



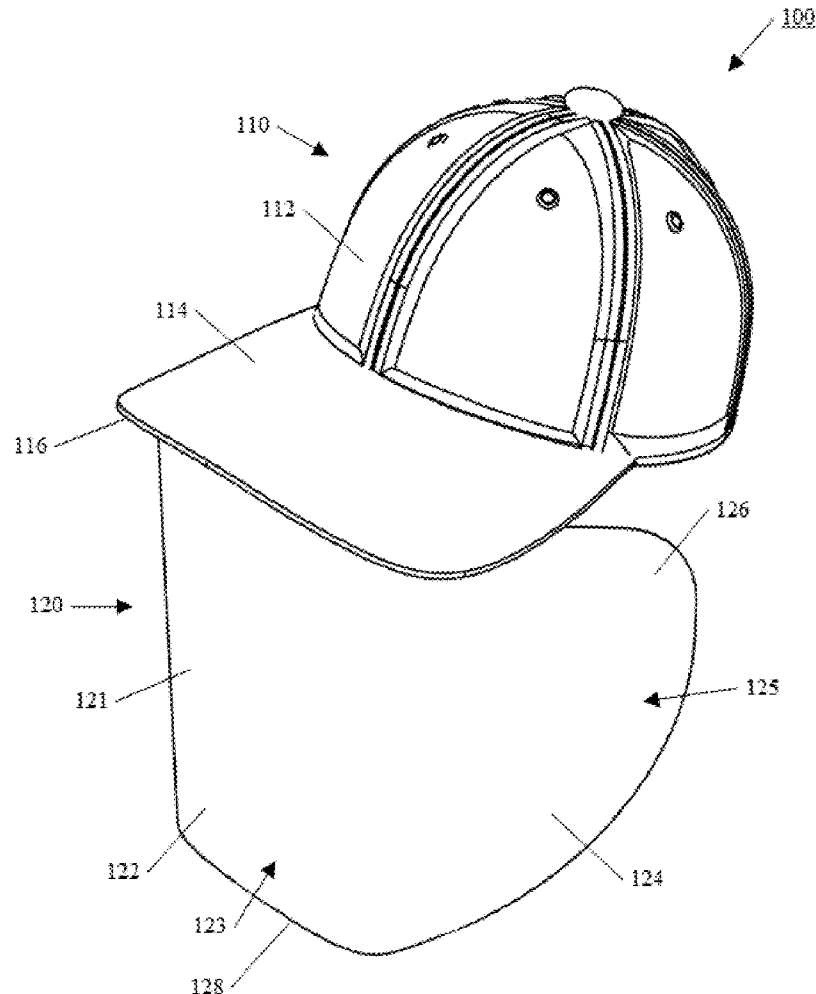
US 20210368886A1

(19) **United States**(12) **Patent Application Publication**
Swart et al.(10) **Pub. No.: US 2021/0368886 A1**(43) **Pub. Date: Dec. 2, 2021**(54) **WEARABLE MICROBE PROTECTIVE SHIELD***A42B 1/24* (2006.01)*A42B 3/22* (2006.01)(71) Applicants: **Mark Andrew Swart**, Villa Park, CA (US); **Francois Badeau**, Newport Beach, CA (US); **Ding Li**, Changsha (CN)(52) **U.S. Cl.**
CPC *A41D 13/1184* (2013.01); *A42B 3/225* (2013.01); *A42B 1/24* (2013.01); *A42B 1/0182* (2021.01)(72) Inventors: **Mark Andrew Swart**, Villa Park, CA (US); **Francois Badeau**, Newport Beach, CA (US); **Ding Li**, Changsha (CN)(57) **ABSTRACT**

A wearable protective microbe shield is provided that has a transparent and bendable shield connected to the underside of a visor portion of a cap, helmet, or protective head gear. In one example, the cap is provided in the form of a baseball cap with a stiff curved front visor. In another example, the protective headgear is a hard hat. The visor has internal or external connectors that coupled to complementary connectors on the top of the transparent microbe shield. These connectors not only provide for removably coupling the microbe shield to the underside of the visor, they also act to add a level of stability and rigidness to the flexible microbe shield. In this way, the microbe shield has no support frame along its side or bottom surface, thereby facilitating exceptional and un-obstructed viewing by the user or wearer and providing exceptional protection against airborne microbes.

(21) Appl. No.: **17/144,370**(22) Filed: **Jan. 8, 2021****Related U.S. Application Data**

(60) Provisional application No. 63/032,003, filed on May 29, 2020.

Publication Classification(51) **Int. Cl.**
A41D 13/11 (2006.01)
A42B 1/0182 (2006.01)

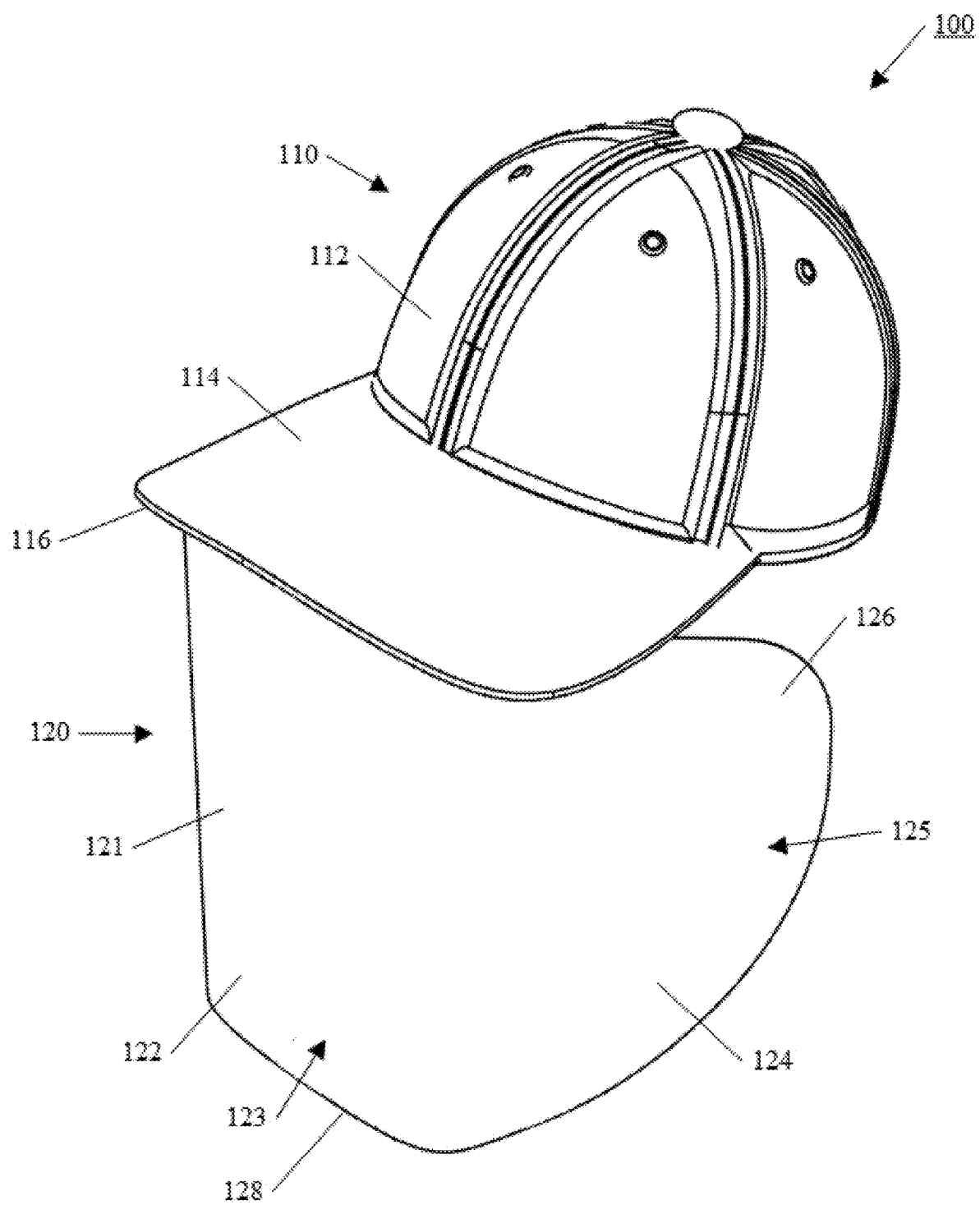


FIG. 1

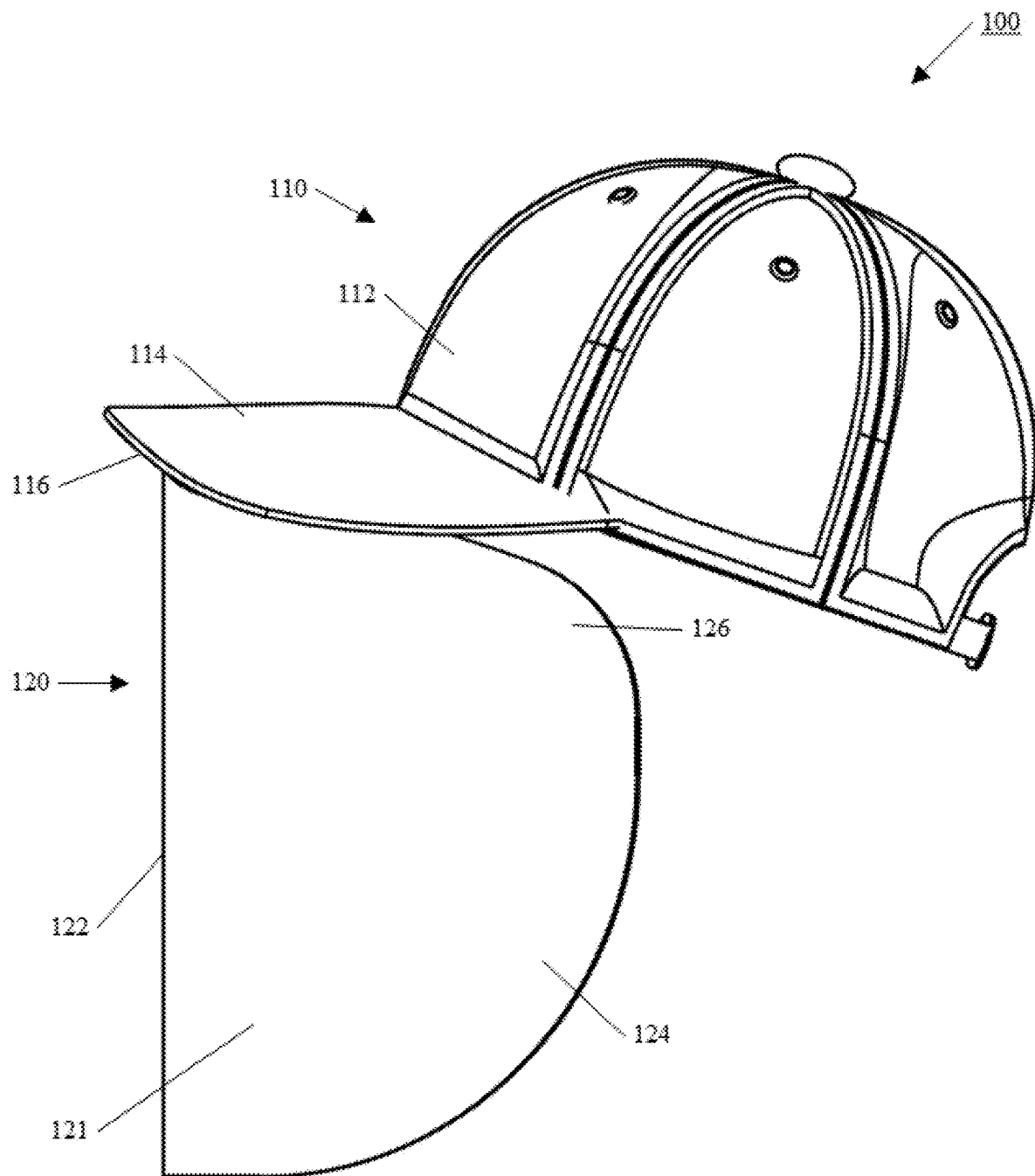
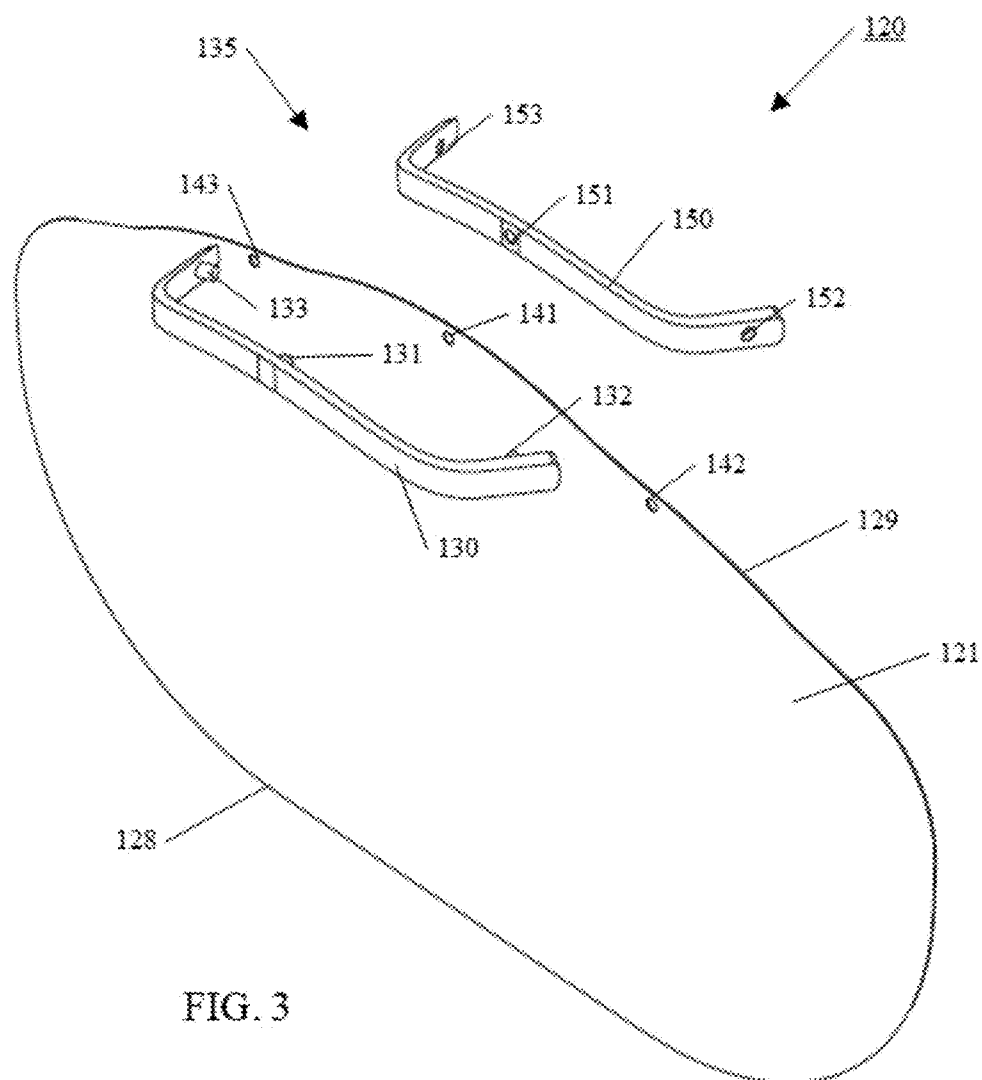
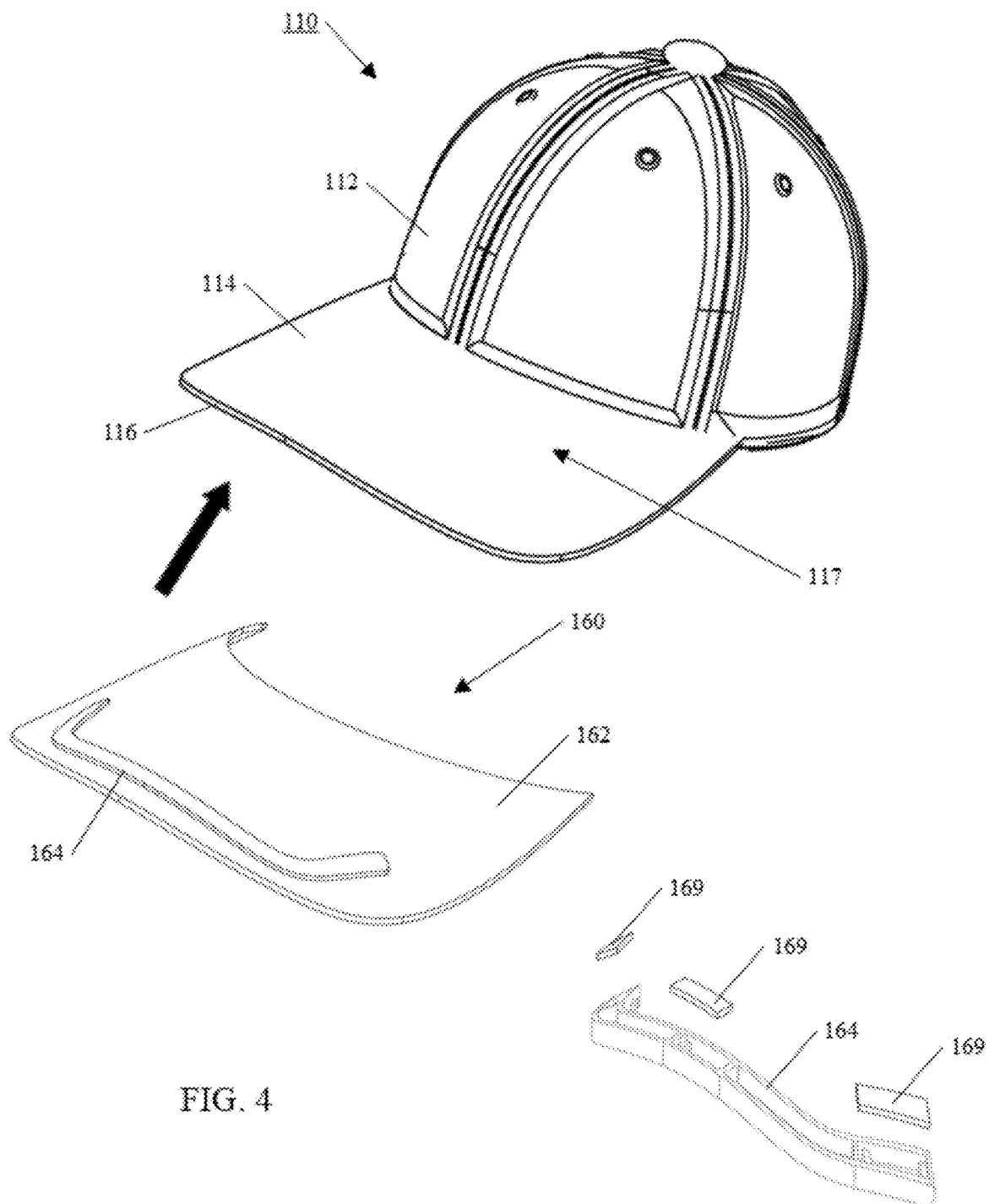


FIG. 2





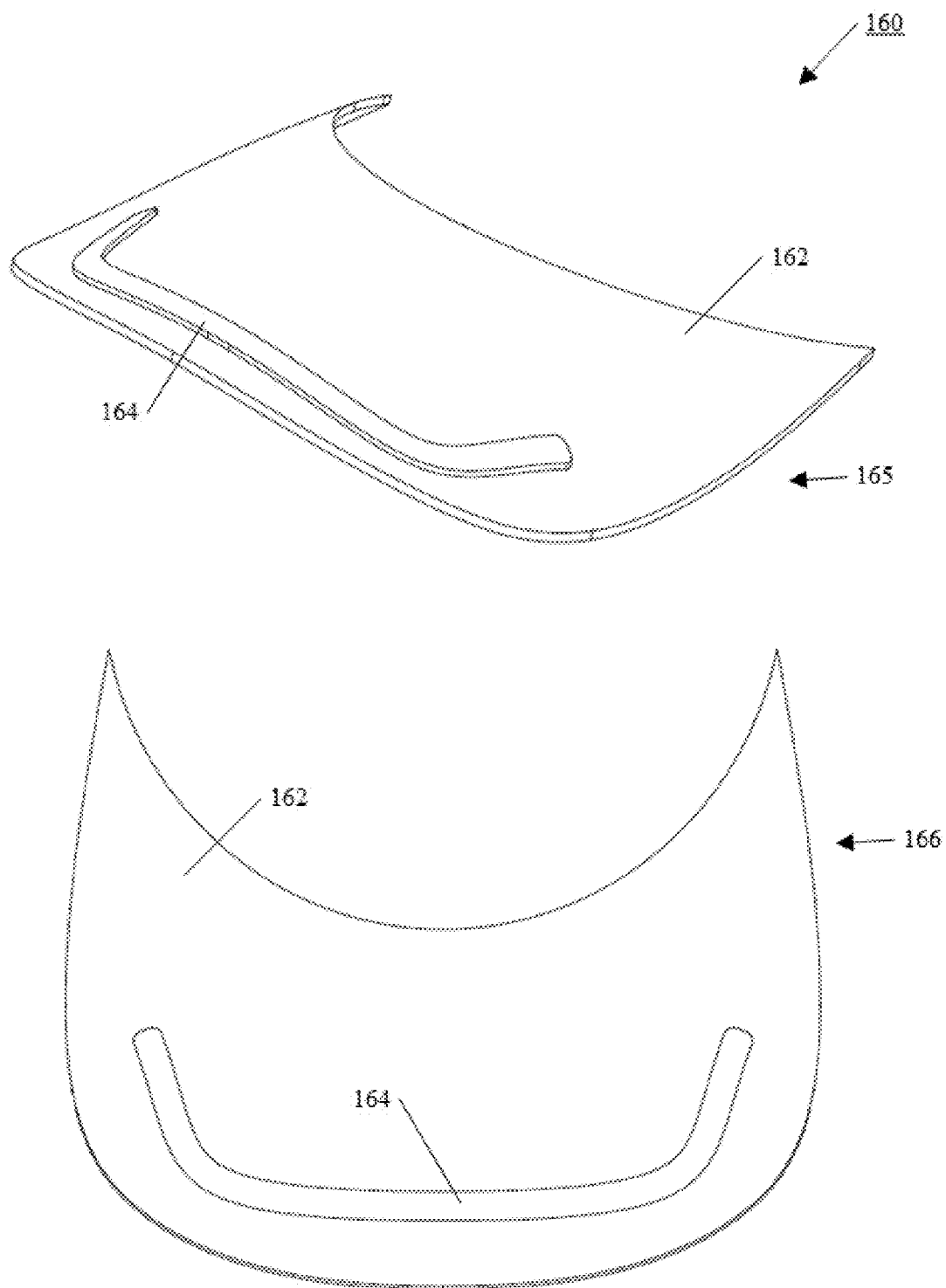


FIG. 5

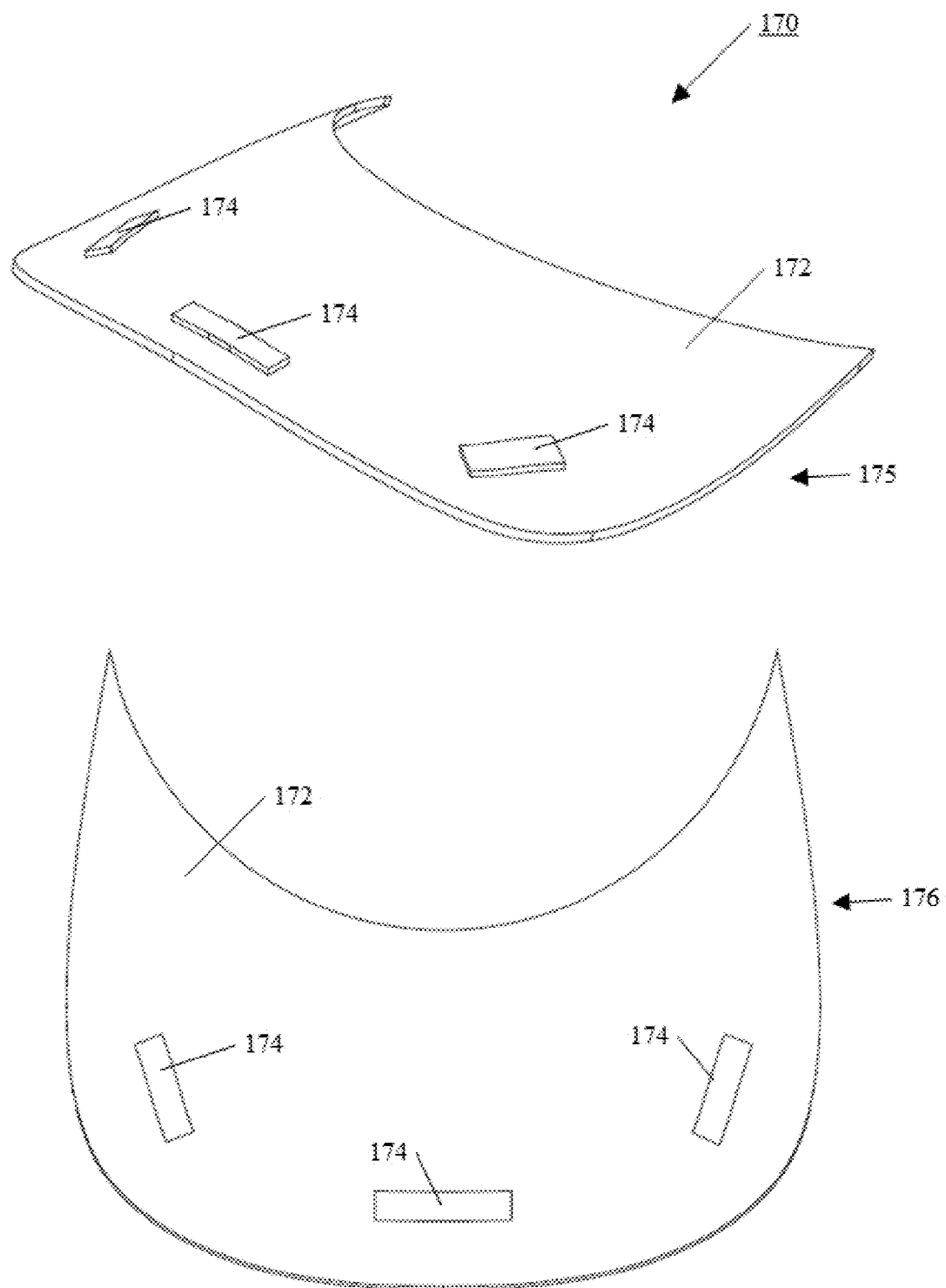


FIG. 6

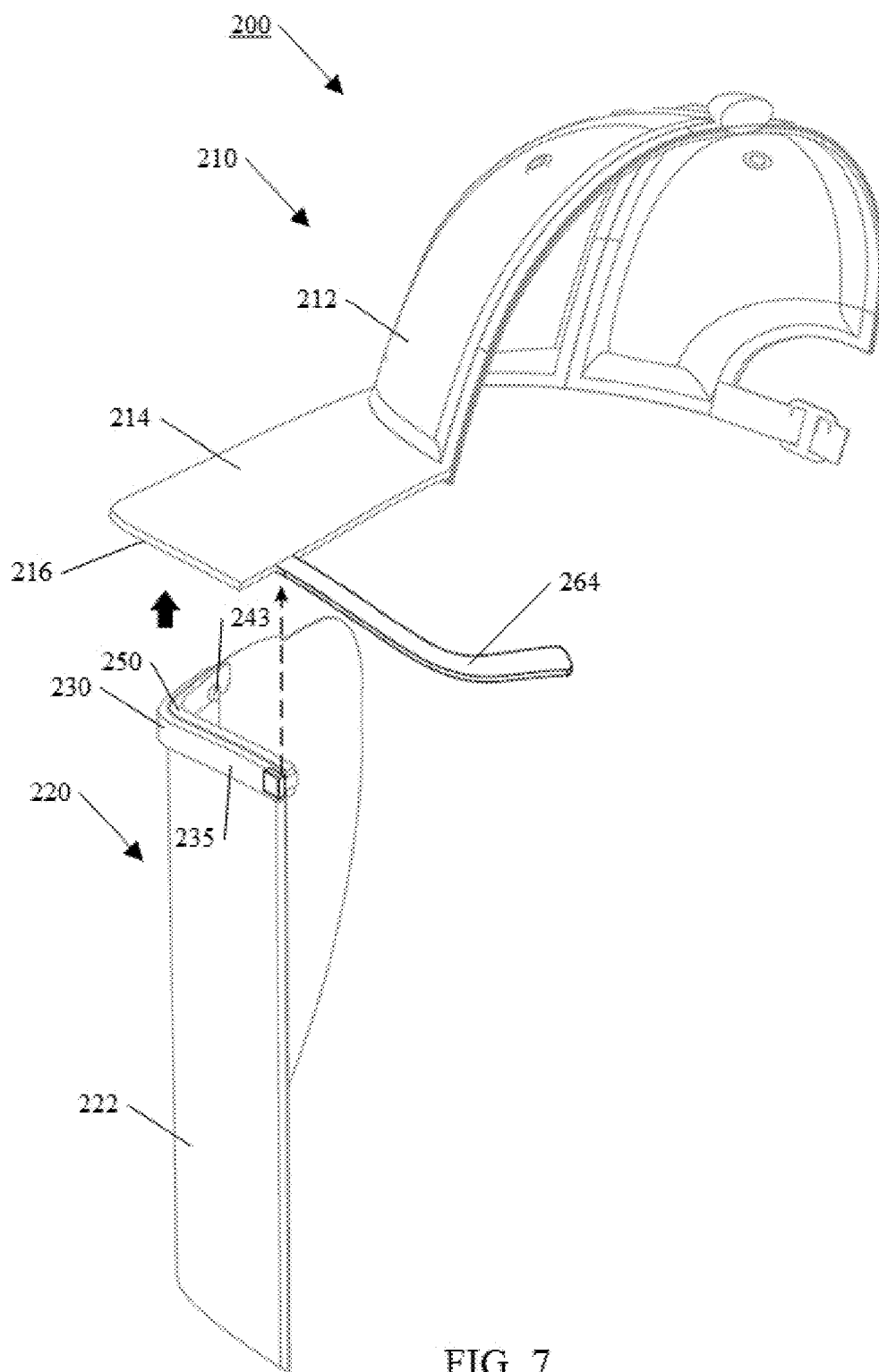


FIG. 7

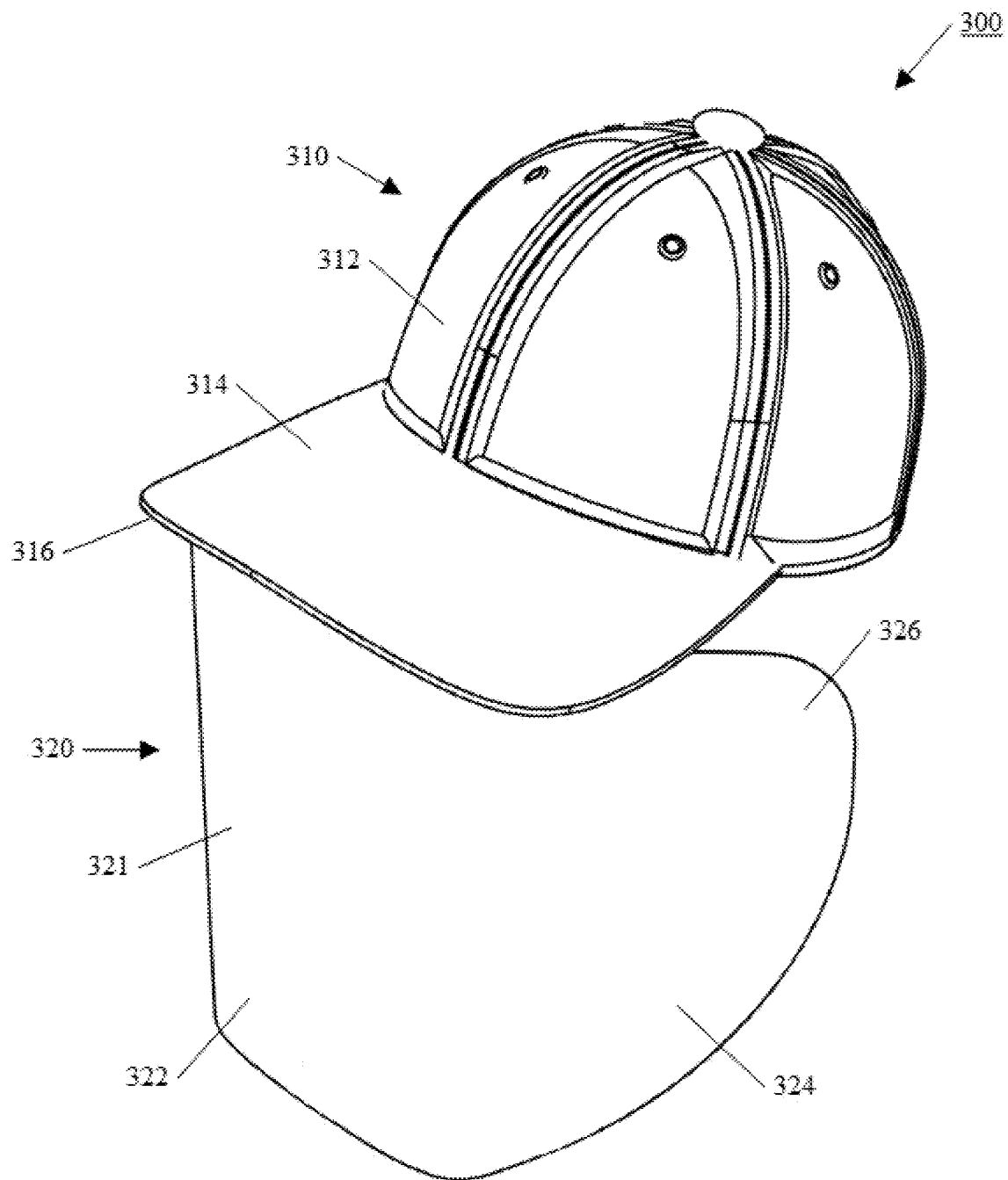
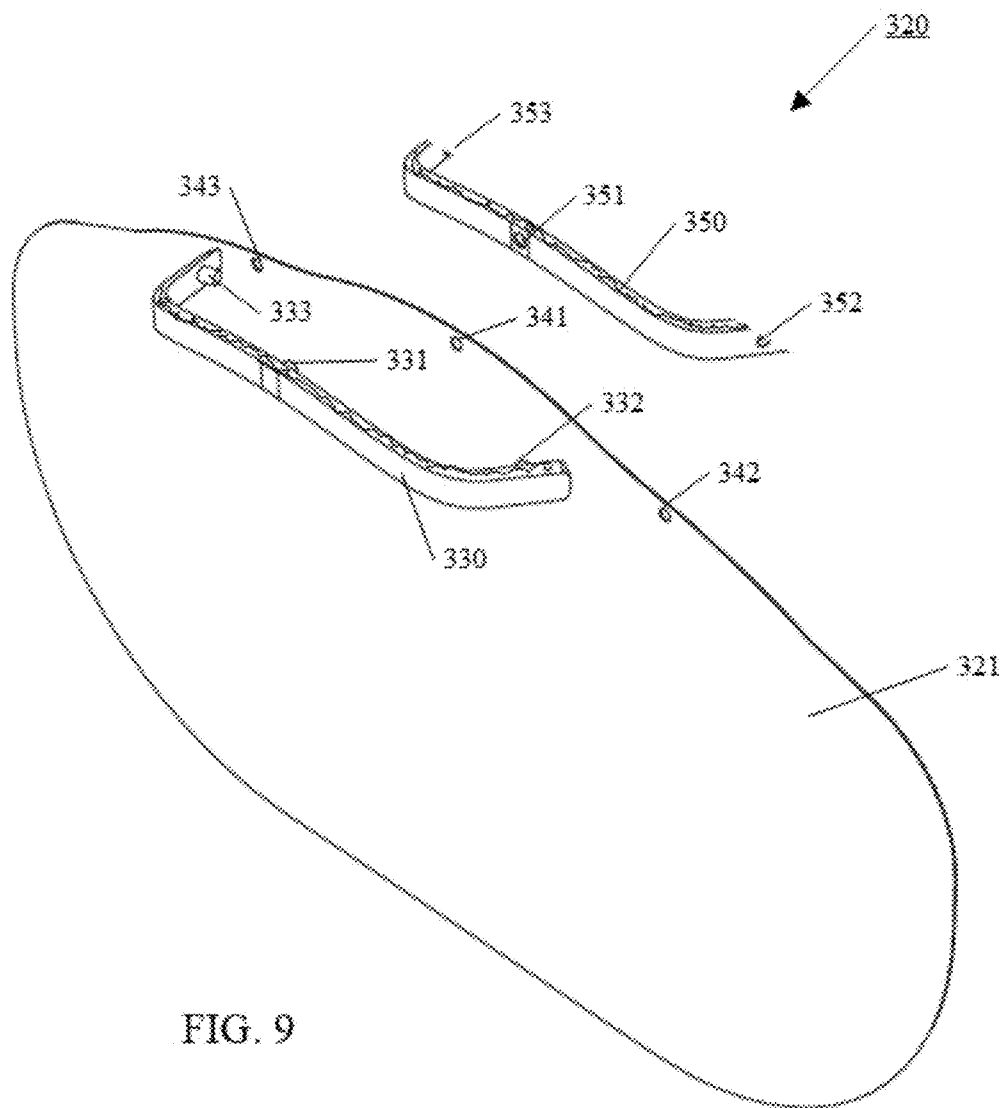


FIG. 8



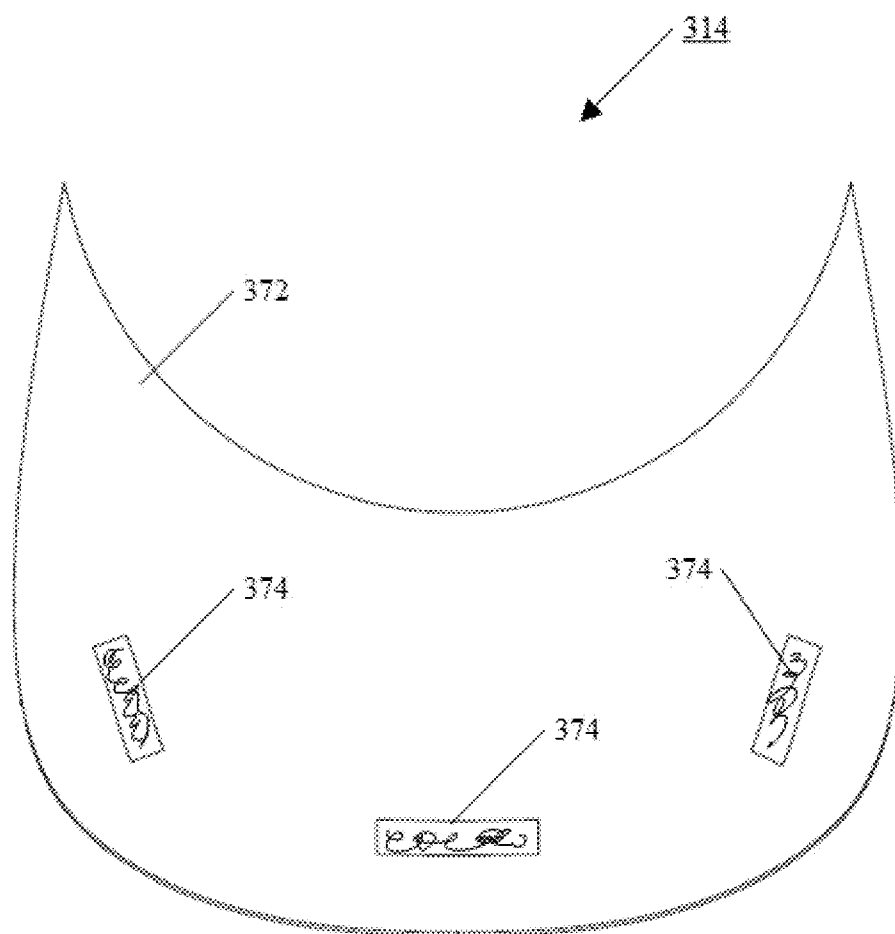


FIG. 10

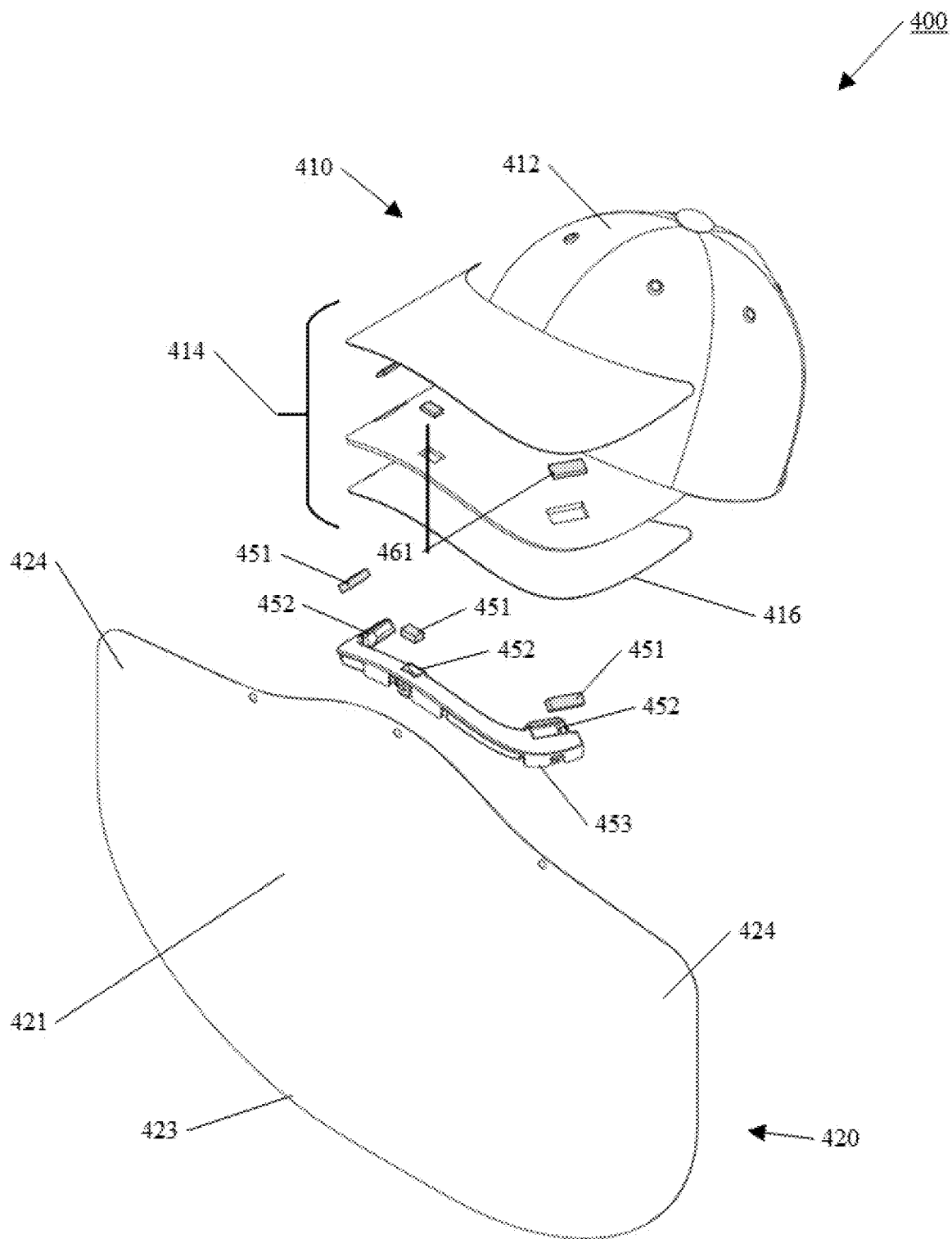


FIG. 11

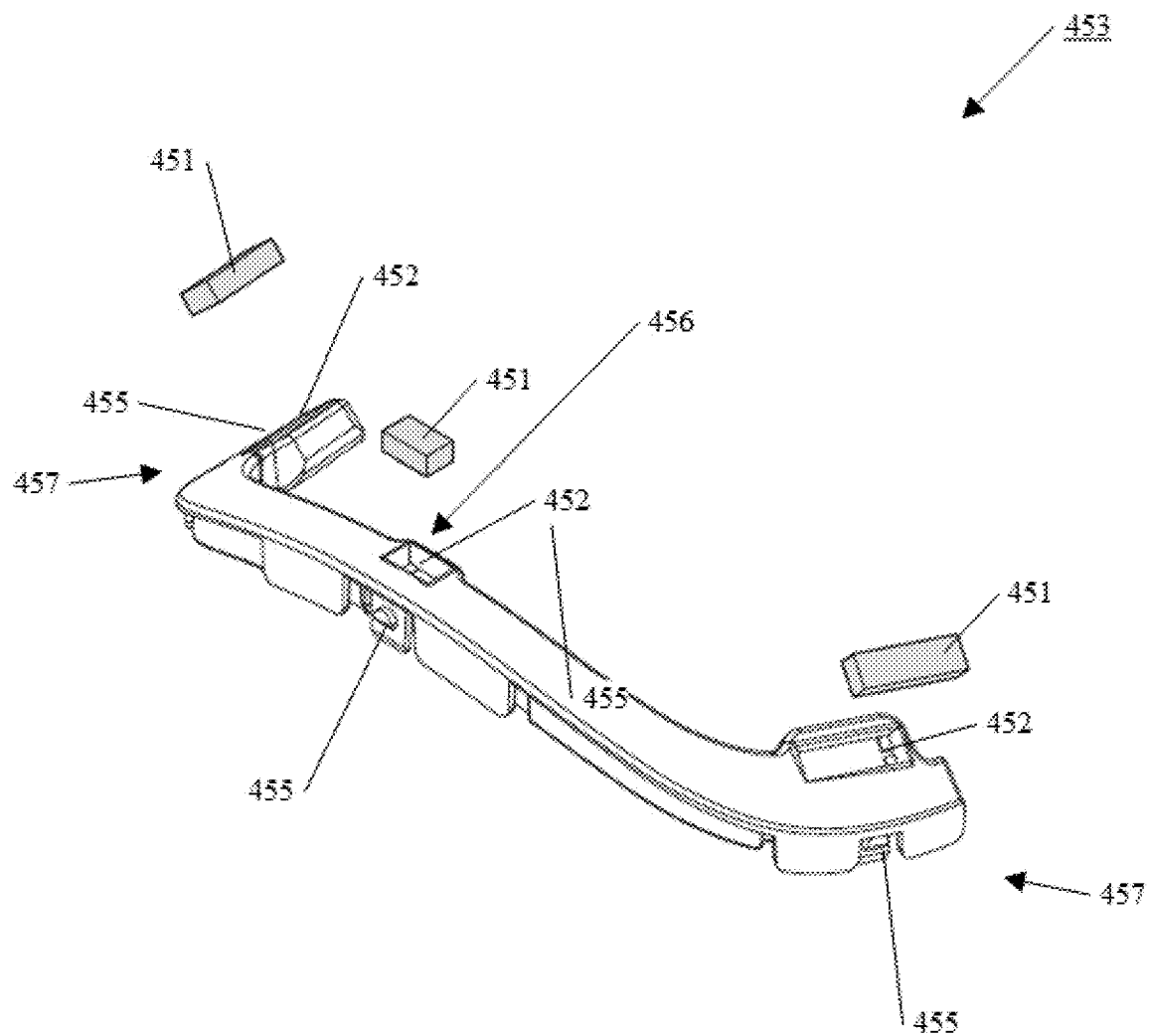


FIG. 12

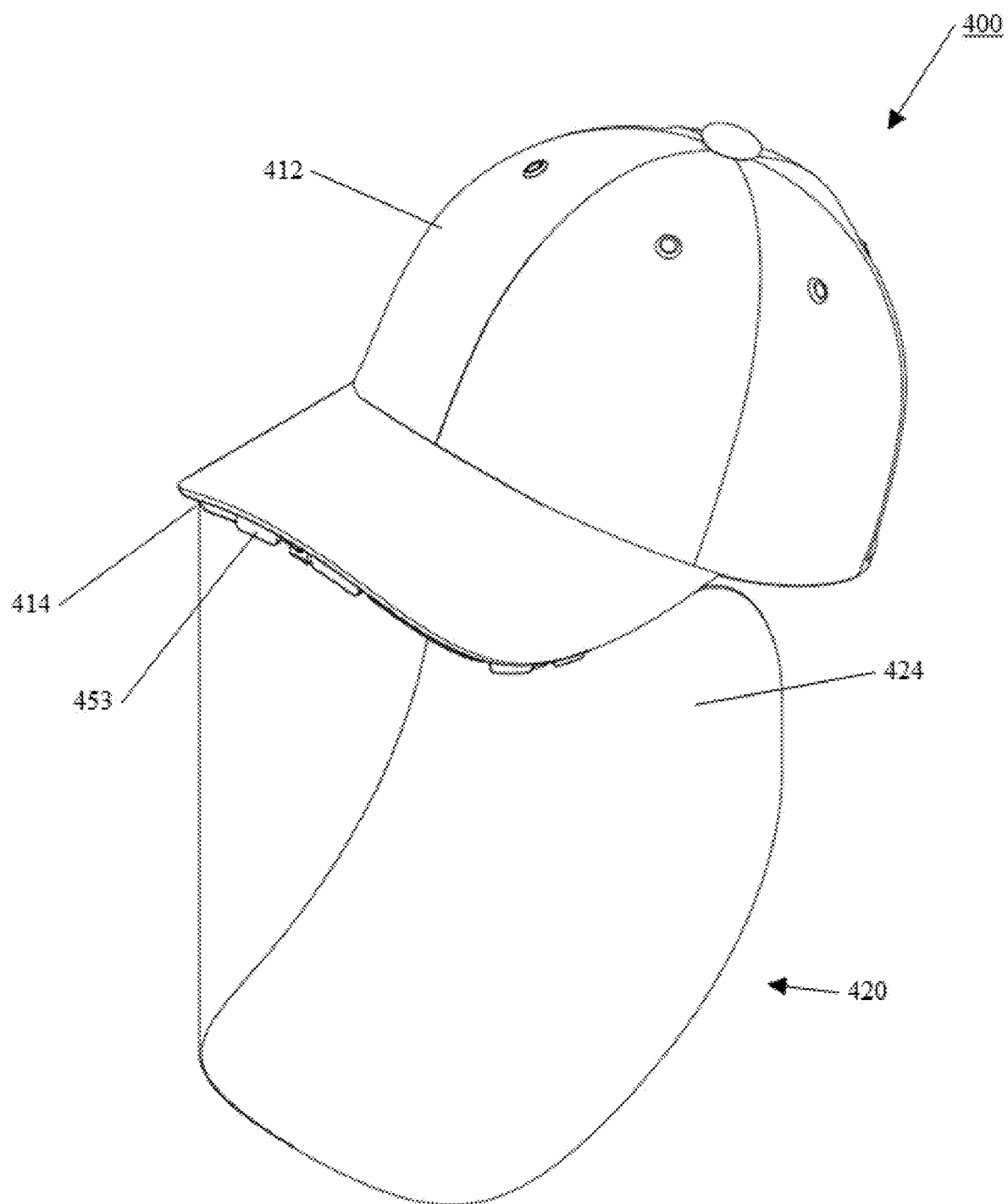


FIG. 13

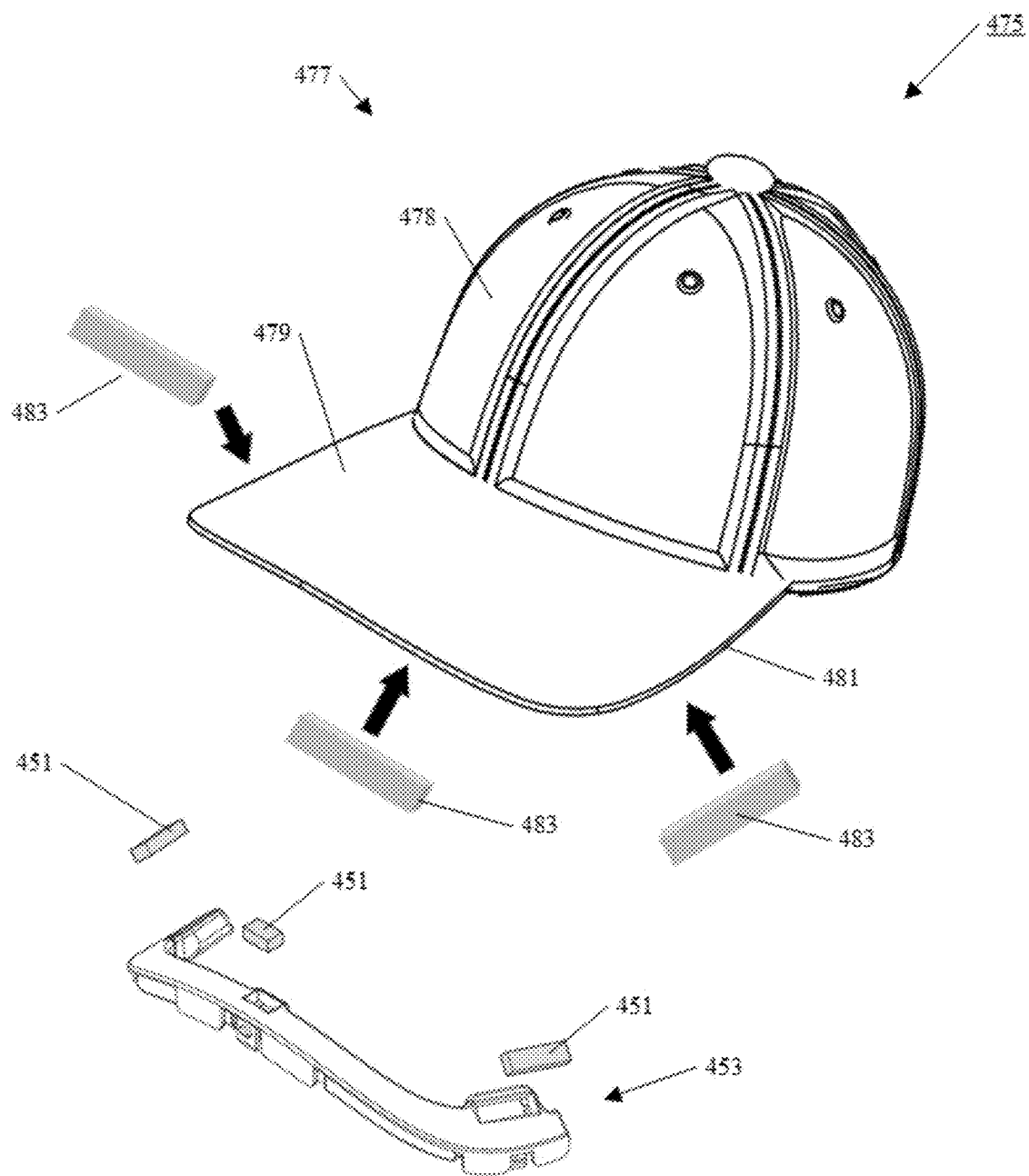


FIG. 14

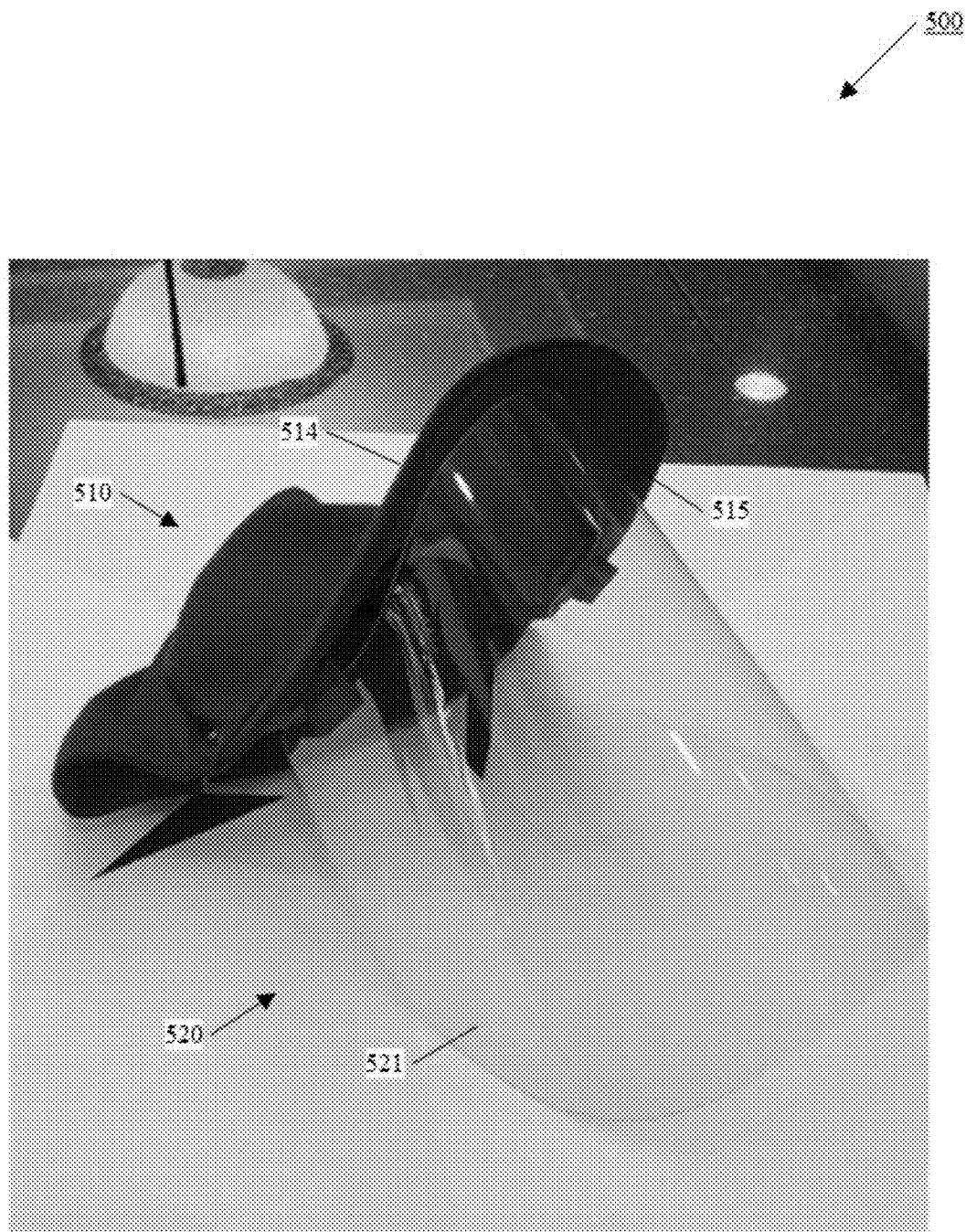


FIG. 15

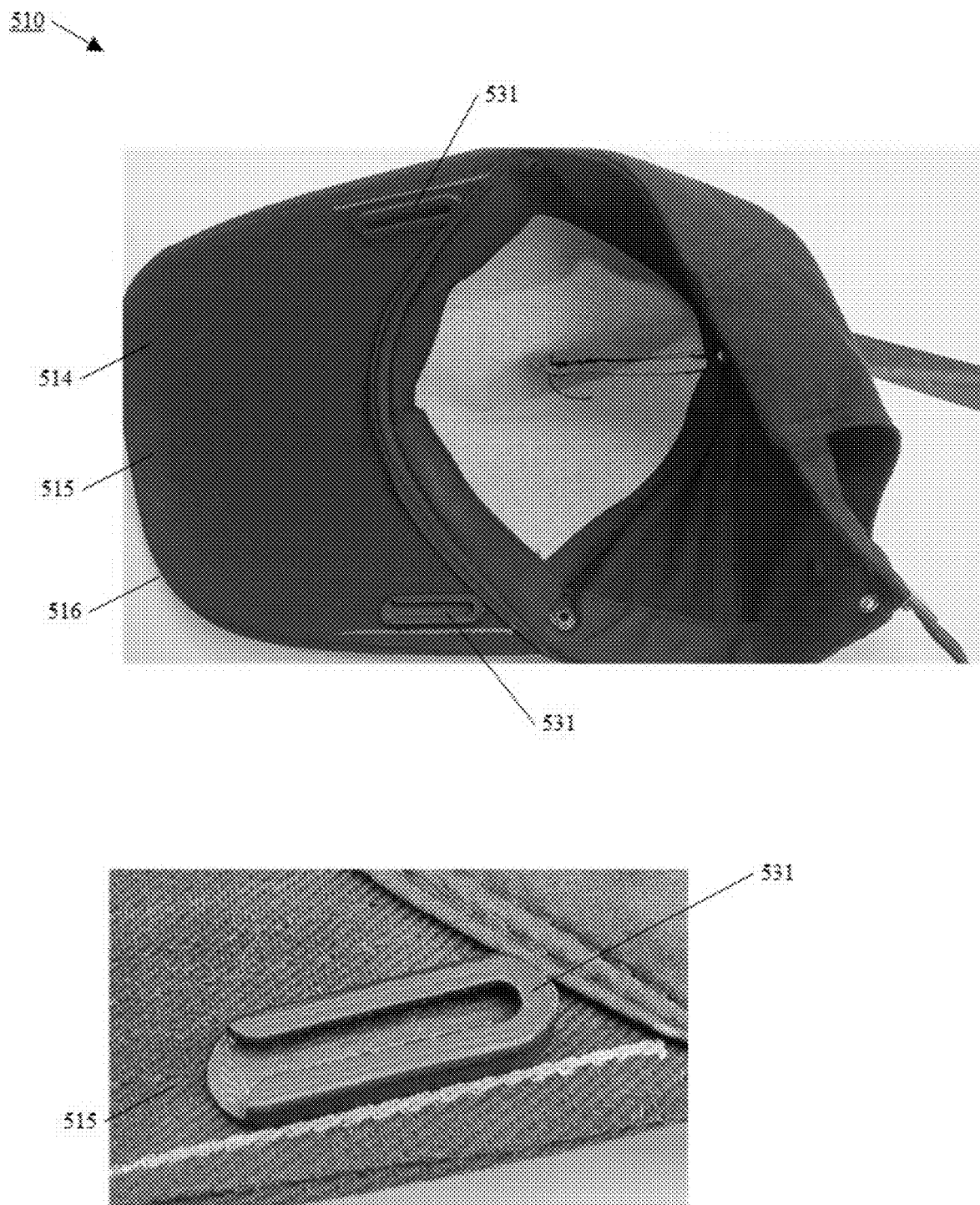


FIG. 16

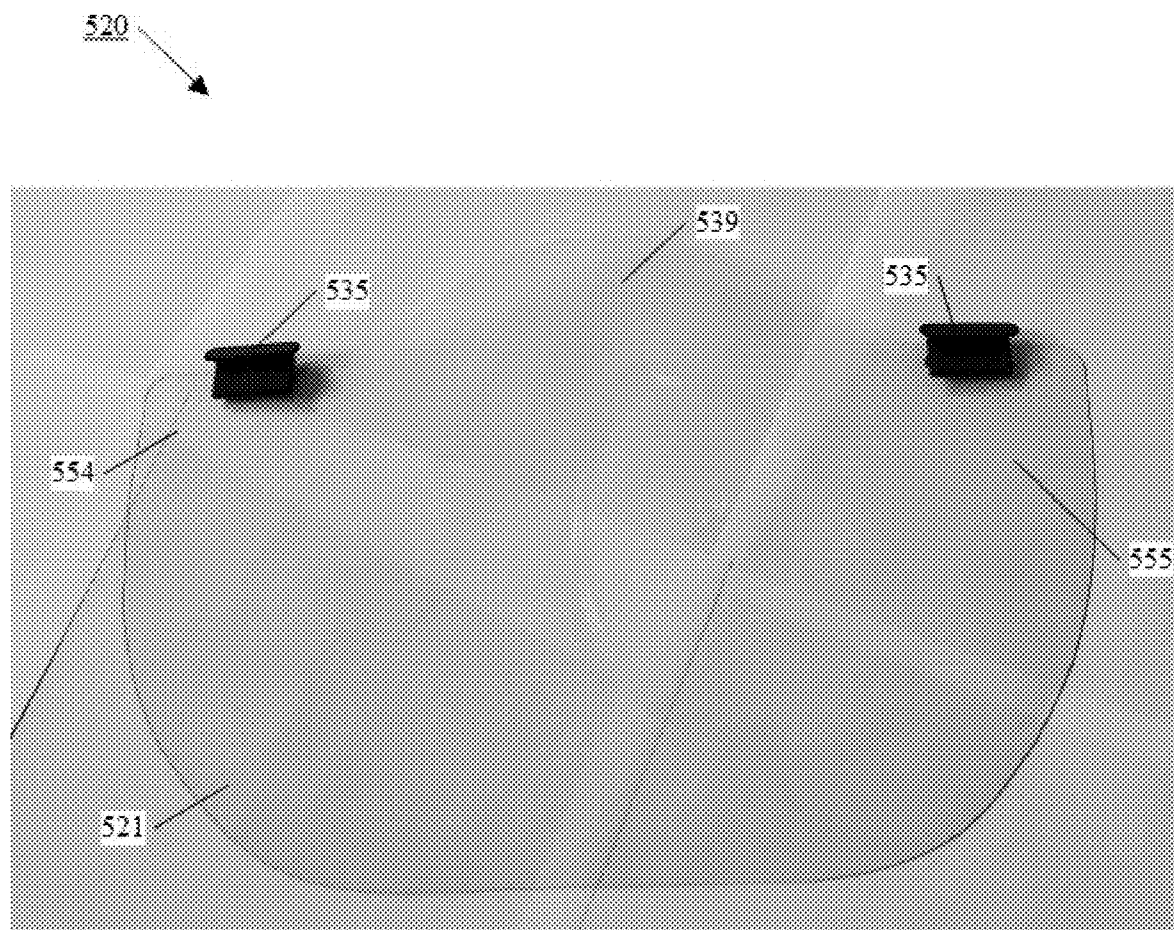


FIG. 17

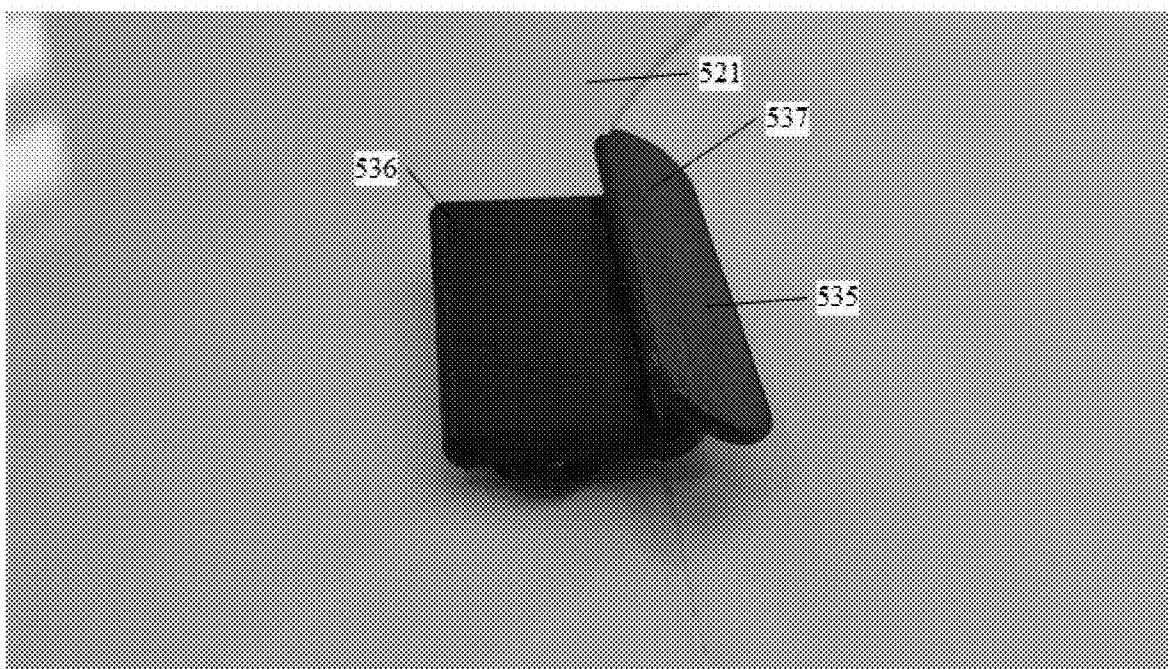
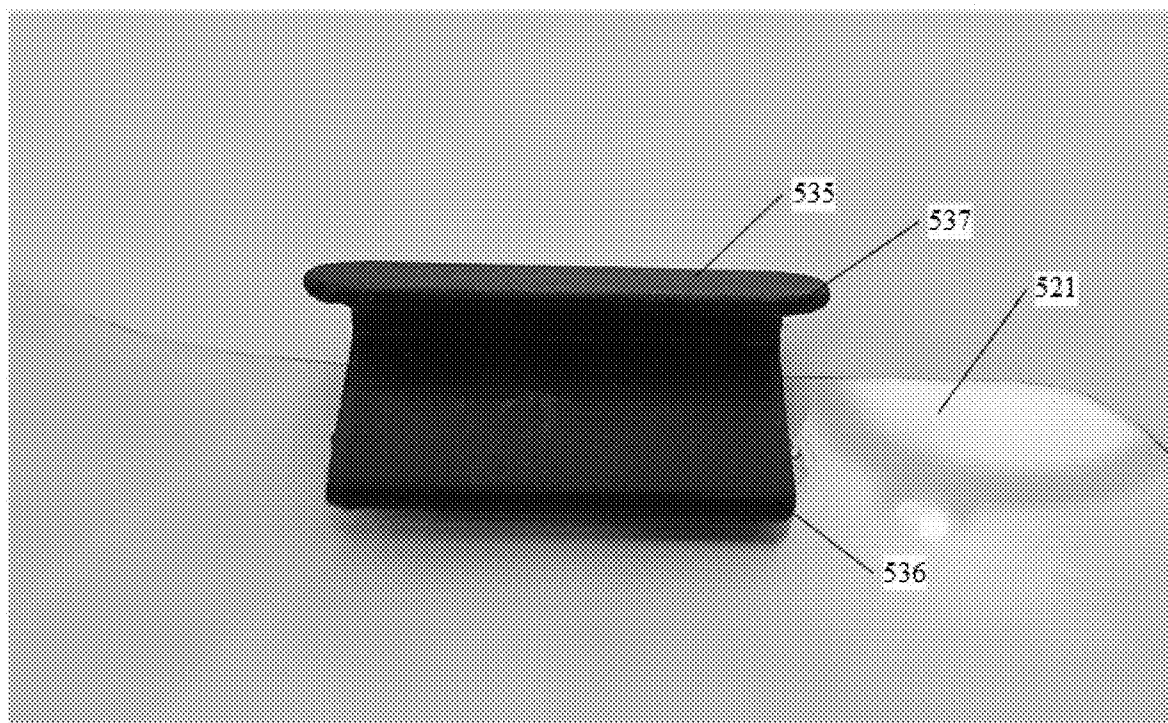


FIG. 18



FIG. 19

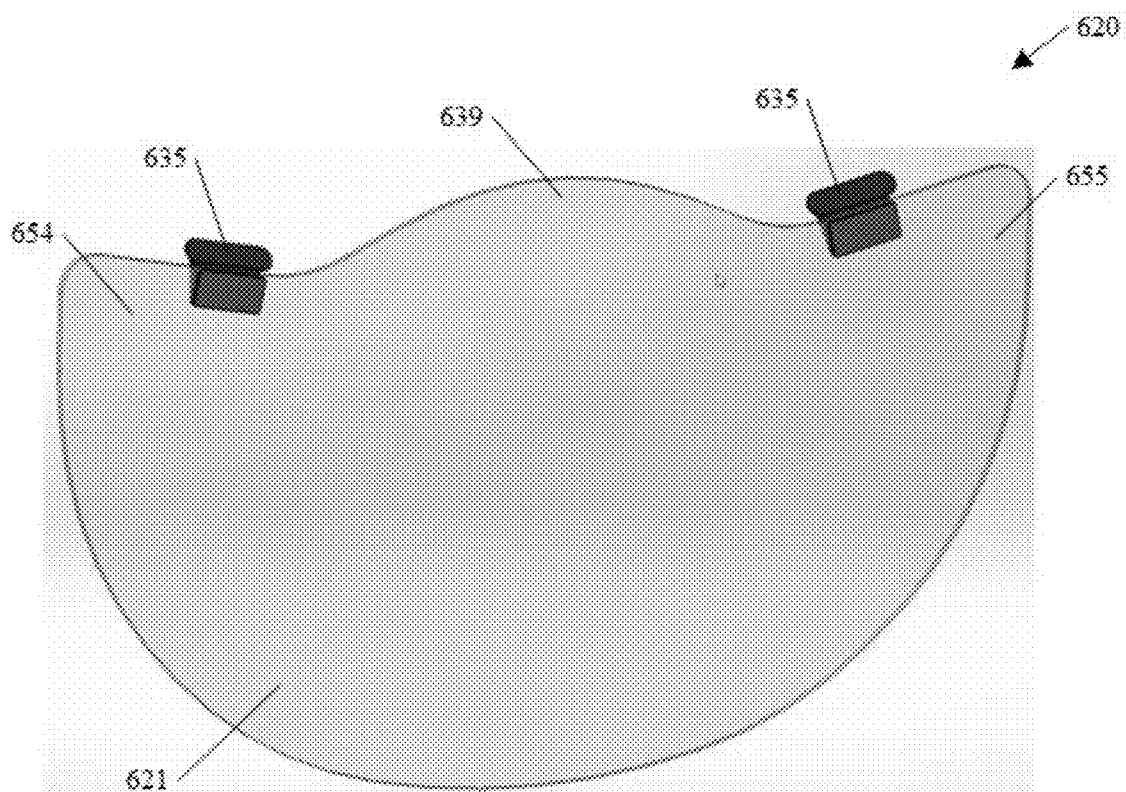


FIG. 20

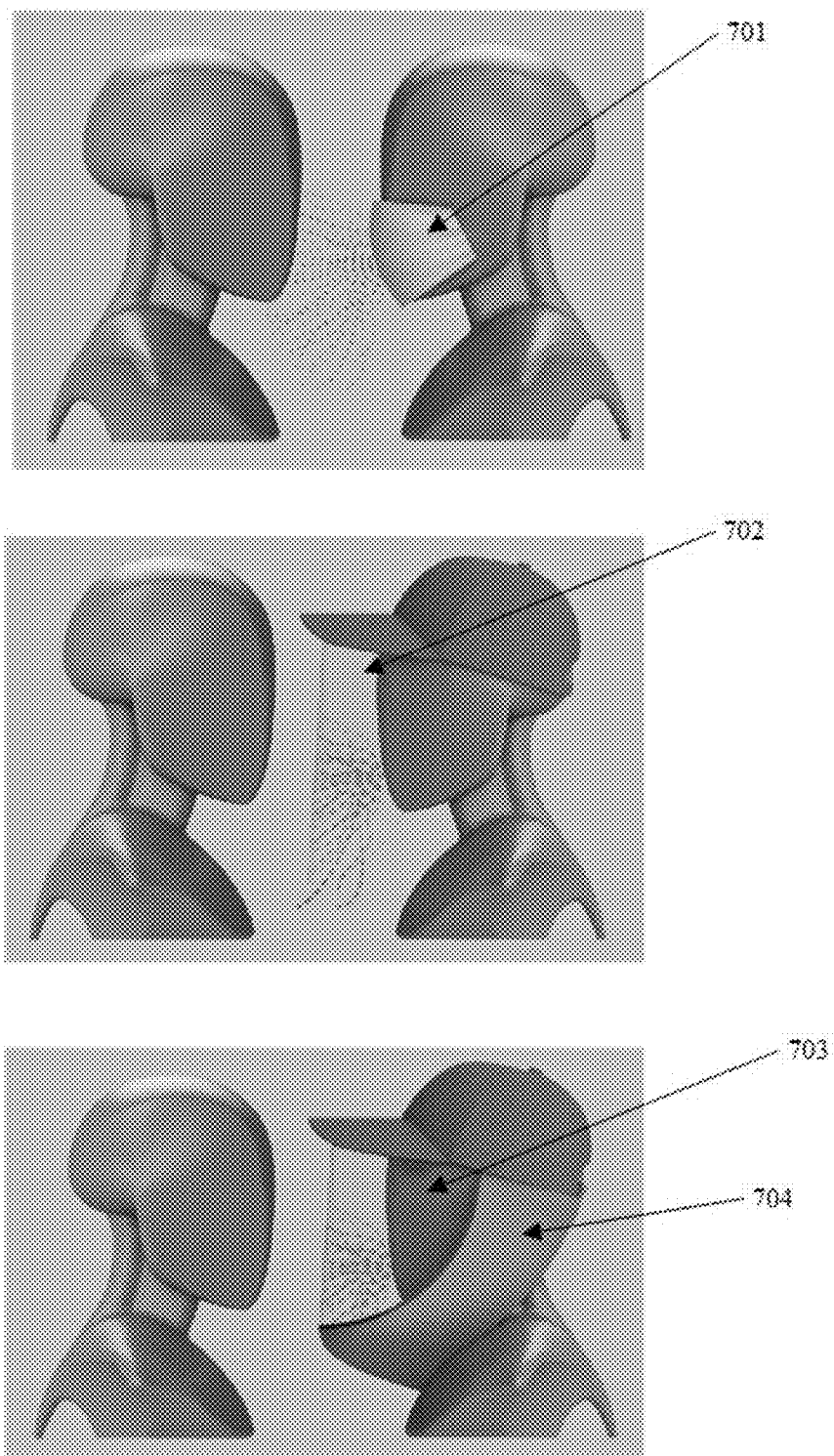


FIG. 21

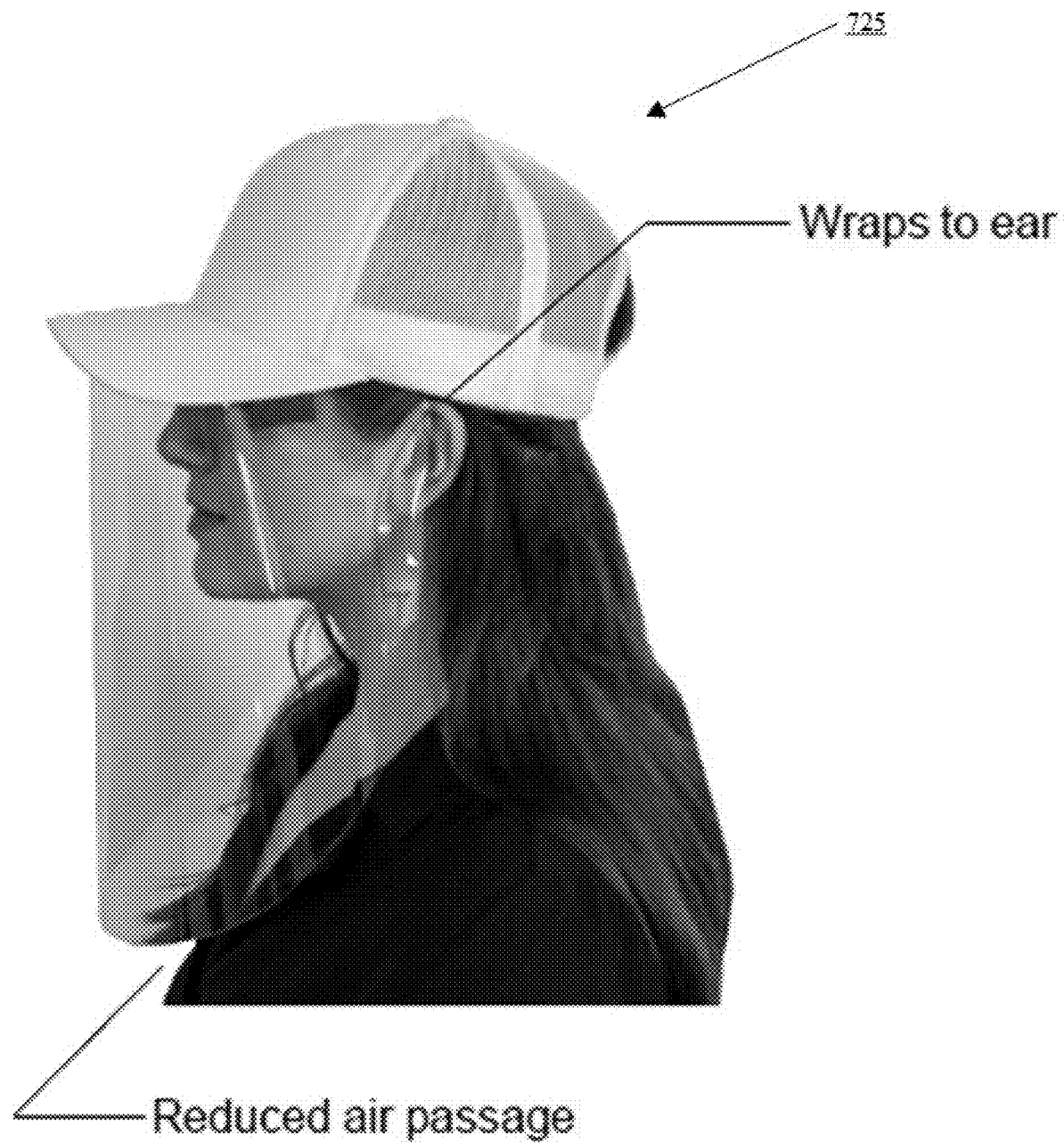


FIG. 22

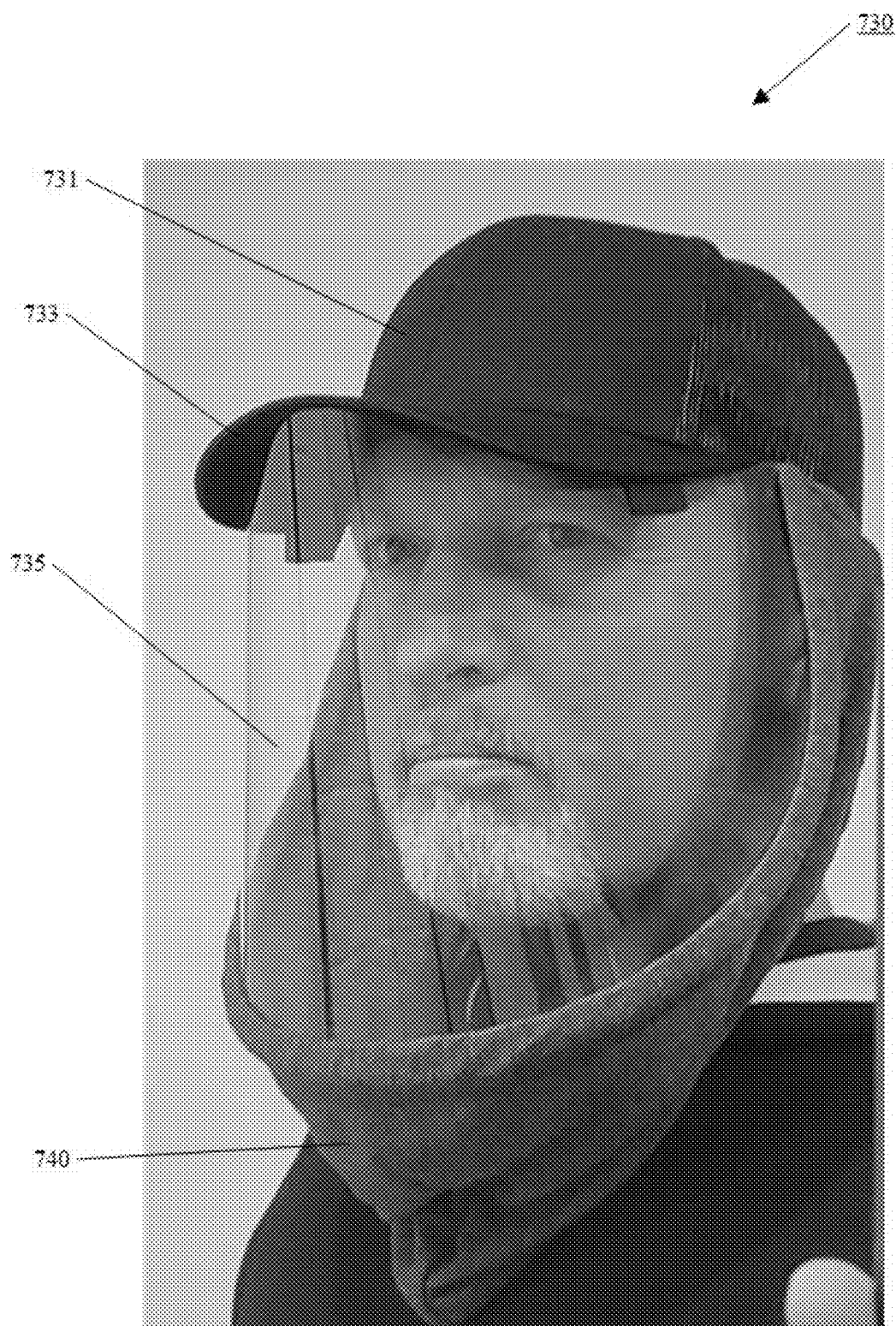


FIG. 23

WEARABLE MICROBE PROTECTIVE SHIELD

RELATED APPLICATIONS

[0001] This application claims benefit to U.S. provisional patent application No. 63/032,003, filed May 29, 2020, and entitled “Wearable Microbe Protective Shield,” which is incorporated herein by reference as if set forth in its entirety.

FIELD OF THE INVENTION

[0002] The field of the present invention is wearable personal protection equipment. More particularly the present invention relates to headwear with integrated safety equipment to protect against microbes.

BACKGROUND

[0003] In December 2019 the world was introduced to a new and deadly virus: the novel severe acute coronavirus 2019, or SARS-CoV2. SARS-CoV2 was highly contagious and quickly spread throughout the entire world, infecting tens of millions around the world, and killing hundreds of thousands in the United States alone. Indeed, as this application is being written, SARS-CoV2 continues to wreak havoc on the health and economy of the world. When infected with SARS-CoV2, a person may develop COVID-19, a dangerous disease affecting the upper respiratory system, heart, brain and other organs. Although many people survive COVID-19, often with no or mild symptoms, COVID-19 leads to death in about 1% to 3% of those unfortunate enough to have been infected with SARS-CoV2. As SARS-CoV2 is so incredibly contagious and easy to spread, even a relatively modest death rate of 1-3% represents millions of deaths on a world-wide scale. Further, the ease of transmission of the virus has led to hospitals and health care delivery systems being overwhelmed.

[0004] Once SARS-CoV2 begins spreading in a population, it has the capability to completely overwhelm a city or nation’s healthcare system. For example, when SARS-CoV2 took hold in New York City, it was only a matter of weeks before hospitals were overflowing, and thousands of beds had to be provided in temporary field hospitals. The only way to slow the spread was by mandating quarantine for those thought to be infected, and enforcing social distancing such that people remained separated in social settings. The goal of social distancing was to “flatten the curve” of hospitalizations in order to allow the hospital and healthcare infrastructure to care for the sick and dying. But, for many, staying at home or social distancing was simply not an option. For example, healthcare workers, grocery store employees, and other essential workers had to put themselves in the community and risk infection and death.

[0005] In response to the devastation COVID-19 was causing throughout the world, most countries, and most states in the United States, issued shelter in place restrictions for nonessential workers. Although these restrictions were largely effective in flattening the curve, it required shutting down significant aspects of the economy, thereby causing the stock markets to crash, unemployment rates to skyrocket, and the spread of hunger, poverty, and despair. After a few months of these lockdown restrictions, it became necessary to open back up the economy and get people back to work, even though SARS-CoV2 was still actively spreading throughout the community and continuing to kill.

[0006] During the SARS-CoV2 epidemic, the medical community determined that wearing a surgical or cloth mask was highly effective in reducing community spread and transmission of SARS-CoV2. In the United States, many cities and counties mandated the wearing of masks in public. Although highly effective in reducing community transmission, masks suffer from several deficiencies. First, they most often use an elastic band to connect to a person’s ears, which is uncomfortable. Second, the mask needs to tightly cover both the nose and the mouth, but over time, the mask loosens and the mask often slips below the nose or above the mouth. In this way the mask becomes nearly useless to prevent spread of the virus. Third, air being expelled from the mouth is hot and damp, which is uncomfortable to re-inhale through the nose. Further, inhaling recently exhaled air has a reduced level of oxygen, and possibly reintroduces microbes back into the wearer’s nose, both of which are dangerous for certain at-risk people. Fourth, it is very difficult to do any strenuous activity while wearing a mask, such as exercising or hard physical labor. Fifth, when wearing a mask and eye glasses, expelled humid air often-times leaks out around the top of the mask at the nose, fogging the glasses. In such a case, the wearer often must remove the mask in order to use their prescription, reading, or sun glasses, but of course then risks community spread. Finally, many people do not like the look of a mask from a fashion standpoint. For these and other reasons, many people have been reluctant to wear a mask, even though its protective quality is well known.

[0007] An alternative to a mask has been a plastic face shield, but these plastic face shields are cumbersome to use, and primarily have been considered to be protective equipment for medical personnel. Accordingly, there is a need for a more comfortable, more usable, and more stylish wearable protective mask.

SUMMARY

[0008] A wearable protective microbe shield is provided that has a transparent and bendable shield connected to a visor portion of a cap, helmet, or protective head gear. In one example, the cap is provided in the form of a baseball cap with a stiff curved front visor. In another example, the protective headgear is a hard hat. The visor has internal connectors that coupled to complementary connectors on the top of the transparent microbe shield. These connectors not only provide for removably coupling the microbe shield to the visor, they also act to add a level of stability and rigidity to the flexible microbe shield. In this way, the microbe shield has no support frame along its side or bottom surface, thereby facilitating exceptional and un-obstructed viewing by the user or wearer.

[0009] The wearable protective microbe shield is stylish and comfortable to wear. As the microbe shield is positioned several inches in front of the wearer’s nose and mouth, the wearer is able to comfortably breathe, even while doing strenuous work or pleasure activities. Additionally, a person is able to wear reading glasses, prescription glasses, and sunglasses in the normal manner, and is able to drink and eat while still leaving the mask safely in place. Most importantly, the wearable protective microbe shield is highly effective in stopping the spread of a microbe, such as the SARS-CoV2 virus.

[0010] The wearable protective microbe shield will enable people to largely return to their normal lives, while still

protecting against community spread of SARS-CoV2 or other microbes. For example, people would be able to go safely to concerts, sporting events, worship services, and other community gatherings. Due to its style and comfort, large numbers of people are more likely to wear the protective shield, thereby increasing the overall protection for the community, nation, and world.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These and other objects and advantages of the invention will become apparent upon reading the following detailed description and upon referring to the drawings and claims. The drawings are not to scale and are intended for illustrative and descriptive purposes only.

[0012] FIG. 1 is an isometric illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0013] FIG. 2 is a side view of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0014] FIG. 3 is an illustration of a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0015] FIG. 4 is an illustration of a cap for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0016] FIG. 5 is an illustration of a visor insert for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0017] FIG. 6 is an illustration of a visor insert for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0018] FIG. 7 is a cutaway illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0019] FIG. 8 is an isometric illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0020] FIG. 9 is an illustration of a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0021] FIG. 10 is an illustration of a visor insert for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0022] FIG. 11 is an isometric and exploded illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0023] FIG. 12 is an isometric view of a shield support member in accordance with an embodiment of the present invention.

[0024] FIG. 13 is an isometric illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0025] FIG. 14 is an isometric and exploded illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0026] FIG. 15 is a picture illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0027] FIG. 16 is an illustration of a cap for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0028] FIG. 17 is an illustration of a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0029] FIG. 18 is an illustration of connectors for a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0030] FIG. 19 is an illustration of a connector for a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0031] FIG. 20 is an illustration of a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0032] FIG. 21 is comparative illustration of a flexible shield for a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0033] FIG. 22 is a picture illustration of a wearable protective microbe shield in accordance with an embodiment of the present invention.

[0034] FIG. 23 is a picture illustration of a wearable microbe shield with shroud in accordance with an embodiment of the present invention.

[0035] While the invention will be described in conjunction with example embodiments, it will be understood that it is not intended to limit the invention to such embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention. It will be understood that the drawings are exemplary, and may not be to scale or may have certain features removed to improve understandability.

DESCRIPTION

[0036] It is firmly established that wearing masks can substantially and significantly reduce community spread of contagious microbes such as viruses, bacteria, and fungi. To get such a beneficial reduction, it is critical that the mask be worn by as many people as possible. For example, one asymptomatic carrier not wearing a mask can infect tens or even hundreds of other people in just a few days. Had that asymptomatic carrier been wearing a mask, it is very likely that fewer of his or her contacts would have gotten sick or died. So wide-spread adoption of the mask is crucial. However, due to the limitations and discomfort of traditional facial masks, acceptance has been limited. As a result, the overall reduction of infection has likewise been limited. What is needed is a comfortable, stylish, and effective mask system that is likely to be widely worn in social and work settings.

[0037] Referring now to FIG. 1, a wearable microbe shield 100 is illustrated. The wearable microbe shield 100 is stylish, easy to wear, and highly effective to reduce community spread of microbes, including viruses such as SARS-CoV2. When in place, the wearable microbe shield 100 allows a wearer to breathe fresh air normally, wear glasses, eat, drink, and have exceptional unimpeded visibility of surroundings. Wearable microbe shield 100 has a cap 110 that is illustrated as a traditional baseball cap. However, it will be appreciated that other headwear may be substituted in accordance with this disclosure. Cap 110 has a crown portion 112 which covers the top of a wearer's head and a visor 114 that extends forward of the wearer's face. The visor 114 is generally stiff and maybe curved and has a front rim 116.

[0038] A microbe shield 120 has a transparent and flexible shield 121 that has a substantially flat front portion 123 and

two ear tabs **125** that extend along the side of a wearer's face. The shield **121** has a top that couples to the visor **114** and a bottom **128**. When the shield **121** is attached to the visor **114**, the shield **121** has sufficient structure and rigidity that no frame is needed along the bottom **128** or sides of the shield **121**. In this way, the wearer has unobstructed vision of his or her surroundings. The microbe shield **121** is substantially transparent and flexible, and most often will be made from a plastic material such as PETG (Polyethylene Terephthalate Glycol) or other similar material. It will be appreciated that for some uses the shield **121** maybe tinted, for example for providing some protection from the sun. In another example, the shield **121** may include a UV protectant, to protect the wearer's face from sunburn and skin damage. It will be understood that the shield may also be coated with an anti-fogging material.

[0039] Referring now to FIG. 2, a side view of the wearable microbe shield **100** is illustrated. In this view, it can be seen that the shield **121** extends downward from the visor **114**, and is coupled to the visor **114** just inside rim **116** of the visor. The shield **121** has ear tabs **125** which extend along the side of the face for the wearer. In this way, highly effective protection is provided from the spread of virus, as well as providing for a clear and unobstructed view for the wearer.

[0040] Referring now to FIG. 3, a shield **120** for the wearable microbe shield **100** is illustrated. The shield **121** is substantially transparent and flexible and has a bottom **128** and a top **129**. A top frame **135** permanently attaches to the top **129** of the shield **121**. The top frame **135** has a post piece **130** that extends through the top of shield **121** and is received into receiver piece **150**. More particularly, post **131** extends through hole **141** and is frictionally received into receiver **151**; post **132** extends through hole **142** and is frictionally received into receiver **152**; and post **133** extends through hole **143** and is frictionally received into receiver **153**. When the post piece **130** is permanently connected to receiver piece **150**, the curvature of the top frame **135** causes the shield **121** to also be bent into its usable shape. Further, the top frame **135** provides sufficient stiffness and stability to the shield **121** that no additional frame is needed, thereby facilitating exceptional visibility for the wearer. It will be appreciated that the top frame may be made of various materials, such as plastics or a metal, depending on how the shield **120** is intended to couple to the visor **114**. For example, if the visor **120** is intended to magnetically coupled to the visor **114**, then at least one piece (**130** or **150**) of the top frame **135** would be made from a magnetic material, or a metallic material capable of coupling to a magnet in the visor **114**.

[0041] Referring now to FIG. 4, a cap **110** is illustrated. The cap **110** has a visor **114** with a top surface **117** and the rim **116**. A visor insert **160** has a support piece **162** and a magnetic coupler **164**. The support piece **162** may be made for example from a semi rigid plastic material that is able to provide support and sufficient rigidity to the visor **114**. The magnetic coupler **164** may be made of a solid metallic metal, or may have spaced apart magnets. Although magnetic coupler **164** is illustrated on the top surface of insert **162**, it will be appreciated that it may also be positioned on the bottom surface of the insert piece **162**. The visor insert **160** is inserted inside the visor **114** during manufacture of the cap **110**. It will also be appreciated that the visor insert **160** may be alternatively adhered to the bottom surface of visor **114**,

for example by a hook and loop material, an adhesive, or by sewing. However, when the visor insert is mounted inside the visor **114** during manufacturing, the connector **164** is completely hidden from view, thereby giving the cap **110** a clean and stylish look.

[0042] Referring now to FIG. 5, an isometric view **165** and a side view **166** of the visor insert **160** is illustrated. As can best be seen from side view **166**, the magnetic coupler **164** has a flat front portion and two curved side extensions shaped and sized according to the complementary top frame **135** of the shield **121**. In this way, the magnetic coupler **164** would attract middle piece **130** or metal piece **150** to removably coupled microbe shield **121** to the visor **114**. Although magnetic coupler **164** is illustrated as a solid one-piece magnet, it will be appreciated that the magnetic coupler may be provided in multiple pieces. For example, FIG. 6 shows a visor insert **170** having a support piece **172** that has three spaced-apart magnets **174**. As best seen in the isometric view **175**, the support piece **172** is semi-rigid and curved according to the design required for the visor **114**. As best illustrated in view **176**, the magnetic pieces **174** are arranged to mate and cooperate with the top frame **135** of the microbe shield **120**.

[0043] Referring now to FIG. 7, a cutaway view of a wearable microbe shield **200** is illustrated. Wearable microbe shield **200** has a cap **210** and a microbe shield **220**. The cap **210** has a crown portion **212** with a visor **214** having a rim **216**. The microbe shield **220** has a substantially transparent and flexible shield **221** that has a top frame **235**. The top frame **235** is made from a post connector **230** that permanently attaches the shield **220** to a connector piece **250**. This top frame thereby bends the shield **221** to have a generally flat front portion and two ear tabs. One or both of pieces **230** and **250** are made from a metal that is attracted to a magnet. Magnetic piece **264** is inserted inside the visor **214** of cap **210**. As illustrated, magnetic piece **264** is directly received and positioned in the visor **214**. However, it will be appreciated that the magnetic piece **264** may be first placed on a visor insert similar to the visor insert described with reference to FIG. 4. In such a case, the visor insert would act to add additional stiffness and shape to the visor **214**, as well as placement of the magnetic piece **264**. It will be appreciated that the magnetic piece **264** may be constructed as a single negative piece, or may be multiple spaced apart magnets.

[0044] Referring now to FIG. 8, a wearable microbe shield **300** is illustrated. Wearable microbe shield **300** has a cap **310** that has a crown **312** and the visor **314** having a rim **316**. A microbe shield **320** extends from the visor **314** to cover the wearer's face. A flexible and substantially transparent shield **321** extends from just inside the rim **316** and curves according to the shape of the visor **314** to form two ear tabs **325**.

[0045] Referring now to FIG. 9, the microbe shield **320** is illustrated. Microbe shield **320** has a flexible and substantially transparent shield **321** that has a post piece **330** that connects to a receiver piece **350**. In particular, post **331** extends through hole **341** to be frictionally received into receiver **351**; post **332** extends through hole **342** and is frictionally received into receiver **352**; and post **333** extends through hole **343** and is frictionally received into receiver **353**. When the post piece is **330** is permanently attached to the receiver piece **350**, the shield **321** is bent such that it has a generally flat front surface and 2 earpieces. One or both of the pieces (**330** and **350**) of the top frame **335** include a hook

or loop material. In this construction, the top frame 335 would generally be formed from a plastic material, and then the hook or loop material adhesively connected to the top frame 335.

[0046] Referring now to FIG. 10, the underside of visor 314 is illustrated. The underside surface 372 of visor 314 has spaced apart hook or loop material 374. It will be understood that the hook or loop material 374 may be provided as a single piece, or may be provided in multiple separate pieces. The hook or loop material 374 is complementary to the hook or loop material on top frame 335. For example, if top frame 335 has a hook material, then faster 374 will be a loop material. Conversely if the top frame 335 has a loop material, then faster 374 will be a hook material. In use, a wearer couples the top frame 335 of the shield 322 the underside 372 of visor 314 by connecting the hook and loop material together. In this way, the microbe shield 320 is securely and removably connected to the visor 314 of the cap 310.

[0047] Referring now to FIG. 11, a wearable microbe shield 400 is illustrated in an exploded view. Wearable microbe shield 400 has a cap 410 that has a crown 412, and a visor 414 with an outer rim 416. As illustrated, cap 410 is a customized baseball cap 410. The wearable microbe shield 400 has a microbe shield 420 that has a shield 421 that has a front portion 423 and two ear tabs 424. As described before, the shield 421 is flexible and substantially transparent. The microbe shield 420 securely couples to the underside of the rim 414 using three magnets 451. Magnets 451 are frictionally received into openings 452 in a shield support piece 453. It will be understood that the magnets 451 may be glued or otherwise secured into the openings 452. A magnetic coupler 461 is constructed internal to the visor 414. As illustrated, the magnetic coupler 461 is a set of three metallic members sized and arranged to couple to respective magnet pieces 451. It will be understood that the magnetic coupler 461 may be made with more or fewer pieces. For example, the magnetic coupler 461 could be one piece or four or more pieces. It will also be understood that alternatively the magnets could be internally positioned in the brim 412 while the shield support 453 holds the metallic pieces. Generally, shield support 453 couples the top of microbe shield 421 to the underside of the visor 414 in a way that bends the shield 421 to generally follow the rim 416 of the visor and positioning the shield 421 to create ear tabs 424 along the side of a wear's face. As illustrated in FIG. 12, the microbe shield 420 extends downward from the underside of visor 414, and the ear tabs extend to cover the side of the wearer's face. In this way the shield 421 provides effective protection against transmission of virus, while enabling excellent visibility for the wearer.

[0048] Referring now to FIG. 12, a closeup view of the shield support 453 is illustrated. Shield support 453 is illustrated with the magnets 451 and magnet holders 452. The shield support 453 also has shield clips 455 that removably secure the shield 421 to the shield support 453. In this way, shields may be replaced if they become damaged or scratched. Also, the wearer may replace the shield 421 according to environmental or personal conditions, for example, using a UV coated shield, a darkened shield, or a shield coated with an anti-microbial material or an anti-fogging material. Further, shields of different lengths and widths can be used according the risk condition of particular situations. The shield support 453 is also constructed to provide or adapt to the natural shape of a baseball cap visor,

such as visor 414. In this way, the center of the shield support 453 is raised at the center 456, and slopes downward to edges 457. The edges 457 of the shield support 453 are also angled to adapt to the side angle of the underside of the visor. This angle not only allows the shield support to adapt to the shape of the hat brim, but also causes the shield 421 to properly bend and shape to form ear tabs 424. As illustrated, at the edges 457, the magnets, magnet holder, and shield support are set at about a 30-45-degree angle from horizontal. It will be appreciated that this angle can be set according to the specific shape of the brim being used.

[0049] Referring now to FIG. 13, the wearable microbe shield 400 is illustrated. Microbe shield 400 has a substantially transparent and flexible shield 420 that is magnetically connected to the underside of the visor 414 of hat 412. The shape and contour of the magnetic shield support 453 is set to match the shape of the contour of the underside of the visor 414, and also bends, shapes, and holds the flexible shield 420 to form ear tabs 424.

[0050] Referring now to FIG. 14, a wearable microbe shield 475 is illustrated in an exploded view. Wearable microbe shield 475 has a cap 477 that has a crown 478, and a visor 479 with an outer rim 481. As illustrated, cap 477 is a standard off-the-shelf baseball cap 477. As described with reference to shield support 453, a microbe shield securely removable attaches to the shield support 453, which in turn is magnetically connected to the underside of the visor 479 using three magnets 451. Magnets 451 are frictionally received into openings in the shield support piece 453. It will be understood that the magnets 451 may be glued or otherwise secured into the openings in the shield support 453. Magnets 483 are attached to the underside of the visor 479, for example by a glue or other adhesive, such as a double-sided tape. As illustrated, the magnets 483 are a set of three metallic members sized and arranged to couple to respective magnet pieces 451 in the shield support 453. It will be understood that the magnets 483 may be made with more or fewer pieces, depending on the construction of the shield support. Generally, shield support 453 couples the top of microbe shield to the underside of the visor 479 in a way that bends the transparent shield to generally follow the rim 481 of the visor 479 and positioning the transparent shield to create ear tabs along the side of a wearer's face. In this way the transparent shield provides effective protection against transmission of virus, while enabling excellent visibility for the wearer. Advantageously, the wearable microbe shield 475 enable the use of a standard off the shelf baseball style cap. It will be understood that other style of caps or hats may be used, such as a hardhat.

[0051] Referring now to FIG. 15, a wearable microbe shield 500 is illustrated. Wearable microbe shield 500 has a cap 510 and a shield 520. The shield 521 removably attaches to the underside 515 of the visor 514. As illustrated, shield 521 requires no support frame along its side or bottom, thereby facilitating exceptional comfort and unobstructed view. When the shield 521 is attached to the cap 510, the shield 521 has a generally curved front that extends to cover the wear's ears. The cap 510 is illustrated in FIG. 16, showing the underside 515 of visor 514. Slot clips 531 are provided along the side of the visor 514 toward the crown portion of the cap 510 and just inside the rim 516 of the visor 514. As illustrated, 2 slot clips 531 are used, with each slot clip being an elongated to frictionally receive a complementary tab piece.

[0052] Referring now to FIG. 17, microbe shield 520 is illustrated. Microbe shield 520 has a shield portion 521 that is shaped to have a curved center portion 539 and ear tab portions 554 and 555. Tab connectors 535 are permanently attached to shield 521 for example by an adhesive or by a friction fit and are positioned on the top of the shield 521 adjacent to the ear tabs 554 and 555. As illustrated in FIG. 18, these tab connectors 535 have a base portion 536 that permanently adheres to the shield 521, for example by glue, and adhesive, or by a friction fit. A tab 537 extends from the base 536 at an angle. This angle, which is illustrated is approximately 30°, has been selected to shape, bend, and position the shield 521 into its desired configuration when connected to the visor 515. It will be understood that other angles may be used, depending upon the particular placement of the clips 535. The tab 537 has rounded ends to facilitate ease of insertion into the mating connector 531 on the underside 515 of visor 514. In use, a user simply bends shield 521 and inserts the tab 537 of each clip 535 into the mating elongated connectors under the visor 414. Due to the particular positioning and angling of the clips 535, the shield 521 is bent to generally follow the shape of the visor, including a generally flat or curved front portion and 2 ear tabs, and is comfortably biased away from the users face.

[0053] Referring now to FIG. 19, an alternative slot clip 631 is illustrated attached to a cap visor 615. Slot clip 631 is like slot clip 531 as described above, except that slot clip 631 has an engagement mechanism at its closed end for more securely retaining the shield clips. In this way, it takes additional effort to remove the shield after it has snapped into place.

[0054] Referring now to FIG. 20, another example of the microbe shield 620 is illustrated. Microbe shield 620 has a shield portion 621 that is shaped to have a curved center portion 639 and ear tab portions 654 and 655. Tab connectors 635 are permanently attached to shield 621 for example by an adhesive or by a friction fit and are positioned on the top of the shield 621 adjacent to the ear tabs 654 and 655. These tab connectors 635 permanently adheres to the shield 621, for example by glue, and adhesive, or by a friction fit. A tab extends from the connector 635 at an angle. This angle, which is illustrated is approximately 30°, has been selected to shape, bend, and position the shield 621 into its desired configuration when connected to the cap visor. It will be understood that other angles may be used, depending upon the particular placement of the clips 635. In use, a user simply bends shield 621 and inserts the tab of each clip into the mating elongated connectors under the cap visor 414. Due to the particular positioning and angling of the clips 635, the shield 621 is bent to generally follow the shape of the visor, including a generally curved front portion and 2 ear tabs, and is comfortably biased away from the user's face. The tabs 535 are positioned about 11 inches apart for an adult cap. The ear tabs 554 and 555 extend two or more inches from the end of each tab to provide even more coverage to the side of the user's face.

[0055] Referring now to FIG. 21, illustrations of three manners of protective gear is shown. In view 701, the user is shown coughing with a standard cloth mask. Since the mask must be porous for breathability, microbes can pass through an infect another individual. In view 702, the user is wearing a microbe shield, such as microbe shield 520. Since the shield is solid, if the user coughs, any droplets are either caught on the plastic shield as drops or are expelled

downward or behind the user. As such, any microbes in the air are unlikely to be breathed in by the other people. However, for even greater protection, the microbe shield may be provided with a shroud 703 which attaches to the outside edges of the plastic shield, and drapes to the wearer's body. As shown in view 703, the microbe shield and shroud provide an extreme level of protection against community spread. It will be understood that the shroud can be made of several types of materials, such as cloth, canvas, or plastics. The microbe shield with shroud is further described and illustrated with reference to FIG. 23.

[0056] Referring to FIG. 22, microbe shield 725 is illustrated being worn by a woman. The shield 725 is sized to have the ear tabs extend over the ear and extending down toward the chest. In this configuration, any microbe in a breath or cough would be very unlikely to be inhaled by another person.

[0057] Referring now to FIG. 23, a wearable microbe shield 730 with shroud 740 is illustrated. The wearable microbe shield has a hat, such as baseball cap 731 that has a visor 733. It will be understood that other types of caps or hats, such as a hardhat, may be used. A flexible transparent microbe shield 735 attaches to the underside of the visor 733, as described herein. A shroud 740 attaches to the perimeter of the microbe shield 735 and drapes or extends to the body of the wearer. In this way, the spaces between the wearer and bottom and sides of the microbe shield are covered to restrict airflow. That is, the wearer's exhaled breath is filtered through the shroud 740 prior to contacting outside air, thereby reducing, or nearly eliminating any microbes from being expelled outside the wearable microbe shield 730. In a similar way, air from outside is also restricted or filtered such that it is unlikely that the wearer would be exposed to any outside microbe. It will be appreciated that the shroud 740 may be constructed of various materials depending on the specific application. For example, the shroud may be made of one or more layers of cloth, fabricate or non-woven material. In other examples, the shroud may be made as a thin film of plastic, foil, or such sheet material.

[0058] Although the wearable microbe shield has primarily been described as effective protection against community spread, it should also be recognized that it can be advantageously worn as protection against UV radiation. In this regard, the face shield may have a UV layer or UV protectant in the transparent shield that protects the wearer's face from sun damage and UV rays. Further, the shield may be tinted for more comfortable use in bright sun.

[0059] Although the wearable microbe shield has primarily been described using a soft baseball-type cap and visor, it will be understood that other types of hats or head coverings can be used. For example, a sturdier hat, such as a hard hat, may provide protection in an industrial, construction, or work environment. In such a case, a hardhat would have a visor extending from its front to which the shield can attach as described herein. Such an industrial wearable microbe shield could be used, for example, by meat processors in a meat packing plant, an industry particularly hard hit by the corona virus. The shield would protect exposing others to the virus, while maintaining good vision and comfort.

[0060] While particular preferred and alternative embodiments of the present intention have been disclosed, it will be appreciated that many various modifications and extensions

of the above described technology may be implemented using the teaching of this invention. All such modifications and extensions are intended to be included within the true spirit and scope of the appended claims.

What is claimed, is:

1. A wearable microbe shield cap, comprising:
 - a cap having a crown and an integral visor, the visor having a top, a bottom, a front and two sides;
 - a shield connector coupled to the bottom of the visor that is positioned adjacent the front and two sides of the visor;
 - a substantially transparent and flexible microbe shield;
 - a cap connector at the top of the shield, the cap connector being complementary to and removably receivable by the shield connector; and
 - wherein when the shield connector is coupled to the cap connector, the shield extends from the bottom of the visor and is bent to generally follow the periphery of the front and two sides of the visor.
2. The wearable microbe shield cap according to claim 1, wherein:
 - the cap connector comprises a top frame for the shield, the top frame having a substantially straight portion and two side portions that angle to generally follow the shape of the visor.
3. The wearable microbe shield cap according to claim 1, wherein:
 - the shield connector is integrally formed in the visor; and
 - the shield connector and cap connector are magnetically coupled.
4. The wearable microbe shield cap according to claim 1, further comprising:
 - a flexible shroud attached to the perimeter of the microbe shield to cover the space between the microbe shield and a body of a wearer.
5. The wearable microbe shield cap according to claim 1, wherein:
 - the shield connector is a plurality of pieces integrally formed in the visor;
 - the cap connector is a plurality of pieces complementary to the plurality of shield connector pieces; and
 - the shield connector and cap connector are magnetically coupled.
6. The wearable microbe shield cap according to claim 1, wherein:
 - the shield connector is attached to the bottom of the visor; and
 - the shield connector and cap connector are magnetically coupled.
7. The wearable microbe shield cap according to claim 1, wherein the microbe shield has ear tabs that, when the microbe shield is coupled to the visor, extend away from the visor and toward a wearer's ears.
8. The wearable microbe shield cap according to claim 1, when the microbe shield is coupled to the visor, there is no frame below the cap connector such that there is no frame or support in a wearer's line of sight.
9. The wearable microbe shield cap according to claim 1, where in the cap is a baseball style cap.

10. The wearable microbe shield cap according to claim 1, where in the cap is a protective hard hat.

11. A wearable microbe shield cap, comprising:
 - a cap having a crown and an integral visor, the visor having a top, a bottom, a front and two sides;
 - a first shield connector on one bottom side of the visor, and a second shield connector on the other bottom side of the visor;
 - a substantially transparent and flexible microbe shield, the shield having a top, a bottom, a center portion, and two ear tabs;
 - a first cap connector at the top of the shield at one ear tab, a second cap connector at the top of the shield at the other ear tab, the cap connectors being complementary to and removably receivable by the shield connectors;
 - wherein when the shield connectors are coupled to the cap connectors, the shield is bent such that the center portion of the shield is positioned under the visor.

12. The wearable microbe shield cap according to claim 11, wherein there are two and only two cap connectors and two and only two complimentary shield connectors.

13. The wearable microbe shield cap according to claim 11, wherein the cap connectors and the shield connectors are slidably coupled.

14. The wearable microbe shield cap according to claim 11, wherein the cap connectors and the shield connectors are shaped to cause the shield to be directed away from a wearer's chest.

15. The wearable microbe shield cap according to claim 11, when the microbe shield is coupled to the visor, there is no frame below the cap connector such that there is no frame or support in a wearer's line of sight.

16. A wearable microbe shield cap, comprising:
 - a cap with a visor, the visor having a contoured rim and a bottom visor surface;
 - a cap connector constructed to removably secure a flexible microbe shield, the cap connector shaped to cause the top of the microbe shield to generally follow the contoured rim; and
 - wherein the visor further comprises a shield connector that magnetically attracts the cap connector.

17. The wearable microbe shield cap according to claim 16, wherein the shield connector is integrally formed in the visor.

18. The wearable microbe shield cap according to claim 16, wherein the shield connector is attached to the bottom of the visor.

19. The wearable microbe shield cap according to claim 16, further comprising:

- a flexible shroud attached to the perimeter of the microbe shield to cover the space between the microbe shield and a body of a wearer.

20. The wearable microbe shield cap according to claim 16, wherein the microbe shield has ear tabs that, when the microbe shield is coupled to the visor, extend away from the visor and toward a wearer's ears.

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