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(54) **VEHICLE SECURITY SHIELDS AND RELATED METHODS**

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Publication Classification

(51) **Int. Cl.**

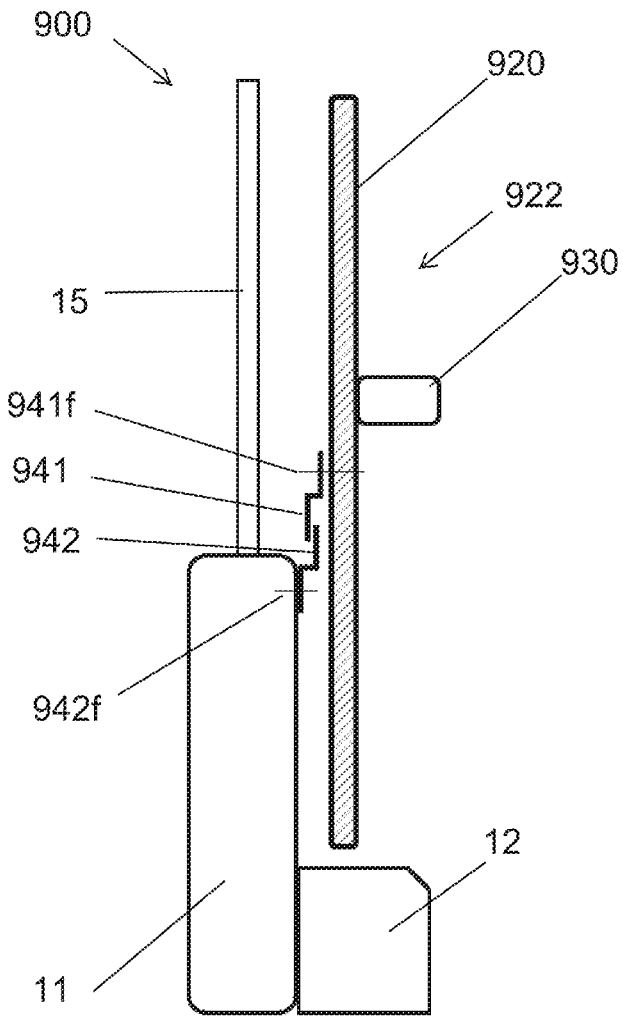
F41H 5/22	(2006.01)
F41H 5/013	(2006.01)

(52) **U.S. Cl.**

CPC ***F41H 5/226*** (2013.01); ***F41H 5/013*** (2013.01)

(57) **ABSTRACT**

Removable vehicle window security shield assemblies and related methods of use and/or installation. In some embodiments, an insert-shield assembly may comprise an insert-shield with or without a separate inner shield, one or both of which may comprise a ballistic-rated, transparent material. The assembly may be mounted in and/or to and/or adjacent to one or more existing windows or other openings of a vehicle. In some embodiments, an inner shield of the shield assembly may be removeable from the assembly. In some embodiments, the entire assembly or a portion thereof may be removed to allow an officer or other user to use the removed portion as a portable shield. The removed portion may be returned to the vehicle following use to enhance the protection of the vehicle. In some embodiments, a personal shield may be inserted into and held by a holster that is positioned within the window frame of a vehicle.



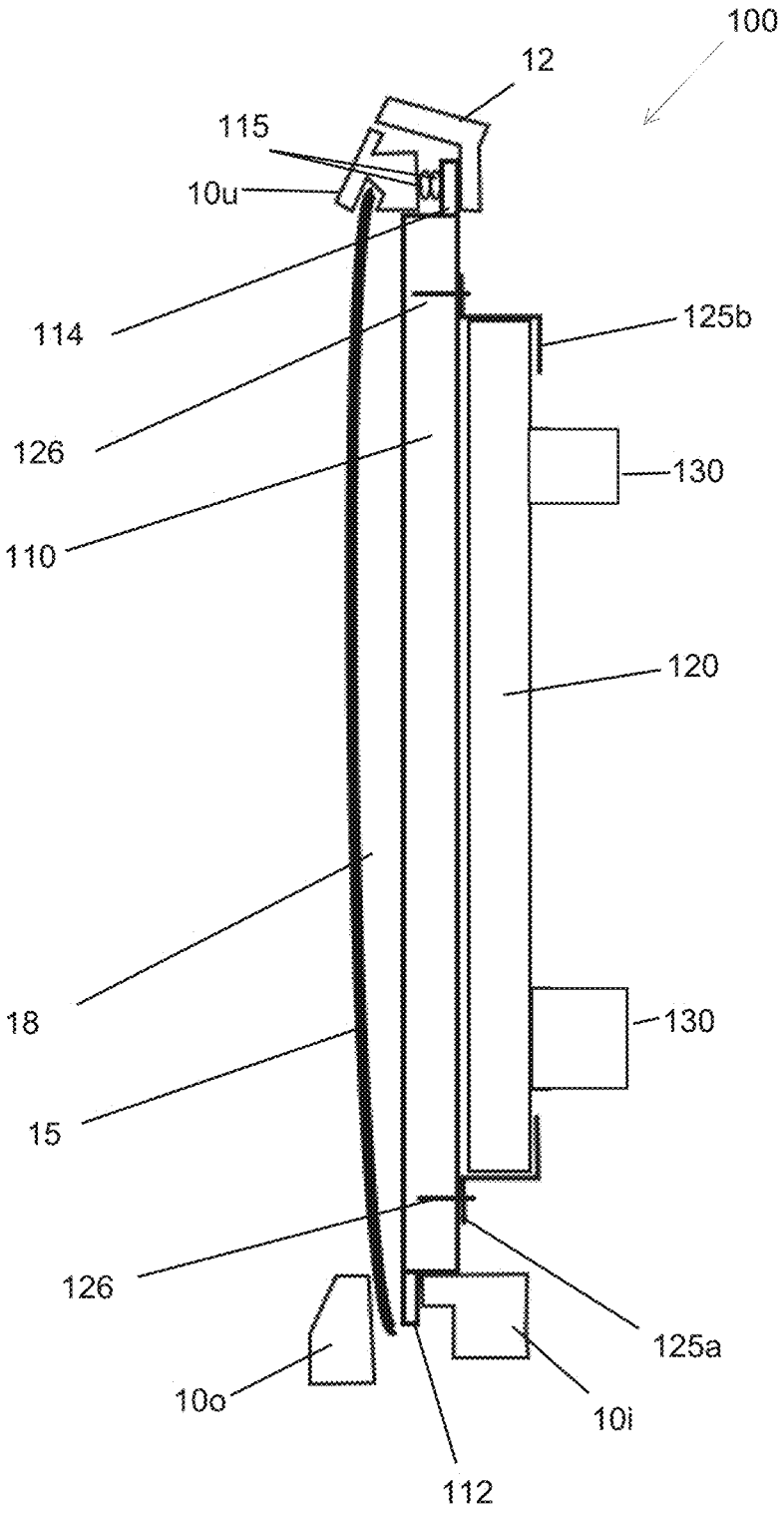

100
12
115
10u
114
125b
126
130
110
120
18
130
15
126
125a
10o
10i
112

FIG. 1

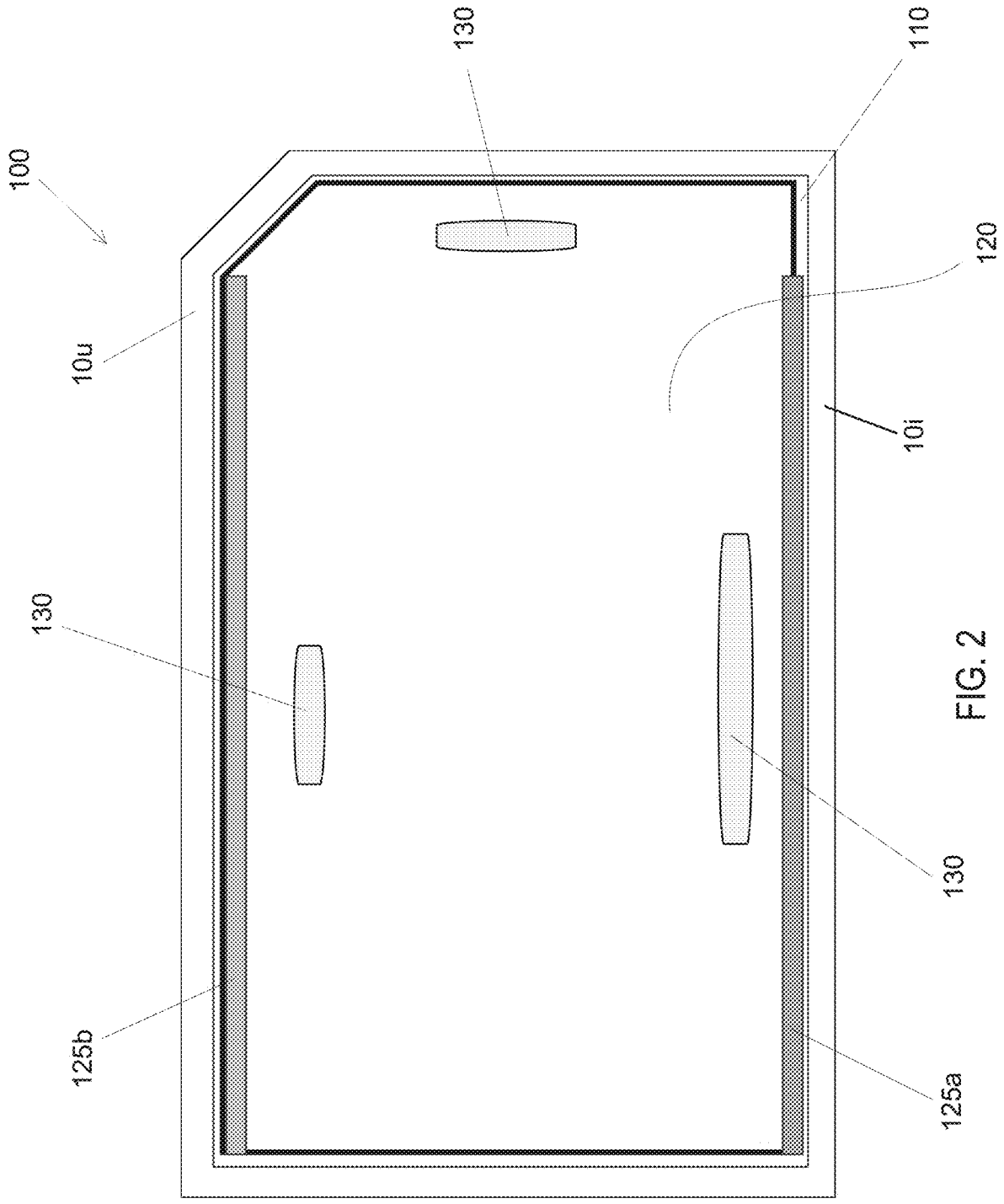


FIG. 2

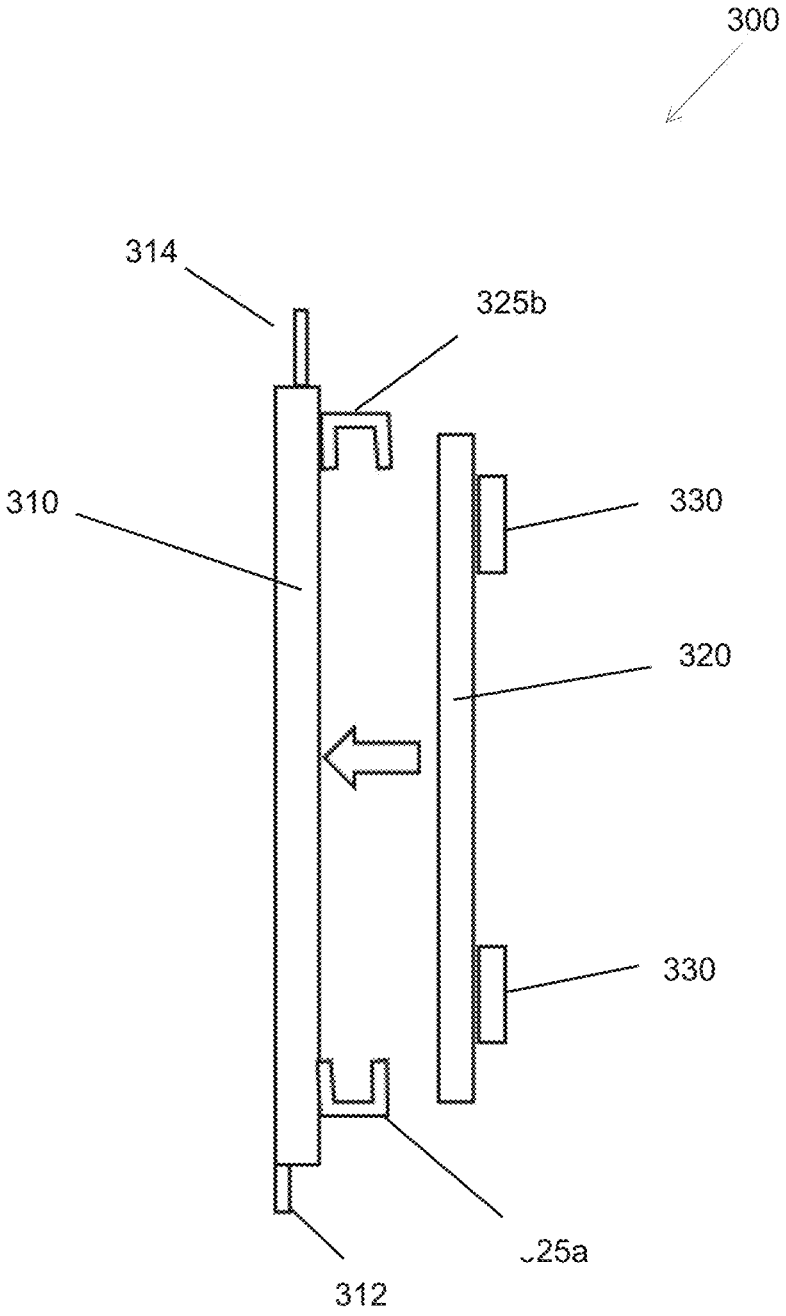


FIG. 3

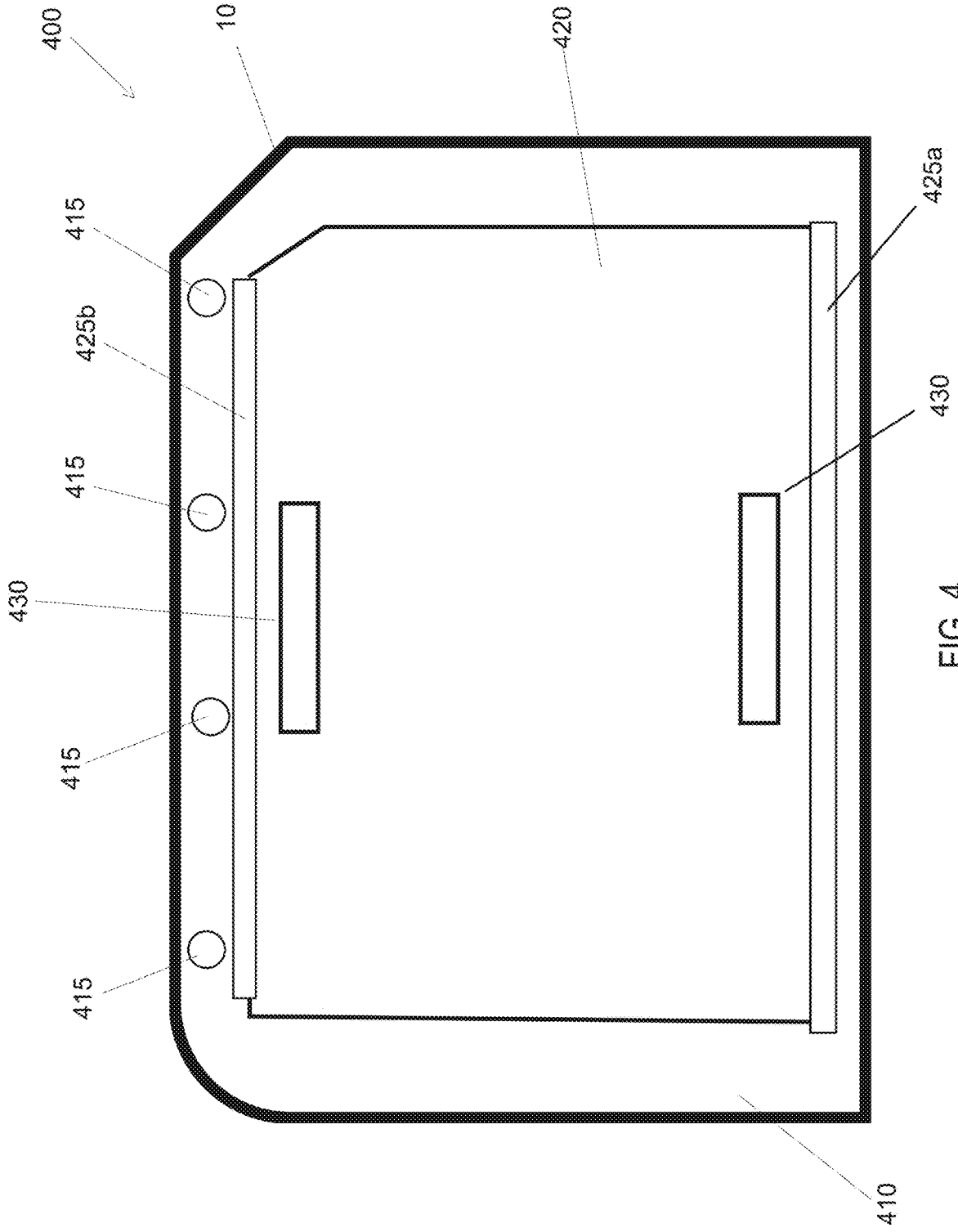


FIG. 4

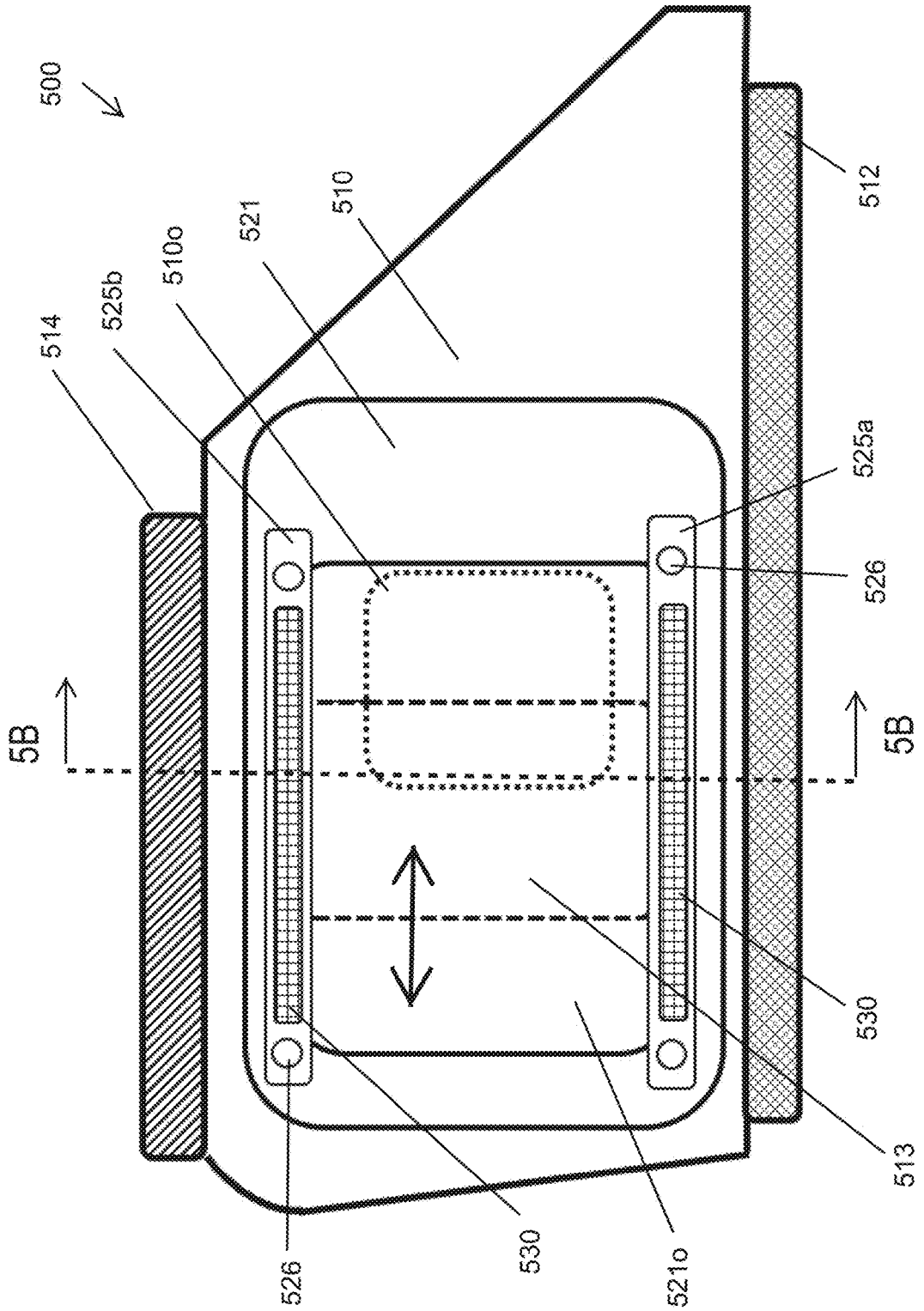

500
510
521
510o
525b
514
512
525a
526
5B
5B
530
513
526
530
521o

FIG. 5A

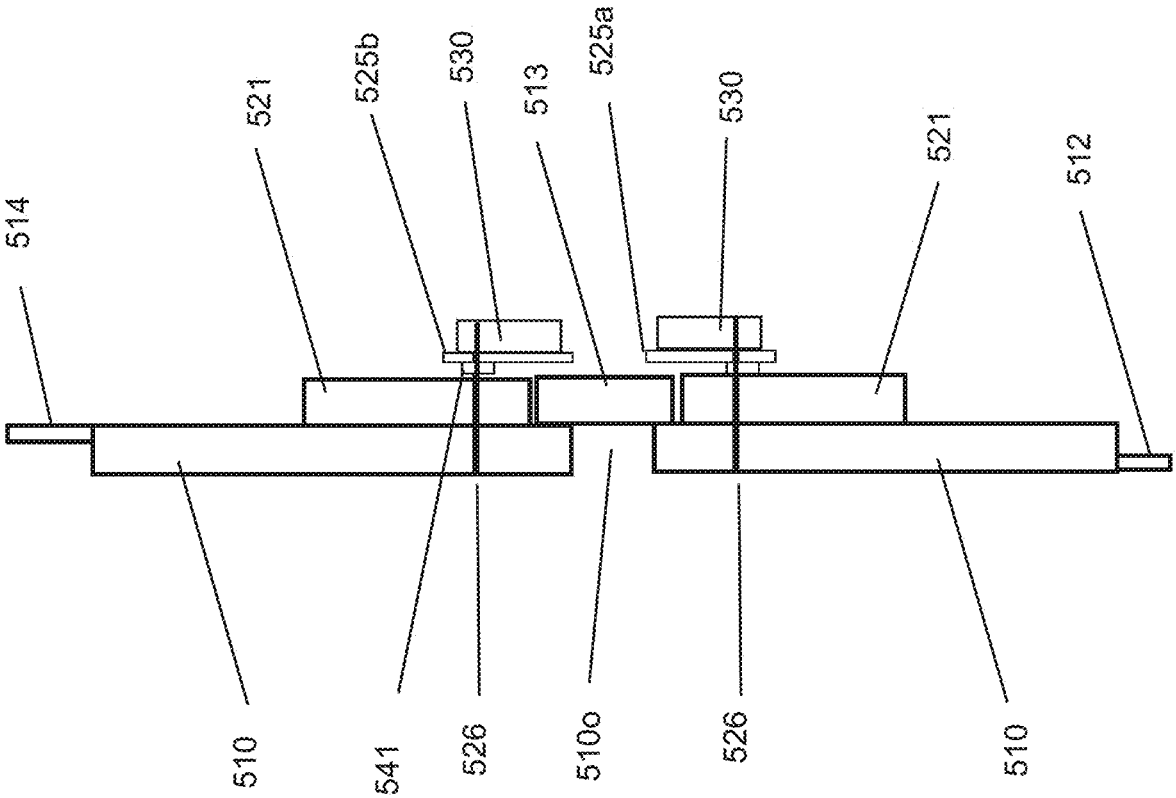


FIG. 5B

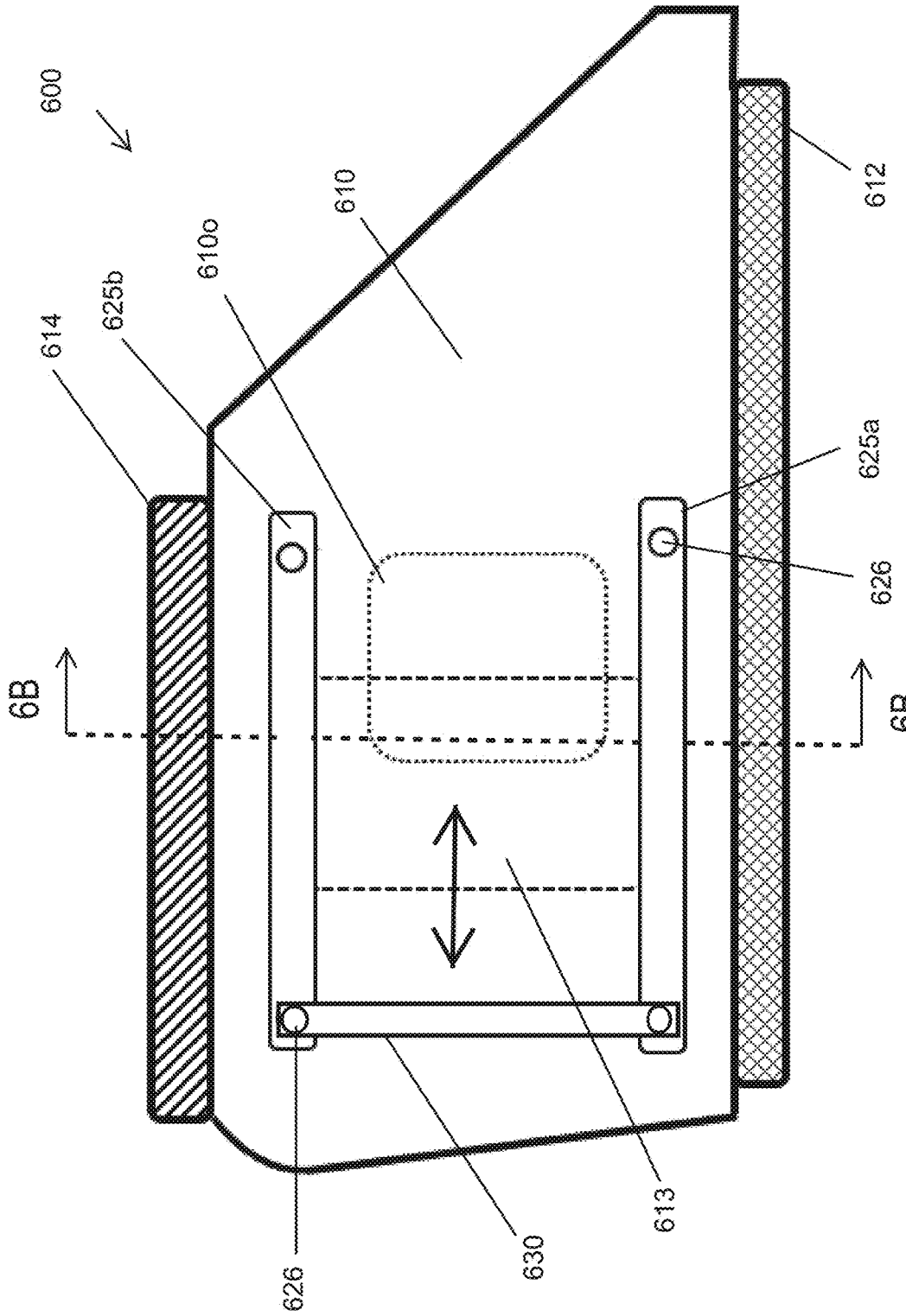


FIG. 6A

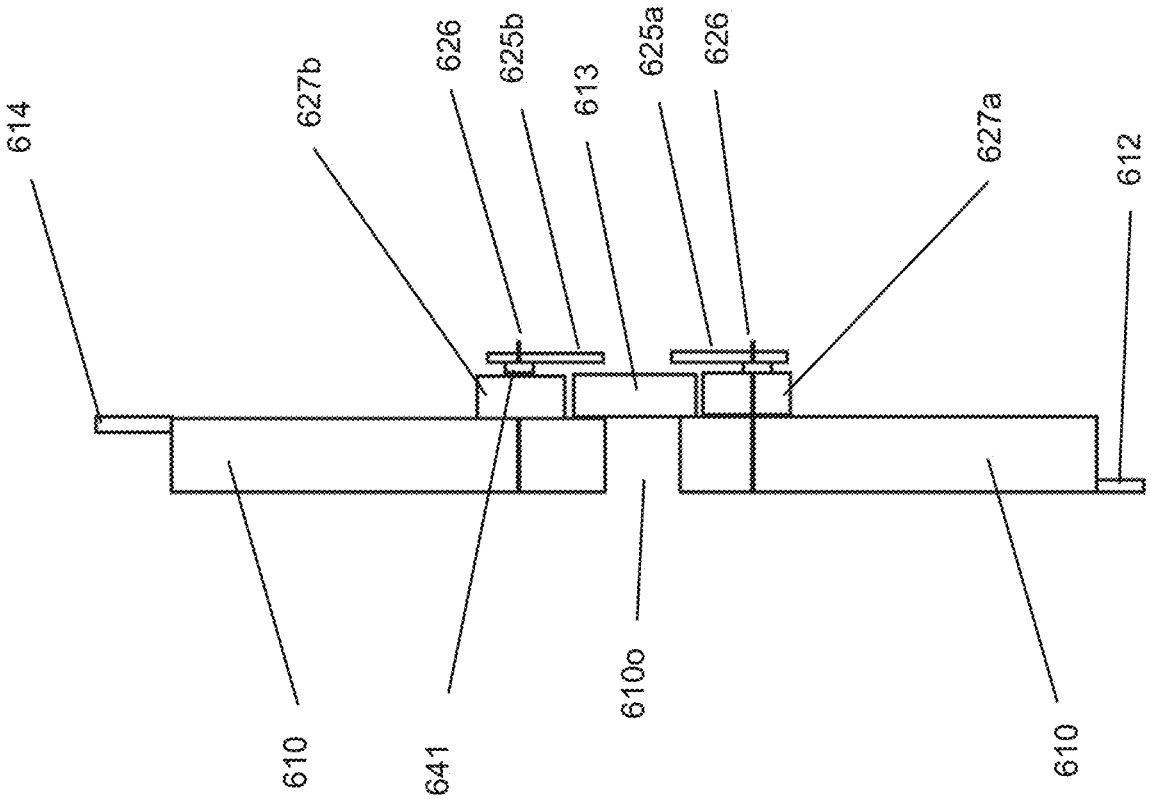


FIG. 6B

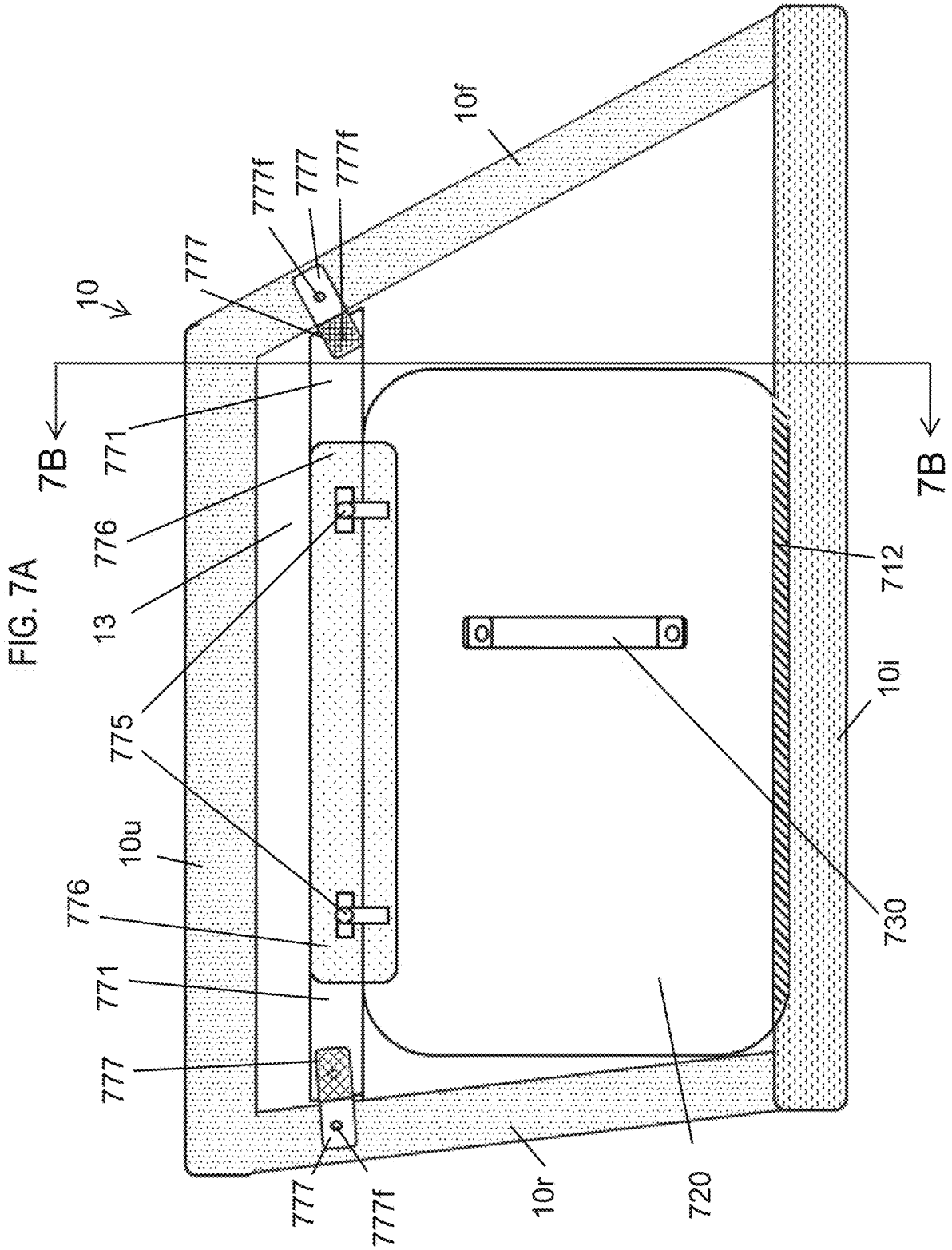

10
7B
7B
771
776
13
775
776
771
777
777
777f
777
777f
10f
712
10i
730
10u
720
10r

FIG. 7A

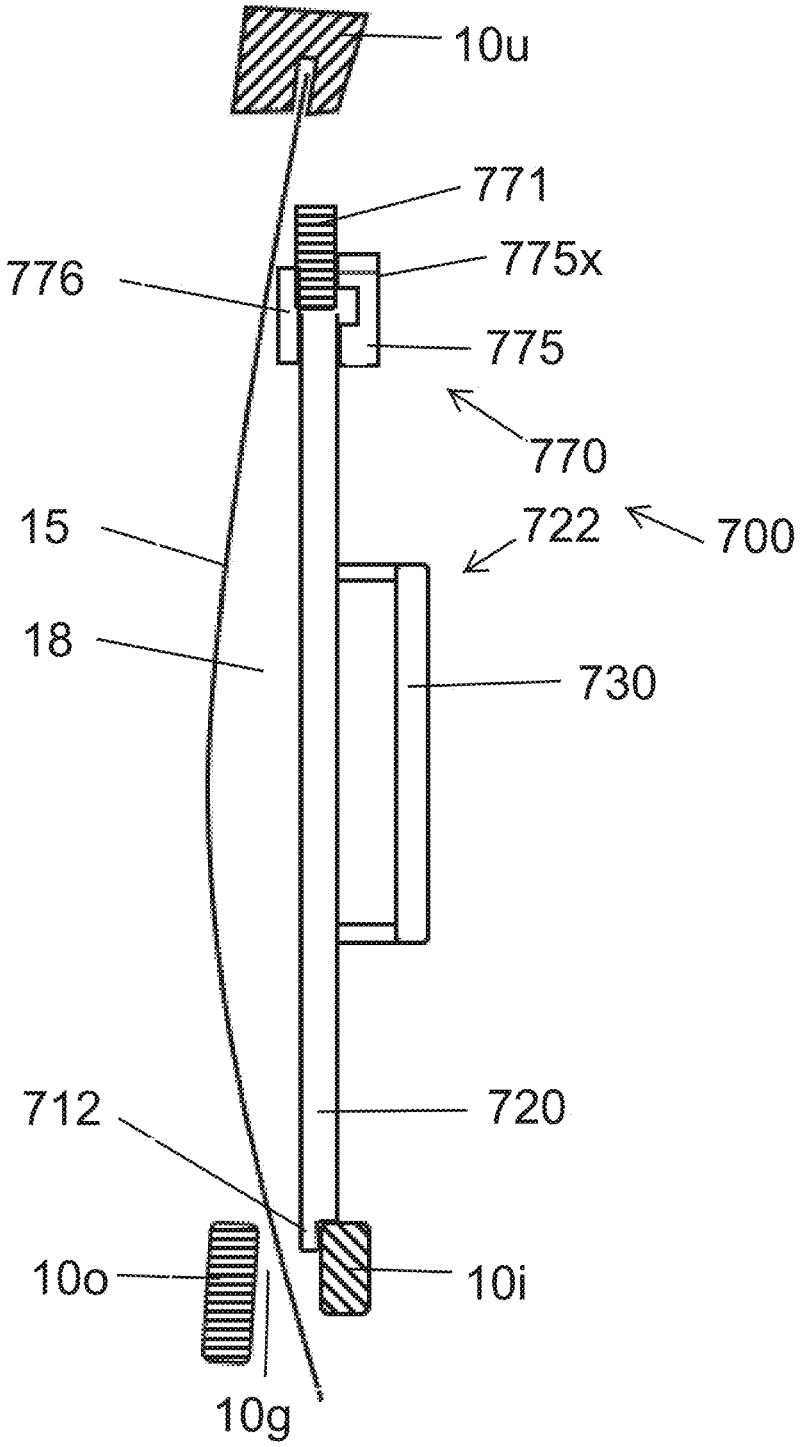


FIG. 7B

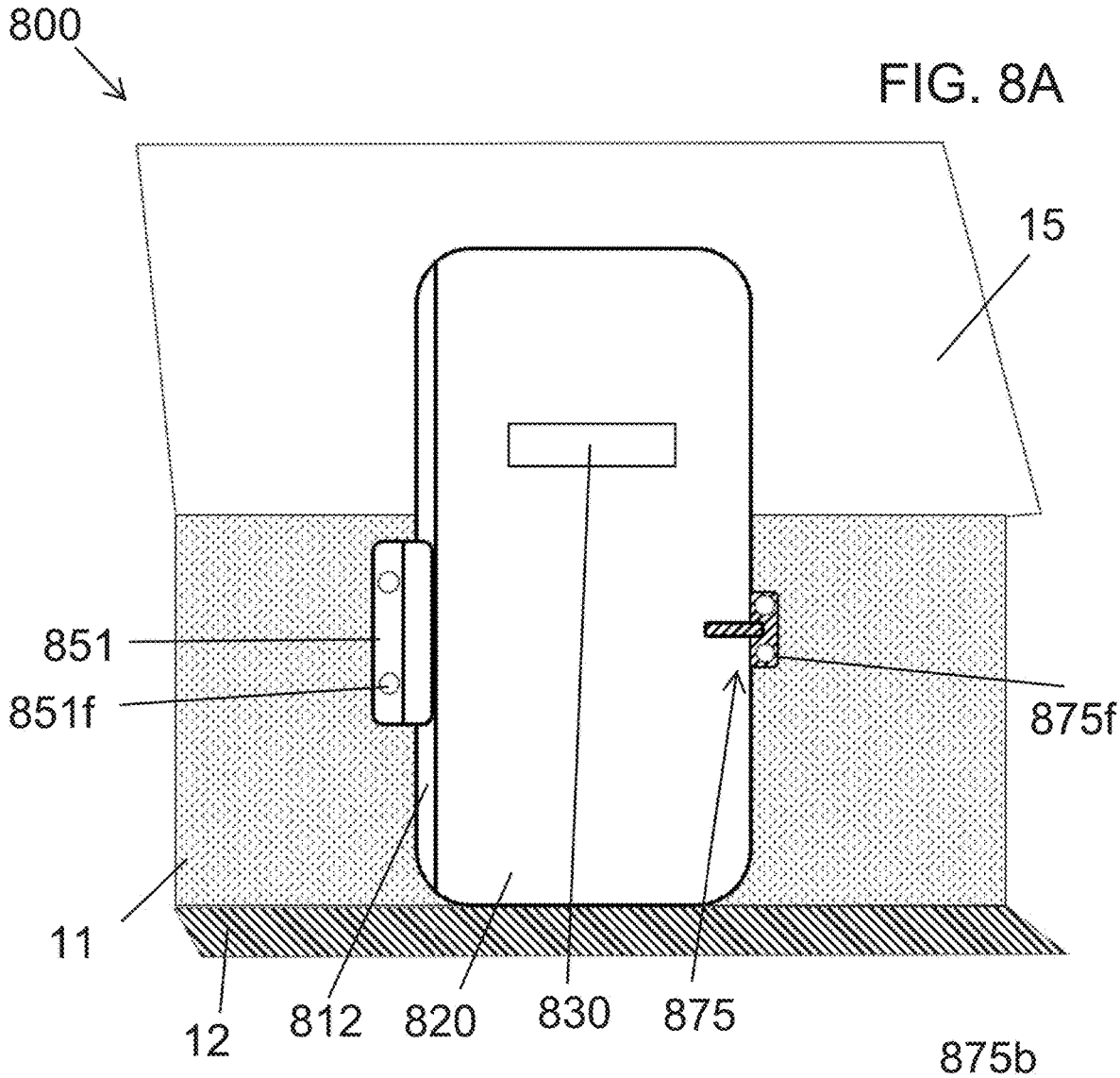

800
15
851
851f
875f
11
12
812
820
830
875

FIG. 8A

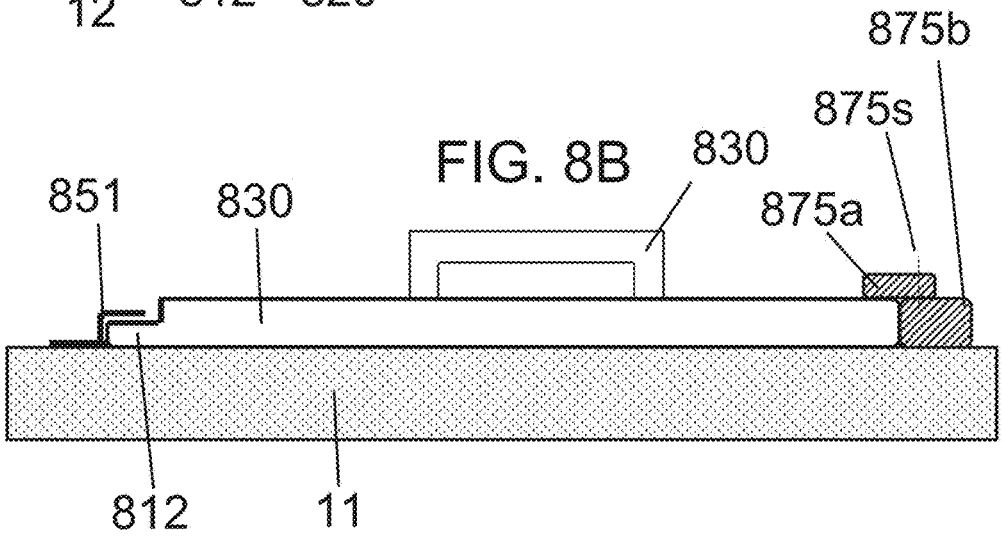

875b
875s
830
851
830
875a
812
11

FIG. 8B

FIG. 9

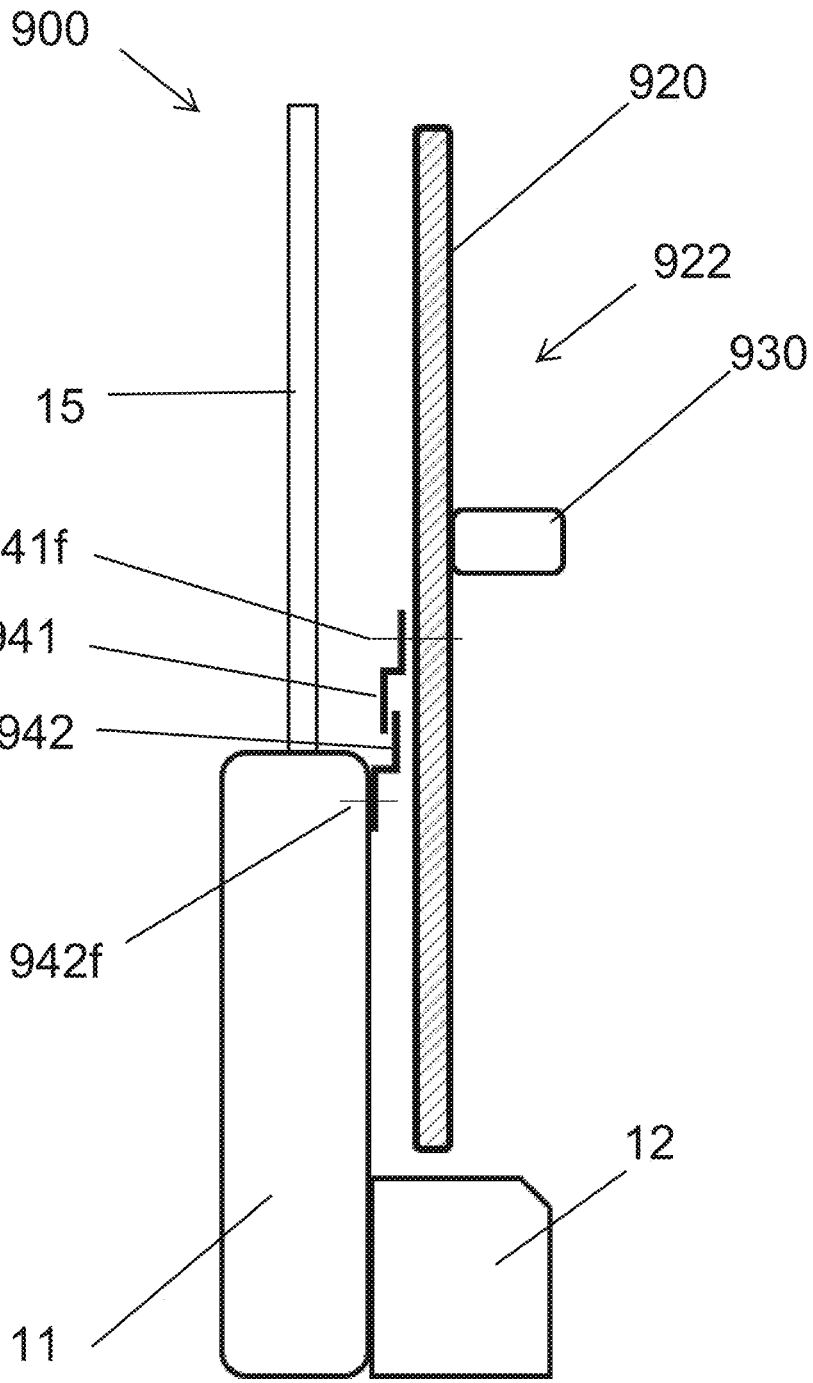


FIG. 10

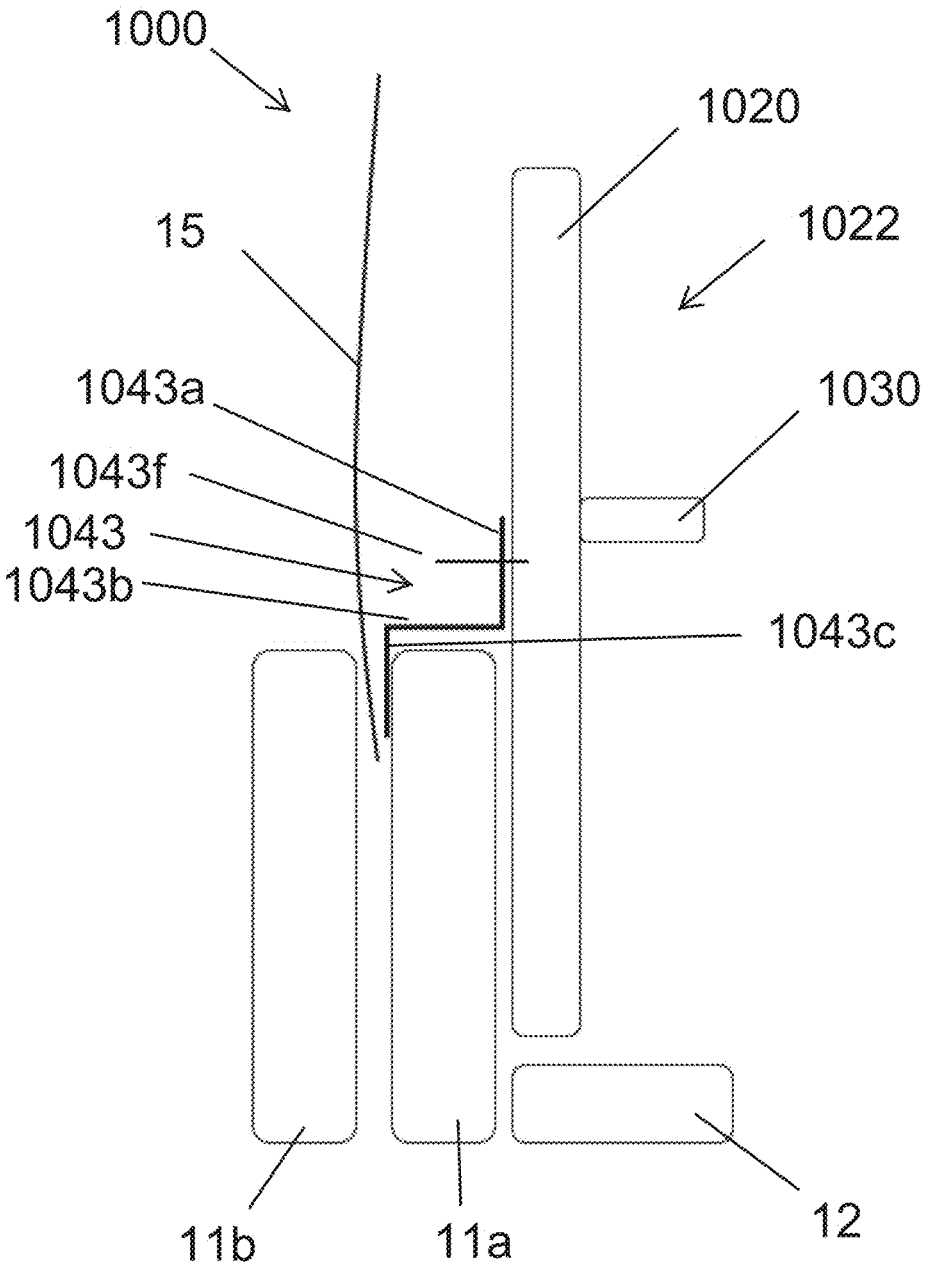
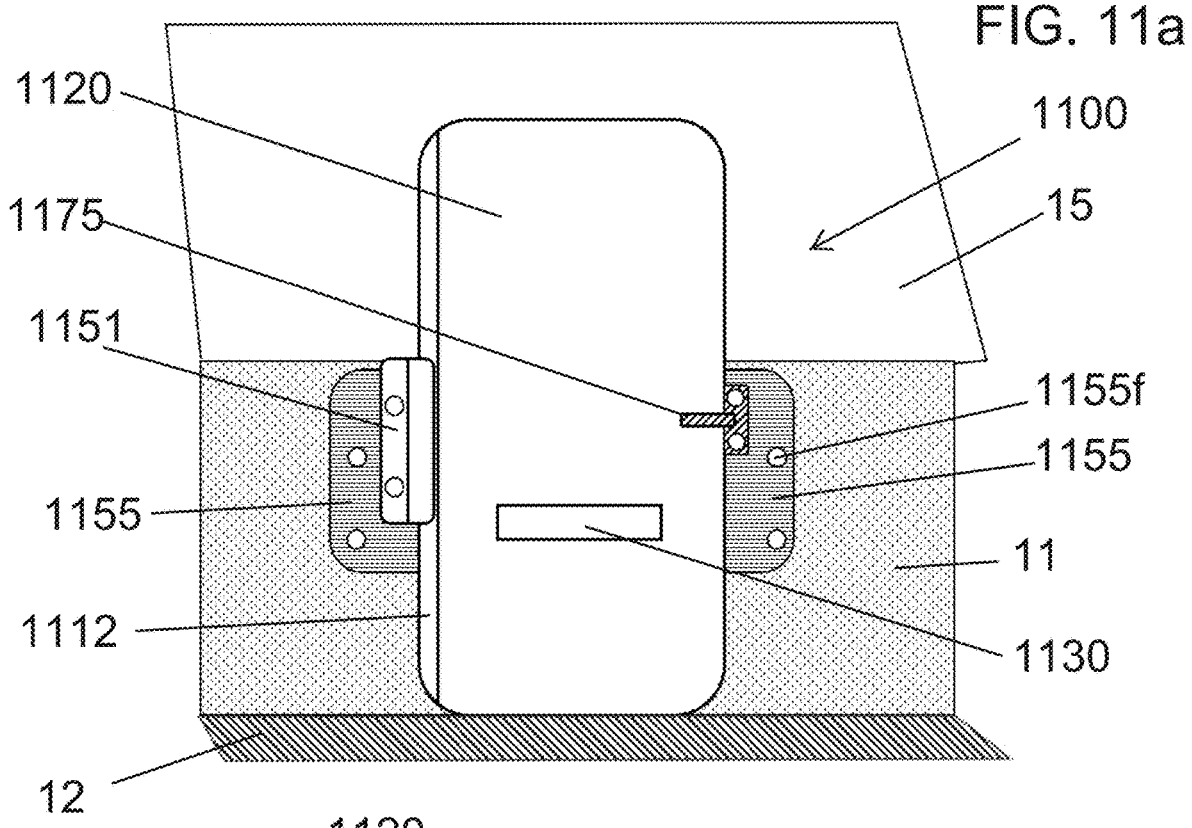

1000
1020
15
1022
1043a
1030
1043f
1043
1043b
1043c
11b
11a
12

FIG. 11a



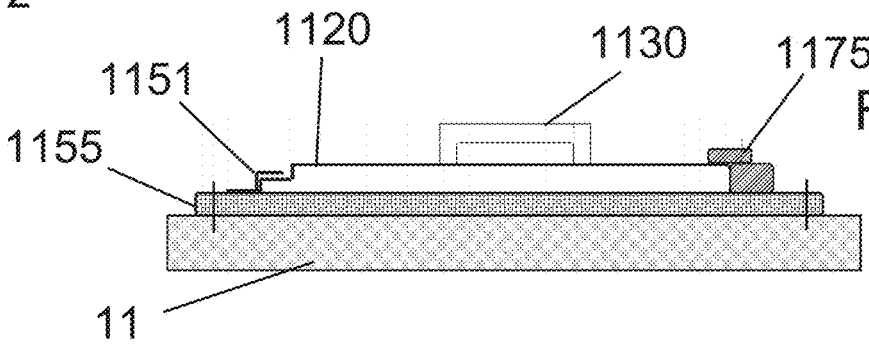


FIG. 11b

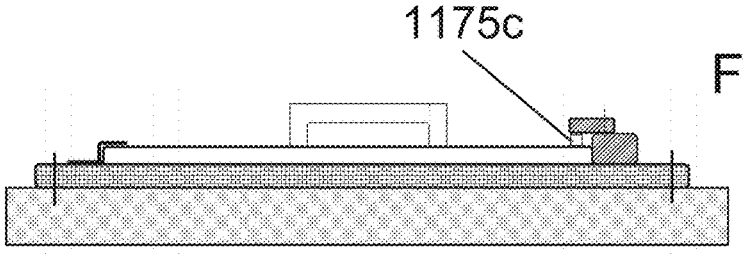
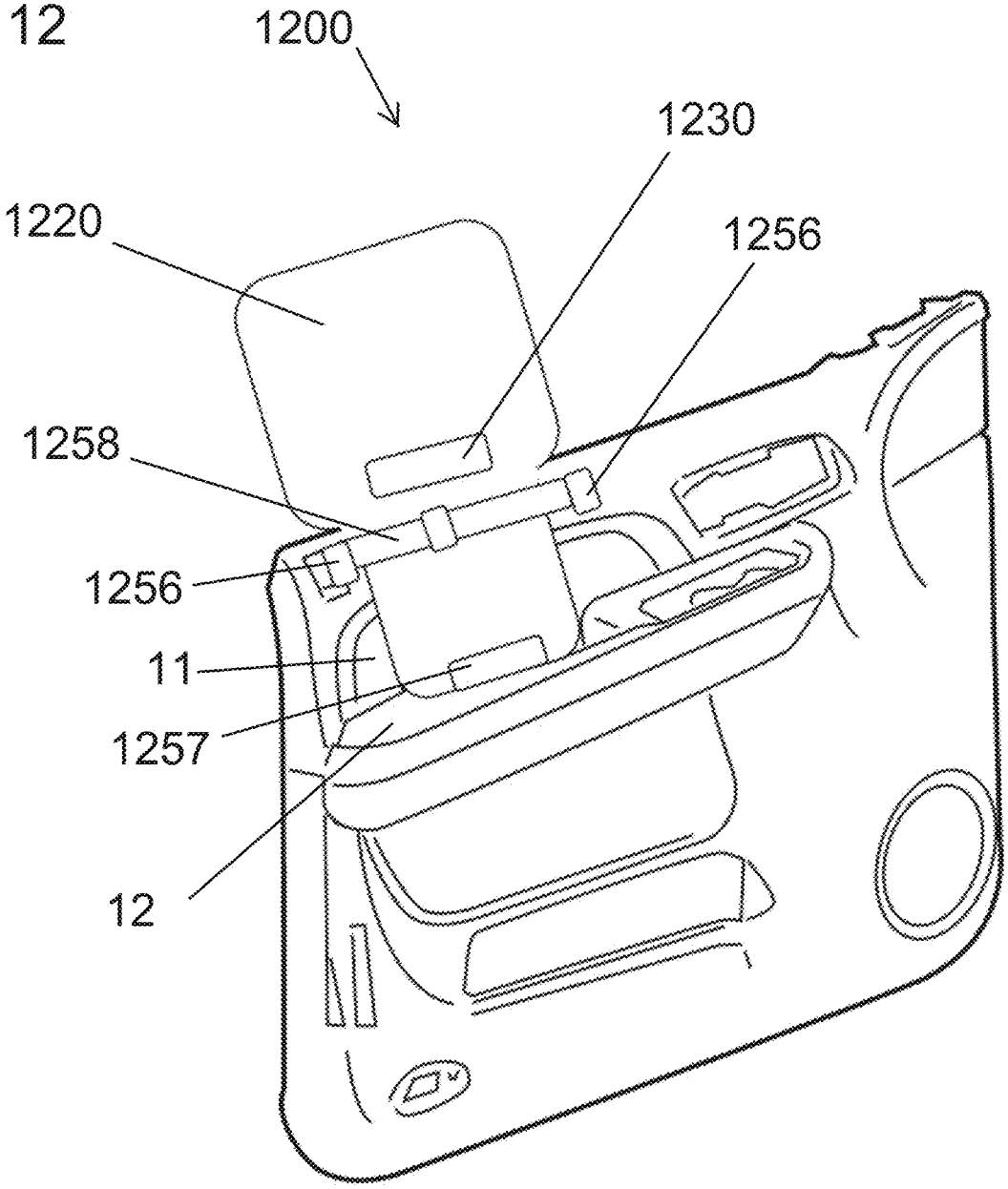


FIG. 11c

FIG. 12



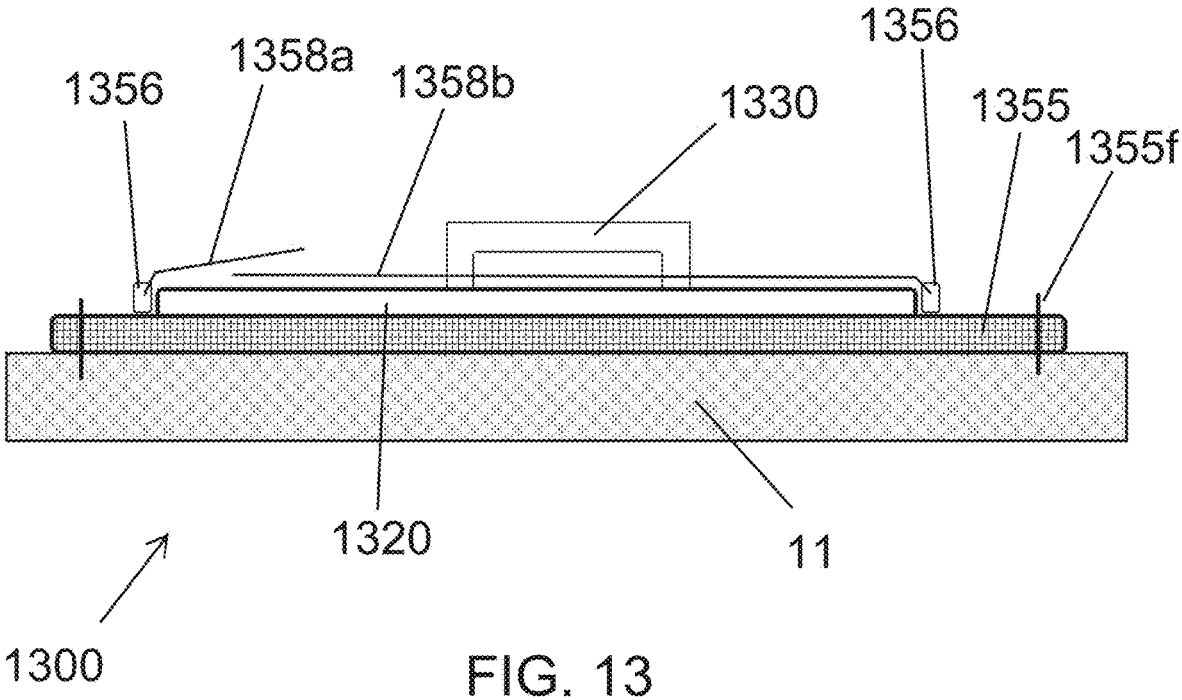


FIG. 13

VEHICLE SECURITY SHIELDS AND RELATED METHODS

SUMMARY

[0001] Disclosed herein are various embodiments of vehicle security shields, along with related methods of use and/or installation. In some embodiments and implementations, a ballistic-rated, transparent glazing may be either retrofit to, or permanently coupled during automobile manufacturing, with one or more windows of a vehicle, such as a police vehicle or another security vehicle. In other preferred embodiments, a portion of the shield, or the entire shield, may be removeable from the vehicle to allow an officer or other user to use the shield or shield portion as a portable, personal shield.

[0002] Preferably, the shield will either completely absorb or substantially reduce the kinetic energy of bullets or other projectiles to either keep the vehicle occupants safe, or at least reduce the severity and/or possibility of such injury. The insert-shield may also prevent or at least inhibit vehicle break-ins. Preferably, the insert-shield is installed so as to be spaced apart from the vehicle's original/existing glass in order to allow the original glass to operate as normal.

[0003] In some embodiments comprising two shield-layers, one of these shields (such as preferably an interior shield) may be removably coupled with the outer and/or primary insert-shield. For example, a sliding mechanism may be used such that the interior shield can slide out and be used as portable protection away from the vehicle. The interior shield may therefore comprise one or more handles to allow the insert-shield to be carried and used as a portable, personal shield.

[0004] In other embodiments comprising two or more shield-layers, the interior shield may be permanently coupled with the outer insert-shield and be configured so as to be installed and removed without tools in seconds and may be transferred to and used in another like-vehicle.

[0005] In other embodiments, the insert-shield may be of sufficient thickness itself to meet the minimum level of perceived threat.

[0006] In some embodiments, the outer insert-shield may comprise a CNC-fabricated flat panel of suitable, ballistic-grade material. The material used for the outer shield may vary in thickness around certain portions of the perimeter and/or on the main body. More particularly, the outer shield may either be formed with reduced thickness portions, such as flanges, at the top and/or bottom, or such flanges may be coupled to the top and/or bottom of the shield or such flanges may be routed from an original piece of material. These portions may allow the outer shield to be inserted into the existing space/groove between the inner door panel and the original/existing glass.

[0007] Preferably, the outer insert-shield is cut to fit/match, or at least substantially match, the shape of the original/existing window, but may exceed the height of the original window/opening slightly, such as, for example, by about between an inch and about two inches. At the top of the outer insert-shield, the flange may be bonded and/or mechanically attached to the door frame, such as in some embodiments with a very high bond (VHB) tape or a VHB-type attachment with hooks and loops (Velcro®) or Dual-Lock®, which may allow the outer shield to be quickly removed if desired. Preferably, the upper flange is positioned and configured so that it not only is positioned adjacent to the door frame, but also is thin enough so that it can be pinched and/or compressed between the door frame and the body frame of the vehicle (such as the rubber door gasket) without impeding the door from being fully closed.

[0008] The features, structures, steps, or characteristics disclosed herein in connection with one embodiment may be combined in any suitable manner in one or more alternative embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Non-limiting and non-exhaustive embodiments of the disclosure are described, including various embodiments of the disclosure with reference to the figures, in which:

[0010] FIG. **1** is a cross-sectional view of a vehicle security insert-shield assembly coupled with a vehicle door frame adjacent to an existing window of the vehicle according to some embodiments.

[0011] FIG. **2** depicts the vehicle security insert-shield assembly of FIG. **1** shown from the perspective of the interior of the vehicle.

[0012] FIG. **3** is an exploded, side elevation view of a vehicle security insert-shield assembly according to other embodiments shown decoupled from a vehicle and with the inner shield of the assembly removed from the outer shield.

[0013] FIG. **4** depicts a vehicle security insert-shield assembly according to yet another embodiment shown coupled to a vehicle and shown from the perspective of the interior of the vehicle.

[0014] FIG. **5**A depicts a vehicle security insert-shield assembly according to yet another embodiment shown from the perspective of the interior of the vehicle demonstrating the additive use of multiple sheets of material.

[0015] FIG. **5**B depicts a cross-sectional, side-elevation view of the insert-shield assembly of FIG. **5**A taken at the line **5**B/**5**B.

[0016] FIG. **6**A depicts a vehicle security insert-shield assembly according to yet another embodiment shown from the perspective of the interior of the vehicle demonstrating the use of one, thicker outer insert-shield sheet.

[0017] FIG. **6**B depicts a cross-sectional, side-elevation view of the vehicle security insert-shield assembly of FIG. **6**A taken at the line **6**B/**6**B.

[0018] FIG. **7**A depicts a holstered, vehicle security shield system shown from the perspective of the interior of the vehicle.

[0019] FIG. **7**B depicts a cross-sectional view of the embodiment depicted in FIG. **7**A taken at the line **7**B/**7**B.

[0020] FIG. **8**A depicts another holstered, vehicle security shield system shown from the perspective of the interior of the vehicle.

[0021] FIG. **8**B depicts a top view of the holstered, vehicle security shield system of FIG. **8**A.

[0022] FIG. **9** depicts a rear view of a holstered, vehicle security shield system utilizing one or more hangers.

[0023] FIG. **10** depicts a rear view of a holstered, vehicle security shield system utilizing a hanger.

[0024] FIG. **11***a* depicts another holstered, vehicle security system shown from the perspective view of the interior of the vehicle.

[0025] FIG. **11***b* is a top view of the system of FIG. **11***a*.

[0026] FIG. **11***c* is another top view of the system of FIG. **11***a* in which the latch is modified.

[0027] FIG. **12** is a perspective view of another vehicle security system secured by a strap.

[0028] FIG. **13** is a top view of a vehicle security system similar to that of FIG. **12**, however, the strapping system is held in place by a mounting platform.

DETAILED DESCRIPTION

[0029] A detailed description of apparatus, systems, and methods consistent with various embodiments of the present disclosure is provided below. While several embodiments are described, it should be understood that the disclosure is not limited to any of the specific embodiments disclosed, but instead encompasses numerous alternatives, modifications, and equivalents. In addition, while numerous specific details are set forth in the following description in order to provide a thorough understanding of the embodiments disclosed herein, some embodiments can be practiced without some or all of these details. Moreover, for the purpose of clarity, certain technical material that is known in the related art has not been described in detail in order to avoid unnecessarily obscuring the disclosure.

[0030] Apparatus, methods, and systems are disclosed herein relating to vehicle ballistic security. More particularly, vehicle ballistic security shields are disclosed herein that may be applied to existing vehicles, such as police vehicles or other security vehicles, or may be installed as such vehicles are manufactured, to provide protection from bullets, other projectiles, and/or unauthorized entry. In some embodiments, the security shield may include two independent shields/layers. In some such embodiments, one of these shields/layers may be removable to allow for use as a portable shield. In still other embodiments, shield layers may be rigidly coupled together via bonding and/or mechanical fasteners and act as one unit that may be inserted in vehicle door window frames for ballistic protection and removed to become a personal security shield.

[0031] The embodiments of the disclosure may be best understood by reference to the drawings, wherein like parts may be designated by like numerals. It will be readily understood that the components of the disclosed embodiments, as generally described and illustrated in the figures herein, could be arranged and designed in a wide variety of different configurations. Thus, the following detailed description of the embodiments of the apparatus and methods of the disclosure is not intended to limit the scope of the disclosure, as claimed, but is merely representative of possible embodiments of the disclosure. In addition, the steps of a method do not necessarily need to be executed in any specific order, or even sequentially, nor need the steps be executed only once, unless otherwise specified. Additional details regarding certain preferred embodiments and implementations will now be described in greater detail with reference to the accompanying drawings.

[0032] FIG. **1** depicts a first embodiment of a vehicle security insert-shield assembly **100** positioned within a window frame **10** (consisting of interior panel **10***i*, outer panel **10***o*, and upper door frame component **10***u*) of a vehicle. Window frame components **10***i*/**10***o*/**10***u* may be, in some preferred embodiments, defined by a door frame of the vehicle. As shown in this figure, insert-shield assembly **100** comprises two shield portions, namely, a first insert-shield portion **110**, which may comprise an outer (relative to the vehicle) insert-shield **110**, and a second shield portion **120**, which may comprise an inner shield **120**. As described in greater detail below, in some embodiments, one of these shields may be removable from the vehicle. For example, in some embodiments, inner shield **120** may be removed from the vehicle to allow for an officer or other vehicle occupant to use inner shield **120** as a portable shield.

[0033] Outer insert-shield **110** may be preferably, permanently, or at least more permanently, coupled with the vehicle. Thus, in some embodiments, outer insert-shield **110** may be machined or otherwise formed within an upper and/or lower portion that may be positioned within an opening within the vehicle. Thus, as shown in FIG. **1**, outer insert-shield **110** may comprise a lower flange **112** configured to fit and be received within a space/groove (a window retraction slot) formed between existing and/or original glass **15** of the vehicle and a portion of the vehicle, such as the vehicle door panel/frame **10***i*. The opposite side of the outer insert-shield **110**, which in the depicted embodiment comprises the upper side (alternative embodiments are contemplated in which the preferred positioning/configuration may be reversed), may then be bonded or otherwise rigidly coupled with the upper portion of the window/door frame **10***u*. In some embodiments, one or more screws or other fasteners **115** may be used. In some embodiments, either in addition or as an alternative to such fasteners, a tape may be used, such as a double-sided, very high bond (VHB) tape. In still other embodiments, a removable tape or other means for coupling may be used such as VELCRO® or another hook-and-loop material or Dual-Lock®. This may allow for removing the entire shield assembly **100** if desired.

[0034] The upper end of outer insert-shield **110** may also be machined or otherwise formed with a reduced thickness flange **114**. This may allow the vehicle door to continue to close following installation. Preferably, the thickness of flange **114** is such that it can be positioned between the chassis door frame **12** and the window/door frame **10** when the door is closed. Because the preferred thickness of the main body of the outer insert-shield **110** would not allow the door to be closed in this manner, providing a reduced thickness flange **114** may be useful. In preferred embodiments, flange **114** may have a thickness of between about 0.12 and about 0.5 inches. In some such embodiments, the thickness of flange **114** may be about 0.25 inches. However, these dimensions, along with various other dimensions set forth herein, may vary as needed in accordance with different vehicle specifications.

[0035] It is preferred that outer insert-shield **110** be formed to have a shape that is at least as big as and/or matches, or at least substantially matches, that of the existing window/glass **15**, at least in two dimensions (as discussed below, unlike typical vehicle windows, shield **110** may be flat in the third dimension). This is preferable to avoid regions in the existing window/glass **15** that are left unprotected by assembly **100** and therefore may allow for projectiles to pass therethrough and/or may allow for unauthorized vehicle entry.

[0036] Outer insert-shield **110** (and inner shield **120** if desired) are preferably made up of a transparent glazing material to allow it to be positioned adjacent to (internal to) a vehicle window/glass so that the officer/driver/occupant can be protected by assembly **100** and still be able to look out of the window. The material used is preferably bullet-proof, or at least bullet resistant so as to serve as a ballistic protective barrier. In preferred embodiments, a transparent, polycarbonate plastic or combination of various laminated plastics (which may contain ceramics and/or acrylics) may be used, such as ballistic-grade, Bayer® Makrolon® poly-

carbonate sheets. In preferred embodiments, the thickness of outer shield **110** may range from between about 0.5 and about 1.25 inches. In some such embodiments, the thickness of outer insert-shield may be about 0.5 inches.

[0037] The inner shield **120** may be thicker than or thinner than the outer insert-shield **110**. Thus, in preferred embodiments, the thickness of inner shield **120** may range from between about 0.5 and about 1 inches. In some such embodiments, the thickness of inner shield **120** may be about 0.75 inches.

[0038] In certain preferred embodiments, the combination of the two layers/shields may be sufficient to satisfy at least level the minimum level of protection specified by a customer. In preferred embodiments, the minimum level of protection may be Level 1 of the Standard Underwriters Laboratory Protection Level Ratings for bullet-resistant systems or Level IIIA from the National Institute of Justice ("NIJ"). The tradeoffs are a balance between the weight of the assembly and the minimum protection provided against various types of threats ranging from a hand-gun to a rifle. For example, a material thickness may be 0.500" may be necessary to protect against a 0.9 mil handgun and perhaps up to 2.500" of material to protect against rounds from certain rifles. In some embodiments, it may be preferable for the outer shield to be approximately 0.500" thick, protecting against lower caliber weapons, with a smaller (in area) inner shield that may be 1.250" thick positioned to protect the head and torso from higher caliber weapons. The thicknesses of each of the outer insert-shield and inner shield may vary depending upon customer specifications. Thus, this layered shield would have an overall lower weight than if the entire outer insert-shield were 1.500" thick.

[0039] In embodiments configured to be applied to side windows of police cars or other vehicles, it is also preferable that shield assembly **100** be coupled with a vehicle so as to allow the original/existing window to be operational following installation. In some embodiments, this may be accomplished by, for example, providing a spacing/gap **18** in between the original window/glass **15** and the outer surface of outer shield **110**, as shown in FIG. **1**. In addition, or in some embodiments, alternatively, outer shield **110** may comprise a flat sheet. Because vehicle windows are typically bowed, providing a flat outer shield **110** may be used to provide this spacing/gap **18**.

[0040] As also shown in both FIGS. **1** and **2**, assembly **100** may further comprise a holster **125**, which is an example of means for releasably coupling inner shield **120** to outer shield **110** and/or the vehicle. In the depicted embodiment, this releasably coupling means or holster comprises a pair of rails **125***a* and **125***b* that are configured to slidably receive inner shield **120**. Rails **125***a*/**125***b* may be permanently coupled with outer shield **110** in a variety of different ways, such as using adhesives, VHB tapes or other tapes, rivets, bolts, screws, or other fasteners **126**, or the like. Rails **125***a* and **125***b* may comprise L- or U- or Z- or H-shaped coupling members that create a channel to slidably receive the inner shield **120** therein.

[0041] More particularly, in practice, when it is desired to remove inner shield **120** for use as a portable shield, inner shield **120** may be slid parallel to the vehicle window **15** and the outer shield **110** (with the vehicle door open). Similarly, when it is desired to return inner shield **120** to assembly **100**, inner shield **120** may be inserted into the channels formed by coupling members **125***a* and **125***b* and slid into place behind the outer shield **110**. It is contemplated that, in alternative embodiments, a single rail, such as only lower rail **125** may be used. Although in the depicted embodiment the means for releasably coupling inner shield **120** to outer shield **110** and/or the vehicle comprises a means for slidably coupling inner shield **120** to outer shield **110** and/or the vehicle, alternative embodiments are contemplated in which the inner shield may be coupled in alternative ways. For example, in some embodiments, the two shields may be permanently coupled. In other embodiments, the inner shield **120** may be releasably coupled using, for example, a releasable hook and loop or other fastener fabric, one or more groove/projection pairs or any other suitable coupling structure(s). In still other embodiments, only a single shield may be provided.

[0042] As also shown in FIGS. **1** and **2**, in some embodiments, one or more handles **130** may be coupled (preferably rigidly and/or permanently coupled) to inner shield **120**. This may facilitate removal of inner shield **120** from outer shield **110** and/or use of inner shield **120** as a portable shield upon being removed from outer shield **110**, as previously described. As shown in FIG. **2**, which depicts the interior of assembly **100** coupled adjacent to an inner surface of a vehicle window **15**, one or more handles **130** may be positioned adjacent to and extend along upper and/or lower edges/portions of inner shield **120** and one or more handles may be positioned adjacent to and extend along one or both lateral edges/portions of inner shield **120**. This may allow an officer or other user to grasp and position the portable inner shield **120** in a variety of different ways as desired. Handles **130** may have a gripping portion and a coupling portion. The coupling portion may be smaller and, in some embodiments, spaced apart from, the gripping portion to allow for gripping. The gripping portion may also be shaped in an ergonomic manner if desired, in some embodiments with a plurality of grooves for receiving a user's fingers. The handle(s) **130** may be rigidly and/or permanently coupled to outer shield **110** and/or another portion of assembly **100** using, for example, SS bolts or other fasteners.

[0043] FIG. **3** depicts another embodiment of a vehicle security shield assembly **300**. Assembly **300** is shown with inner shield **320** removed from outer insert-shield **310**. In addition, outer shield **310** is shown decoupled from a vehicle window to which it would ultimately be coupled during operation. By decoupling outer shield **310** from the vehicle, the opposing flanges **312** and **314** at the lower and upper ends, respectively, of outer shield **310**, can more easily be seen. In some embodiments, the flanges disclosed herein, including but not limited to flanges **312** and **314**, may have a thickness that is between about 20% and about 50% of the thickness of outer shield **310**. In some such embodiments, the thickness of flanges **312** and/or **314** may be about half of the thickness of the outer shield **310**. As previously described, this may allow for lower flange **312** to be inserted into a space/groove in the window/door frame structure and/or may allow for upper flange **314** to be bonded and/or mechanically attached to the top of the window/door frame without impeding the door's ability to open and close.

[0044] Although FIG. **3** appears to show upper flange **314** having the same length (in this cross-sectional view) as lower flange **312**, in some embodiments these two flanges may differ in length as needed, and in fact, their relative lengths may be dependent upon and specific to each vehicle's model-type and year. For example, in some embodi-

ments, the upper flange **314** may have a greater length than the lower flange **312**. Thus, in some such embodiments, the lower flange **312** may have a length of between about 0.5 and about 1.5 inches. In some such embodiments, the lower flange **312** may have a length of about 1 inch.

[0045] Similarly, in some embodiments, the upper flange **314** may have a length (in this cross-sectional view) of between about 0.5 inches and about 1.5 inches. In some such embodiments, the upper flange **314** may have a length of about 1.5 inches. In some such embodiments, or in alternative embodiments, thus, assembly **300** may be configured such that the upper flange **314** exceeds the height of the original/existing vehicle glass by between about 0.5 and about 2 inches. In some such embodiments, assembly **300** may be configured such that the upper flange **314** exceeds the height of the original/existing vehicle glass by about 1.5 inches. As stated previously, the cross-sectional lengths of the upper and lower flanges will be dependent upon and specific to each vehicle's model-type and year.

[0046] As with assembly **100**, assembly **300** further comprises a pair of channels **325***a* and **325***b* that together comprise a holster or means for releasably coupling inner shield **320** to outer shield **310** and/or a vehicle. In the depicted embodiment, these channels may be defined by anodized U-shaped members. However, other structures may be used, such as L-shaped, Z-shaped, and h-shaped members, as well as alternative materials. If sufficiently flexible materials are used, inner shield **320** may be coupled with outer shield **310** by simply pressing inner shield **320** against outer shield **310**, as shown in the arrow of FIG. **3**. However, in more typical embodiments having rigid channels, inner shield **320** may be coupled with outer shield **310** by inserting one lateral end of inner shield **320** into channels **325***a* and/or **325***b* and sliding inner shield **320** into channels **325***a* and **325***b* laterally, as previously mentioned.

[0047] Assembly **300** may further comprise one or more handles **330**, which, as previously mentioned, may be used to facilitate removal of shield **320** and/or be used to facilitate gripping/use of shield **320** as a portable shield following such removal.

[0048] FIG. **4** depicts still another embodiment of a vehicle security insert-shield assembly **400**. Assembly **400** is shown coupled to a window frame **10** of a vehicle door and is shown from the perspective of the inner side of the window. As with previous embodiments, assembly **400** comprises an outer insert-shield **410** and an inner shield **420** configured to be removably coupled with the inner shield **410**. This may be accomplished by way of a pair of rails **425***a*/**425***b* mounted to outer shield **410** so as to slidably receive inner shield **420**.

[0049] In addition, assembly **400** comprises a pair of handles **430** positioned adjacent to the bottom and top ends of inner shield **420** to facilitate removal and use of inner shield **420** as a portable shield, as previously mentioned.

[0050] As also shown in FIG. **4**, a plurality of bolts or other fasteners **415** may be used to rigidly and/or permanently and/or temporarily mount outer insert-shield **410** to the window/door frame **10**. These fasteners **415** preferably extend along the top portion of outer shield **410** and, as previously mentioned, the bottom portion of outer shield **410** may be positioned in the space/groove between the original/existing window and the door frame **10**. FIG. **4** also illustrates that, in preferred embodiments, the inner shield **420** is smaller in height and/or length than outer shield **410**, which may allow for placement of fasteners or other coupling means to mount outer insert-shield **410** without impeding the ability of inner shield **420** to be removed.

[0051] In some embodiments, fasteners **415** may comprise quick-release fasteners to allow for the outer shield **410**, or the entire assembly **400**, to be removed. This may be useful, for example, in order to allow the outer shield **410** to be cleaned. In some such embodiments, the quick-release fasteners may comprise a mounting stud, washers, mounting nuts, and a latching body, which may comprise a quick-release button or other actuation mechanism to allow for release of the latching body. In other embodiments, the fastener may be a quick-release fabric or plastic like Velcro® or Dual-Lock® respectively. The latching body may be mounted to the outer shield **410**. Such quick-release fastening assemblies are therefore an example of a means for releasably mounting an outer shield to a vehicle window and/or door frame.

[0052] Although not shown in FIG. **4**, assembly **400**, or any of the other assemblies disclosed herein, may comprise ventilation openings to allow air to move into or out of a vehicle when the original/existing window is down. In some embodiments, such ventilation openings may only be formed in the outer shield **410** to allow air to flow in between the two shields and into or out of the vehicle. In other embodiments, ventilation openings may be formed in both the outer shield **410** and the inner shield **420**. In some such embodiments, such openings may be offset from one another such that no openings provide a direct path for bullets or other projectiles into the vehicle.

[0053] FIGS. **5**A and **5**B are still another embodiment of the insert-shield assembly. FIG. **5**B is a cross section taken along line **5**B/**5**B shown in FIG. **5**A. Assembly **500** comprises 3 main components: the main body, upper flange **514** and lower flange **512**. The main body comprises insert-shield **510** that is positioned closest to the stock glass window and all other components coupled with or to insert-shield **510**. Inner shield **521** may be comprised of optically clear, ballistic resistant material that is preferably permanently coupled to insert-shield **510** via fasteners **526** that may be through-bolted or bonded or sonically welded to insert-shield **510**. The positioning of inner shield **521** is such that protection of the vehicle occupant's head and torso are optimized. The thickness of inner shield **521** may be the same thickness or greater than insert-shield **510**. As the overall shield thickness increases, more protection is afforded to the vehicle occupant. In alternative embodiments, inner shield **521** may be relatively smaller than insert-shield **510** in order to lessen the weight for law enforcement personnel that may be more likely to use the invention when defending away from the vehicle.

[0054] An opening with direct access to the outside of the vehicle when the vehicle window glass is lowered may provide the benefits of ventilation, the ability to talk to others or pay tolls, or the ability to fire a weapon through the opening from the inside of the vehicle. Insert-shield opening **510***o* may be substantially overlapped with cut-out **5210** in inner shield **521** on one end. Cut-out **5210** may serve as a channel for sliding door **513**. Sliding door **513** may be comprised of the same material at the same thickness as inner shield **521**. As shown with the two-sided arrow, sliding door **513** may be moved to the left to fully expose opening **510** or moved to the right to completely cover opening **510**. Bottom rail **525***a* and top rail **525***b* may be coupled to inner

shield **521** and insert-shield **510** via fasteners **526**; said rails serving to act as a holster as previously described to contain sliding door **513** during operation. Spacer **541** may increase the needed space to allow sliding door **513** to move more freely in cut-out **521***o*. The thickness of sliding door **513** may preferably be sufficient to provide the specified level of protection to the vehicle occupant.

[0055] So that the insert-shield assembly **500** may be carried by the user, handles **530** may be coupled along rails **525***a* and **525***b* (shown horizontally in the embodiment of FIG. **5**A) or between rails **525***a* and **525***b* (not shown in FIG. **5**A, but would show as vertical components). Handles **530** may be comprised of flexible material that may more resemble straps or more rigid materials that would present as rigid handles. In some embodiments, when the insert-shield is removed for personal protection, the left side of the insert-shield in FIG. **5**A may be cup' which may, by gravity, close sliding door **513** (or ensure it is closed or remains closed) during a fire-fight to ensure maximum protection for the user,

[0056] FIGS. **6**A and **6**B are still another embodiment of the insert-shield assembly. FIG. **6**B is a cross section taken along line **6**B/**6**B shown in FIG. **6**A. Assembly **600** comprises 3 main components: the main body, upper flange **614** and lower flange **612**. The main body comprises insert-shield **610** that is positioned closest to the glass window and all other components coupled with or to insert-shield **610**. However, in assembly **600**, there is no inner shield. This may require an increase in thickness of the insert-shield to provide the protection levels specified for vehicle occupants.

[0057] An opening with direct access to the outside of the vehicle when the vehicle window glass is lowered may provide the benefits of ventilation, the ability to talk to others or pay tolls, or the ability to fire a weapon through the opening from the inside of the vehicle.

[0058] Insert-shield opening **610***o* may be covered as needed by sliding door **613** that may be comprised of the same material at the same or a different thickness as insert-shield **620**. As shown with the two-sided arrow, sliding door **613** may be moved to the left to fully expose opening **610** or moved to the right to completely cover opening **610**. A containment pocket may be created by orienting lower standoff **627***a* and upper standoff **267***b* in a manner to contain sliding door **613**. Standoffs **627***a*/**627***b* may be the same thickness as or a thickness slightly greater than sliding door **613**. Bottom rail **625***a* and top rail **625***b* may be coupled to standoffs **627***a* and **627***b* respectively and insert-shield **610** via fasteners **626** and overlap over sliding door **613**; said rails serving to act as a holster as previously described to contain sliding door **613** during operation. Spacer **641** may increase the needed space to allow sliding door **613** to move more freely in cut-out **621***o*. The thickness of sliding door **613** may preferably be sufficient to provide the specified level of protection to the vehicle occupant.

[0059] So that the insert-shield assembly **600** may be carried by the user, handle **630** may be coupled from the left side of lower and upper rails **625***a* and **625***b* respectively (shown vertically in the embodiment of FIG. **6**A; not shown in FIG. **6**B as it is not part of the cross section). Handle **630** may be comprised of flexible material that may more resemble straps or more rigid materials that would present as rigid handles. In some embodiments, when the insert-shield is removed for personal protection, the left side of the insert-shield in FIG. **6**A may be cup' which may, by gravity, close sliding door **613** (or ensure it is closed or remains closed) during a fire-fight to ensure maximum protection for the user.

[0060] The following may be one method to install, without tools, one or more of the quick-release insert-shield assemblies contemplated herein:

[0061] 1. The door of the vehicle should be open with its window in the fully retracted position. This further assumes that the mating portion of any fastener system has been affixed to the top of the window frame of the door.

[0062] 2. Position the back of the lower flange of the insert-shield assembly to the groove into which the window retracts and then lower the remaining forward portion of the lower flange into said groove ensuring that any gaskets/seals are oriented to their proper position, usually pointed cup'. At this point, the top flange may be 4 to 24 inches away from the top of the door's window frame.

[0063] 3. Push the upper flange toward the top of the door's window frame until the quick-release fasteners make contact and couple.

[0064] The following may be one method to operate one or more of the insert-shield assemblies contemplated herein:

[0065] 1. Open and close the vehicle door as needed.

[0066] 2. Open and close the vehicle's stock glass window as needed.

[0067] 3. Open and close the sliding door of the insert-shield assembly as needed.

[0068] The following may be one method to uninstall one or more of the quick-release insert-shield assemblies contemplated herein:

[0069] 1. Pull the top flange away from the upper portion of the door's window frame until the quick-release fasteners disengage and the angle of the top of the flange is 20 to 45 degrees.

[0070] 2. Lift up on the insert-shield assembly either uniformly or beginning at one of the two ends and remove the assembly until it is free of the car door frame.

[0071] 3. If the insert-shield is needed as a personal shield, grasp the handle and rotate the now personal-shield to the proper orientation for use.

[0072] FIGS. **7**A and **7**B depict an embodiment of a dual-purpose security shield and retaining system **700** that may serve as a protective device one or both when positioned within the window frame of a vehicle or while being carried by a law enforcement officer. Shield system **700** may be comprised of insert shield assembly **722** and retaining assembly **770**. Insert shield assembly **722** may be comprised of shield body **720**, handle **730**, and lower flange **712**. Retaining assembly **770** may be comprised of support member **771**, alignment guide **776**, and one or more quick-release fasteners **775**.

[0073] In FIGS. **7**A and **7**B, system **700** is positioned within window frame **10** (consisting of interior panel **10***i*, outer panel **10***o*, and upper window frame component **10***u*, front window frame component **10***f*, and rear window frame component **10***r*) of a vehicle. Window frame components **10***i*/**10***o*/**10***u*/**10***r*/**10***f* may be, in some preferred embodiments, defined by a door frame of the vehicle. Retaining assembly **770** may extend between rear window frame component **10***r* and front window frame component **10***f* as support member **771** may be preferably permanently coupled or temporarily coupled to said frame components by one or more fasteners **777**. In preferred embodiments, support member **771** may have a height that extends from the

top of insert shield assembly **722** up to upper window frame component **10***u* or may extend to a lesser height leaving space **13**. Leaving some amount of space **13** may be preferable for ventilation or communicating with others outside the vehicle, however, support member **771** should be of sufficient height in order to mount at least one quick release fastener **775** and be capable of withstanding a specified number of impacts from projectiles.

[0074] In some embodiments, quick-release fasteners **775** may comprise quick-release fasteners to allow for the shield **720** to be quickly removed. In preferred embodiments, the quick-release fastener may be a latching body mounted to support member **771** comprised of an arm that rotates about axis **775***x*, said arm engaging shield **720** to hold in in place as desired, and said arm rotated out of the path of shield **720** when it is desired to remove shield assembly **722**. In other embodiments, the quick-release fasteners may comprise a quick-release button or other actuation mechanism to allow for release of the latching body. Such quick-release fastening assemblies are therefore an example of a means for releasably mounting a shield to a vehicle window and/or door frame.

[0075] In preferred embodiments, fasteners **777** that couple support member **771** to the window frame components **10***f* and **10***r*, may be, for example, Z-brackets, that are themselves mechanically fastened to the window frame components. As an example, the first flange portion of the Z-bracket may be fastened to the side of the window frame component facing the viewer in FIG. **7**A, the second flange portion that is perpendicular to the first flange portion may be directed away from the viewer in FIG. **7**A, and the third flange portion that is parallel with the first flange portion may then be permanently coupled with fastener **777***f* to support member **771** on the side away from the viewer of FIG. **7**A. Alternatively, the Z-brackets may be rotated about its longitudinal axis by 180 degrees and similarly mounted. In alternative embodiments, **777** may be a flat bracket coupled to the sides of the window frame component and the support member **771** on the side facing the viewer of FIG. **7**A.

[0076] In preferred embodiments, shield body **720** may be machined or otherwise formed, e.g., router, to comprise a lower portion/flange **712** that may be positioned toward the outer surface of the shield to fit within/between a window retraction slot **10***g* of the vehicle door. Thus, as shown in FIGS. **7**A & **7**B, shield body **720** may comprise a lower flange **712** configured to fit and be received within a window retraction slot **10***g* formed between, when window **15** is in the full down position, the vehicle interior door panel/frame **10***i* and outer panel **10***o*, or, when the top of window **15** is elevated from its lowest position adjacent to or beyond interior door panel/frame **10***i*, the window retraction slot **10***g* formed between window **15** and interior door panel/frame **10***i*. In some embodiments, lower flange **712** may have a thickness that is between about 20% and about 50% of the thickness of shield body **720**. In some such embodiments, the lower flange **712** may have a length of between about 0.12 and about 1.50 inches. In some such preferred embodiments, the lower flange **712** may have a length of between about 0.25 inches and about 1.50 inches, with 0.50 inches being preferable. However, these dimensions, along with various other dimensions set forth herein, may vary as needed in accordance with different vehicle specifications.

[0077] In some embodiments, either in addition or as an alternative to such permanent fasteners **777**, a tape may be used, such as a double-sided, very high bond (VHB) tape. In still other embodiments, a removable tape or other means for coupling may be used such as VELCRO® or another hook-and-loop material or Dual-Lock®. This may allow for removing the entire shield system **700** if desired.

[0078] It may be preferred that system **700** be formed to have a shape that is substantially similar to the existing window/glass **15** and a size that may be between 70% to 100% of the surface area of the existing window/glass **15**, in at least in two dimensions (unlike typical bowed vehicle windows, shield body **720** may be flat in the third dimension). This is preferable to avoid regions in the existing window/glass **15** that is left unprotected by system **700** and therefore may allow for projectiles to pass therethrough and/or may allow for unauthorized vehicle entry. However, in some specifications, officers may prefer to have the system **700** protect them from projectiles from hidden angles while having open space from the more visible angles, in preferred embodiments, the more front angles, so they may communicate with others outside the vehicle.

[0079] Shield body **720** and/or support member **771** may preferably be comprised of transparent glazing material to allow them to be positioned adjacent to (internal to) a vehicle window/glass so that the officer/driver/occupant can be protected by system **700** and still be able to see out of the window. The material used is preferably bulletproof, or at least bullet resistant so as to serve as a ballistic protective barrier. In preferred embodiments, a transparent, polycarbonate plastic or combination of various laminated plastics (which may contain ceramics and/or acrylics) may be used, such as ballistic-grade or bullet resistant, Bayer® Makrolon® polycarbonate sheets. In various embodiments, the thickness of shield body **720** may range from between about 0.5 and about 1.50 inches depending upon the threat. In preferred embodiments to mitigate threats against handguns, the preferred thickness is between about 0.75 to 1.0 inches. In some such embodiments, the thickness of insert-shield **720** may be about 0.5 inches. In various embodiments, the thickness of support member **771** may range from between about 0.5 and about 1.5 inches depending upon the threat.

[0080] In preferred embodiments, the minimum level of protection may be Level 1 of the Standard Underwriters Laboratory Protection Level Ratings for bullet-resistant systems or Level IIIA from the National Institute of Justice ("NIJ"). The tradeoffs are a balance between the weight of the insert shield assembly **722** and the minimum protection provided against various types of threats ranging from a hand-gun to a rifle. For example, a material thickness may be 0.750" may be necessary to protect against a 0.9 mil handgun and perhaps up to 2.500" of material to protect against rounds from certain rifles. In some embodiments, it may be preferable for insert shield **720** to be approximately 1.00" thick.

[0081] In embodiments configured to be applied to side windows of police or other vehicles, it is also preferable that shield system **700** be coupled with a vehicle so as to allow the original/existing window to be operational following installation. In some embodiments, this may be accomplished by, for example, providing a spacing/gap **18** in between the original window/glass **15** and the outer surface of outer shield **110**, as shown in FIG. **7**B. In addition, or in some embodiments, alternatively, shield body **720** may

comprise a flat sheet. Because vehicle windows are typically bowed, providing a flat outer shield **720** may be used to provide this spacing/gap **18**.

[0082] As also shown in FIGS. **7**A and **7**B, retaining assembly **770** in conjunction with the window retraction slot **10***g* (the space between interior door panel **10***i* and outer panel **10***o*) may constitute a releasably coupling means or holster for shield assembly **722**. More particularly, in practice, when it is desired to remove inner shield assembly **722** for use as a portable shield, one or more quick-release fasteners **775**, which may be a latch that rotates about axis **775***x*, may have its arm rotated out of the arcing path of the top of shield body **720** such that once the top of shield body **720** clears support assembly **770**, bottom flange **712** may be lifted out of the window retraction slot **10***g*, thus completely releasing shield assembly **722** from its secured position and permitting use as a personal shield. When it is desired to return shield assembly **722** to its secured position in the vehicle window opening, bottom groove **712** may be inserted in the window retraction slot **10***g*, next, the top edge of shield assembly **722** may be moved with an arcing motion into place adjacent to support member **771** and alignment guide **776**, at which time at least one quick-release fastener **775** is adjusted to swing its arm into position to contain the top edge of shield **720**. In alternative embodiments, shield **720** may not comprise a lower flange **712** and the lower edge portion of shield **720** may be contained by a rail, for example, an H-channel or a U-channel (not shown) coupled to the bottom of the door window area, while retaining assembly **770** remains as described herein. Such rails may be permanently coupled with bottom of the door window area in a variety of different ways, such as using adhesives, VHB tapes or other tapes, rivets, bolts, screws, or other fasteners, or the like.

[0083] As also shown in FIGS. **7**A and **7**B, in some embodiments, one or more handles **730** may be coupled (preferably rigidly and/or permanently coupled) to shield **720**. This may facilitate removal of shield **720** from outer retaining assembly **770** and/or use of shield **720** as a portable shield upon being removed from retaining assembly **770**, as previously described. As shown in FIG. **7**A, which depicts the interior of system **700**, one or more handles **730** may be positioned adjacent to and extend along upper and/or lower edges/portions of shield **720** and one or more handles may be positioned adjacent to and extend along one or both lateral edges/portions of shield **720**. This may allow an officer or other user to grasp and position the portable shield **720** in a variety of different ways as desired. Handles **730** may have a gripping portion and a coupling portion. The coupling portion may be smaller and, in some embodiments, spaced apart from, the gripping portion to allow for gripping. The gripping portion may also be shaped in an ergonomic manner if desired, in some embodiments with a plurality of grooves for receiving a user's fingers. The handle(s) **730** may be rigidly and/or permanently coupled to shield **720** and/or another portion of assembly **722** using, for example, SS bolts or other fasteners.

[0084] The following may be one method to install, without tools, one or more of the quick-release shield assemblies contemplated herein, assuming the retaining assembly **770** has been secured to a door frame:

[0085] 1. The door of the vehicle may be opened or closed. The window may be fully retracted, fully extended, or partially extended.

[0086] 2. Position the one side of the lower flange (when holstered) of the shield into the window retraction slot and then lower the remaining portion of the lower flange into said slot. The top edge of the shield should lean toward the interior of the vehicle.

[0087] 3. Push the upper edge of the shield toward the support assembly until it contacts the guide, then turn quick-release fastener(s) into retention position so that the shield is contained.

[0088] The following may be one method to uninstall one or more of the quick-release insert-shield assemblies contemplated herein:

[0089] 1. Turn quick-release fastener(s) to a position that does not contain the shield.

[0090] 2. Tilt the top edge of the shield (when holstered) toward the interior of the car.

[0091] 3. Lift the lower flange from the window retraction slot by lifting up on the handle until it is free from the door frame.

[0092] 4. If the shield is needed as a personal shield, grasp the handle and rotate the now personal-shield to the proper orientation for use.

[0093] FIGS. **8**A and **8**B depict an embodiment of a dual-purpose security shield and retaining system **800** that may serve as a protective device one or both when positioned adjacent to the window frame of a vehicle or while being carried by a law enforcement officer. Shield system **800** may be comprised of insert shield assembly (comprising shield body **820** and handle **830**) and retaining assembly (comprising one or more flange retainers **851** and one or more quick release fasteners **875**). Insert shield body **820** may be further comprised flange **812**.

[0094] In the embodiment depicted in FIGS. **8**A and **8**B, flange retainer **851** may be configured to be anchored by fasteners **851***f* to the face of the inside door panel **11** of the vehicle. Flange retainer **851** is configured to receive flange **812** of shield body **820**. Positioned at or approximately the width of shield body **820** on the inside door panel may be quick release fastener **875** comprised of arm **875***a* that turns about swivel point **875***s* and is coupled to base **875***b*.

[0095] To holster the insert shield, the user positions shield body **820** on a slight angle and slides flange **812** beneath a wing of flange retainer **851**. Once flange **812** is positioned, the opposite long side of shield body **820** is moved towards and against the door panel and quick-release fastener arm **875***a* is moved to engage and hold shield body **820**. To unholster the insert shield, the user turns the fastener arm **875***a* back over the body of the quick release fastener, angles that side of the shield body **820** away from the quick release fastener and removes flange **812** from the flange retainer **851**. The bottom side of shield body **820** will rest on the arm rest **12** of the vehicle door. A significant portion of shield body **820** will be adjacent to vehicle window **15** in order to provide ballistic protection to both the head, neck, and upper shoulder areas of the occupant. In addition, the lower part of the shield will provide ballistic protection to the user's torso.

[0096] FIG. **9** depicts another embodiment that holds a security shield in place on the door of a vehicle yet permits quick removal. System **900** is comprised of shield assembly **922** and coupling bracket **941** and corresponding coupling bracket **942**. Shield assembly **922** is comprised of shield body **920** and handle **930** as previously described herein. One or more coupling brackets **941** may be fastened to shield body **920** by fastener **941***f* as shown in FIG. **9** with its

opening facing down. One or more corresponding coupling brackets **942** may be permanently fastened to door panel **11** with its opening(s) facing up with fasteners **942***f*. To holster shield assembly **922**, the raised edge of coupling bracket **941** is positioned and dropped into the opening formed between the raised edge of corresponding coupling bracket **942** and door panel **11**. To unholster shield assembly **922**, shield assembly **922** is simply lifted and the edge of coupling bracket **941** is removed from the opening formed by corresponding coupling bracket **942** and door panel **11**. The bottom edge of shield body **920** may or may not rest upon door arm rest **12**.

[0097] A significant portion of shield body **920** will be adjacent to vehicle window **15** in order to provide ballistic protection to both the head, neck, and upper shoulder areas of the occupant. In addition, the lower part of the shield will provide ballistic protection to the user's torso.

[0098] FIG. **10** depicts still another embodiment to quickly holster a dual-purpose, portable ballistic shield. System **1000** may be comprised of shield assembly **1022** and capture bracket **1043**. Shield assembly **1022** may be comprised of shield body **1020**, handle **1030**, and capture bracket arm **1043**. Capture bracket arm **1043***a* is permanently coupled to shield body **1020** by fastener **1043***f* which may be an adhesive or a physical fastener. Capture bracket arm may be comprised of any non-deformable material including but not limited to metal or plastic. The horizontal portion **1043***b* of capture bracket **1043** is configured to be a length (depending upon the model of vehicle) that allows the slot arm **1043***c* to be placed into the upper portion the window slot formed between the upper portions of inner door panel **11***a* and outer door panel **11***b*. The bottom edge of shield body **1020** may or may not rest upon door arm rest **12**. To holster shield assembly **1022**, arm **1043***c* is lifted over inner door panel **11***a* and lowered into the window slot until some portion of capture bracket **1043** engages that inner door panel.

[0099] A significant portion of shield body **1020** will be adjacent to vehicle window **15** in order to provide ballistic protection to both the head, neck, and upper shoulder areas of the occupant. In addition, the lower part of the shield will provide ballistic protection to the user's torso.

[0100] FIGS. **11***a*-**11***c* depict an embodiment of a dual-purpose security shield and retaining system **1100** that may serve as a protective device one or both when positioned adjacent to the window frame of a vehicle or while being carried by a law enforcement officer. Shield system **1100** may be comprised of insert shield assembly (comprising shield body **1120** and handle **1130**) and retaining assembly (comprising mounting platform **1155**, one or more flange retainers **1151** and one or more quick release fasteners **1175**). Insert shield body **1120** may be further comprised flange **1112**.

[0101] In the embodiment depicted in FIGS. **11***a-c*, flange retainer **1151** may be configured to be anchored by fasteners **1151***f* to mounting platform **1155** which may be fastened to the face of the inside door panel **11** of the vehicle. Flange retainer **1151** is configured to receive flange **1112** of shield body **1120**. Positioned at or approximately the width of shield body **1120** on the inside door panel may be quick release fastener **1175** as previously described in the embodiment of FIGS. **8***a-b*.

[0102] To holster the insert shield, the user positions shield body **1120** on a slight angle and slides flange **1112** beneath a wing of flange retainer **1151**. Once flange **1112** is positioned, the opposite long side of shield body **1120** is moved towards and against the door panel and quick-release fastener arm of fastener **1175** is moved to engage and hold shield body **1120**. To unholster the insert shield, the user turns the fastener arm **1175** back over the body of the quick release fastener, angles that side of the shield body **1120** away from the quick release fastener and removes flange **1112** from the flange retainer **1151**. The bottom side of shield body **1120** will rest on the arm rest **12** of the vehicle door. A significant portion of shield body **1120** will be adjacent to vehicle window **15** in order to provide ballistic protection to both the head, neck, and upper shoulder areas of the occupant. In addition, the lower part of the shield will provide ballistic protection to the user's torso.

[0103] In some instances, a shield body **1120** may be less thick than other shields. In these instances a spacer **1175***c* may be utilized to ensure the shield body **1120** properly fits.

[0104] FIG. **12** depicts an embodiment of a dual-purpose security shield and retaining system **1200** that may serve as a protective device one or both when positioned adjacent to the window frame of a vehicle or while being carried by a law enforcement officer. Shield system **1200** may be comprised of insert shield assembly (comprising shield body **1220** and handle **1230**) and retaining assembly (comprising a strap system comprising retainers **1256**, one or more straps **1258**, and retention bracket **1257**).

[0105] Shield body **1220** may be any thickness to reduce or eliminate a ballistic threat. The shape of shield body **1220** may differ from other shield bodies disclosed herein as it may not substantially be rectangular. For example, the width of the upper portion of shield body **1220**, may be wider than the lower portion of shield body **1220** immediately above strap **1256**. This narrowing in of the bottom width from the top width may range from 0.00" to 10.00 inches. This additional width may provide the officer more protective coverage both in the vehicle and when away from the vehicle. One or both bottom sides may be indented from the upper side. This bottom width narrowing may assist in easily removal and placement of the shield body in the retaining assembly.

[0106] Handle **1230** is positioned high enough on the upper portion of shield **1220** so that the forces of gravity do rotate the shield in a user's hand.

[0107] In the embodiment depicted in FIG. **12**, at least two side retainers **1256** are positioned on either side of shield body **1220** and fastened to interior door panel **11**. Strap **1258** may be comprised of one or more parts. In some embodiments, strap **1258** may comprise two straps with each strap being secured at its end to or within side retainers **1256**. The other two ends of strap **1258** may attach effectively forming one strap by releasable items such as hook-and-loop fasteners, buckles, or the like. In other embodiments, strap **1258** may comprise one trap that is threaded through side retainers **1256** on the outside of shield body **1220**, with both ends meeting and attaching via hook-and-loop fasteners, a buckle, or the like.

[0108] In some embodiments in which the bottom of shield body **1220** extends to arm rest **12**, retention bracket **1257** may be coupled to door arm rest **12** in order to retain the bottom edge of shield **1220**. In other embodiments in which the bottom edge of shield body **1220** is desired not to extend to arm wrest **12**, then retention bracket **1257** may be

coupled to door panel **11** (not shown) in order to retain the bottom edge of shield body **1220**.

[0109] To holster the inset shield, the user may slide the bottom edge of shield **1220** between strap **1258** and door panel **11** and secure the bottom edge of shield **1220** within retention bracket **1257**. Alternatively, the bottom edge of shield **1220** may be placed within retention bracket **1257** and the strap or straps may be fastened or fastened together as previously discussed depending if the strap system is comprised of one or two straps. Shield **1220** may be removed in the reverse fashion.

[0110] FIG. **13** depicts another embodiment similar to the embodiment of FIG. **12**, however, the embodiment of FIG. **13** depicts the use of mounting platform **1355**. In this embodiment, side retainers **1356** are affixed to mounting platform **1355** which itself is affixed to interior door panel **11** via fasteners **1355***f*. The insert shield is comprised of shield body **1320** and handle **1330**. Shield body **1320** may be placed adjacent to mounting platform **1355** and strap portions **1358***a* and **1358***b* may be attached as previously discussed in the embodiment of FIG. **12** in order to retain shield body **1220**.

[0111] The foregoing specification has been described with reference to various embodiments and implementations. However, one of ordinary skill in the art will appreciate that various modifications and changes can be made without departing from the scope of the present disclosure. For example, various operational steps, as well as components for carrying out operational steps, may be implemented in various ways depending upon the particular application or in consideration of any number of cost functions associated with the operation of the system. Accordingly, any one or more of the steps may be deleted, modified, or combined with other steps. Further, this disclosure is to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope thereof. Likewise, benefits, other advantages, and solutions to problems have been described above with regard to various embodiments. However, benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced, are not to be construed as a critical, a required, or an essential feature or element.

[0112] Those having skill in the art will appreciate that many changes may be made to the details of the above-described embodiments without departing from the underlying principles of the invention.

1. A vehicle door and personal ballistic protection system comprising:

A removable insert-shield assembly and a retaining assembly;

Said insert-shield assembly comprising one or more sheets of an optically clear, ballistic-resistant material comprising a main body, a holding mechanism, and a side flange wherein

the main body is configured to be positioned between the two components of the retaining assembly adjacent to the inside door panel and window of the vehicle and have a thickness or thicknesses that protect the vehicle occupant against a specified level of ballistic threat,

the side flange is comprised of one or more segments that are configured to be a thickness, length, and width and positioned such that the side flange fits within at least a portion of the flange retainer, and

the holding mechanism enables a user to quickly grasp, remove, and manipulate said removable insert-shield;

and

Said retaining assembly comprising at least one edge retainer and at least one quick-release fastener wherein

the at least one edge retainer is coupled to the inside door panel and configured to capture and contain the side flange of the insert-shield assembly or an edge of the insert-shield assembly and

the at least one quick-release fastener is configured to be coupled to the inside door panel opposite the flange retainer at a distance approximately the horizontal dimension of the insert-shield.

2. The system of claim **1** wherein the insert-shield comprises ballistic-resistant material providing a level of ballistic protection of at least UL Level 1 as defined by Underwriters Laboratory at the date of the filing of this application.

3. The system of claim **1** wherein the insert-shield comprises ballistic-resistant material comprised of an acrylic, glass, ceramic, or polycarbonate material, laminates, or combinations thereof.

4. The insert-shield assembly of claim **1** wherein the holding mechanism is comprised of a material that may be deformable or rigid depending upon the preferences of an end-user.

5. The system of claim **1** wherein the window of the vehicle remains substantially operable.

6. The system of claim **1** wherein the at least one edge retainer and the at least one quick-release fastener are coupled to a mounting plate at a distance approximately the horizontal dimension of the insert-shield and said mounting plate is configured to be coupled to the inside door panel.

7. A method of installing an insert-shield assembly to its corresponding retaining assembly comprising the following steps:

providing the insert-shield assembly of claim **1** relative to the inside of the door;

positioning the lower flange of the insert-shield assembly into the window retraction slot;

tilting the upper edge of the insert-shield assembly toward the retaining assembly until the upper edge meets the retaining guide; and

extending the one or more quick-release fasteners into a position that retains the insert-shield assembly.

8. The method of claim **7** wherein, after completion of all steps, the system does not interfere with the operation of the window of the vehicle door.

9. A method of removing an insert-shield of claim **1** from its corresponding retaining assembly comprising the following steps:

removing the arm of the one or more quick-release fasteners from the path of the upper edge of the insert-shield;

tilting the upper edge of the insert-shield assembly away from the retaining assembly; and

lifting the insert-shield assembly via the holding mechanism thereby disengaging the lower flange from the window retraction slot.

10. A vehicle door and personal ballistic protection system comprising:

A removable insert-shield assembly and a retaining assembly;

Said insert-shield assembly comprising one or more sheets of an optically clear, ballistic-resistant material comprising a main body, and a holding mechanism wherein

the main body is configured to be positioned adjacent to the inside door panel and window of the vehicle and have a thickness or thicknesses that protect the vehicle occupant against a specified level of ballistic threat, and

the holding mechanism enables a user to quickly grasp, remove, and manipulate said removable insert-shield;

and

Said retaining assembly comprising at least two corresponding side retainers and at least one retention strap wherein

one or more corresponding side retainers are affixed to the inside door panel; and

a retention strap is permanently or temporarily configured to be secured by the side retainers forming a tight strap that pulls the shield against the inside of the door panel

11. The system of claim **10** wherein the at least two side retainers are coupled to a mounting plate at a distance approximately the horizontal dimension of the insert-shield and said mounting plate is configured to be coupled to the inside door panel.

12. The system of claim **10** wherein at least one bottom retainers are positioned to capture the bottom portion of the insert-shield assembly.

13. The system of claim **10** wherein the inert-shield has a top width that may exceed the width of the bottom; the bottom of which is configured to pass between the side retainers.

14. A vehicle door and personal ballistic protection system comprising:

A removable insert-shield assembly and a retaining assembly;

Said insert-shield assembly comprising one or more sheets of an optically clear, ballistic-resistant material comprising a main body, and a holding mechanism wherein

the main body is configured to be positioned adjacent to the inside door panel and window of the vehicle and have a thickness or thicknesses that protect the vehicle occupant against a specified level of ballistic threat, and

the holding mechanism enables a user to quickly grasp, remove, and manipulate said removable insert-shield;

and

Said retaining assembly comprising one or more capture brackets permanently affixed to the side of the insert-shield opposite the holding mechanism and configured to have an arm that enters into and engages the portion of the inside door panel that forms the vehicle window retraction slot, said brackets positioned at a height on the insert-shield such that when engaged, the bottom edge of the insert-shield rests upon or is less than two inches away from the arm rest.

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