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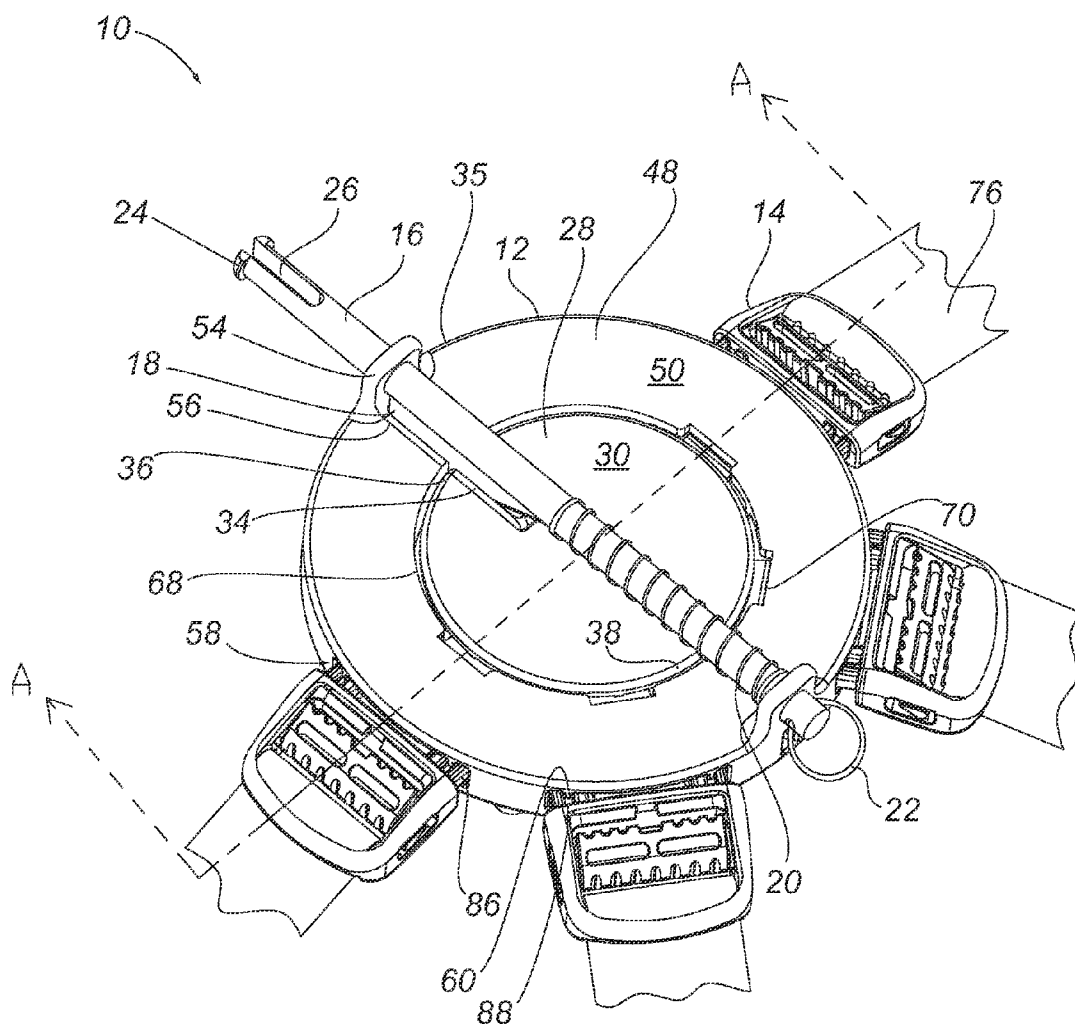
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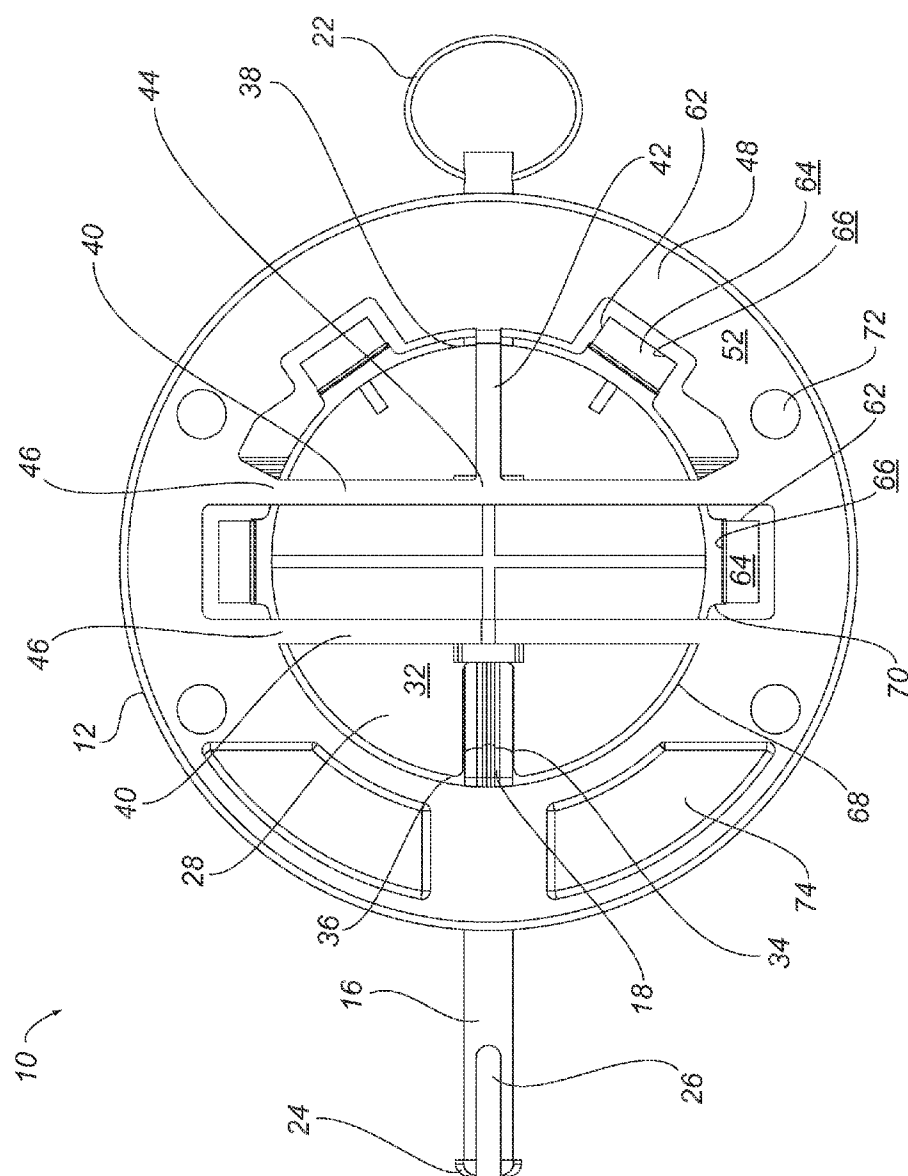
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(57) **ABSTRACT**

Systems that may be used to quickly remove gear having straps from a user's body. Certain embodiments provide a housing into which a plurality of plugs may be inserted. A strap may be secured to each plug, and the straps may be used to secure gear to a user's body. When it is desired to remove the gear, a user may disengage all of the plugs with a single movement—either by pulling on an actuating member that is associated with the housing, or by pressing on a plate associated with the housing. Either movement will disengage the plurality of plugs from the housing at one time.



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3
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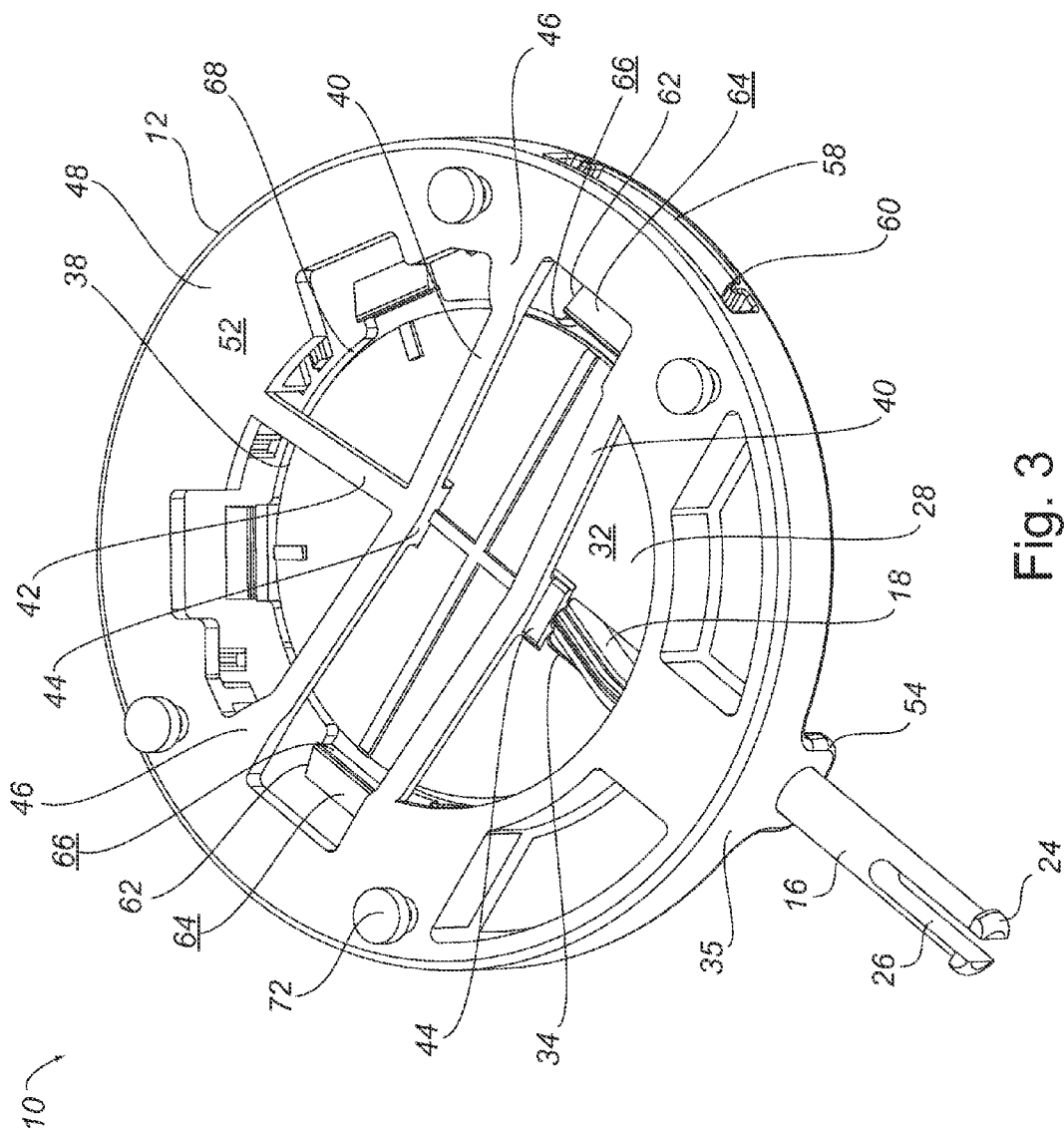


Fig. 3

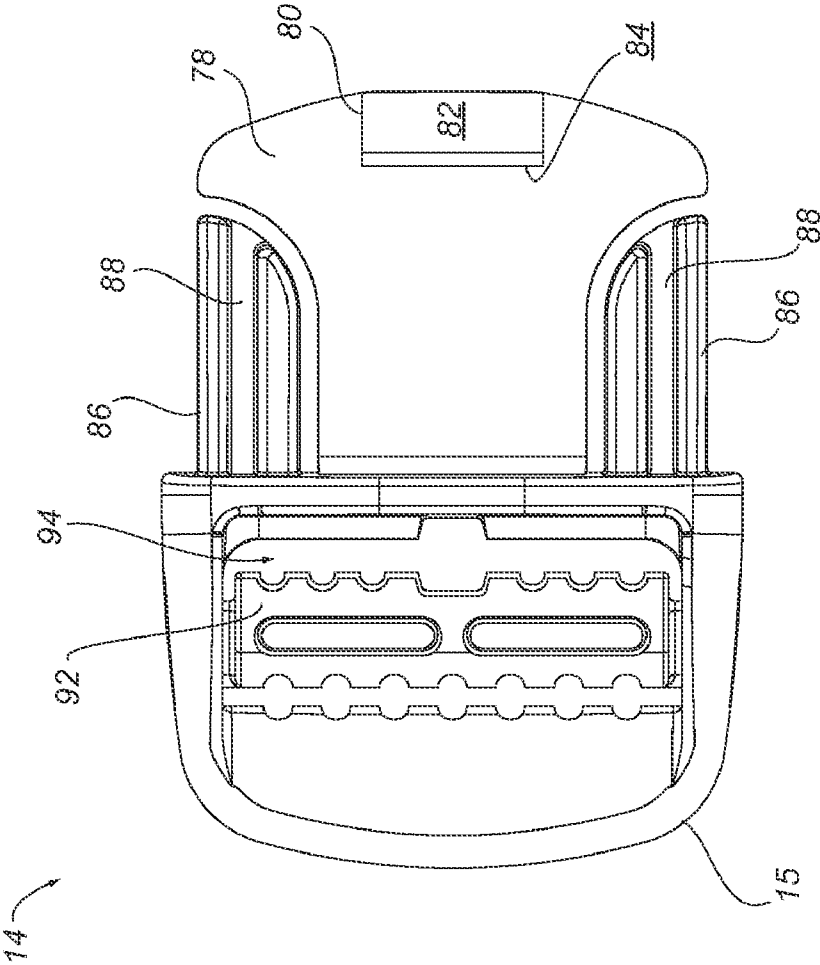


Fig. 4

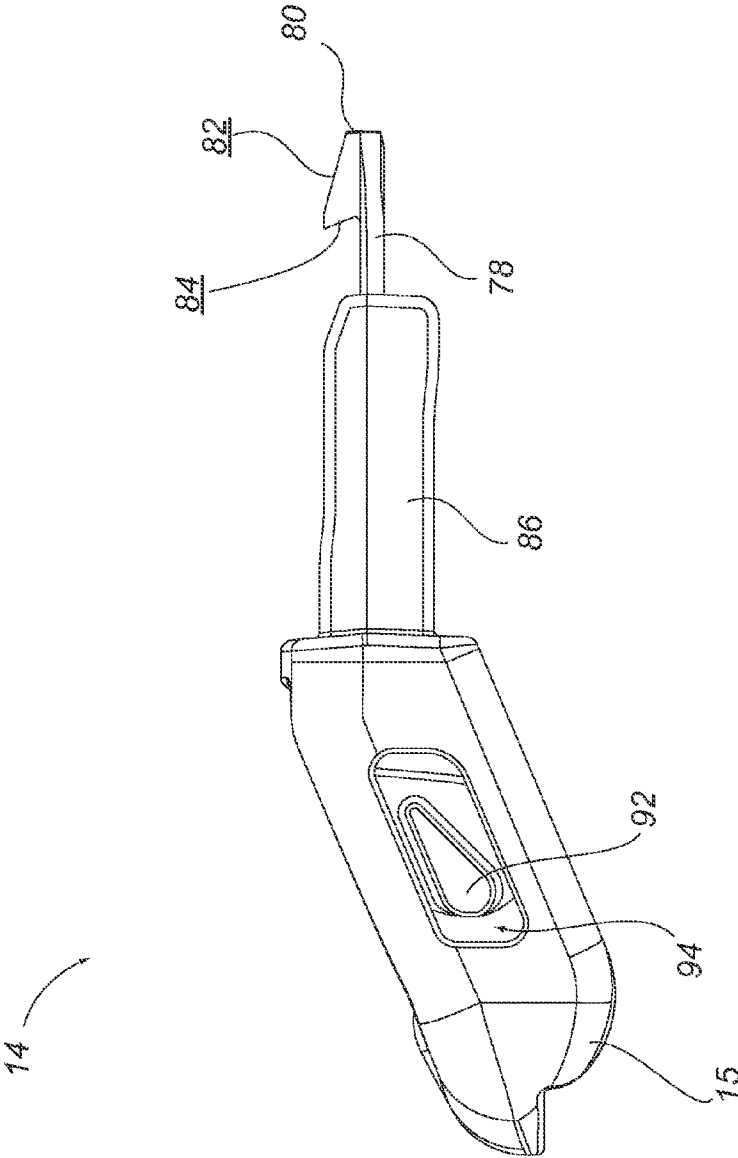


Fig. 5

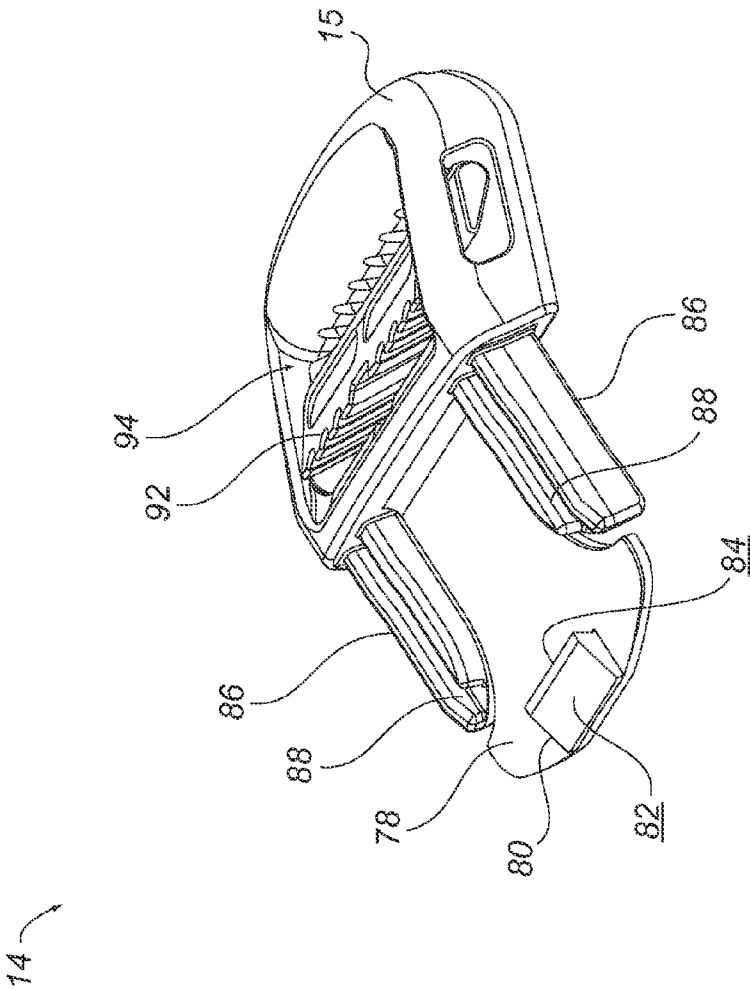


Fig. 6

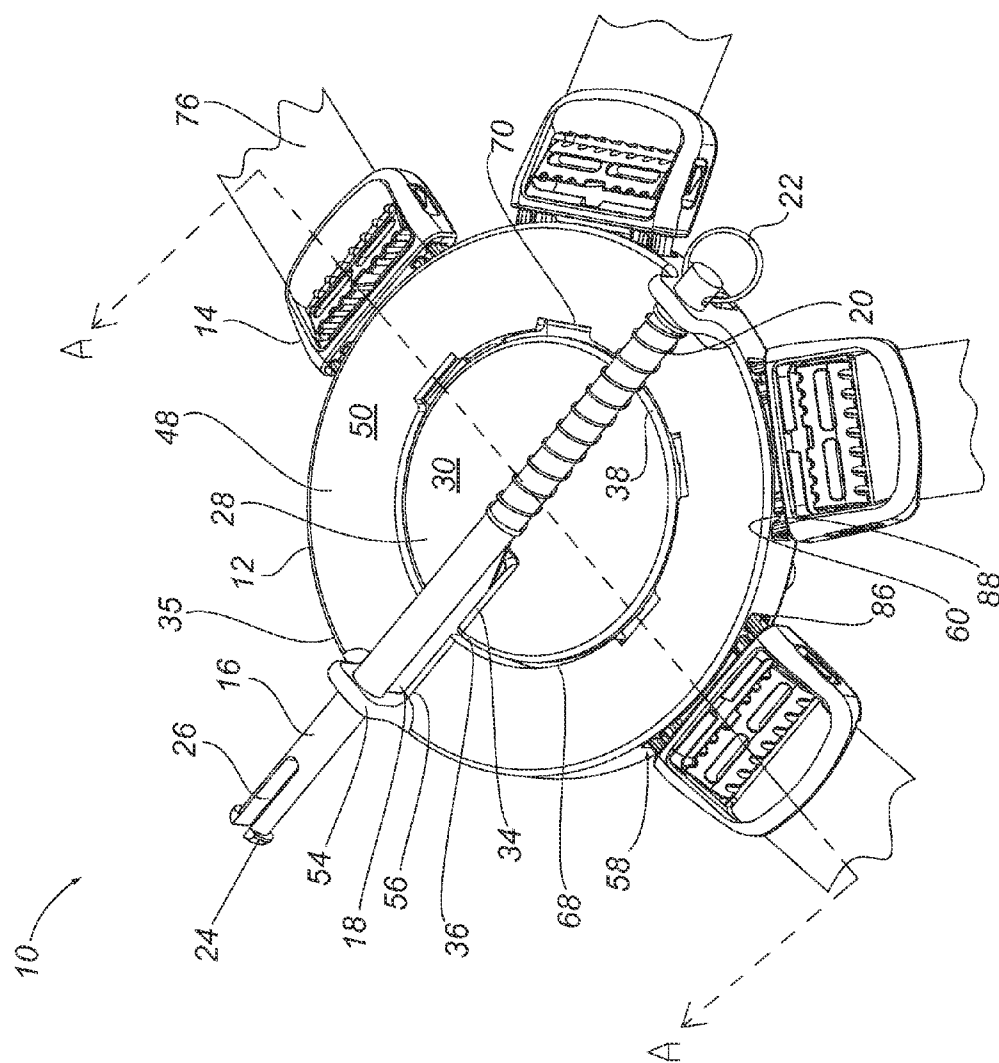


Fig. 7

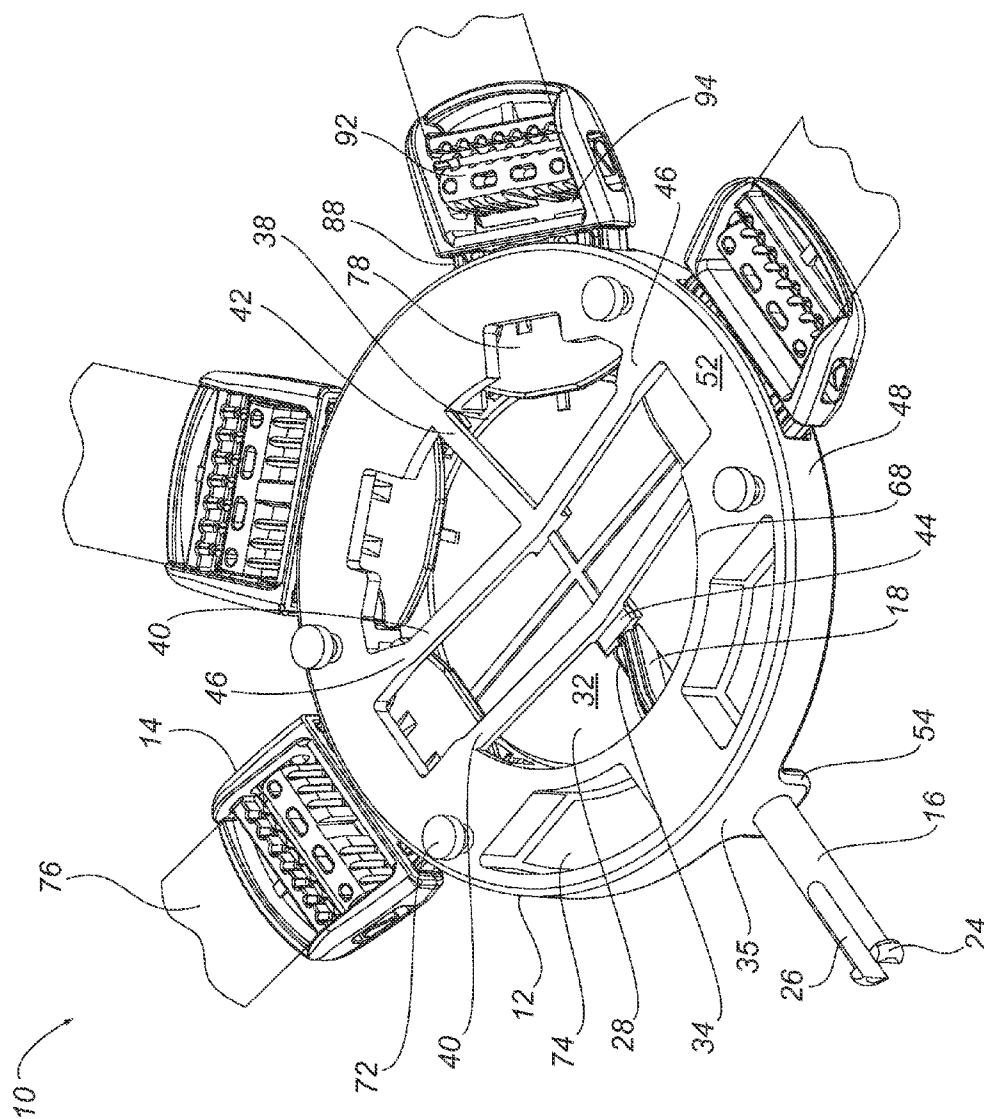


Fig. 8

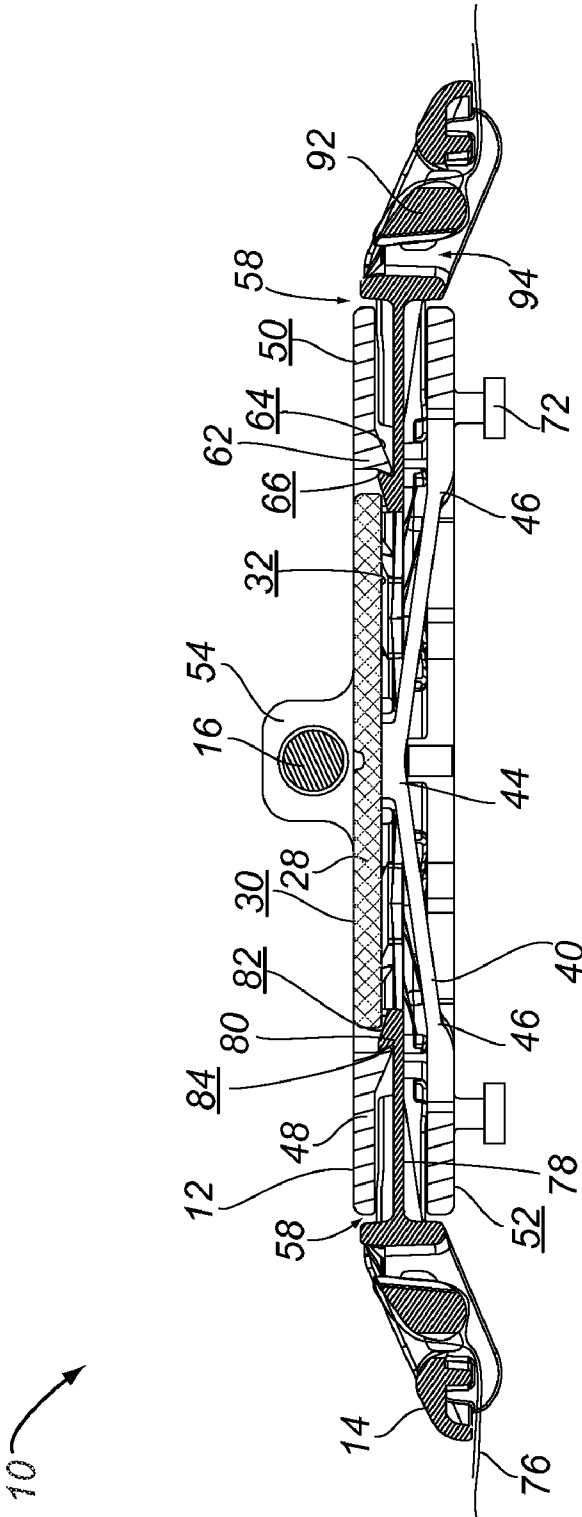


Fig. 9

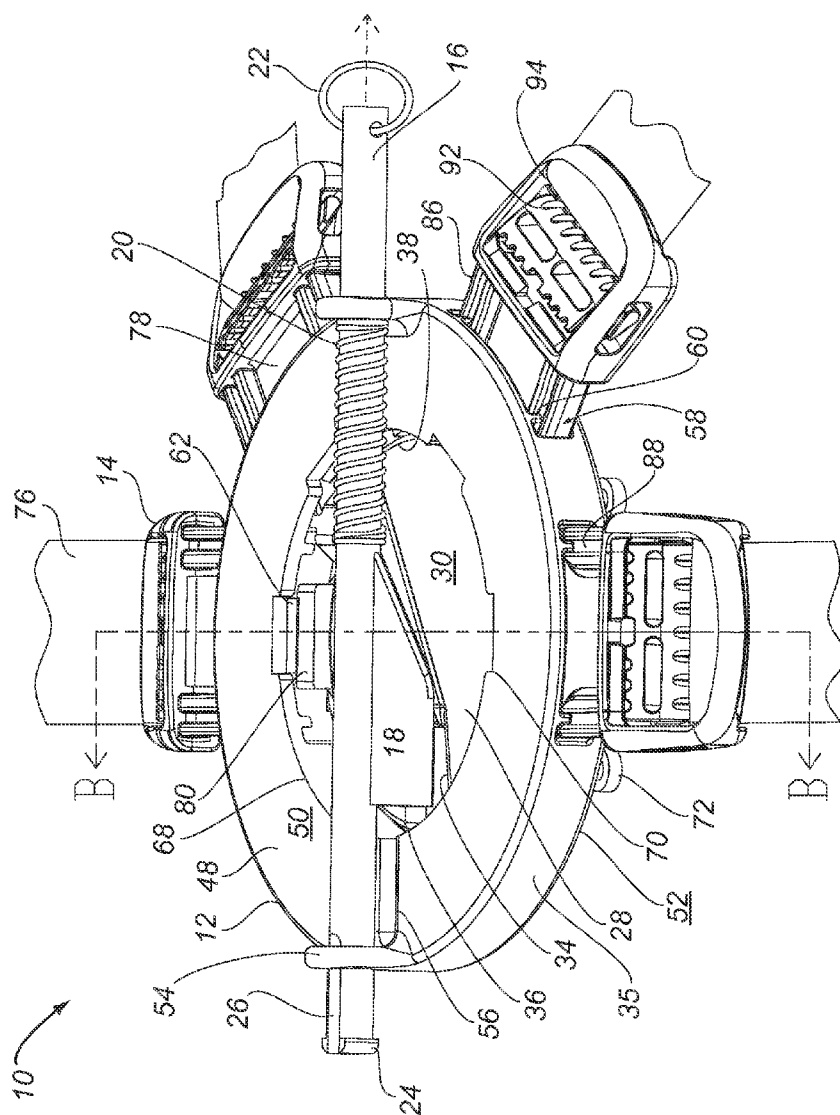


Fig. 10

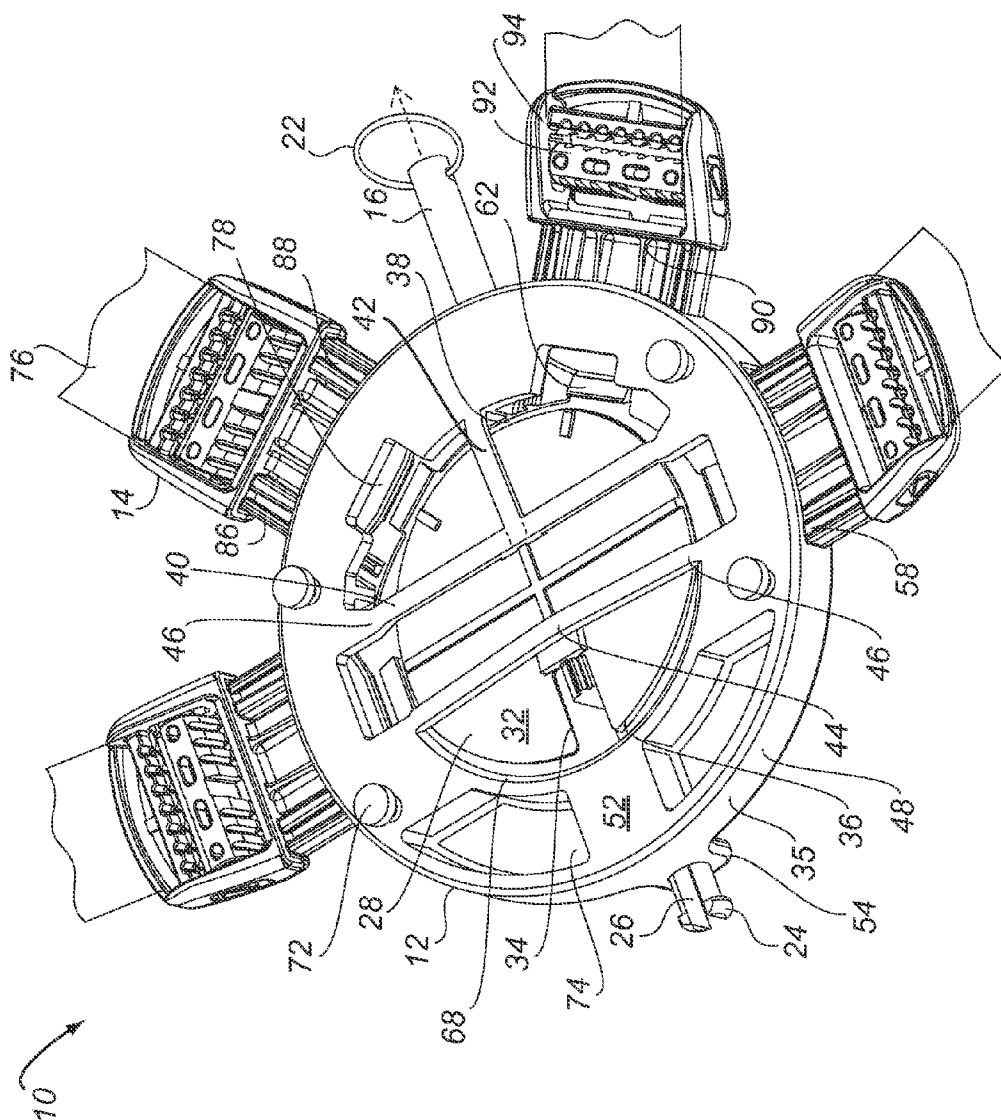


Fig. 11

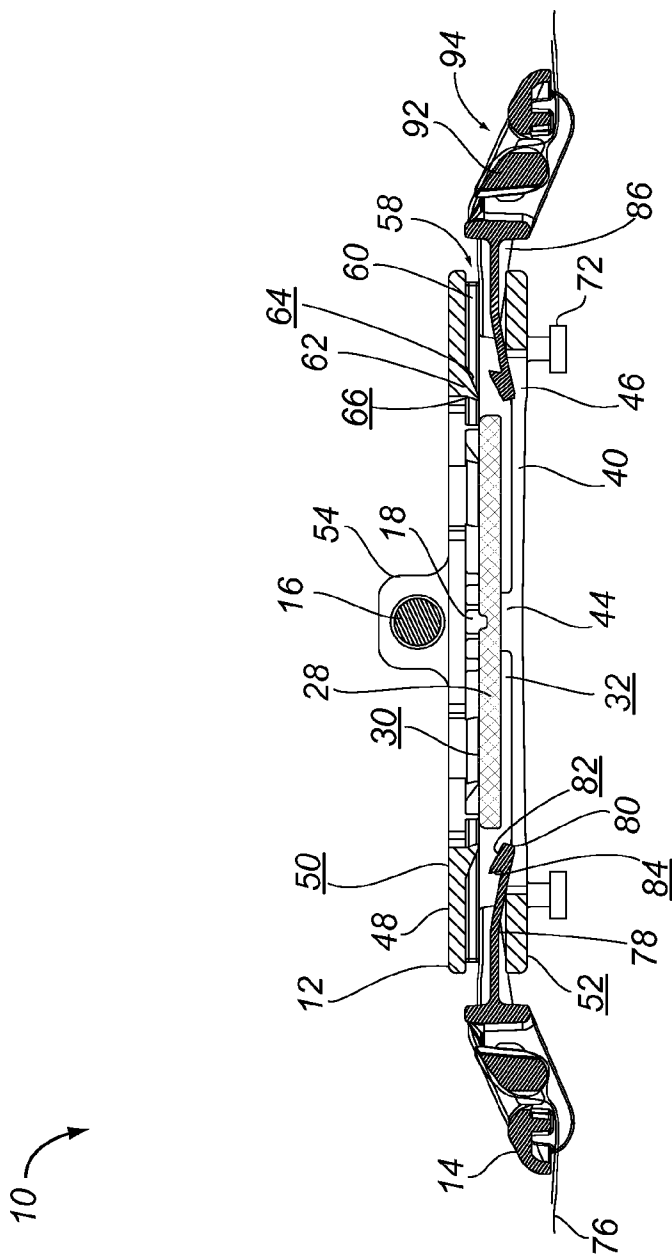


Fig. 12

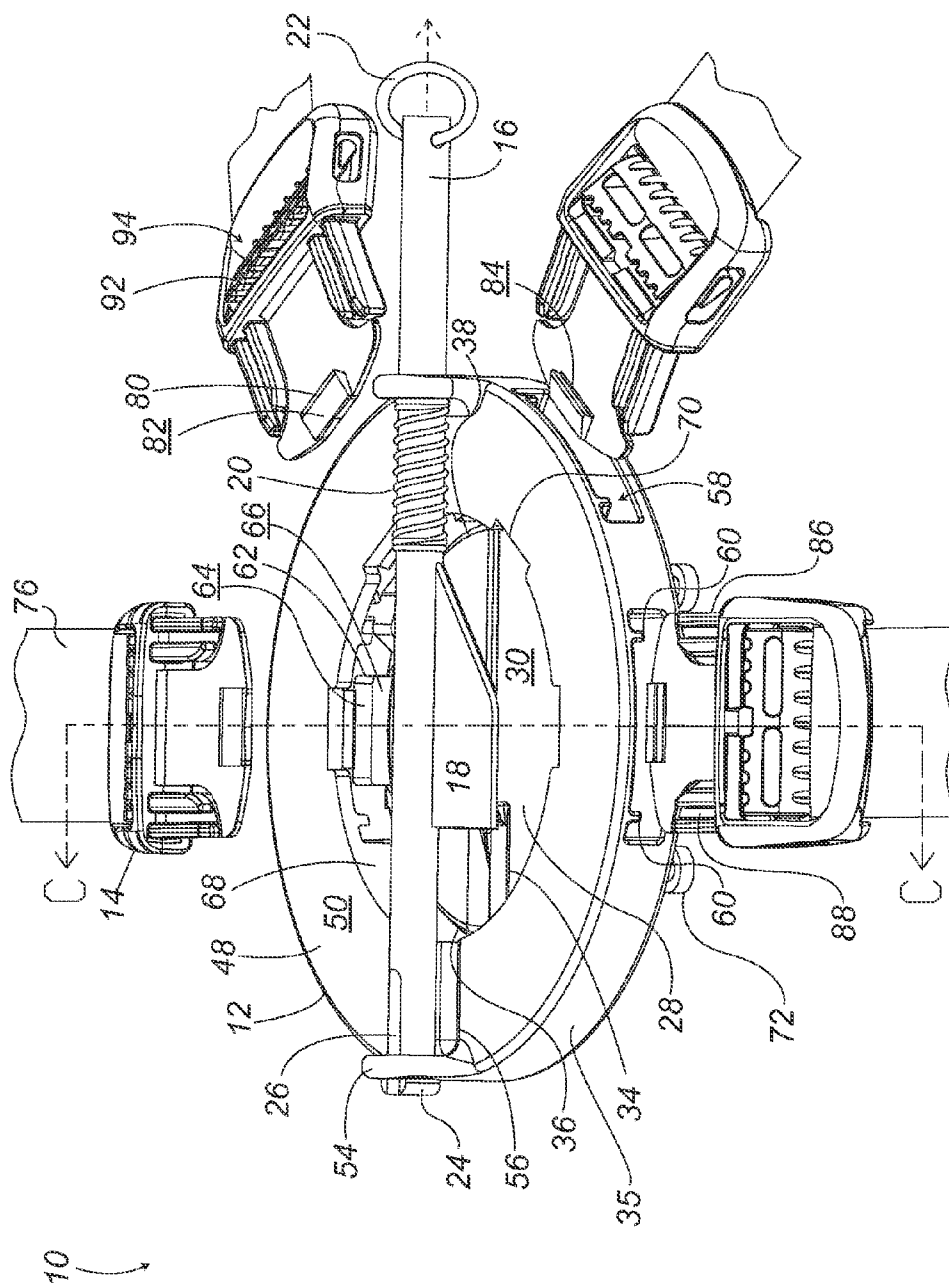


Fig. 13

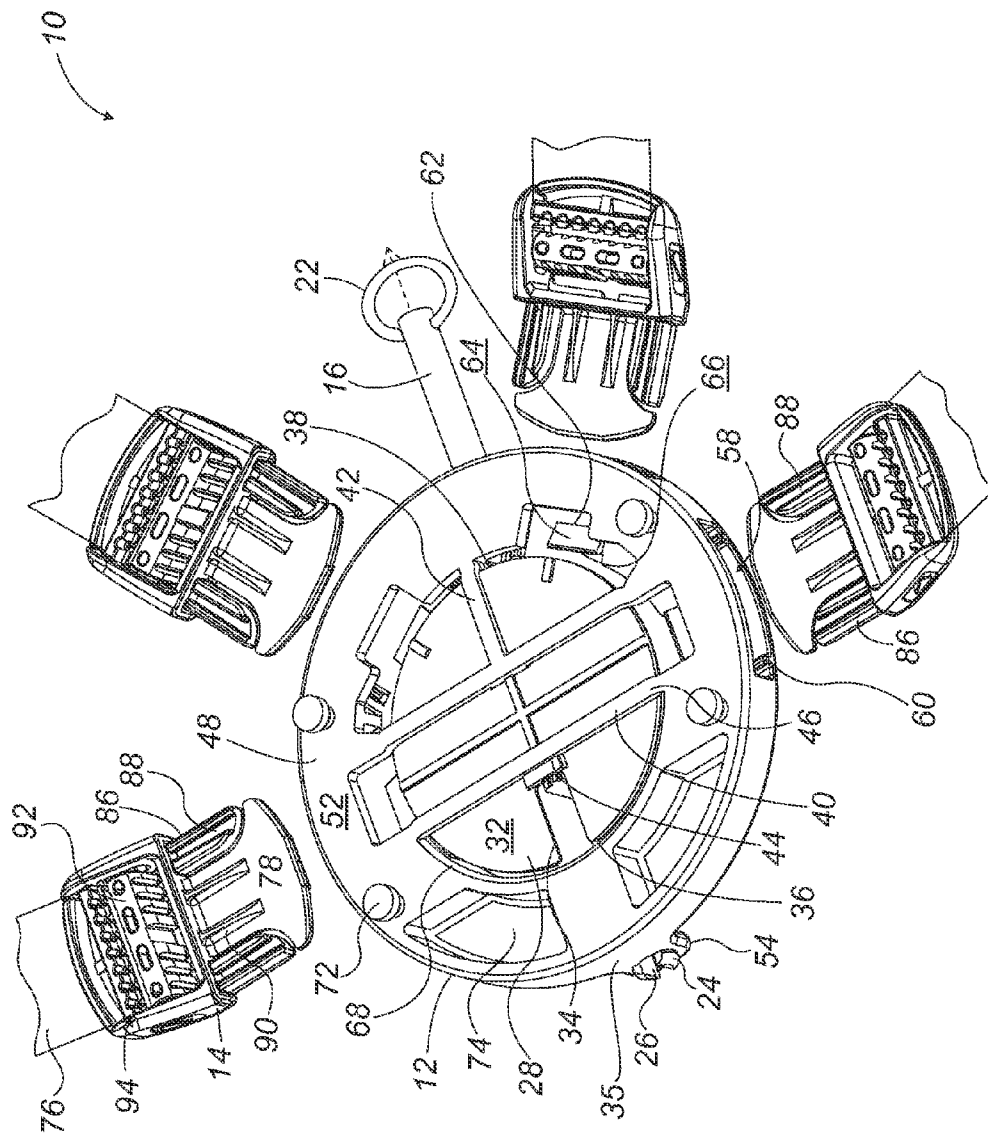
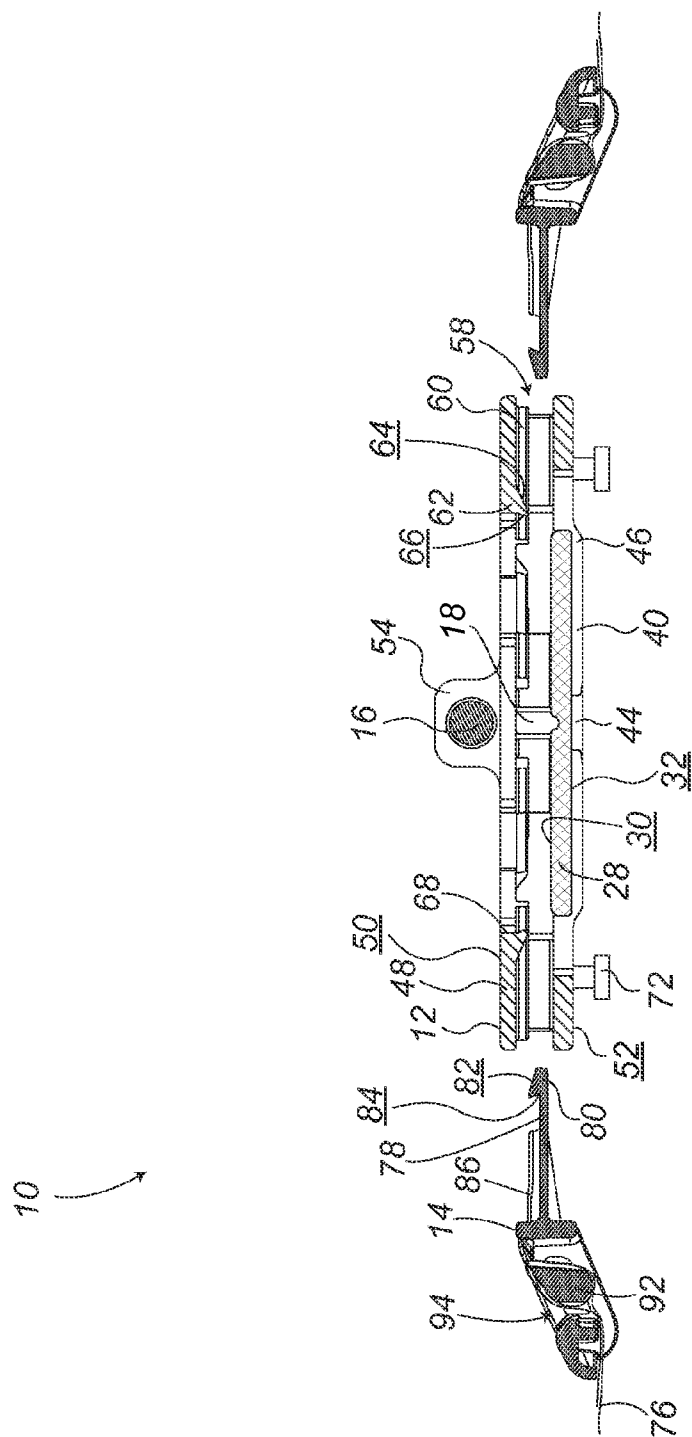


Fig. 14



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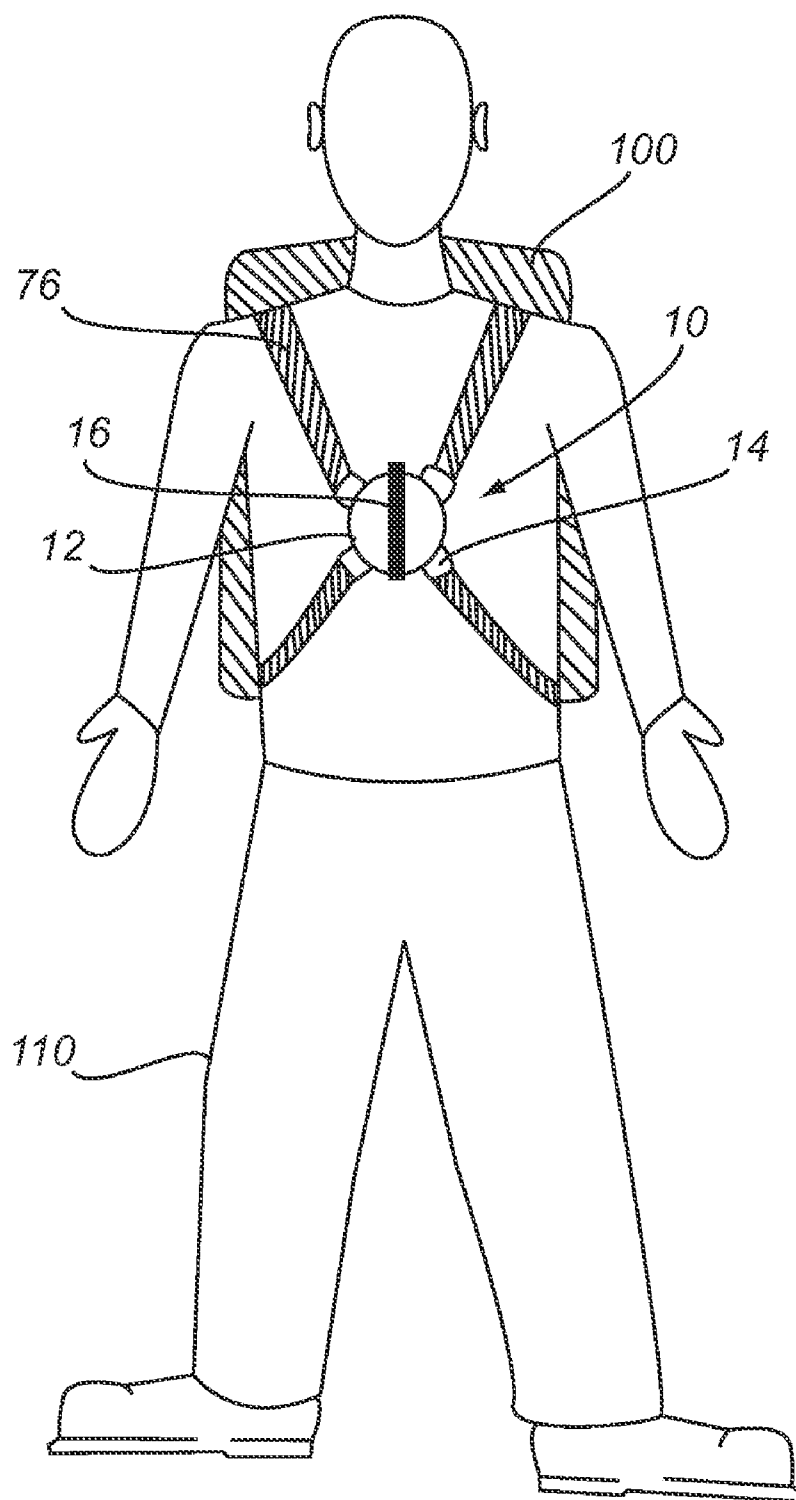


Fig. 16

RELEASE SYSTEM

FIELD OF THE INVENTION

[0001] The following invention relates to release systems that may be used to quickly and easily remove gear that has straps from a user's body.

BACKGROUND OF THE INVENTION

[0002] A user might wear some type of gear on their body, including but not limited to military tactical vests, backpacks, hiking gear, diving equipment, parachutes, garments, or any other type of pack. The gear may include a plurality of straps that are secured to a user's body to form a secure fit. For example, there may be one strap secured around a user's left shoulder, one around the right shoulder, straps secured around the user's torso, and so on.

[0003] In such systems the gear may be removed by slipping the straps off the user's body. This method may take a long time, because each strap must be separately removed from whatever extremity it is secured around. Additionally, as the number of straps increases, the number of movements required to remove the gear also increases. There is an increased risk of confusion and/or entanglement as the number of movements increases. Finally, slipping the straps off a user's body requires a certain amount of space—a user must move his or her shoulders, elbows, etc. to remove the gear. If the user is in a confined area, his or her movement may be restricted such that the user cannot readily remove the gear.

[0004] Although slipping off the straps may be sufficient when time and/or restrictions on movement are not at issue, in other situations, it may be required to remove the gear more quickly or easily. For example, in a military setting the user might face danger, and might need to remove the gear quickly to escape the danger. If the user is inside of a military vehicle (for example, inside of a cockpit of an airplane), then movement may be restricted and the user may not be able to readily remove the gear. In a diving setting, the user might need to remove the diving equipment quickly in order to be unencumbered for easy swimming. In such situations, every moment counts and it is thus desirable to remove the gear as quickly as possible.

[0005] Systems have been developed to allow gears having straps to be removed quickly. In some systems, the straps have buckles or hooks that a user may disengage to release the straps. For example, in some systems a metal hook is engaged with a metal ring, and the user may remove the gear by disengaging the hook from the ring. In other systems, buckles are used to secure the straps, and the buckle may be disengaged by manually pressing on a release mechanism associated with each individual buckle. Once disengaged, the gear falls off the user's body. But such systems are problematic in that it takes time to disengage each individual buckle and/or hook. Another problem is that metal parts (such as metal hooks and metal rings) increase the weight of the gear, which may be uncomfortable or dangerous.

[0006] Thus, there is a need for a system that may be used to quickly and easily remove gear having a plurality of straps from a user's body.

[0007] Specifically, there is a need to reduce the amount of time it takes to remove gear from a user's body.

[0008] There is also a need to reduce the number of movements required to remove gear from a user's body.

SUMMARY OF THE INVENTION

[0009] Certain embodiments of the invention provide a housing into which a plurality of plugs may be inserted. A strap may be secured to each plug, and the straps may be used to secure gear to a user's body. When it is desired to remove the gear, a user may disengage all of the plugs with a single movement—either by pulling on an actuating member that is coupled to the housing, or by pressing on a plate associated with the housing. Either movement will disengage the plurality of plugs from the housing at one time.

[0010] Thus, certain embodiments reduce the amount of time and number of movements that is required to remove the gear by providing a single housing that may disengage a plurality of plugs. The single housing additionally reduces manufacturing costs and the weight of the system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A full and enabling disclosure including the best mode of practicing the appended claims and directed to one of ordinary skill in the art is set forth more particularly in the remainder of the specification. The specification makes reference to the following appended figures, in which use of like reference numerals in different features is intended to illustrate like or analogous components.

[0012] FIG. 1 is a top plan view of a release system according to certain embodiments of the invention.

[0013] FIG. 2 is a bottom plan view of the release system shown in FIG. 1.

[0014] FIG. 3 is a bottom perspective view of the release system shown in FIG. 1.

[0015] FIG. 4 is a top plan view of a plug according to certain embodiments of the invention.

[0016] FIG. 5 is a side view of the plug shown in FIG. 4.

[0017] FIG. 6 is a top perspective view of the plug shown in FIG. 4.

[0018] FIG. 7 is a top perspective view of a release system according to certain other embodiments of the invention.

[0019] FIG. 8 is a bottom perspective view of the release system shown in FIG. 7.

[0020] FIG. 9 is a cross-sectional view of the release system of FIG. 7 taken along line A-A.

[0021] FIG. 10 is a top perspective view of a release system according to other embodiments of the invention.

[0022] FIG. 11 is a bottom perspective view of the release system shown in FIG. 10.

[0023] FIG. 12 is a cross-sectional view of the release system of FIG. 10 taken along line B-B.

[0024] FIG. 13 is a top perspective view of a release system according to still other embodiments of the invention.

[0025] FIG. 14 is a bottom perspective view of the release system shown in FIG. 13.

[0026] FIG. 15 is a cross-sectional view of the release system of FIG. 13 taken along line C-C.

[0027] FIG. 16 shows one embodiment of a release system and gear secured to a user.

DETAILED DESCRIPTION OF THE INVENTION

[0028] FIGS. 1-3 show certain embodiments of a housing 12 that may receive a plurality of plugs 14. Each plug 14 may be associated with a strap 76 of gear 100 that may be secured

to a user 110, as shown in FIG. 16. As used herein, gear 100 is non-limiting and may include but is not limited to military tactical vests, backpacks, hiking gear, diving equipment, parachutes, or any other type of garment that has straps to secure to a user 110. Although FIG. 16 shows the release system 10 secured to the front of the user 110, the release system 10 may also be positioned in reverse, such that the release system 10 is on the user's 110 back. Likewise, the release system 10 may be oriented in any direction, such that a tab 22 on the actuating member 16 is pointed up, down, or any other direction. Furthermore, although there are only four straps 76 shown in FIG. 16, other embodiments may have fewer or more straps 76.

[0029] As shown in FIGS. 1-3, the housing 12 may include a frame 48 having an inner edge 68, and a plate 28 may be positioned within the frame 48. Although the frame 48 and plate 28 are both circular in the figures (such that the frame 48 and plate 28 are generally concentric), it should be understood that any desired shape may be used. The frame 48 has a top surface 50, a bottom surface 52 opposite the top surface 50, and sidewalls 35 extending between the top surface 50 and the bottom surface 52. The plate 28 also has a top surface 30 that is generally on the same level as the top surface 50 of the frame 48 when the release system 10 is engaged (as shown in FIG. 9). But when the system is disengaged, the top surfaces 30, 50 of the plate 28 and frame 48 are no longer on the same level (as shown in FIGS. 12, 15). As shown in FIG. 3, the sidewalls 35 of the frame 48 define a plurality of apertures 58 that are each dimensioned to receive a plug 14. Each aperture 58 may include guide rails 60 that enable proper alignment of the plug 14. Additionally, each aperture 58 may include an engaging member, such as lip 62, that faces towards the bottom surface 52 of the frame 48. The lip 62 may include a slanted surface 64 and an inner surface 66 that faces the inner edge 68 of the frame 48. As will be described in more detail herein, the lip 62 is dimensioned to engage with an engaging member of the plug 14, such as flange 80. There may also be provided at least one recess 70 on the inner edge 68 of the frame 48, located coincident with the lip 62.

[0030] As shown in FIGS. 2 and 3, the plate 28 may be coupled to the frame 48 by a plurality of ribs 40, 42. Any number or positioning of ribs 40, 42 are within the scope of the present invention. In certain embodiments there may be provided two transverse ribs 40 that connect with the plate 28 at a middle connecting point 44, and connect with the frame at an end connecting point 46. If desired, there may also be a partial rib 42 connected to one of the transverse ribs 40. In certain embodiments the ribs 40, 42 are flexible such that the system may move between the engaged position and the disengaged position.

[0031] The housing 12 may also include an actuating member 16 that is coupled to the frame 48 by at least one receiving portion 54. The flange 24 on the actuating member 16 prevents the actuating member 16 from being pulled out of the receiving portion 54, and the cutout 26 may allow the end of the actuating member 16 to flex and be inserted into the receiving portion 54. The actuating member 16 is but one non-limiting way to disengage the plugs 14 from the frame 48. In the embodiments shown in the figures, the actuating member 16 is generally an elongated cylinder with a protrusion 18 on one portion facing the plate 28 and frame 48. A bottom view of the protrusion 18 is in FIG. 3, and a side view is in FIGS. 10 and 13. The shape of the protrusion 18 shown is in no way limiting, and in other embodiments, the protrusion

18 may be generally square, round, or oval, etc. The plate 28 and the frame 48 may both have a recess 34, 56 (respectively) to receive the protrusion 18. There may be provided a spring 20 around the actuating member 16 that is secured by one of the receiving portions 54 and by the protrusion 18. In one non-limiting method of engaging or disengaging the plugs 14, a user may pull on tab 22 provided on the actuating member 16. In use, the release system 10 may be secured to the user 110 in any direction, such that the tab 22 is pointed up, down, or any other direction.

[0032] As shown in FIG. 2, the bottom surface 52 of the frame 48 may include optional voids 74 that may be desirable to reduce material costs and/or the weight of the frame 48. The bottom surface 52 of the frame 48 may also include knobs 72 that may be used to secure the housing 12 to the user 110. For example, the knobs 72 may be secured to a shirt worn by the user 110 by sewing, knots, bands, buttons, snaps, or other fasteners. Thus, when the plugs 14 are released from the frame 48 (and the gear 100 falls off the user 110), the housing 12 remains secured to the user 110. This may be useful in order to avoid losing or damaging the housing 12.

[0033] FIGS. 4-6 show certain embodiments of a plug 14 that may be inserted into apertures 58 of the frame 48. Embodiments of the plug 14 may include a body 15, guide arms 86 with a channel 88 to guide the plug 14 into the housing 12, and a tongue 78 with a flange 80 to secure the plug 14 within the housing 12. Specifically, the flange 80 may comprise a slanted surface 82 and an inner surface 84 that faces the body 15 of the plug. The body 15 of the plug 14 may also include an aperture 94 and a securing bar 92 to receive and secure a strap 76. The cross-sectional views in FIGS. 9, 12, and 15 show a strap 76 inside the aperture 94 and wrapped around the securing bar 92. In other embodiments (not shown) the strap 76 may be secured to the plug 14 in other ways, such as by sewing, with adhesives, or welding. As shown in FIGS. 4-6, the body 15 of the plug 14 is angled with respect to the guide arms 86 and tongue 78. This angle may provide ergonomic benefits; for example, an angled plug 14 may fit more securely to a user 110, as shown in FIG. 16. The angled plug 14 may also prevent slippage of the straps 76. As shown most clearly in FIG. 14, the tongue 78 may include ribs 90 to provide increased strength.

[0034] As shown in FIGS. 7-9, a plurality of plugs 14 may be received in apertures 58 in the frame 48. In the embodiments shown in the figures, there are four apertures 58 to receive four plugs 14; however, that number is by no means limiting and in other embodiments there may be fewer or more apertures 58. The particular configuration of the apertures 58 on the frame 48 is also not limiting and may vary based on application. For example, a different configuration and/or number of apertures 58 may be desired if the gear 100 is a backpack as compared to a military vest.

[0035] As shown in FIGS. 7 and 8, each aperture 58 is dimensioned to receive a plug 14. The aperture 58 may include guide rails 60 that mate with channels 88 on the plug 14. The guide rails 60 and channels 88 ensure that the plug 14 is properly aligned within the aperture 58. As the plug 14 is inserted, the slanted surface 82 of the flange 80 (on the plug 14) contacts and rides up the slanted surface 64 of the lip 62 (on the frame 48). When the apex of each slanted surface 64, 82 is reached, the lip 62 and the flange 80 become engaged. Specifically, as shown in FIG. 9, the inner surface 84 of the flange 80 contacts the inner surface 66 of the lip 62. The contact between the respective inner surfaces 66, 84 engages

the plug 14 within the frame 48; thus, FIGS. 7-9 illustrate the plugs 14 in the engaged position. The lip 62 and the flange 80 may be considered "engaging members" in that they engage with one another to secure the plug 14 within the aperture 58. In this engaged position, the top surface 30 of the plate 28 is generally on the same level as the top surface 50 of the frame 48, and (as shown in FIG. 9), the plate 28 does not interfere with the engagement of the lip 62 and the flange 80.

[0036] FIGS. 10-12 show the plugs 14 in the process of disengagement. That is, the plugs 14 are being disengaged but are not completely disengaged. The plugs 14 may be disengaged in one of two ways. First, a user may pull on tab 22. This is the method that is illustrated in FIGS. 10-12. When a user pulls on the tab 22, the spring 20 is compressed and the actuating member 16 moves across the plate 28, from a first side 36 of the plate 28 to a second side 38 of the plate 28. As the actuating member 16 moves the protrusion 18 depresses a portion of the first side 36 of the plate 28, as shown in FIG. 10, such that the plate 28 is tilted. As shown in FIG. 11, the ribs 40, 42 are partially flexed to accommodate the tilting of the plate 28. As shown in FIG. 12, the plate 28 is depressed toward the bottom surface 52 of the frame 48. As it is depressed, the bottom surface 32 of the plate 28 contacts and depresses the flange 80 of one or more of the plugs 14, thus disengaging the flange 80 from the lip 62 of the frame 48.

[0037] FIGS. 13-15 show the plugs 14 in the fully disengaged position. In these figures, the user 110 has pulled on the tab 22 such that the spring 20 is further compressed. The flange 24 stops any further movement of the actuating member 16 by contacting the receiving portion 54 of the frame 48. The protrusion 18 has depressed at least a portion of the second side 38 of the plate 28 such that the plate 28 is no longer tilted. As shown in FIGS. 14 and 15, the ribs 40, 42 are fully flexed to accommodate the depressed plate 28. Thus, in FIG. 15, the bottom surface 32 of the plate 28 is generally on the same level as the bottom surface 52 of the frame 48. Additionally, the flange 80 is fully disengaged from the lip 62, allowing the plug 14 to be removed from the frame 48. In use (such as shown in FIG. 16), straps 76 of gear 100 are secured to the plugs 14. Thus, when the plugs 14 are disengaged and come out of the frame 48, the straps 76 and the gear 100 are released from the user 110. If the housing 12 is secured to the user 110 by the knobs 72, then the housing 12 will remain secured to the user 110 even when the plugs 14 are released.

[0038] Alternatively to pulling the actuating member 16 as shown in FIGS. 10-12, a user may simply depress the plate 28 such that the plugs 14 become fully disengaged as shown in FIGS. 13-15.

[0039] The release system 10 may be used again after the plugs 14 have been disengaged. For example, when the actuating member 16 is released, the spring 20 returns the actuating member 16 to its initial position. Alternatively, the user 110 may simply remove pressure from the plate 28. The flexible ribs 40, 42 apply force to the plate 28, moving it up to its initial position, wherein the top surface 30 of the plate 28 is generally on the same level as the top surface 50 of the frame 48. Then the user 110 can re-insert the plugs 14 into the apertures 58 and secure the gear 100 to the user 110.

[0040] Embodiments of the invention therefore provide at least two ways to disengage the plugs 14 (either pulling on tab 22 or by directly depressing the plate 28). The user 110 may use one method or the other depending upon preference or ease of use. Certain embodiments of the invention therefore provide methods of disengaging plugs 14 using only a single

motion rather than disengaging each plug 14 individually. Embodiments also reduce manufacturing costs by providing a single housing 12 that receives a plurality of plugs 14.

[0041] The frame 48 and plate 28 may be constructed from the same material, or from different materials, including but not limited to nylon, acetal, or an impact modified polyacetal resin, such as TPOM. The use of such lightweight materials reduce the weight of the release system 10. If desired, the material may be reinforced with fibers, and may include additional additives such as fire retardants. The frame 48 and plate 28 may be made from any one of several manufacturing techniques, including injection molding. The frame 48 and plate 28 may be molded separately, and then subsequently joined together by the ribs 40, 42. Alternatively, the frame 48 and plate 28 may be molded in one piece with any necessary machining to finish the ribs 40, 42 and other elements. Similarly, the plugs 14 may also be made of nylon, acetal, or an impact modified polyacetal resin (such as TPOM), and may be molded or machined. The actuating member 16 may be made of any suitable plastic or metal, and may be molded or machined. The spring 20 may be any suitable spring that is dimensioned to receive the actuating member 16.

[0042] The foregoing is provided for purposes of illustration and disclosure of embodiments of the invention. It will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing may readily produce alterations to, variations of, and equivalents to such embodiments. Accordingly, it should be understood that the present disclosure has been presented for purposes of example rather than limitation, and does not preclude inclusion of such modifications, variations and/or additions to the present subject matter as would be readily apparent to one of ordinary skill in the art.

1. A release system comprising:

- a housing comprising: a frame that defines a plurality of apertures, each aperture comprising an engaging member; a plate positioned within the frame and moveable between a first position and a second position;
- a plurality of plugs inserted into the plurality of apertures, each plug comprising an engaging member; and
- an actuating member coupled to the frame and configured to selectively depress the plate when the actuating member is moved across the frame and the plate,

wherein, when the plate is in the first position, the engaging members of the plugs are engaged with the engaging members of the apertures to secure the plugs within the apertures, and

wherein, when the plate is in the second position, the plate is depressed and disengages the engaging members of the plugs from the engaging members of the apertures to release the plugs from the apertures.

2. The release system as in claim 1, wherein the plate is moved into the second position by either depressing the plate or by moving the actuating member.

3. The release system as in claim 1, wherein the frame comprises a top surface and a bottom surface, and the plate comprises a top surface and a bottom surface, and wherein, when the plate in the first position, the top surface of the frame is generally on the same level as the top surface of the plate.

4. The release system as in claim 1, wherein, when the plate is in the second position, the plate contacts and applies force to the engaging members of the plugs to thereby disengage the engaging members.

5. The release system as in claim 1, wherein the engaging member of one of the plugs comprises a slanted surface and

an inner surface, and the engaging member of one of the apertures comprises slanted surface and an inner surface.

6. The release system as in claim 5, wherein the inner surface of the engaging member of one of the plugs contacts the inner surface of the engaging member of one of the apertures, thus engaging the engaging member of one of the plugs with the engaging member of one of the apertures.

7. The release system as in claim 1, wherein the frame comprises a top surface, a bottom surface opposite the top surface, and sidewalls extending between the top surface and the bottom surface, and wherein the plurality of apertures are defined by the sidewalls, the top surface, and the bottom surface of the frame.

8. The release system as in claim 1, wherein the actuating member comprises an elongated cylinder and a protrusion.

9. The release system as in claim 8, wherein when the actuating member is moved across the frame and the plate, the protrusion contacts and depresses the plate, thus moving the plate into the second position.

10. The release system as in claim 1, wherein at least one of the frame or the plate is comprised of at least one of nylon, acetal, an impact modified polyacetal resin, or TPOM.

11. The release system as in claim 1, wherein one of the apertures further comprises at least one guide rail, and one of the plugs further comprises at least one channel that mates with the at least one guide rail when the plug is inserted into the aperture.

12. A release system comprising:

a housing comprising: a frame that defines a plurality of apertures; a plate positioned within the frame and moveable between a first position and a second position;

a plurality of plugs inserted into the plurality of apertures, each plug comprising an engaging member; and

an actuating member comprising an elongated cylinder and a protrusion, wherein the actuating member is coupled to the frame and the protrusion is configured to selectively depress the plate when the actuating member is moved across the frame and the plate,

wherein, when the plate is in the first position, the engaging members of the plugs are engaged with at least a portion of the apertures to secure the plugs within the apertures, and

wherein, when the plate is in the second position, the plate contacts and applies force to the engaging members of the plugs to thereby release the plugs from the apertures.

13. The release system as in claim 12, wherein the plate is moved into the second position by either depressing the plate or by moving the actuating member.

14. The release system as in claim 12, wherein both an outer top edge of the frame and an outer top edge of the plate are generally circular.

15. The release system as in claim 14, wherein an outer top edge of the plate is concentric with an outer top edge of the frame.

16. The release system as in claim 12, further comprising at least one flexible rib to couple the plate to the frame.

17. The release system as in claim 16, wherein the at least one rib presses on the plate to return the plate to the first position.

18. A release system comprising:

a housing comprising:

a frame comprising a top surface, a bottom surface opposite the top surface, and sidewalls extending between the top surface and the bottom surface, wherein the sidewalls of the frame define the plurality of apertures that are configured to receive a plurality of plugs; and

a plate having a top surface and positioned within the frame, wherein the plate is moveable between a first position and a second position;

an actuating member coupled to the frame and configured to selectively depress the plate when the actuating member is moved across the frame,

wherein, when the plate is in the first position, the top surface of the frame is generally on the same level as the top surface of the plate, and

wherein, when the plate is in the second position, the plate is configured to contact and apply force to the plurality of plugs to thereby release the plugs from the apertures.

19. The release system as in claim 18, further comprising a plurality of plugs inserted into the plurality of apertures.

20. The release system as in claim 19, wherein each plug is secured to a strap.

21. The release system as in claim 18, further comprising knobs protruding from the bottom surface of the frame, wherein the knobs may be used to secure the housing to a garment or gear worn by a user.

* * * * *