom end. In some embodiments, the sloped portion extends from the bottom end of the ramped inner surface to a portion of the ramped inner surface below the top end.

[0015] In some embodiments, the sloped portion of the ramped inner surface is at an angle between 40 degrees and 50 degrees from an axis corresponding to the front face.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The disclosed embodiments will hereinafter be described in conjunction with the appended drawings, provided to illustrate and not to limit the disclosed embodiments, wherein like designations denote like elements.

FIG. 1 shows a perspective view of a helmet in an engaged fastener position and a retained cheek pad position according to various embodiments.

FIG. 2 shows a perspective view of a cheek pad of the helmet of FIG. 1.

FIG. 3 shows a side view of a projecting fastener of the helmet of FIG. 1.

FIG. 4 shows an assembly view of the projecting fastener of FIG. 3 and a backing of the cheek pad of FIG. 2.

FIG. 5 shows a rear perspective view of the projecting fastener of FIG. 3 and the backing of the cheek pad of FIG. 2.

FIG. 6 shows a front perspective view of the projecting fastener of FIG. 3 and the backing of the cheek pad of FIG. 2.

FIG. 7 shows a perspective view of a receiving fastener of the helmet of FIG. 1.

FIG. 8 shows a front view of the receiving fastener of FIG. 7.

FIG. 9 shows a side view of the receiving fastener of FIG. 7.

FIG. 10 shows a cross-section view of the helmet of FIG. 1 along line 10-10 in the engaged fastener position and the retained cheek pad position.

FIG. 11 shows the cross-section view of the helmet of FIG. 10 with the cheek pad of the helmet of FIG. 1 removed in the engaged fastener position and the retained cheek pad position.

FIG. 12 shows a cross-section view of the helmet of FIG. 1 along line 12-12 in the engaged fastener position and the retained cheek pad position.

FIG. 13 shows a bottom perspective view of a cheek pad of the helmet of FIG. 1.

FIG. 14 shows a front view of the helmet of FIG. 1 in the engaged fastener position and the retained cheek pad position.

FIG. 15 shows the cross-section view of the helmet of FIG. 12 in the engaged fastener position and the retained cheek pad position.

FIG. 16 shows the cross-section view of the helmet of FIG. 12 in a disengaged fastener position and a released cheek pad position.

FIG. 17 shows the cross-section view of the helmet of FIG. 10 in the disengaged fastener position and the released cheek pad position.

FIG. 18 shows the cross-section view of the helmet of FIG. 10 with the cheek pad of the helmet of FIG. 1 removed in the disengaged fastener position and the released cheek pad position.

FIG. 19 shows the cross-section view of the helmet of FIG. 12 in the disengaged fastener position and the released cheek pad position.

FIG. 20 shows a perspective view of the helmet of FIG. 1 in the disengaged fastener position and the released cheek pad position.

DETAILED DESCRIPTION

[0017] Various embodiments of the novel systems, apparatuses, and methods disclosed herein are described more fully hereinafter with reference to the accompanying drawings. This disclosure can, however, be embodied in many different forms and should not be construed as limited to any specific structure or function presented throughout this disclosure. Rather, these embodiments are provided so that this disclosure will be thorough and will fully convey the scope of the disclosure to those skilled in the art. Based on the teachings herein, one skilled in the art would appreciate that the scope of the disclosure can be intended to cover any embodiment of the novel systems, apparatuses, and methods disclosed herein, whether implemented independently of, or combined with, any other embodiment of the disclosure. For example, an apparatus can be implemented or a method can be practiced using any number or combination of the embodiments set forth herein. In addition, the scope of the disclosure can be intended to cover such an apparatus or method that can be practiced using other structure, functionality, or structure and functionality in addition to or other than the various embodiments of the disclosure set forth herein. It should be understood that any embodiment disclosed herein can be implemented by one or more elements of a claim.

[0018] Although particular embodiments are described herein, many variations and permutations of these embodiments fall within the scope of the disclosure. Although some benefits and advantages of the preferred embodiments are mentioned, the scope of the disclosure can be not intended to be limited to particular benefits, uses, and/or objectives. The detailed description and drawings are merely illustrative of the disclosure rather

than limiting, the scope of the disclosure being defined by the appended claims and equivalents thereof.

[0019] It will be recognized that while certain embodiments of the disclosure are described in terms of a specific sequence of steps of a method, these descriptions are only illustrative of the broader methods of the disclosure, and can be modified as required by the particular application. Certain steps can be rendered unnecessary or optional under certain circumstances. Additionally, certain steps or functionality can be added to the disclosed embodiments, or the order of performance of two or more steps permuted. All such variations are considered to be encompassed within the disclosure disclosed and claimed herein.

[0020] While the disclosure has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. The disclosure is not limited to the disclosed embodiments. Variations can be understood and effected by those skilled in the art in practicing the claimed disclosure, from a study of the drawings, the disclosure and the appended claims.

[0021] Full-face helmets with cheek pads can be used in various environments, such as recreational or professional sporting activities or general road travel. Some environments can pose dangers to wearers. For example, wearers can use helmets while riding a motorcycle in a road environment, such as a highway or narrow path. In these environments, wearers can be at risk of experiencing a motor-vehicle accident. Some environments can have extreme weather conditions. For example, in hot weather, the material of cheek pads can expand. Accordingly, cheek pads in contact with a wearer's face can push further into the wearer's face. As cheek pads can contribute to a secure fit of the helmet on the wearer's head, cheek pads can provide resistance to removing the helmet. This can create problems when it is necessary to remove the helmet from the head of the user, such as after a motor vehicle accident, when it is necessary to administer medical care to a driver of the motorcycle. Therefore, improvements in removable cheek pads are needed which allow for removal of helmets from the heads of users without compromising secure fit.

[0022] Systems and methods described herein provide a helmet that can be removed from a wearer's head in various environments. As discussed herein, the helmet can include one or more cheek pads. The cheek pads can include fasteners that secure the cheek pads to fasteners of an inner lining of the helmet. The fasteners of each cheek pad and the inner lining can be engaged to selectively retain the cheek pad. While worn by a wearer, the fasteners can be disengaged by a wearer action to quickly and easily release the cheek pads from the helmet. In this way, the wearer can remove the helmet with less resistance as the cheek pads are no longer intermediate to the wearer and the inner lining of the helmet, creating additional space or clearance between the wear-

er and the helmet. Removing the helmet can be crucial in situations in which the wearer requires medical attention. Accordingly, facilitating easier removal of helmets can be beneficial when responding to sporting or road accidents, for example, where participants or vehicle drivers are wearing helmets. The user experience of wearing full-face helmets can also be advanced by facilitating easier removal of helmets having cheek pads.

[0023] Systems and methods will now be described with reference to the figures. FIG. 1 illustrates a helmet 100, according to an exemplary embodiment. Helmet 100 can include a front end 172, a top end 174, a bottom end 176, a first side 180, and a second side 182 that comprise an outer shell 110. Outer shell 110 can be a rigid, or hard exterior of helmet 100. Outer shell 110 can include plastics. Outer shell 110 can additionally or alternatively include metal. Along an interior surface 112 of outer shell 110, an inner lining 114 disposed within outer shell 110. Inner lining 114 can be impact-absorbing and can shape to a head of a wearer of helmet 100 to support the head during impact.

[0024] Helmet 100 can be a full-face helmet that protects a wearer's whole head. As shown, helmet 100 can include one or more openings, including a window opening 168 along front end 172 to receive a face shield, for example. Helmet 100 can also include a lower opening 170 along bottom end 176. Lower opening 170 can be proximate to a wearer's chin and/or neck when helmet 100 is worn. A wearer can place helmet 100 on their head through lower opening 170. Similarly, a wearer can remove helmet 100 from their head through lower opening 170.

[0025] Helmet 100 can receive one or more cheek pads 200, shown in FIG. 1 with a fabric portion 202 (FIG. 2) removed. As shown, helmet 100 can include about one cheek pad 200 or about two cheek pads 200. As shown, helmet 100 can include cheek pads 200 along each of first side 180 and second side 182, which can be proximate to right and left sides of a wearer's head, respectively, when helmet 100 is worn. Accordingly, cheek pad 200 can be included at portions of helmet 100 proximate to cheeks and/or a chin of a wearer of helmet 100.

[0026] Cheek pad 200 can be secured in helmet 100, such as to outer shell 110, such as to interior surface 112 of outer shell 110, such as to inner lining 114 of interior surface 112. Cheek pad 200 can be selectively retained in helmet 100, such as to outer shell 110, such as to interior surface 112 of outer shell 110, such as to inner lining 114 of interior surface 112. In this way, cheek pad 200 can be retained in helmet 100. FIG. 1 shows a retained cheek pad position 20 in which cheek pad 200 is retained in helmet 100. As discussed herein, cheek pad 200 can be selectively retained by a wearer of helmet 100. By a wearer action, the wearer can release cheek pad 200 from helmet 100 such that cheek pad 200 is no longer retained in helmet 100.

[0027] Helmet 100 can include one or more components to selectively retain cheek pad 200 in helmet 100.

For example, helmet 100 can include one or more fasteners that can utilize a snap-fit arrangement, adhesive, or another attachment means, for example, to selectively retain cheek pad 200 in helmet 100. Helmet 100 can include a projecting fastener 208 to selectively retain cheek pad 200 to helmet 100, such as to outer shell 110, such as to interior surface 112 of outer shell 110, such as to inner lining 114 of interior surface 112. Cheek pad 200 can receive projecting fastener 208. Helmet 100, such as outer shell 110, such as interior surface 112, such as inner lining 114 of interior surface 112 can receive projecting fastener 208 in a cheek pad material 201 of cheek pad 200 to selectively retain cheek pad 200. In other words, projecting fastener 208 can be engaged in helmet 100 to secure cheek pad 200 to helmet 100. Projecting fastener 208 can facilitate a snap-fit arrangement to secure cheek pad 200 to helmet 100 such that cheek pad 200 is retained. As shown, cheek pad 200 can be secured to helmet 100 such that cheek pad 200 is proximate to interior surface 112 of outer shell 110, such as to inner lining 114 of interior surface 112. FIG. 1 shows an engaged position 10 in which projecting fastener 208 is engaged in helmet 100 and cheek pad 200 is retained.

[0028] FIG. 2 illustrates a cheek pad 200, according to an exemplary embodiment. It should be understood that cheek pad 200 can be disposed along first side 180 (FIG. 1) or second side 182 (FIG. 1) of helmet 100 (FIG. 1). Accordingly, detailed description made with reference to cheek pad 200 and components of helmet 100 along first side 180 apply to cheek pad 200 and components of helmet 100 along second side 182, and vice versa.

[0029] As shown, cheek pad 200 can include fabric portion 202. Fabric portion 202 can be formed from any suitable fabric or textile, such as fiber, yarn, cotton, or leather, and can include elastic or semi-elastic material. Fabric portion 202 can be disposed at a front end 222 of cheek pad 200 proximate to a wearer's cheeks and/or chin when helmet 100 (FIG. 1) is worn to provide cushioning and comfort. Cheek pad 200 can include a backing 204 at a rear end 224 of cheek pad 200. Fabric portion 202 can be coupled to backing 204. For example, fabric portion 202 can be attached to backing 204 via an adhesive. Backing 204 can be rigid. With reference to FIGS. 1-2, backing 204 can be coupled to helmet 100, such as to outer shell 110, such as to interior surface 112 of outer shell 110, such as to inner lining 114 of interior surface 112. Cheek pad 200 can include a tab 220 as shown in FIG. 2. Tab 220 can support a wearer action to release cheek pad 200 from helmet 100.

[0030] Referring to FIG. 2, cheek pad material 201 of cheek pad 200 can receive projecting fastener 208. Cheek pad material 201 can include an opening 206 to receive projecting fastener 208. Accordingly, projecting fastener 208 can be disposed through opening 206. Backing 204 can receive projecting fastener 208. Backing 204 can include opening 206 to receive projecting fastener 208.

[0031] Projecting fastener 208 can include a first end

210, a second end 216 opposing first end 210, and an intermediate stem 214 connecting first end 210 and second end 216 as shown in FIG. 3, according to an exemplary embodiment. With reference to FIGS. 2-3, second end 216 of projecting fastener 208 can be disposed through opening 206 in cheek pad material 201 such that opening 206 and at least a portion of cheek pad material 201 are disposed between first end 210 and second end 216. Accordingly, intermediate stem 214 can be disposed through opening 206, leaving the first end 210 of the projecting fastener 208 exposed.

[0032] First end 210, intermediate stem 214, and second end 216 can be generally circular having different diameters. As shown in FIG. 3, first end 210 can have a first diameter 212, intermediate stem 214 can have a second diameter 215, and second end 216 can have a third diameter 218. First diameter 212 can be smaller than third diameter 218. Second diameter 215 can be smaller than first diameter 212.

[0033] FIGS. 4-6 show a system having cheek pad 200 and projecting fastener 208, according to an exemplary embodiment. The opening 206 of cheek pad material 201 through which projecting fastener 208 is disposed can be in backing 204 of cheek pad 200, as shown with reference to FIG. 4. Referring to FIGS. 3-4, opening 206 can include a fourth diameter 207. Fourth diameter 207 can be smaller than first diameter 212 of first end 210 and third diameter 218 of second end 216, similar to second diameter 215 of intermediate stem 214, such that cheek pad material 201 retains projecting fastener 208. Fourth diameter 207 can be about third diameter 218. In addition, first diameter 212 and third diameter 218 can be larger than fourth diameter 207 such that first end 210 and second end 216 of projecting fastener 208 can extend outwardly from opening 206. In this way, intermediate stem 214 can be retained in opening 206 to retain projecting fastener 208 in backing 204 of cheek pad 200. Projecting fastener 208 retained in cheek pad 200, such as backing 204, is shown in FIGS. 5-6 with fabric portion 202 (FIG. 2) removed. Fabric portion 202 can be coupled to backing 204 and, therefore, projecting fastener 208. Referring to FIG. 6, fabric portion 202 can be coupled to backing 204 and second end 216 of projecting fastener 208.

[0034] As discussed above with reference to FIG. 1, helmet 100, such as outer shell 110, such as interior surface 112, such as inner lining 114 of interior surface 112 can receive projecting fastener 208 in cheek pad 200 to selectively retain cheek pad 200. In other words, projecting fastener 208 can be engaged in helmet 100 to secure cheek pad 200 to helmet 100. Helmet 100 can include one or more components to selectively retain projecting fastener 208, and therefore cheek pad 200, such that cheek pad 200 is secured to helmet 100. Referring to FIGS. 1 and 7, helmet 100 can include a receiving fastener 116 to selectively retain cheek pad 200 to helmet 100, such as to outer shell 110, such as to interior surface 112 of outer shell 110, such as to inner lining 114 of in-

terior surface 112. Interior surface 112 can include receiving fastener 116. Inner lining 114 can include receiving fastener 116. Receiving fastener 116 can be in-molded in outer shell 110, such as in interior surface 112 of outer shell 110, such as in inner lining 114 of interior surface 112.

[0035] Receiving fastener 116 is shown in FIGS. 7-9, according to an exemplary embodiment. Receiving fastener 116 can include an opening 119 surrounded by an outer frame 122. Opening 119 surrounded by outer frame 122 can form a front face 118 of receiving fastener 116. In other words, front face 118 can be bounded by outer frame 122.

[0036] Receiving fastener 116 can include one or more surfaces in addition to front face 118. Receiving fastener 116 can include an inner surface 148. Inner surface 148 can be positioned behind front face 118. In addition, inner surface 148 can be attached to front face 118 at one or more portions of inner surface 148. Inner surface 148 can include a top end 150 and a bottom end 164 opposing top end 150. Top end 150 can be coupled to front face 118. Bottom end 164 can be coupled to front face 118.

[0037] Opening 119 can include one or more openings that can be separated by structural features of outer frame 122. For example, opening 119 can include a first opening 126 and a second opening 138, with reference to FIG. 8, according to an exemplary embodiment. Second opening 138 can be adjacent first opening 126. As shown, first opening 126 and second opening 138 can be adjacent such that both first opening 126 and second opening 138 extend alongside one another on an axis 137 within opening 119. First opening 126 can be an upper opening and second opening 138 can be a lower opening disposed below first opening 126 along axis 137.

[0038] First opening 126 and second opening 138 can be about the same size. First opening 126 and second opening 138 can be different sizes. First opening 126 can be smaller than second opening 138. Accordingly, first opening 126 that is an upper opening can be smaller than second opening 138 that is a lower opening. As shown, first opening 126 can be generally circular. Similarly, second opening 138 can be generally circular. First opening 126 can have a first diameter 134. Second opening 138 can have a second diameter 144 larger than first diameter 134. As also shown in FIG. 8, inner surface 148 can include a width 166. Width 166 can be about the same as first diameter 134. Accordingly, width 166 can be less than second diameter 144.

[0039] As discussed, one or more structural features of outer frame 122 can separate portions of opening 119. Front face 118 can include one or more tapered portions 136 extending into opening 119, such as into first opening 126 and second opening 138. One or more tapered portions 136 can be portions of outer frame 122. Tapered portion 136 can extend into opening 119. In this way, front face 118 can be bounded by outer frame 122 having tapered portion 136 extending into opening 119. Tapered portion 136 can extend into opening 119 to separate first

opening 126 and second opening 138. Accordingly, tapered portion 136 can be disposed between first opening 126 and second opening 138. Tapered portion 136 can be disposed between first opening 126 that is an upper opening and second opening 138 that is a lower opening. In addition, front face 118 can be bounded by outer frame 122 having tapered portion 136 extending into first opening 126 and second opening 138.

[0040] Front face 118 can additionally include one or more cutouts 132. Referring to FIG. 8, outer frame 122 can include cutout 132 to support flexing of outer frame 122. As opening 119 can include one or more openings, outer frame 122 can include separate frames. Outer frame 122 can include a first frame 130 and a second frame 142. First frame 130 can surround first opening 126. Similarly, second frame 142 can surround second opening 138. Accordingly, first frame 130 can surround first opening 126 that is an upper opening and second frame 142 can surround second opening 138 that is a lower opening. First frame 130 can include cutout 132. Second frame 142 can include cutout 132. First opening 126 being smaller than second opening 138 can be bounded by first frame 130 having cutout 132. Accordingly, cutout 132 can support flexing of first frame 130 to expand first opening 126, which can be smaller than second opening 138 bounded by second frame 142 without cutouts 132.

[0041] A side view of receiving fastener 116 is shown in FIG. 9, according to an exemplary embodiment. As shown, receiving fastener 116 can include front face 118 and inner surface 148. Inner surface 148 can be positioned behind front face 118 such that inner surface 148 is toward the left-side of FIG. 9 compared to front face 118. Inner surface 148 can include one or more portions between top end 150 and bottom end 164. Portions of inner surface 148 can be oriented at different angles relative to an axis 137 corresponding to front face 118. For example, inner surface 148 can include a first portion 152. Inner surface 148 can include a second portion 156. First portion 152 can be a top portion such that first portion 152 is coupled to top end 150. Accordingly, first portion 152 can extend from top end 150 to a portion of inner surface 148 above bottom end 164. Second portion 156 can be a bottom portion such that second portion 156 is coupled to bottom end 164. Accordingly, second portion 156 can extend from bottom end 164 to a portion of inner surface 148 below top end 150.

[0042] Inner surface 148 can be a guide within receiving fastener 116 for components disposed within receiving fastener 116. Accordingly, portions of inner surface 148 can be oriented at different angles relative to axis 137 corresponding to front face 118. For example, first portion 152 and second portion 156 can be oriented at different angles relative to axis 137. First portion 152 can extend generally parallel to axis 137. In this way, first portion 152 can include a flat portion.

[0043] Second portion 156 can include one or more sloped portions. Inner surface 148 having sloped second

portion 156 can be a ramped inner surface 148. Second portion 156 can extend generally along an axis 157. Axis 157 can be at an angle α from axis 120. Angle α can be between about 20 degrees and about 70 degrees, such as between about 30 degrees and about 60 degrees, such as between about 40 degrees and about 50 degrees, such as about 45 degrees. Accordingly, second portion 156 can include one or more sloped portions at angle α from axis 120. As second portion 156 can be coupled to bottom end 164, sloped second portion 156 can extend from bottom end 164 to a portion of inner surface 148 below top end 150.

[0044] Receiving fastener 116 can receive components between front face 118 and inner surface 148. Accordingly, receiving fastener 116 can include additional features for structural support. Receiving fastener 116 can include a bracket 162. Bracket 162 can extend below second portion 156. Accordingly bracket 162 can be a lower bracket extending below second portion 156 including a sloped portion.

[0045] To guide components within receiving fastener 116, inner surface 148 can include curved surfaces. First portion 152 and second portion 156 can be separated by a transition 160. In other words, transition 160 can be disposed between first portion 152 and second portion 156. Transition 160 can be curved. Accordingly, transition 160 between first portion 152 including a flat portion and second portion 156 including a sloped portion can be curved.

[0046] As shown in FIG. 9, inner surface 148 can be positioned behind front face 118 having first opening 126 and second opening 138. Accordingly, ramped inner surface 148 can be positioned behind front face 118. As discussed, ramped inner surface 148 can include first portion 152 and second portion 156. First portion 152 can be positioned behind first opening 126. In other words, a first center part 154 of first portion 152 can be along a first central axis 128 of first opening 126. Accordingly, first portion 152 including a flat portion can be positioned behind first opening 126 being an upper opening. Similarly, second portion 156 can be positioned behind second opening 138. In other words, a second center part 158 of second portion 156 can be along a second central axis 140 of second opening 138. Accordingly, second portion 156 including a sloped portion can be positioned behind second opening 138 being a lower opening.

[0047] Between inner surface 148 and front face 118, receiving fastener 116 can include a retaining area 146. In other words, inner surface 148 being positioned behind front face 118 can form a cavity, or retaining area 146, in which components received by receiving fastener 116 can be disposed. Retaining area 146 can extend between first portion 152 and first opening 126. In addition, retaining area 146 can extend between second portion 156 and second opening 138.

[0048] Receiving fastener 116 can receive components, such as projecting fastener 208 (FIG. 10). Refer-

ring to FIGS. 10-11, receiving fastener 116 can receive projecting fastener 208 such that they are engaged. In engaged position 10 in which projecting fastener 208 is engaged in helmet 100, projecting fastener 208 of cheek pad 200 can be engaged with receiving fastener 116. Each of first side 180 and second side 182 of helmet 100 can include about one to about five receiving fasteners 116 to receive about one to about five projecting fasteners 208, such as about three receiving fasteners 116 to receive about three projecting fasteners 208.

[0049] FIG. 10 shows engaged position 10 and retained cheek pad position 20 in which cheek pad 200 is retained in helmet 10, according to an exemplary embodiment. Engaged position 10 can facilitate retained cheek pad position 20. Engaged position 10 and retained cheek pad position 20 is shown in FIG. 11 with cheek pad 200 removed, according to an exemplary embodiment. As shown, receiving fastener 116 can receive projecting fastener 208 to selectively retain cheek pad 200. In other words, projecting fastener 208 and receiving fastener 116 can be engaged to selectively retain cheek pad 200. Engaged position 10 and retained cheek pad position 20 is also shown in FIG. 12. As shown, cheek pad 200 can be disposed between and proximate to both projecting fastener 208 and receiving fastener 116 such that cheek pad 200 is retained. In engaged position 10, projecting fastener 208 can be disposed in retaining area 146 between first portion 152 and first opening 126.

[0050] Projecting fastener 208 and receiving fastener 116 can be engaged in a snap-fit arrangement to be in engaged position 10. To facilitate the snap-fit arrangement, with reference to FIG. 12, according to an exemplary embodiment, front face 118 of receiving fastener 116 can receive projecting fastener 208. In other words, projecting fastener 208 can be disposed through opening 119 surrounded by outer frame 122. First opening 126 can engage projecting fastener 208 in the snap-fit arrangement to facilitate engaged position 10. Accordingly, first opening 126 that is an upper opening can engage projecting fastener 208 in the snap-fit arrangement to facilitate engaged position 10. Cutout 132 on first frame 130 surrounding first opening 126 can allow first frame 130 to flex such that first opening 126 can engage projecting fastener 208. As shown in FIG. 12, in the snap-fit arrangement to facilitate engaged position 10, front face 118 can receive projecting fastener 208 such that first end 210 of projecting fastener 208 is received within a corresponding receiving fastener 116.

[0051] As discussed, one or more structural features of outer frame 122 can separate portions of opening 119. These structural features can support engagement of projecting fastener 208 and receiving fastener 116. Tapered portion 136 can extend into opening 119 to separate first opening 126 and second opening 138. Accordingly, tapered portion 136 can be disposed between first opening 126 and second opening 138. Tapered portion 136 can be disposed between first opening 126 that is an upper opening and second opening 138 that is a lower

opening. Tapered portion 136 can maintain engagement of projecting fastener 208 by providing resistance to projecting fastener 208 moving beyond tapered portion 136 and away from first opening 126. In this way, tapered portion 136 can facilitate retaining projecting fastener 208 in first opening 126. Accordingly, engaged position 10 and retained cheek pad position 20 can be maintained.

[0052] Referring to FIGS. 10-12, cheek pad 200 can be selectively retained to helmet 100. As such, cheek pad 200 can be selectively released from helmet 100. To release cheek pad 200 from helmet 100, a wearer can engage tab 220 of cheek pad 200, shown in FIG. 13. With reference to FIGS. 13-14, according to an exemplary embodiment, engaging tab 220 can include pulling tab 220 downward along a direction 14. In this way, cheek pad 200 can be released from helmet 100 through lower opening 170 of helmet 100. Tab 220 can release one or more engagements of projecting fastener 208 (FIG. 11) and receiving fastener 116 (FIG. 11), such as between about one engagement of projecting fastener 208 and receiving fastener 116 and about five engagements of projecting fastener 208 and receiving fastener 116, such as about three engagements of projecting fastener 208 and receiving fastener 116. Accordingly, cheek pad 200 can entirely be released by a single engagement of tab 220.

[0053] Based on the foregoing, wearer action on tab 220 can facilitate moving projecting fastener 208 and receiving fastener 116 from engaged position 10 to a disengaged position 12 (FIG. 16), and, therefore, from retained cheek pad position 20 to a released cheek pad position 22 (FIG. 16). Releasing cheek pad 200 from helmet 100 can be seen with reference to FIGS. 15-20.

[0054] FIG. 15 shows projecting fastener 208 and receiving fastener 116 in engaged position 10, according to an exemplary embodiment. As shown, receiving fastener 116 can receive projecting fastener 208 such that projecting fastener 208 can be disposed in retaining area 146 between first portion 152 and first opening 126. In engaged position 10, cheek pad 200 can be disposed between and proximate to both projecting fastener 208 and receiving fastener 116 such that cheek pad 200 is retained.

[0055] Projecting fastener 208 and receiving fastener 116 can be selectively engaged and disengaged. Second opening 138 can disengage projecting fastener 208 and receiving fastener 116. Accordingly, second opening 138 that is a lower opening can disengage projecting fastener 208 and receiving fastener 116. Projecting fastener 208 and receiving fastener 116 can be engaged in a snap-fit arrangement to be in engaged position 10. Accordingly, second opening 138 can disengage projecting fastener 208 and receiving fastener 116 from the snap-fit arrangement.

[0056] Engaging tab 220 (FIG. 13) attached to cheek pad 200 can disengage one or more engagements of projecting fastener 208 and receiving fastener 116. Referring to FIGS. 15-16, engaging tab 220 such that tab

220 is pulled downward along a direction 14 can disengage projecting fastener 208 and receiving fastener 116. As shown in FIG. 16, according to an exemplary embodiment, projecting fastener 208 and receiving fastener 116 can be in disengaged position 12 such that cheek pad 200 is not retained. Disengaged position 12 can support released cheek pad position 22 such that cheek pad 200 can be releasable from helmet 100 (FIG. 14).

[0057] Engaging tab 220 (FIG. 13) along direction 14 can disengage projecting fastener 208 and receiving fastener 116 by moving projecting fastener 208 through opening 119 of receiving fastener 116, with reference to FIGS. 15-16. Engaging tab 220 along direction 14 can move projecting fastener 208 from first opening 126 to second opening 138. Second opening 138 can disengage projecting fastener 208 and receiving fastener 116 such that cheek pad 200 is not retained and can be released.

[0058] As projecting fastener 208 is disposed in retaining area 146 of receiving fastener 116, engaging tab 220 (FIG. 13) along direction 14 can move projecting fastener 208 through retaining area 146. Disengaging projecting fastener 208 can include moving projecting fastener 208 in retaining area 146 from being between first portion 152 of inner surface 148 and first opening 126, to being between second portion 156 of inner surface 148 and second opening 138. In this way, disengaging projecting fastener 208 can include guiding projecting fastener 208 along inner surface 148 of receiving fastener 116. In other words, disengaging projecting fastener 208 can include guiding projecting fastener 208 from first portion 152 to second portion 156 of inner surface 148. As shown, direction 14 can follow inner surface 148 of receiving fastener 116.

[0059] Inner surface 148 can guide first end 210 of projecting fastener 208 within receiving fastener 116. Disengaging projecting fastener 208 can include guiding projecting fastener 208, such as first end 210, through opening 119, such as from first opening 126 to second opening 138. In other words, disengaging projecting fastener 208 can include guiding projecting fastener 208, such as first end 210, along inner surface 148 through retaining area 146. First end 210 can pass through second opening 138 of the corresponding receiving fastener 116 but not first opening 126. Accordingly, first end 210 can pass through second opening 138 that is a lower opening but not first opening 126 that is an upper opening. In other embodiments, the configuration can be inverted such that second opening 138 can facilitate engagement and first opening 126 can facilitate disengagement.

[0060] Inner surface 148 can be ramped to guide projecting fastener 208 from engaged position 10 to disengaged position 12. In this way, projecting fastener 208 can be guided out of engagement with receiving fastener 116. In contrast, inner surface 148 having an I-shaped bracket could retain projecting fastener 208 as projecting fastener 208 is pulled down, requiring a second user ac-

tion to pull projecting fastener 208 away from receiving fastener 116 to achieve disengaged position 12.

[0061] With reference to FIGS. 15-16, transition 160 disposed between first portion 152 and second portion 156 can be curved to guide projecting fastener 208 from engaged position 10 to disengaged position 12. Transition 160 disposed between first portion 152 and second portion 156 can be curved to guide projecting fastener 208 from a snap-fit arrangement with receiving fastener 116. At least second portion 156 can include a sloped portion to guide projecting fastener 208 from engaged position 10 to disengaged position 12. At least second portion 156 can include a sloped portion to guide projecting fastener 208 from the snap-fit arrangement with receiving fastener 116. Accordingly, ramped inner surface 148 can guide projecting fastener 208 from engaged position 10 to disengaged position 12. Engaging tab 220 (FIG. 13) along direction 14 can move projecting fastener 208 along ramped inner surface 148 having curved transition 160 and sloped second portion 156 to facilitate disengagement of projecting fastener 208 from receiving fastener 116.

[0062] Guiding projecting fastener 208 from first opening 126 and second opening 138 can including overcoming tapered portion 136 (FIG. 8). As discussed, tapered portion 136 can extend into opening 119 to separate first opening 126 and second opening 138. Accordingly, tapered portion 136 can be disposed between first opening 126 and second opening 138. Tapered portion 136 can be disposed between first opening 126 that is an upper opening and second opening 138 that is a lower opening. Tapered portion 136 can provide resistance to disengagement of projecting fastener 208 as projecting fastener 208 traverses beyond tapered portion 136 from first opening 126 to second opening 138 to disengage from receiving fastener 116. Accordingly, tapered portion 136 can be overcome to disengage projecting fastener 208 from receiving fastener 116.

[0063] As projecting fastener 208 can be disposed through cheek pad 200, engaging tab 220 (FIG. 13) along direction 14 can also move cheek pad 200 downward. As shown in FIGS. 17-18, according to an exemplary embodiment, cheek pad 200 can be releasable from helmet 100 in released cheek pad position 22 when projecting fastener 208 and receiving fastener 116 are in disengaged position 12.

[0064] With reference to FIG. 19, according to an exemplary embodiment, moving projecting fastener 208 from retaining area 146 through second opening 138 along direction 24 can release cheek pad 200 from helmet 100 through lower opening 170 of helmet 100 shown in FIG. 20, according to an exemplary embodiment. Second opening 138 can disengage projecting fastener 208 and receiving fastener 116. Second opening 138 can be larger than first opening 126 to facilitate disengagement. Projecting fastener 208 can be removed from receiving fastener 116 more easily, or with less resistance, through larger second opening 138. In this way, second opening

can disengage projecting fastener 208.

[0065] Referring again to FIGS. 15-20, cheek pad 200 having projecting fastener 208 can move from released cheek pad position 22 to retained cheek pad position 20 in a manner generally opposite to moving from retained cheek pad position 20 to released cheek pad position 22.

[0066] As with guiding projecting fastener 208 from engaged position 10 to disengaged position 12, inner surface 148 can guide projecting fastener 208 within receiving fastener 116 from disengaged position 12 to engaged position 10. Inner surface 148 can guide first end 210 of projecting fastener 208 within receiving fastener 116. As discussed above, disengaging projecting fastener 208 can include guiding projecting fastener 208, such as first end 210, through opening 119, such as from first opening 126 to second opening 138, such as from first opening 126 that is an upper opening to second opening 138 that is a lower opening. Engaging projecting fastener 208 can include an inverted operation. Engaging projecting fastener 208 can include guiding projecting fastener 208, such as first end 210, through opening 119, such as from second opening 138 to first opening 126, such as from second opening 138 that is a lower opening to first opening 126 that is an upper opening. In other words, engaging projecting fastener 208 can include guiding projecting fastener 208, such as first end 210, along inner surface 148 through retaining area 146.

[0067] Inner surface 148 can be ramped to guide projecting fastener 208 from disengaged position 12 to engaged position 10. Transition 160 disposed between first portion 152 and second portion 156 can be curved to guide projecting fastener 208 from disengaged position 12 to engaged position 10. Transition 160 disposed between first portion 152 and second portion 156 can be curved to guide projecting fastener 208 to a snap-fit arrangement with receiving fastener 116. At least second portion 156 can include a sloped portion to guide projecting fastener 208 to the snap-fit arrangement with receiving fastener 116. At least second portion 156 can include a sloped portion to guide projecting fastener 208 from disengaged position 12 to engaged position 10. At least second portion 156 can include a sloped portion to guide projecting fastener 208 to the snap-fit arrangement with receiving fastener 116. Accordingly, ramped inner surface 148 can guide projecting fastener 208 from disengaged position 12 to engaged position 10. Engaging cheek pad 200 along a direction opposite direction 14 can move projecting fastener 208 along ramped inner surface 148 having curved transition 160 and sloped second portion 156 to facilitate engagement of projecting fastener 208 to receiving fastener 116.

[0068] Additionally or alternatively, projecting fastener 208 can be engaged directly through first opening 126 to move projecting fastener 208 from disengaged position 12 to engaged position 10. A user can push projecting fastener 208 through outer frame 122 such that projecting fastener 208 overcomes resistance from tapered portion 136 along front face 118. In this way, projecting fastener

208 can be in a snap-fit arrangement with receiving fastener 116. Each engagement of projecting fastener 208 and receiving fastener 116 can be engaged individually, or together. Accordingly, cheek pad 200 can be quickly installed.

[0069] It should be noted that the use of particular terminology when describing certain features or embodiments of the disclosure should not be taken to imply that the terminology is being re-defined herein to be restricted to include any specific characteristics of the features or embodiments of the disclosure with which that terminology is associated. Terms and phrases used in this application, and variations thereof, especially in the appended claims, unless otherwise expressly stated, should be construed as open-ended as opposed to limiting. As examples of the foregoing, the term "including" should be read to mean "including, without limitation," "including but not limited to," or the like; the term "comprising" as used herein is synonymous with "including," "containing," or "characterized by," and is inclusive or open-ended and does not exclude additional, unrecited elements or method steps; the term "having" should be interpreted as "having at least"; the term "such as" should be interpreted as "such as, without limitation"; the term "includes" should be interpreted as "includes but is not limited to"; the term "example" is used to provide exemplary instances of the item in discussion, not an exhaustive or limiting list thereof, and should be interpreted as "example, but without limitation"; adjectives such as "known," "normal," "standard," and terms of similar meaning should not be construed as limiting the item described to a given time period or to an item available as of a given time, but instead should be read to encompass known, normal, or standard technologies that can be available or known now or at any time in the future; and use of terms like "preferably," "preferred," "desired," or "desirable," and words of similar meaning should not be understood as implying that certain features are critical, essential, or even important to the structure or function of the present disclosure, but instead as merely intended to highlight alternative or additional features that can or cannot be utilized in a particular embodiment.

[0070] Likewise, a group of items linked with the conjunction "and" should not be read as requiring that each and every one of those items be present in the grouping, but rather should be read as "and/or" unless expressly stated otherwise. Similarly, a group of items linked with the conjunction "or" should not be read as requiring mutual exclusivity among that group, but rather should be read as "and/or" unless expressly stated otherwise. The terms "about" or "approximate" and the like are synonymous and are used to indicate that the value modified by the term has an understood range associated with it, where the range can be $\pm 20\%$, $\pm 15\%$, $\pm 10\%$, $\pm 5\%$, or $\pm 1\%$. The term "substantially" is used to indicate that a result (e.g., measurement value) is close to a targeted value, where close can mean, for example, the result is within 80% of the value, within 90% of the value, within

95% of the value, or within 99% of the value. Also, as used herein "defined" or "determined" can include "pre-defined" or "predetermined" and/or otherwise determined values, conditions, thresholds, measurements, and the like.

Claims

1. A helmet cheek pad and fastener system comprising:
 - a projecting fastener (208) comprising a first end (210) and a second end (216) opposing the first end;
 - a cheek pad (200) comprising a cheek pad material configured to receive the projecting fastener; and
 - a receiving fastener (116) configured to receive the first end of the projecting fastener to selectively retain the cheek pad, the receiving fastener comprising a tapered opening (119) disposed in an outer frame (112), the tapered opening comprising:
 - an upper opening;
 - a lower opening disposed below the upper opening, the lower opening being larger than the upper opening;
 - a tapered portion (136) disposed between the upper opening and the lower opening; and
 - an inner surface (148) configured to guide the first end of the projecting fastener within the tapered opening.
2. The helmet cheek pad and fastener system of claim 1, wherein the inner surface (148) comprises a flat portion and a sloped portion.
3. The helmet cheek pad and fastener system of claim 2, wherein a transition (160) between the flat portion and the sloped portion is curved.
4. The helmet cheek pad and fastener system of claim 2 or 3, wherein the inner surface further comprises a lower bracket (162) configured to extend below the sloped portion.
5. The helmet cheek pad and fastener system of any of claims 2 to 4, wherein the sloped portion is positioned behind the lower opening, the slope configured to guide the first end (210) of the projecting fastener from the upper opening to the lower opening.
6. The helmet cheek pad and fastener system of any of claims 1 to 5, wherein the cheek pad material comprises an opening having a first diameter smaller

than a second diameter of the first end (210) and a third diameter of the second end (216) such that the cheek pad material retains the projecting fastener.

7. The helmet cheek pad and fastener system of any of claims 1 to 6, wherein the outer frame comprises a cutout (132) adjacent the upper opening, the cutout configured to facilitate flexing of the outer frame to receive the first end.
8. The helmet cheek pad and fastener system of any of claims 1 to 7, wherein the first end (210) is configured to pass through the lower opening of the receiving fastener but not the upper opening of the receiving fastener.
9. The helmet cheek pad and fastener system of any of claims 1 to 8, wherein each projecting fastener comprises a stem (214) connecting the first end and the second end, and wherein at least a portion of the stem extends beyond a front face (118) of the receiving fastener when the projecting fastener is in the snap-fit arrangement with the receiving fastener.
10. The helmet cheek pad and fastener system of any of claims 1 to 9, wherein the cheek pad material is disposed between the first end (210) and the second end (216).
11. The helmet cheek pad and fastener system of any of claims 1 to 10, wherein the cheek pad material (201) comprises an opening, and wherein the projecting fastener is configured to be disposed through the opening.
12. A helmet (100) comprising:

a cheek pad and fastener system according to any of claims 1 to 11;
an outer shell (110) to which the cheek pad material is selectively retainable; and, the receiving fastener comprising:

a front face (118) comprising the upper opening, the upper opening being configured to engage the projecting fastener to retain the cheek pad to the outer shell and the lower opening adjacent the first opening, the lower opening configured to disengage the projecting fastener; and
a ramped inner surface (148), the ramped inner surface comprising a sloped portion disposed behind the lower opening, the sloped portion configured to guide the projecting fastener from the upper opening to the lower opening.

13. The helmet of claim 12, wherein the front face comprises a tapered portion (136) extending into the upper opening and the lower opening.

14. The helmet of claim 13, wherein the tapered portion is configured to retain the projecting fastener in the upper opening.

15. The helmet of any of claims 12 to 14, wherein the ramped inner surface further comprises:

a top end (174); and
a bottom end (176) opposing the top end, the ramped inner surface being coupled to the front face at the top end and the bottom end.

16. The helmet (100) of claim 15, wherein the sloped portion extends from the bottom end of the ramped inner surface to a portion of the ramped inner surface below the top end.

17. The helmet (100) of claim any of claims 12 to 16, wherein the sloped portion of the ramped inner surface is at an angle between 30 degrees and 60 degrees, or between 40 degrees and 50 degrees, from an axis (137) corresponding to the front face.

18. The helmet of any of claims 12 to 17 comprising:
an inner lining (114) disposed within the outer shell, the inner lining comprising the receiving fastener, the upper opening being configured to engage the projecting fastener in a snap-fit arrangement, the lower opening being configured to disengage the projecting fastener from the snap-fit arrangement; and
the sloped portion being configured to guide the projecting fastener from the snap-fit arrangement.

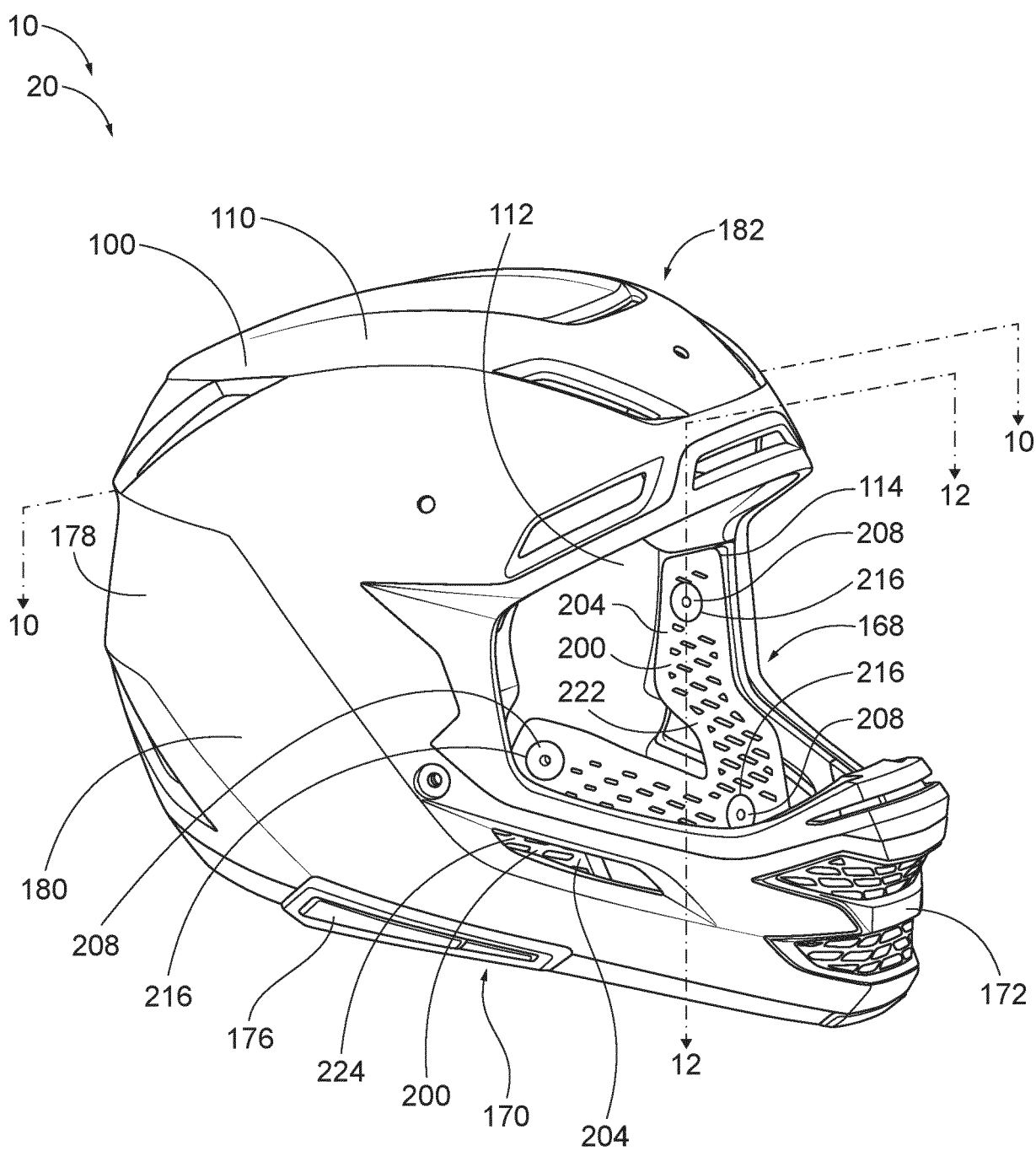


FIG. 1

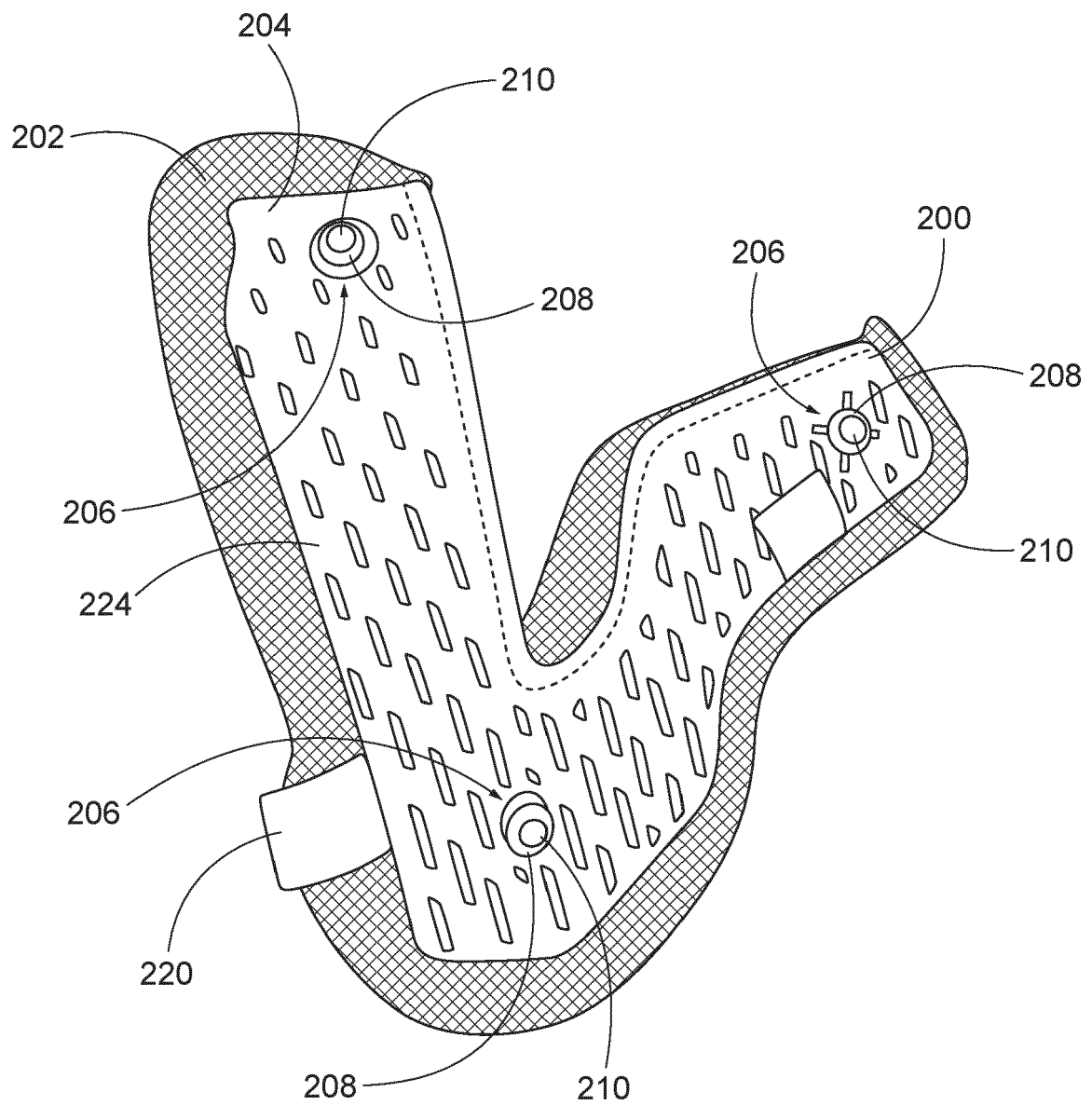


FIG. 2

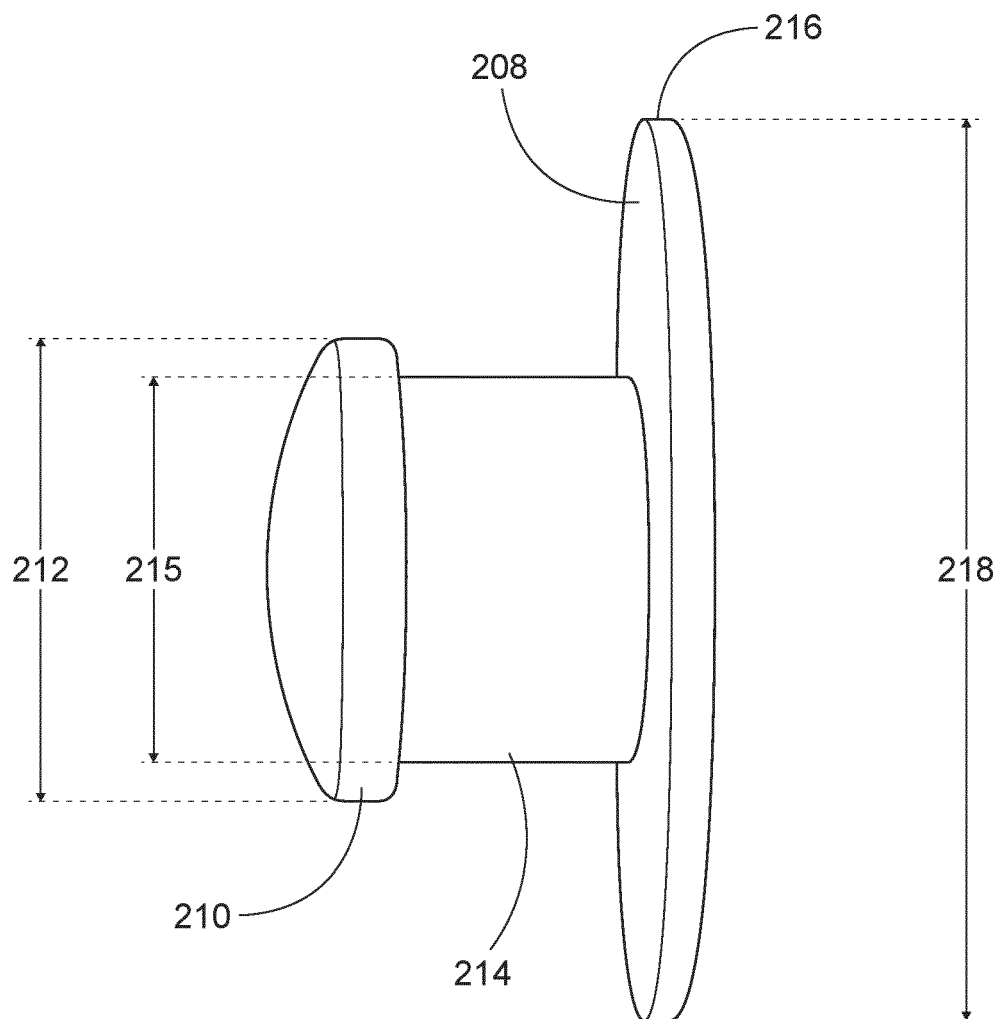


FIG. 3

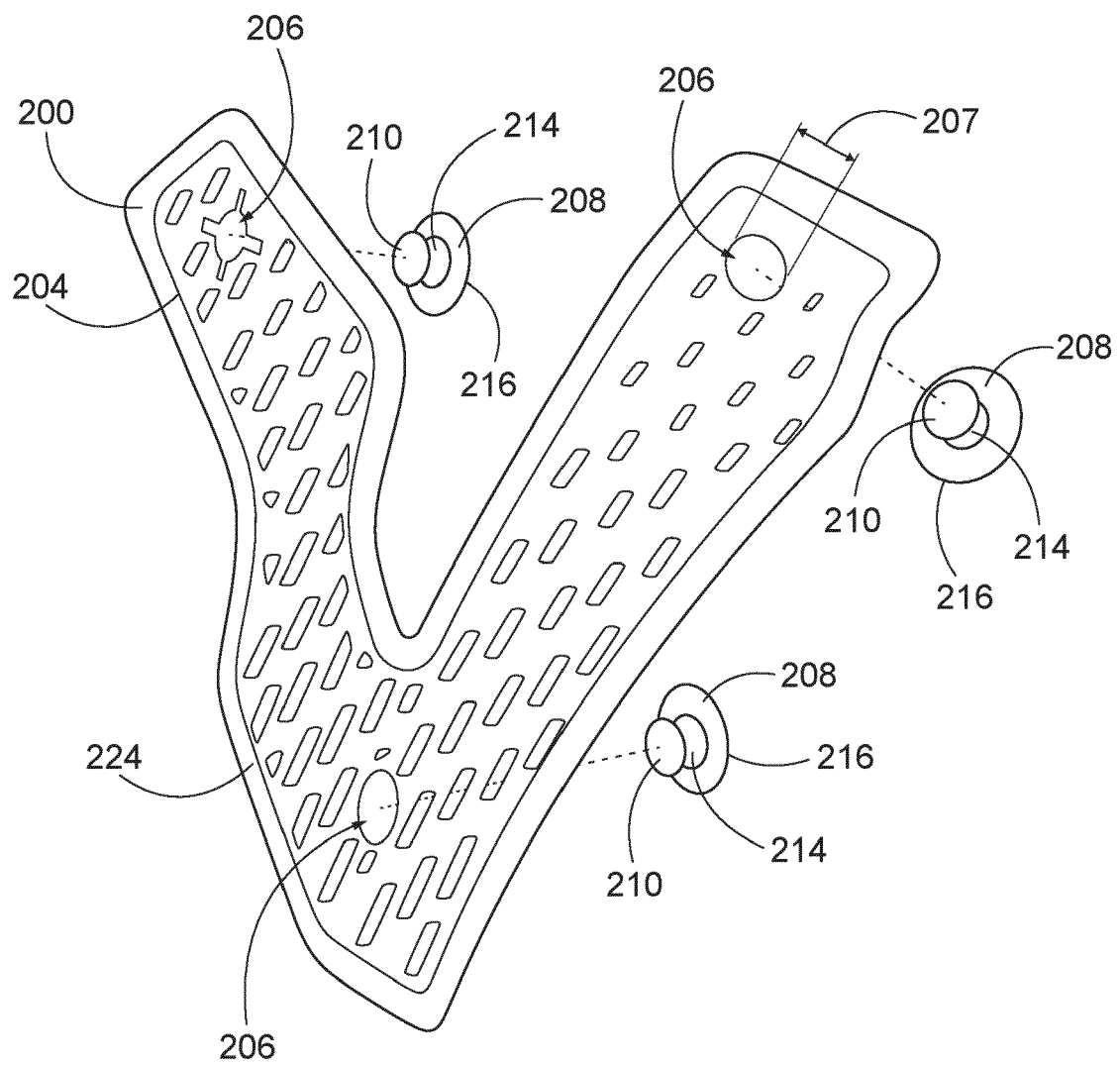


FIG. 4

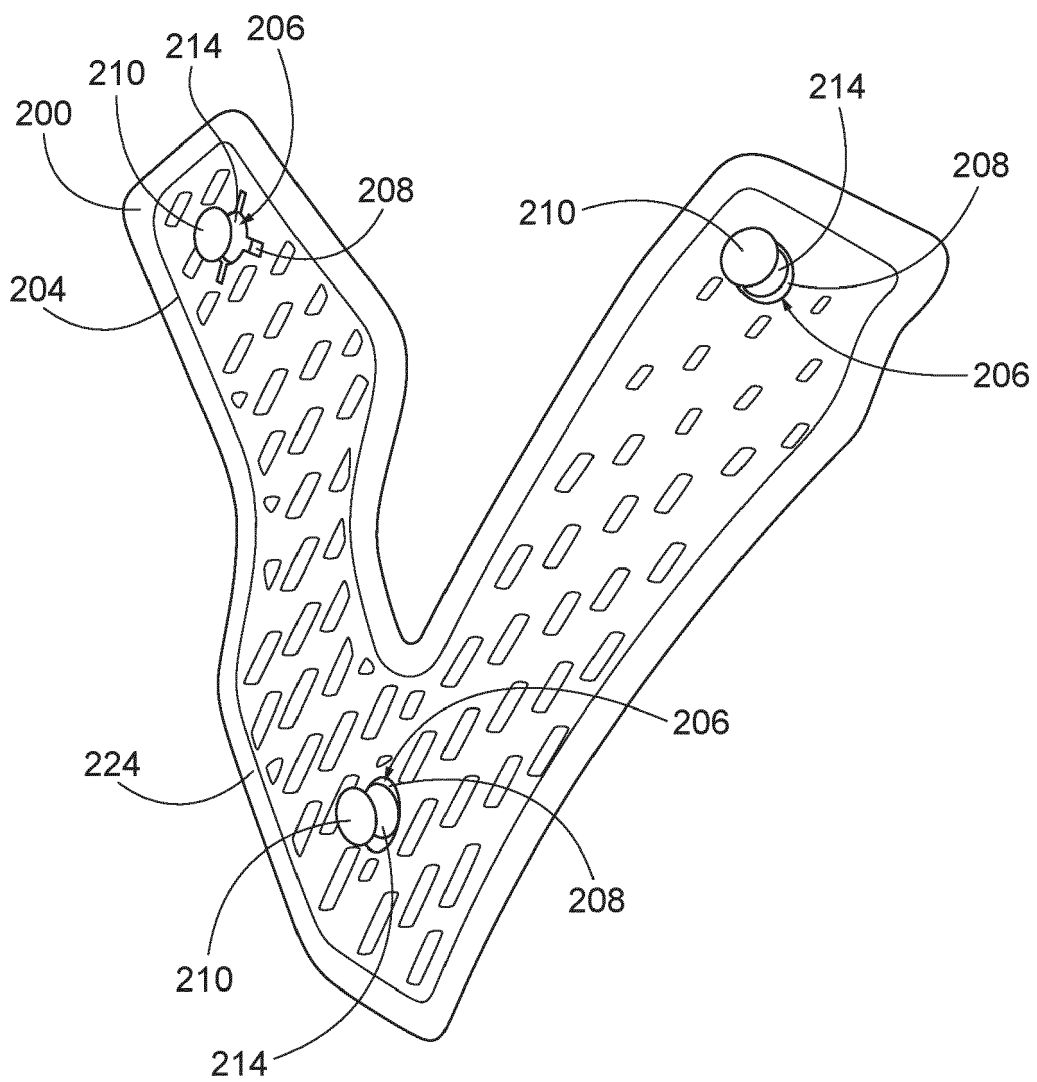


FIG. 5

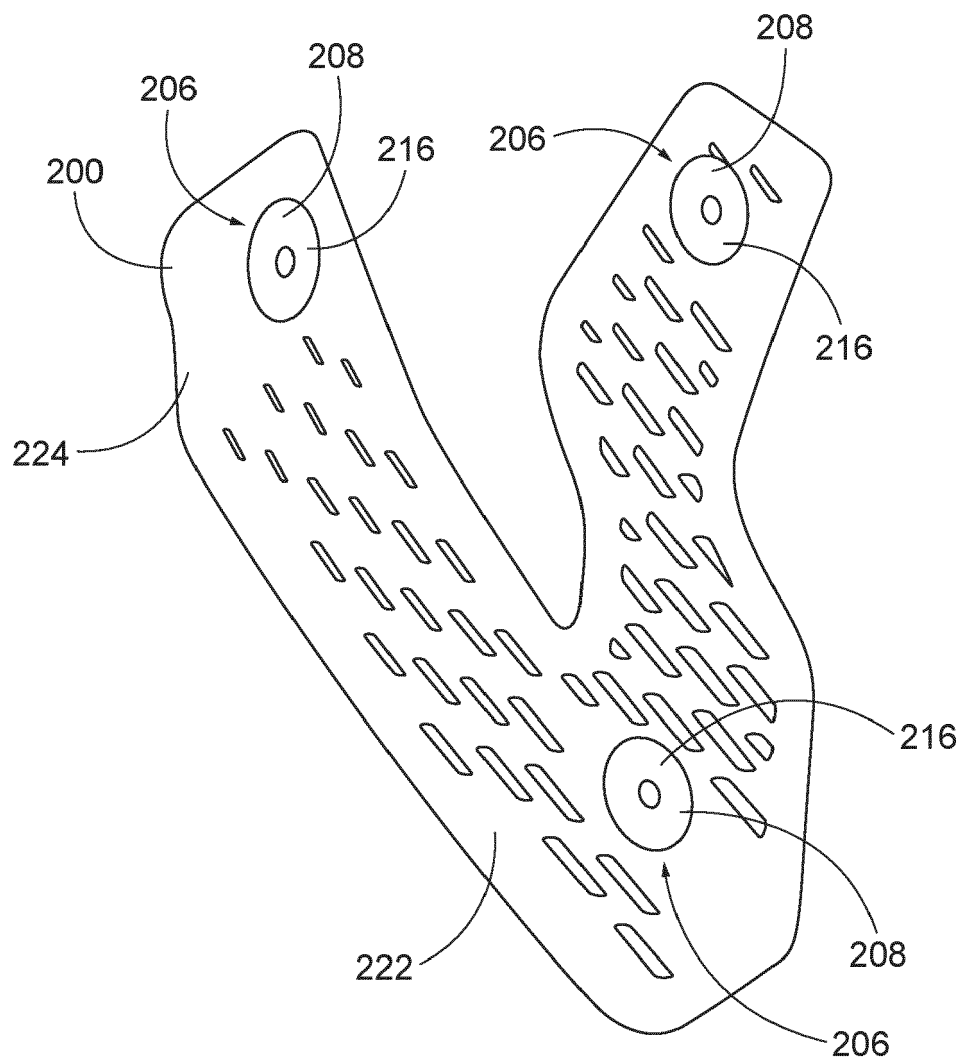


FIG. 6

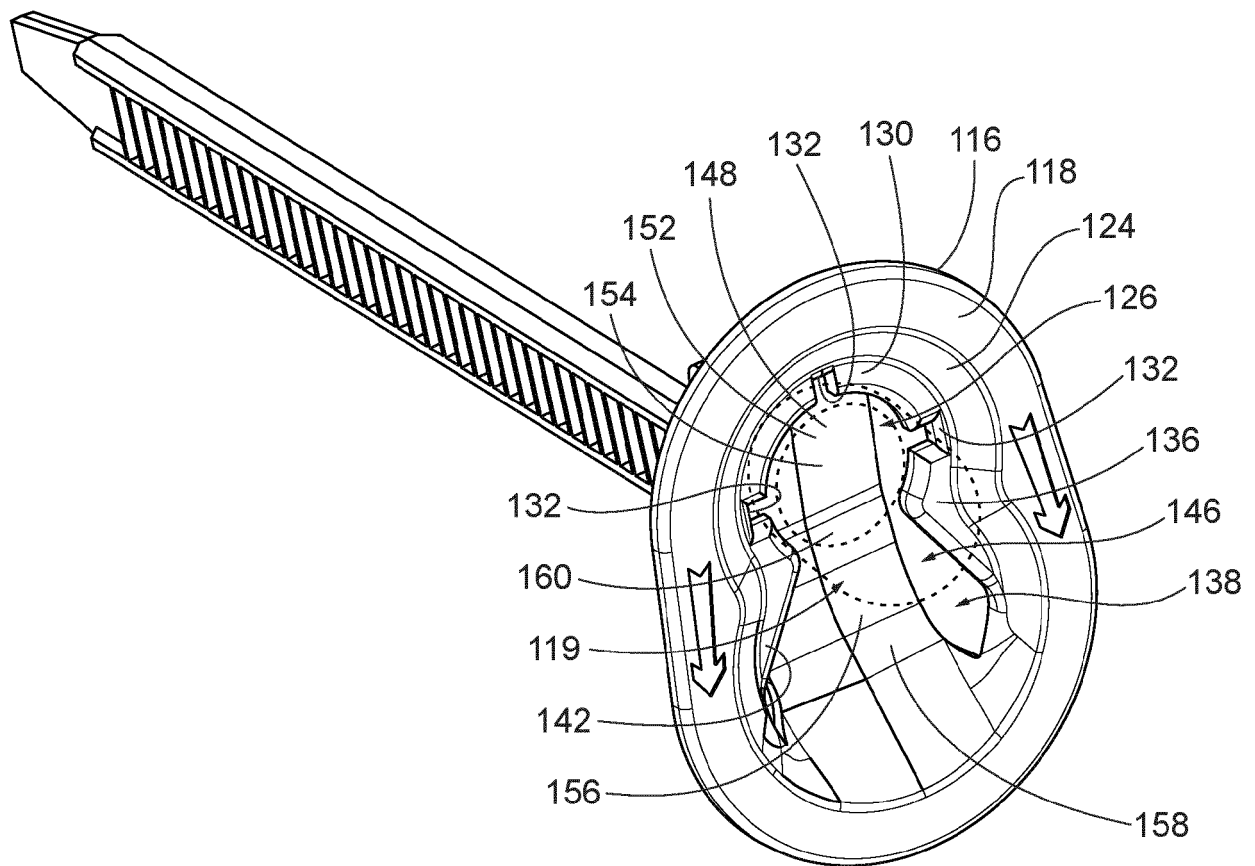


FIG. 7

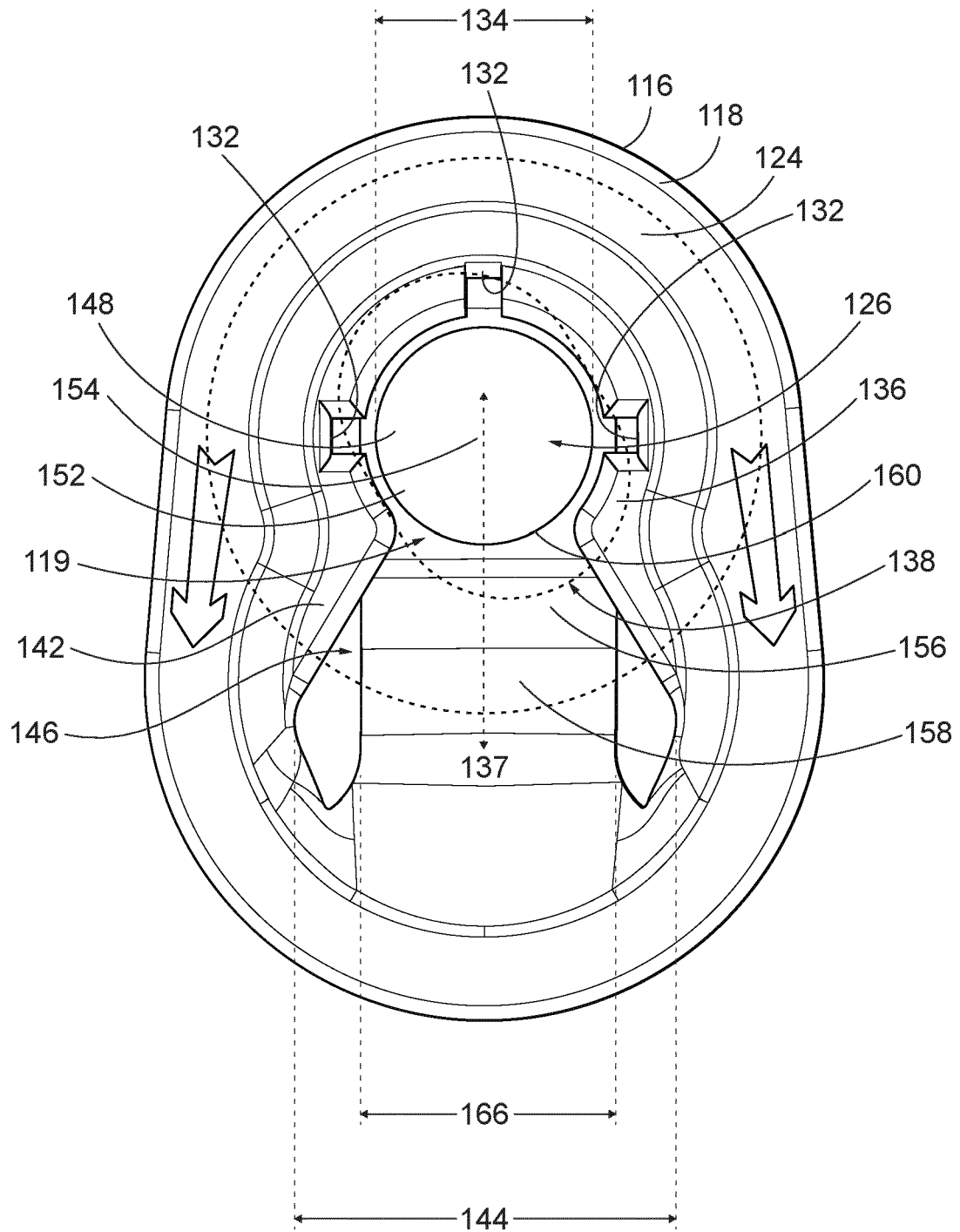


FIG. 8

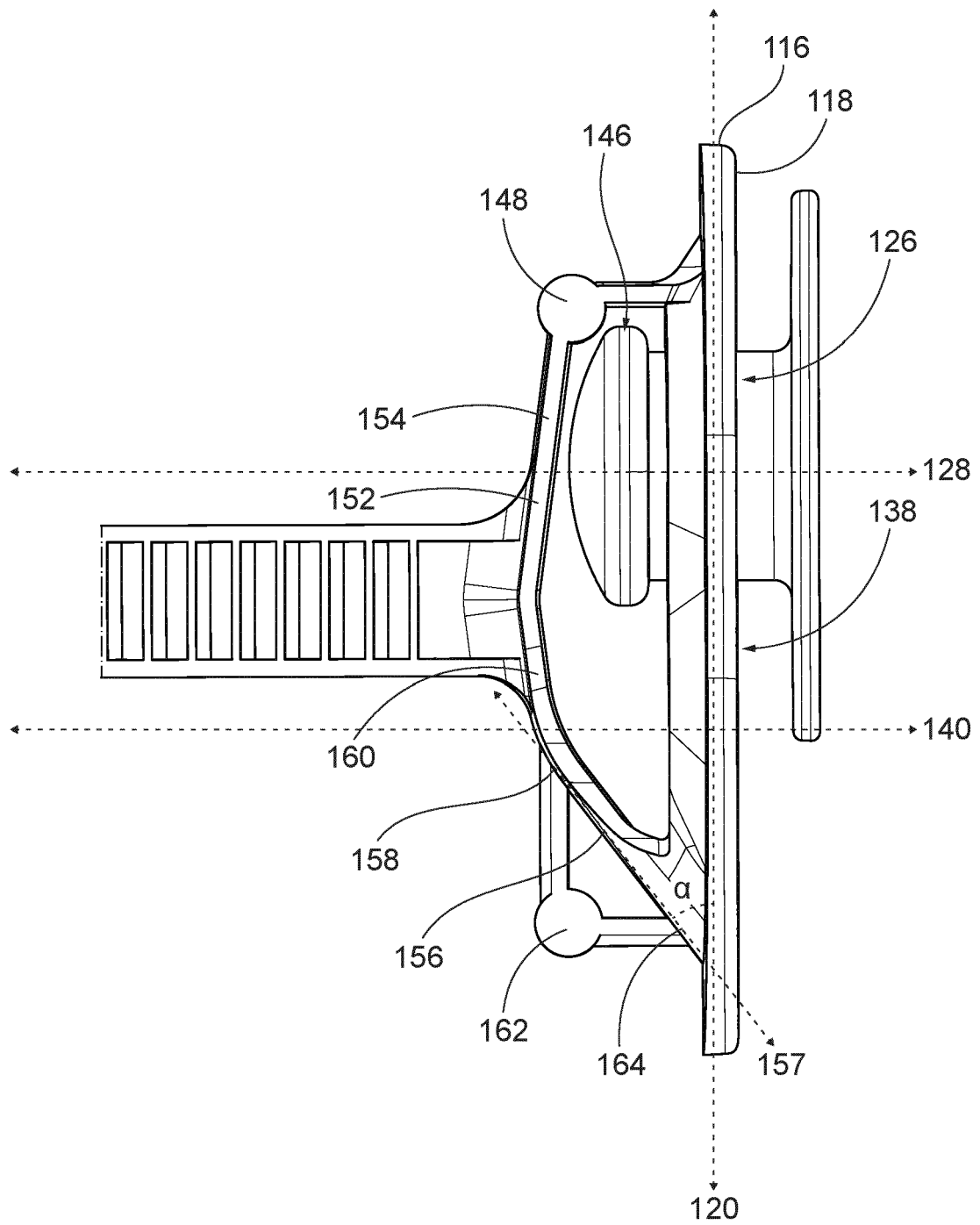


FIG. 9

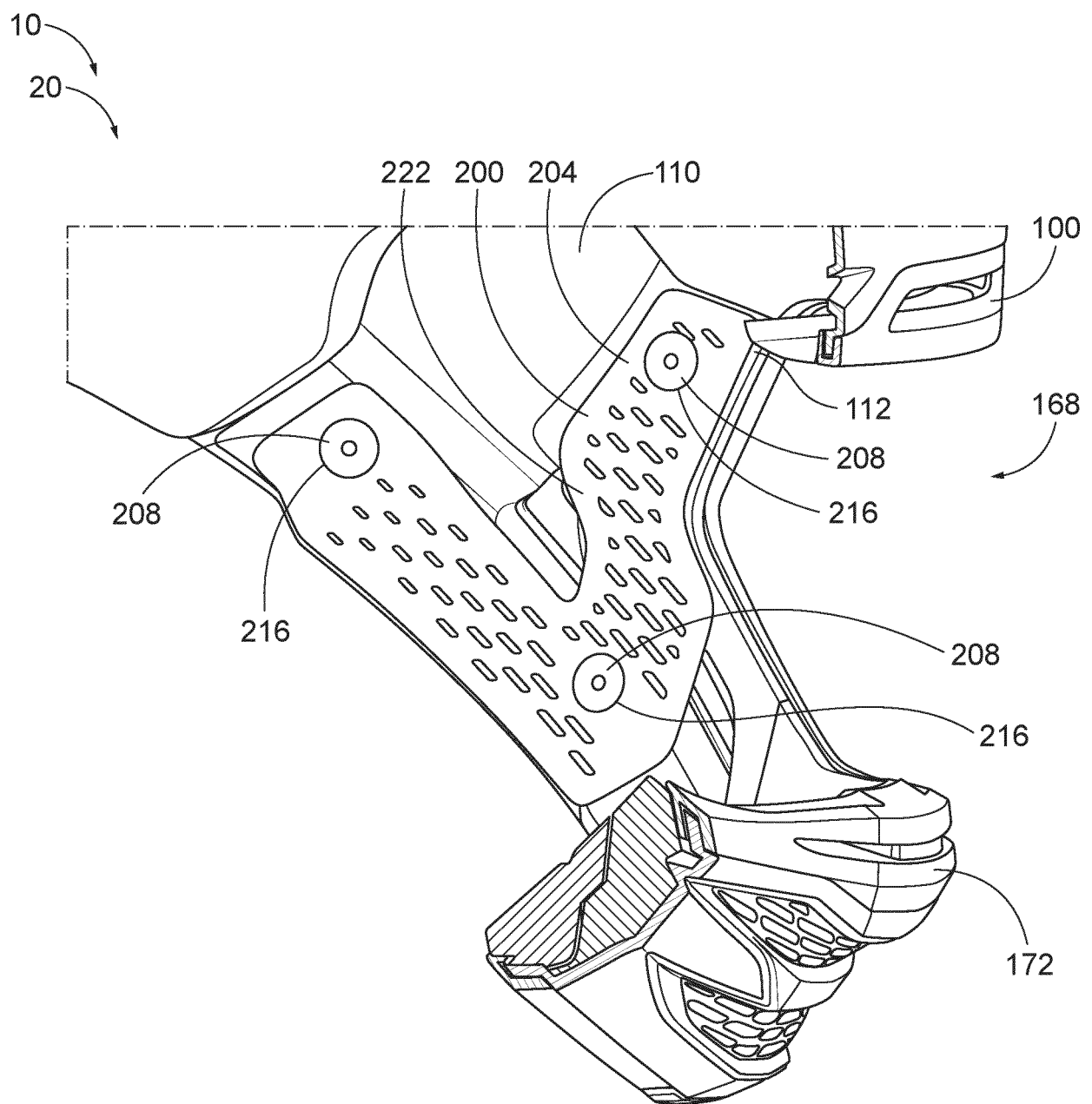


FIG. 10

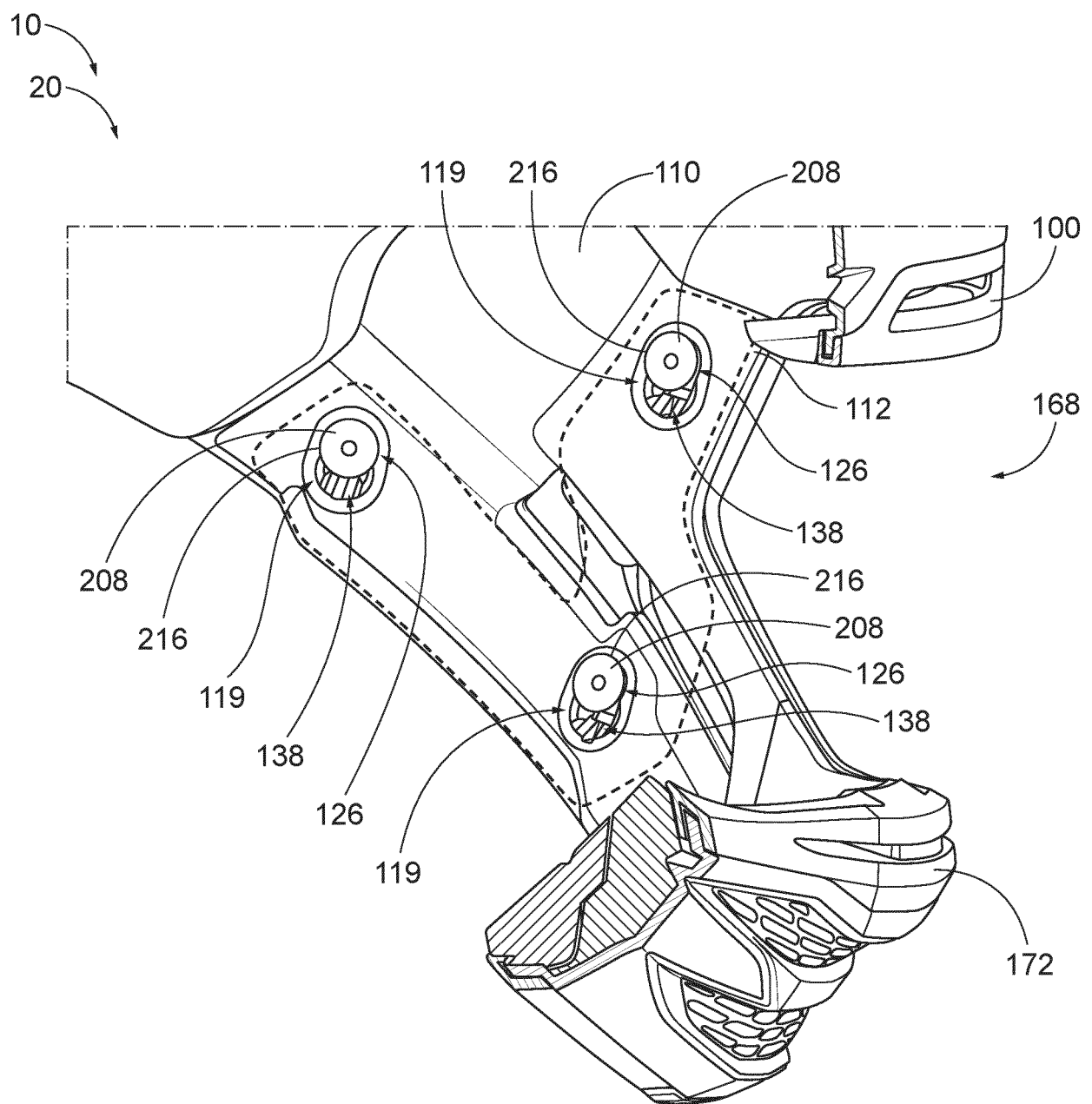


FIG. 11

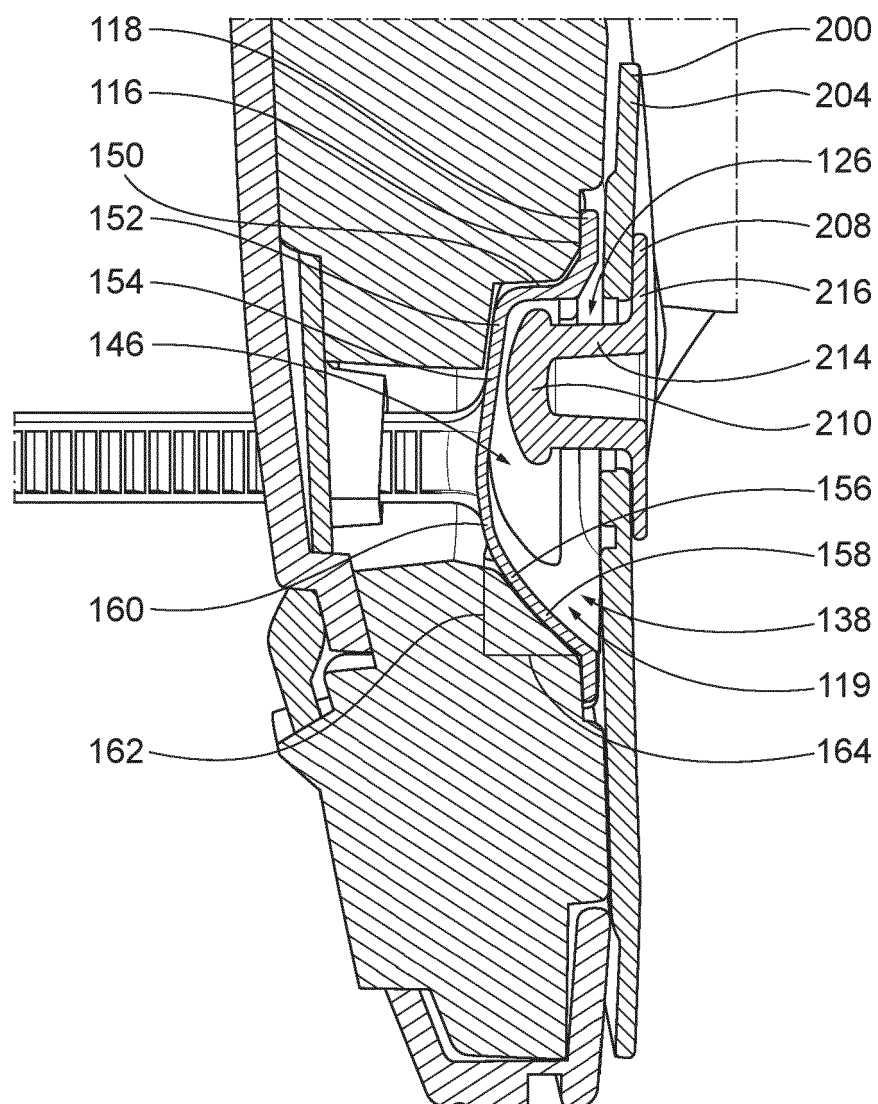
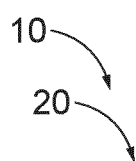


FIG. 12

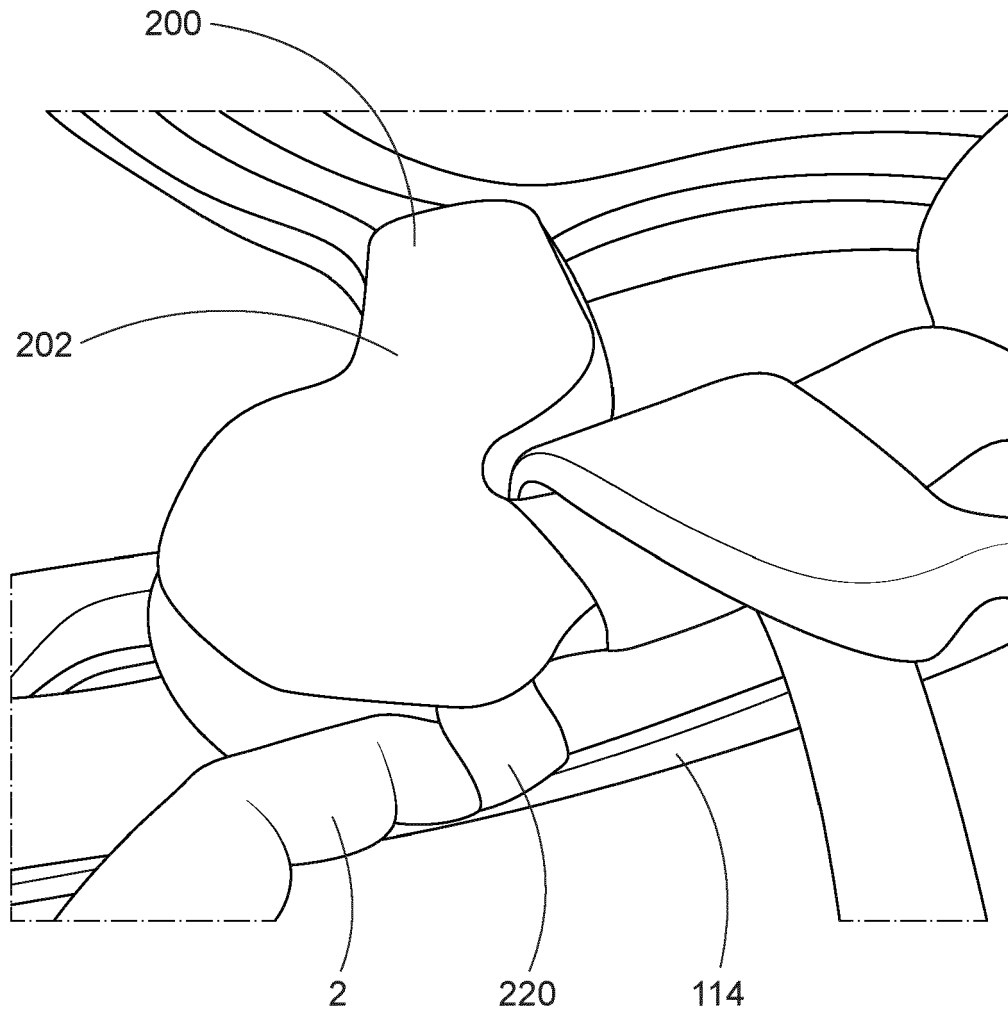


FIG. 13

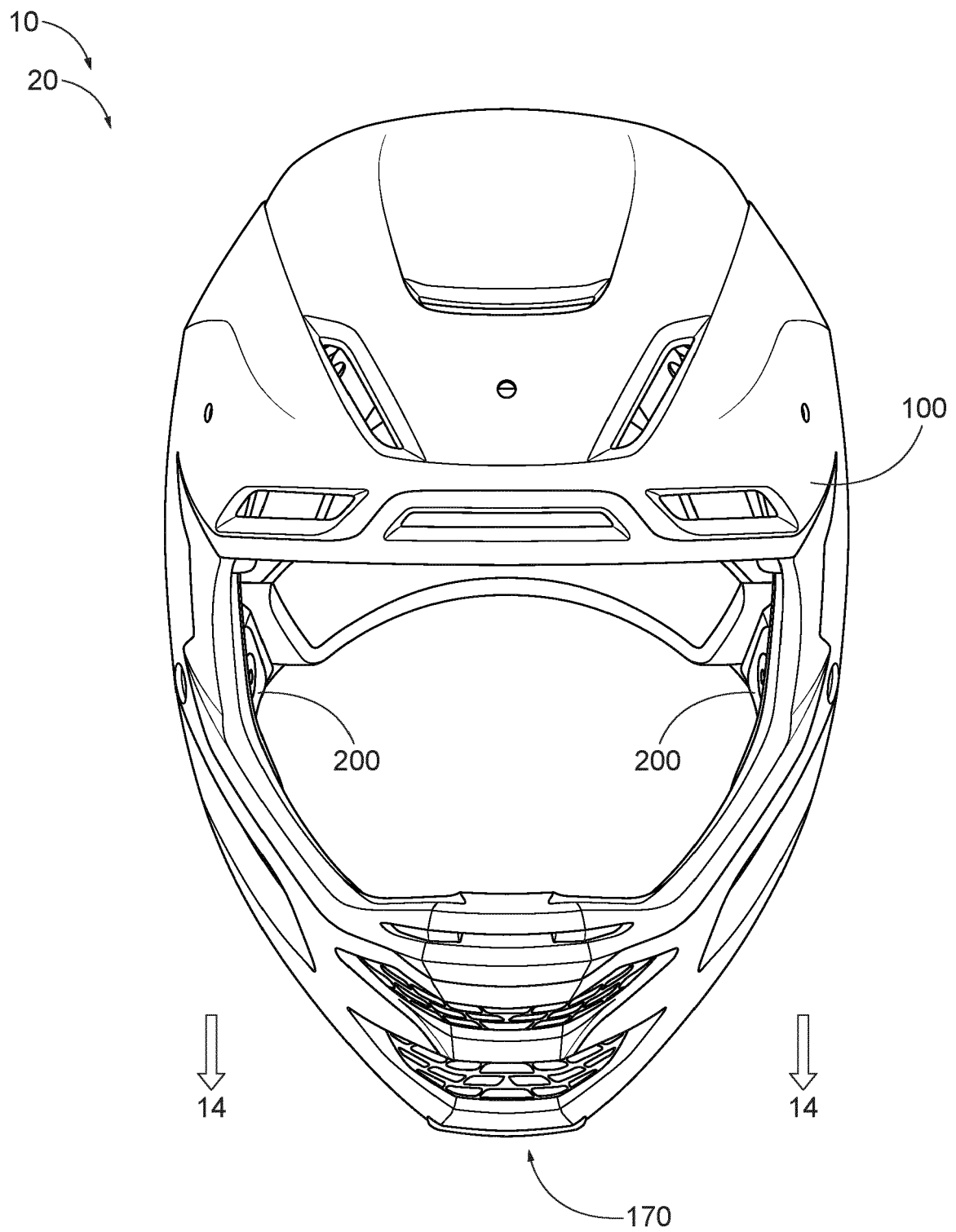


FIG. 14

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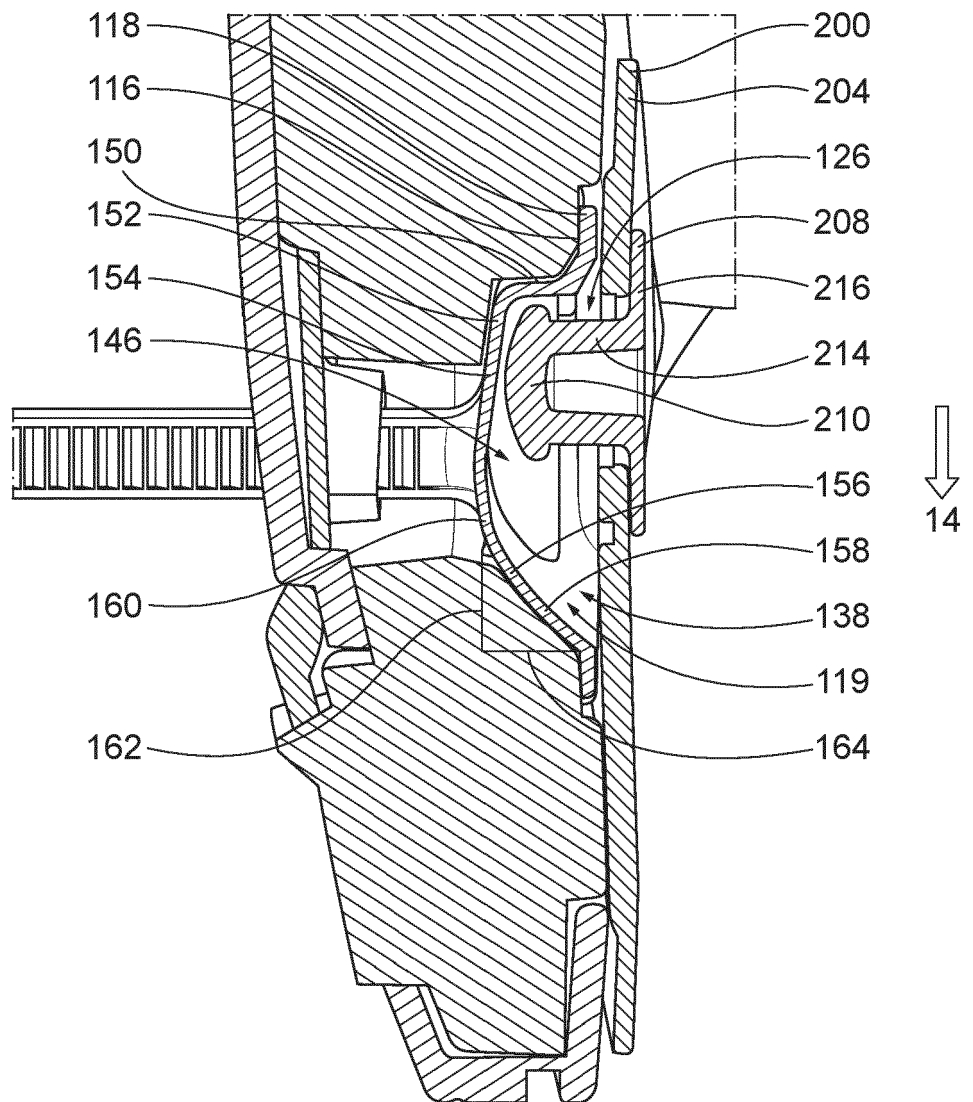


FIG. 15

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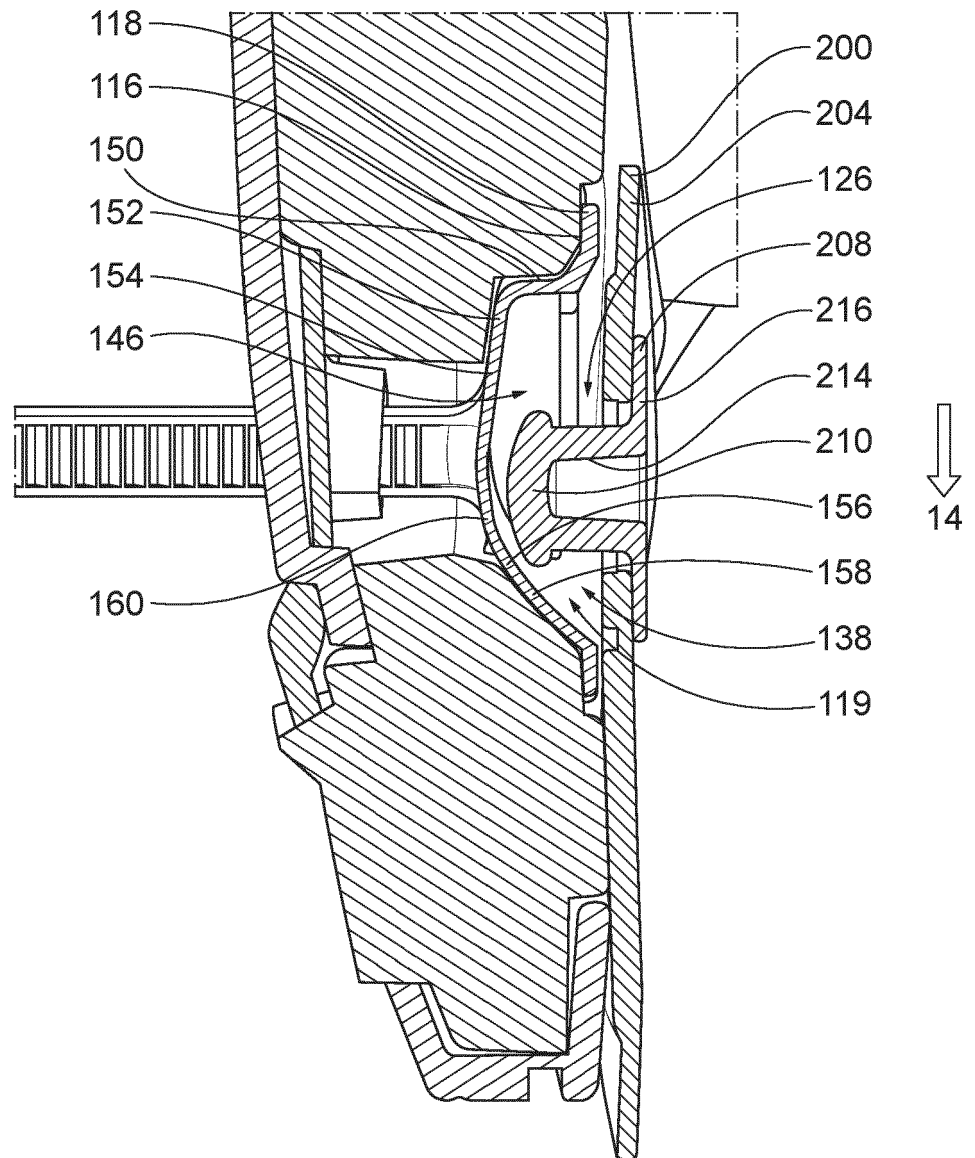


FIG. 16

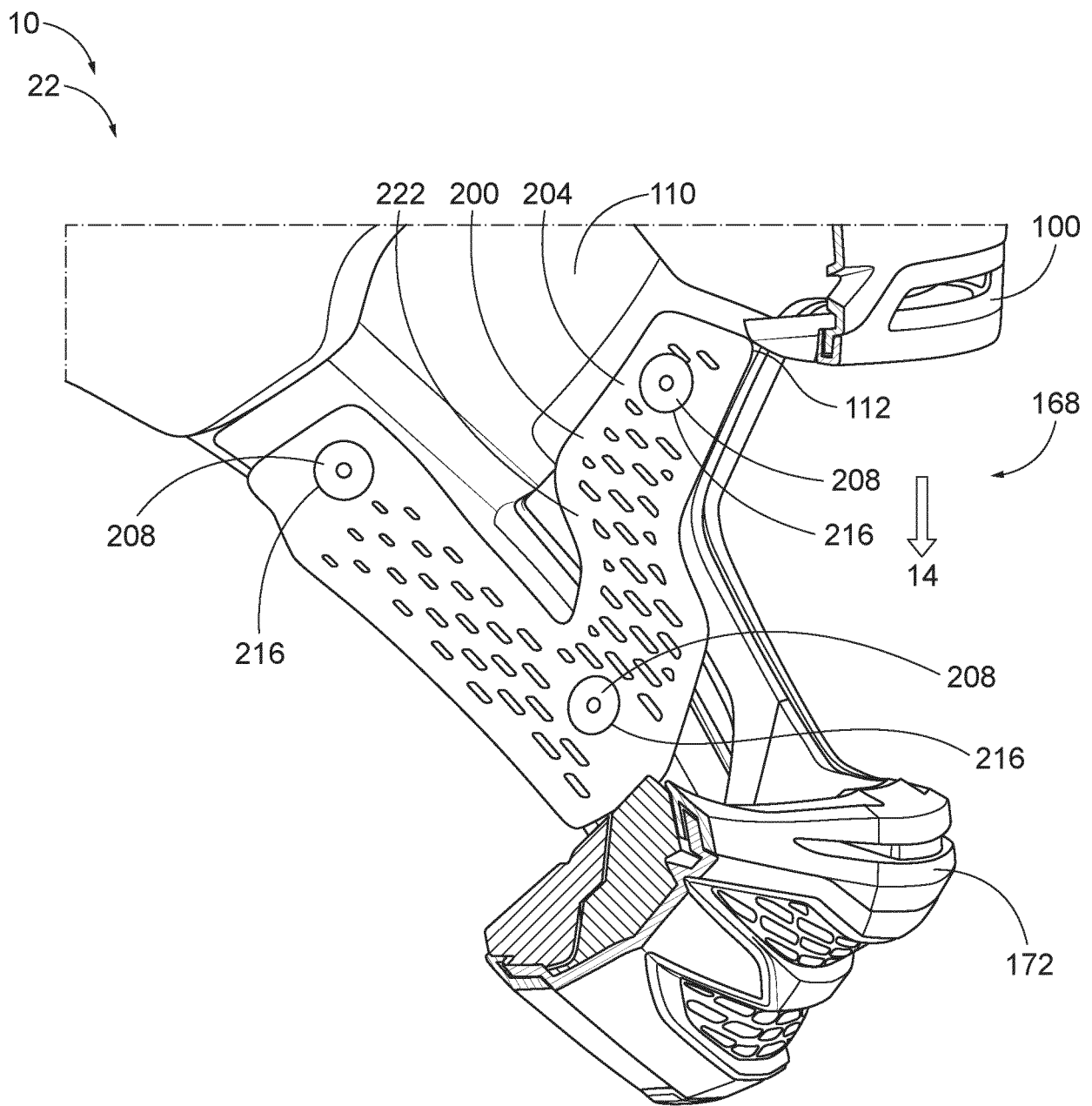


FIG. 17

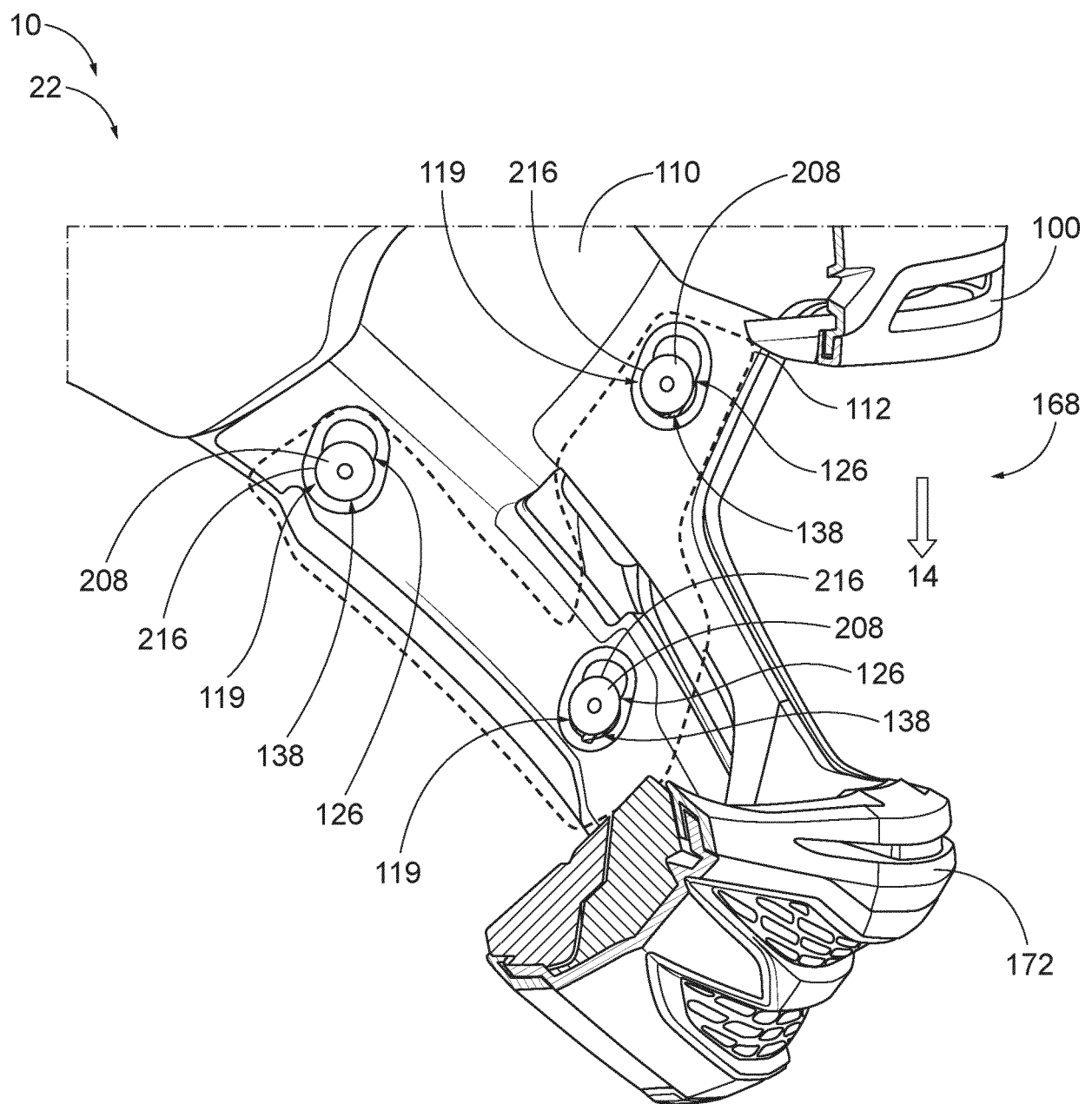


FIG. 18

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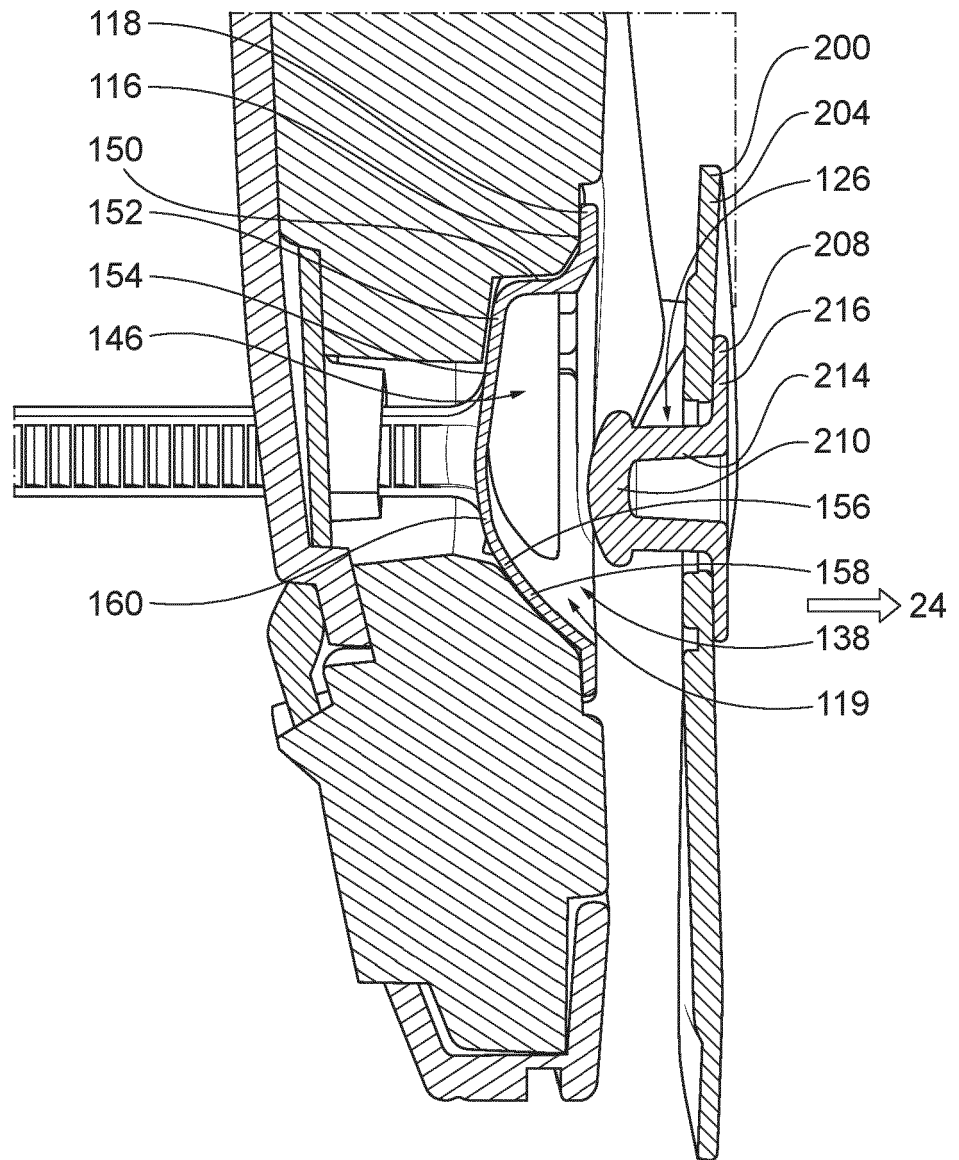


FIG. 19

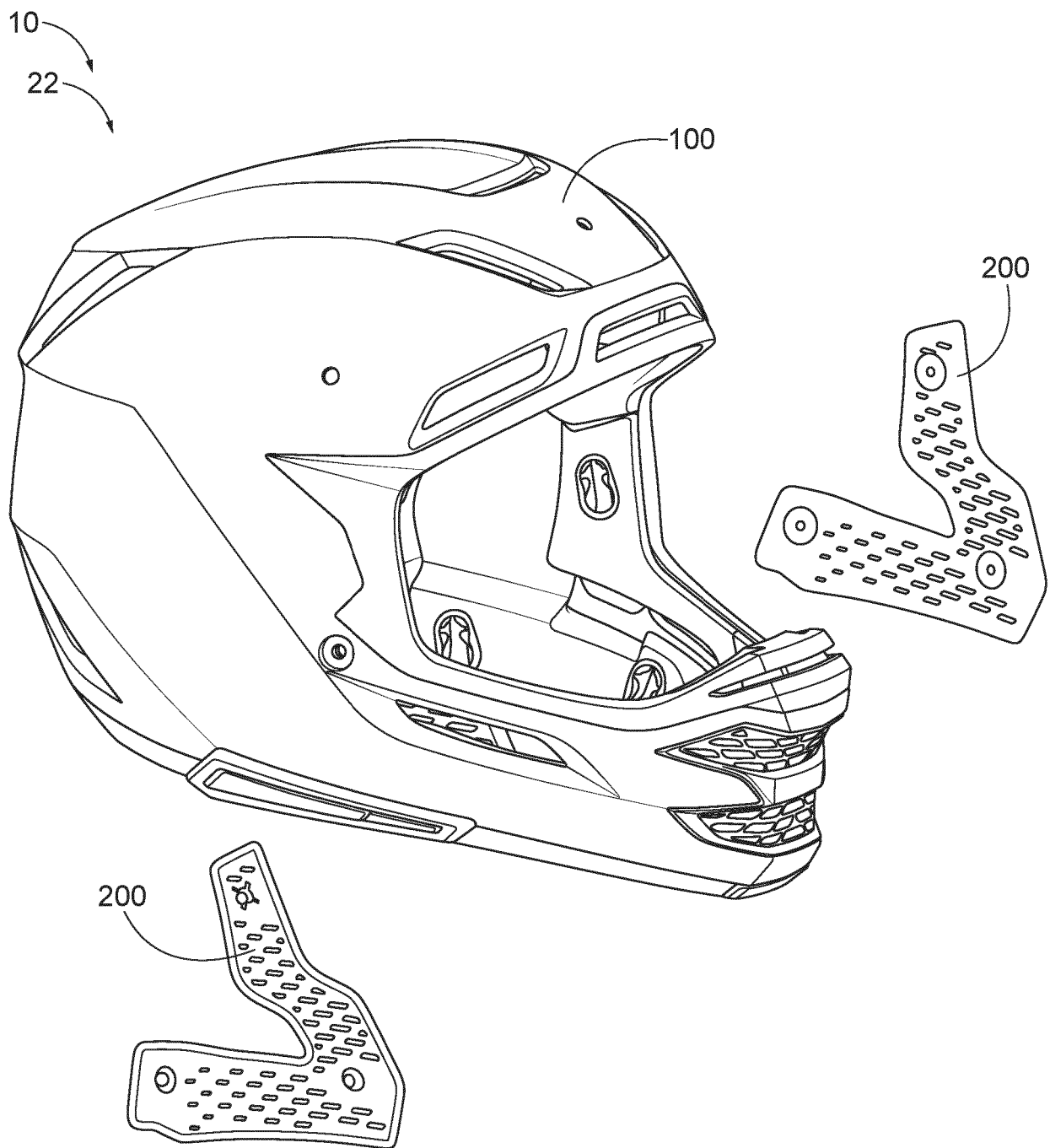


FIG. 20



EUROPEAN SEARCH REPORT

Application Number

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X	EP 0 879 566 B1 (SHOEI CO LTD [JP]) 23 April 2003 (2003-04-23) * paragraph [0020] - paragraph [0031] * * paragraph [0042]; figures 1-5 * -----	1-3,5,8, 9,12-18	
A	WO 2022/190051 A1 (ALPINESTARS RES SPA [IT]) 15 September 2022 (2022-09-15) * abstract; figures 1-29 * -----	1-18	
			TECHNICAL FIELDS SEARCHED (IPC)
			A42B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 October 2024	Examiner Thielgen, Robert
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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The members are as contained in the European Patent Office EDP file on
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