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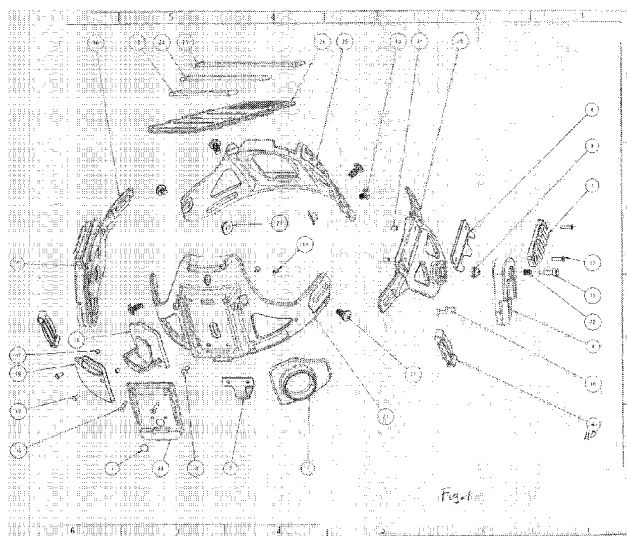
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(54) Title: HELMET ATTACHMENT PLATFORM



(57) Abstract: A modular helmet attachment platform for ACH and MICH helmets enables the user to attach various off-the-shelf user items that users may have in the field, such as lights, IFF devices, NVGs, and NVG accessories, to a helmet.

Helmet Attachment Platform

Related Applications

[0001] This application claims the benefit of the filing date of US Provisional Application No. 61/054,262, filed May 19, 2008, the disclosure of which is incorporated by reference.

Background of the Invention

[0002] The invention is a modular helmet attachment platform for ACH and MICH helmets. The platform enables the user to attach various off-the-shelf user items that users may have in the field, such as lights, IFF devices, NVGs, and NVG accessories, to a helmet.

Brief Description of the Drawings

[0003] In the attached drawings:

[0004] Fig. 1 is an exploded perspective view of an attachment platform that is a first embodiment of the invention;

[0005] Fig. 2 is an enlarged view of a part of Fig. 1;

[0006] Fig. 3 is an enlarged view of another part of Fig. 1;

[0007] Fig. 4 illustrates attachment of a battery/counterweight to the attachment platform;

[0008] Figs. 5-8 illustrate the use of a top strap that forms part of the attachment platform;

[0009] Fig. 9 illustrates attachment of goggles to the attachment platform;

[00010] Fig. 10 illustrates an O₂ mask attachment member that is part of the attachment platform;

[00011] Figs. 11 and 12 illustrate an NVG lanyard that is part of the attachment platform; and

[00012] Figs. 13-16 illustrate ancillary item mounts that are part of the attachment platform.

Detailed Description

[00013] The invention is a modular helmet attachment platform for ACH and MICH helmets. The platform enables the user to attach various off-the-shelf user items that users may have in the field, such as lights, IFF devices, NVGs, and NVG accessories, to a helmet. The invention is applicable to platforms of varying constructions. As representative of the invention, the drawings illustrate one particular platform 100 that is an embodiment of the invention.

[00014] The platform 100 includes a multi-piece frame that supports other parts of the platform. Some user items can be supported directly on the frame; others are supported on the other parts of the platform.

[00015] The frame of the platform includes four pieces—a front frame 27, a rear frame 29, and side frames 28 and 30. To mount the frame on a helmet (such as the helmet 200 shown in Fig. 5), screw 12 is first inserted through the vertically extending center slot 40 of the front frame 27 and into the center hole of the helmet, if the helmet being used is an ACH, to position the front frame on the helmet. In the event that a MICH helmet is used, the vertically extending center slot 42 found just below the top hook 44 of the front frame 27 is where screw 12 will reside to

attach to the MICH's corresponding center hole. The presence of the vertically extending slots 40 and 42 enables the front frame 27 to be secured to different helmets having vertical hole placement tolerances.

[00016] The rear frame 29 of the platform 100 attaches to the rear holes of the helmet via two screws 19 extending through the slots 44 in the side portions of the rear frame. The presence of the slots 44 enables the rear frame 29 to accommodate helmet rear holes that may be in different locations because of manufacturing tolerances. These slots 44 are recessed to allow for the same length screws 19 to be used on either the front frame only configuration or on the rear frame.

[00017] Once the rear frame 29 is secured, the side frames 28 and 30 can be secured to the helmet also—specifically, to the front frame 27 and the rear frame 29. The side frames 28 and 30 of the platform 100 as shown can be attached to the helmet only when both the front and rear frames 27 and 29 are attached as well.

[00018] To attach the side frames 28 and 30 to the front frame 27, the slotted forward arms 46 of the side frames are placed over the slotted side arms 48 of the front frame, before the front screws 19 are inserted and tightened down. The slots 50 in the forward arms 46 of the side frames 28 and 30 enable front to back adjustment of the side frames relative to the front frame 27, to accommodate different size helmets.

[00019] For attaching the side frames 28 and 30 to the rear frame 29, the rear frame 29 includes two weld nuts 21 fitted into vertically slotted openings 52 at the very ends of the rear frame side portions 54. The horizontally slotted rearward arms 56 of the side frames 28 and 30 are placed over the vertically oriented slots 52 of the rear frame side portions 54. Screws 18 are inserted through slots 58 in the rearward arms 56 of the side frames 28 and 30, and into the weld nuts 21, to secure the side

frames to the rear frame. The horizontal slots 58 in the rearward arms 56 of the side frames 28 and 30 enable front to back adjustment of the side frames relative to the rear frame 29, to accommodate different size helmets. This adjustment capability, together with the front to back adjustment capability of the side frames 28 and 30 relative to the front frame 27, and the vertical adjustment capability of the front frame on the helmet, provide a one size fits all capability for the platform 100.

[00020] The front frame 27 supports the reversible Wilcox-Norotos plate 33, the NVG lanyard 140 (Figs.11 and 12), the top strap 26, name badge areas, and ancillary mounts. The reversible Wilcox-Norotos plate, item 33, may have attached to it either a Wilcox-interfaced NVG or a Norotos-interfaced NVG, depending upon the orientation of the plate. The plate 33 may be slid in and out of a plate housing portion 33a on the front of the front frame 27 and flipped around to expose either the Wilcox side or the Norotos side. The two different sides of the 33 will interface with respectively with correspondingly styled interface of one or the other of the two different NVG units.

[00021] The reversible plate 33, once it is slid into place on the housing 33a, is secured to the front frame 27 with screws 15 into opening 62. The housing 33a is configured to accept the plate reversible 33 in either orientation. For a MICH helmet, the front frame 27 may be attached to the platform 100 via screw 12 into MICH's vertical hole 42 either before or after the reversible plate 33 is screwed into place. For an ACH helmet, the front frame 27 must be attached to the platform 100 via screw 12 into ACH's vertical slot 40 before the reversible plate 33 is screwed into place, because the plate covers the slot.

[00022] The rear frame 29 supports a battery pack/counterweight 66 (Fig. 4). In one embodiment, the battery pack 66 is held in place via a Velcro strap 68 looped through slots 70 on the sides of the rear frame 29.

In another embodiment, the battery/counterweight 66 is held in place by a rubber strap 25 (Fig. 2) that is fitted into the slots 70 on the sides of the rear frame 29. The strength of the strap 25 is selected so that the battery/counterweight can break away from the frame under a predetermined amount of force, to prevent hazardous snags.

[00023] The platform is provided with a top strap. Two embodiments are illustrated. In the first embodiment, shown in Fig. 2, the top strap 26 is made of rubber or another elastomeric material. The top strap 26 hooks onto the top of the helmet from the top hook 72 of the front frame 27 to the top hook 74 of the rear frame 29. The top hook 74 of the rear frame 29 engages in any one of the closely placed lateral slots 76 located at the back end portion of the rubber top strap 26. The selected slot 76 depends upon the size of the helmet on which the platform 100 is being attached; any tolerance in the length from front-to-back within a given helmet size is accommodated by the elasticity and strength of the rubber material used for the top strap 26. Any excess length of the top strap 26 can be hidden behind the battery/counterweight.

[00024] The top strap 26 is primarily used to support IFF/IR strobe lights and other accessories, which are held onto the strap 26 via laterally extending rubber straps 23, 24. The ends of the rubber straps may be secured into any of the slots 78 found along the side of the top rubber strap 26, to allow secured items to break away from the strap given some amount of force, to prevent hazardous snags. The stability of spacing between side slots 78, hence the robustness of top strap 26's ability to hold various items, is maintained via the inclusion of numerous horizontal (lateral) slots 80 along the length of top strap 26. These horizontal slots mitigate dimensional variation in the horizontal direction caused by tension experienced (for example, due to Poisson's ratio) when top strap 26 is tightened between front frame 27 and rear frame 29.

[00025] The top rubber strap 26 may alternatively be replaced with a TRON device. The battery-end hook of the TRON device can be connected with the top hook 72 of the front frame 27, and the hook on the TRON device's other end can be connected with a strand of webbing terminated at a slot on the bottom of the rear frame 29.

[00026] In the second embodiment of the top strap, shown in Figs. 5-8, the main top strap 84 is made of fabric. The main top strap 84 has Velcro loop fasteners 86 at both ends that extend through loops 88 on the front and rear frames, to secure the top strap. In this way, the overall length of the main top strap 84 as installed is adjustable to fit different helmet and platform configurations.

[00027] A plurality of laterally extending slots 85 are formed in the main top strap 84. A plurality (four are illustrated) of lateral Velcro straps 92 are extendable through the slots 85 in the top strap. Each one of the lateral Velcro straps 92 can be looped through a selected one of the slots 85 in the main top strap 84 and may wrap back and secure back onto itself, adjustably, to grasp an item such as a light 94 (Fig. 8) to be held to the main top strap. It should be understood that the light shown in Fig. 8 is not a part of the platform 100, nor is it a product of applicant BAE. It should further be understood that the light is not the only thing that may be attached, but is merely an example of something being attached.

[00028] These lateral Velcro straps 92 may individually or altogether be removed from the main strap 84, if desired, or reattached through threading through the slots 85 in the main strap. Without the lateral Velcro straps 92, the main top strap 84 still has fabric Velcro loop fasteners exposed as at 87 for simple Velcro attachment of items for ease of item removal and emergency breakaway.

[00029] The platform 100 includes two adaptors 110 for supporting goggles, such as ESS goggles 112 (Fig. 9), on the side frames 28 and 30. Each adaptor 110 has two barrels 112 at opposite ends, with a web 114 between. A slot 116 extends transversely through the web 114 of the adaptor 110, along the length of the adaptor. A circular goggle pivot 116 is provided on each one of the side frames 28 and 30.

[00030] To adapt the goggles 112 to the platform 100, the existing elastic webbing of the goggles, which normally extends in a complete loop all the way from one side of the goggles to the other so as to fit around the back of the wearer's head, is cut fairly short at each side of the goggles, as shown at 120. Each one of the cut ends 120 is then looped through the slot 116 in one of the adaptors 110, and sewn or otherwise secured onto itself. As a result, the two adaptors 110 are held securely to the short strap ends 120 of the goggles 112. Then, at each adaptor 110, opposite ends of an elastic cord 122 are secured to the barrels 112 of the adaptor. This elastic cord 122 can be slipped around the goggle pivot 116 on the side frame 28 or 30 of the platform 100. The combination of the elastic cord 122 and the adaptor 110 effectively replaces the cut-off central portion of the goggle webbing. This modification is done to each side of the goggles 112.

[00031] The elastic cord 122 allows the goggles 112 to be placed on the platform 100 in several different positions. The goggles 112 can be placed as shown in Fig. 9, over the user's eyes. Alternatively, the goggles 112 can freely pivot away from the user's eyes and all the way to the rear of the helmet for storage. In each position, the goggles 112 are securely retained on the helmet via the combination of the elastic strap 122, the adaptor 110, and the platform 100. The goggles 112 are easily removable from the helmet, simply by removing the elastic straps 122 from the goggle pivots 116.

[00032] The goggle pivot 116 also houses the snap attachment for releasably securing an O₂ Mask. The O₂ mask is secured via an O₂ mask receptacle 8 which is part of the overall platform 100. The goggle pivot has on its interior an undercut for receiving the O₂ mask receptacle 8.

[00033] First, a screw 20 and a nut 9 are screwed together with the receptacle 8 to form one unit that also includes a compression spring 22 through which the screw 20 extends. The O₂ mask is then attached semi-permanently to this unit, specifically to the receptacle 8, via screws 16 in screw holes 16a. As a result, this forms one spring-loaded unit.

[00034] The receptacle 8 has three tabs 132 that engage in a snap fit with the undercut on the goggle pivot 116. Together, this forms a releasable snap-fit pivot connection.

[00035] To mount the receptacle 8, the receptacle is placed in the goggle pivot 116, and the screw 20 is pressed down and held. The pressing of the screw 20 pushes the nut 9 away from the tabs 132, causing them to retract to provide clearance to move the receptacle 8 into the goggle pivot 116.

[00036] The screw 20 is then released. When the screw 20 is released, the nut 9 spreads the tabs 132 out to a rigid position that keeps the receptacle 8 from being removed from the side frame 28 and/or 30. The receptacle 8 is thereby secured to the platform side frame. Once in place, the mask receptacle is fixed at an angled position towards the chin of a 50th-percentile male user.

[00037] The screw 20 may subsequently be pressed and held to enable removal of the mask receptacle 8 from the side frame 28 and/or 30. The O₂ mask may be quickly donned and doffed from the helmet by placing or removing the snap receptacle 8 on and off the goggle pivot 116.

[00038] In an alternative embodiment, there is no screw 20, nut 9, or spring 22. Instead, the tabs 130, 132 on the receptacle 8 and on the goggle pivot 116 act strictly as a snap-fit design and are of a semi-flexible material yet ribbed to improve rigidity. With this alternative mask receptacle design, the angular position of the mask is not fixed, and the mask may be rotated to any desired position. The receptacle 8 is thus pivotally supported on the goggle pivot 116 for pivotal movement relative to the goggle pivot. The O₂ mask is thus supported on the helmet for pivotal movement relative to the helmet.

[00039] The NVG lanyard 140 (Figs. 11 and 12) is a shock cord whose end portions 142 terminate in hooks. The lanyard 140 can be used to latch on to an NVG that is in place on the NVG mounting plate 33 so that the user does not lose the NVG should it break away from its mount.

[00040] When the lanyard 140 is not in use, it is stored on the front frame 27. The central portion 144 of the lanyard 140 is fitted into a sized recess channel 146 on the back side of the front frame 27. The end portions 142 extend from underneath the frame 27 and are stored on cylindrical posts 148 located on each side of the housing for the reversible NVG mounting plate 33. When the lanyard 140 is in use (not shown), the hooks 142 are pulled off the posts 148 and wrapped around an NVG unit to hold it securely on the front frame 27. In an alternative embodiment, not shown, the lanyard 140 and its hooks can be hidden completely behind the front frame 27 when the lanyard is not in use.

[00041] The front frame 27 has two elliptical openings 150, one on either side of the NVG mount, that are used to support various COTS items. The rear frame 29 similarly has two openings 150 that can be used for the same purpose. Each item that snaps into one of the openings 150 has tabs that resiliently extend through the opening and engage behind the frame piece, to hold the item in place on the frame piece.

[00042] Specifically, for each item to be supported there is provided, as part of the platform 108, an ancillary mount with four tabs 154 on its back side which as a group have the same elliptical shape as the opening 150 in the front frame 27. The apexes of these four tabs 154 are orthogonal from one another, and each has a unique geometry so that the breakaway force in each direction is unique. The largest of the four tabs 154 snaps in first and is the strongest, whereas the weakest tab snaps in last; the weakest tab is the tab closest to the lateral center of the frame (the NVG mounting portion) since it is least likely to experience breakaway force.

[00043] For example, the mount designated 11 in Figs. 1-3, 13 and 14 may snap into the elliptical opening 150 in the left side of the frame 27 and support a Princeton Tec Pilot Headlamp Accessory. The mount 11 allows the light to point down and its shroud 11a prevents the light from being seen at a distance-this mount can be modified to allow for the Princetone light's inherent rotational capabilities, for reading maps.

[00044] As another example, the mount designated 10 in Figs. 1-3 and 15 can alternatively fit into the elliptical opening 150 in the left side of the front frame 27. Item 10 can support a Petzl light using screws 17 and threaded inserts 31. This arrangement does not detract from the operability of the light. The light may remain attached to the mount as the mount 10 is donned and doffed from the front frame 27. The angle at which the light should protrude can be selected to guarantee ergonomic placement.

[00045] As yet another example, item 7 (Fig. 16) is an ancillary mount that can be used to temporarily support an NVG lens cap while the NVG is in use. The mount 7 has a circular rim 156 that projects outward, to receive and support the lens cap. Additional ancillary mounts of these kinds may be provided to support other devices.

[00046] The side frames 28 and 30 of the platform 100 extend over the ear sections of the helmet and also support cable management and picatinny rail features. A picatinny rail 1 (Fig. 3) allows for the attachment of various COTS items which are designed to attach to this MIL-STD-1913 dovetail rack. The rail 1 is attached to the platform via threaded inserts 32 in the side frame 28, 30 and screws 13.

[00047] A cable management plate 4 may be attached to the side frame 28, underneath the picatinny rail 1, via screws 13. The cable management plate 4 supports wiring (not shown) routed from the battery on the rear frame 29 of the platform to an NVG attached to the front frame 27. The wiring (cable) can be placed under the three teeth 4a of the plate 4, before the plate is attached to the side frame 28, 30 of the platform.

Claims:

1. An attachment platform for supporting user items on a user's helmet, comprising:

a front frame piece having left and right slotted side arms and having at least one opening for receiving a fastener for supporting the front frame piece on the helmet;

a back frame piece having left and right slotted side arms and having at least one opening for receiving a fastener for supporting the back frame piece on the helmet;

the side arms of the front frame piece being spaced apart from the side arms of the back frame piece when the front frame piece and the back frame piece are mounted on the helmet; and

left and right side frame pieces each having slotted forward arms and slotted rearward arms;

the slots in the forward arms of the side frame pieces overlying the slots in the slotted side arms of the front frame piece when the front frame piece and the side frame pieces are mounted on the helmet, and receiving fasteners extending into the helmet; and

the slots in the rearward arms of the side frame pieces overlying the slots in the slotted side arms of the back frame piece when the back frame piece and the side frame pieces are mounted on the helmet, and receiving fasteners extending into the helmet;

whereby the front-to-back dimension of the platform is adjustable at the front and at the back of the frame side pieces.

2. A platform as set forth in claim 1 also including at least two vertically extending slots in the front frame piece of the platform for providing a vertical adjustment capability when attaching the front frame piece on the helmet.

3. An attachment platform for supporting user items on a user's helmet, comprising:

a frame piece having at least two slots for receiving fasteners for supporting the frame piece on the helmet, the frame piece having an item mount opening extending between its inner and outer surfaces; and

a plurality of item mounts for supporting user items on the frame piece;

each one of the item mounts having a plurality of engagement tabs that resiliently snap into the opening and engage behind the inner surface of the frame piece to hold the item mount on the frame piece.

4. A platform as set forth in claim 3 wherein the item mount opening in the frame is not circular and the items mounts have engagement tabs with differing pull-out strengths.

5. A platform as set forth in claim 4 wherein the item mount opening in the frame is elliptical.

6. An attachment platform for supporting user items on a user's helmet, comprising:

a front frame piece having at least two slots for receiving fasteners for supporting the front frame piece on the helmet; and

an NVG mounting plate having first and second opposite major side surfaces, the first major side surface of the NVG mounting plate adapted to engage and support a Norotos NVG, the second major side surface of the NVG mounting plate adapted to engage and support a Wilcox NVG;

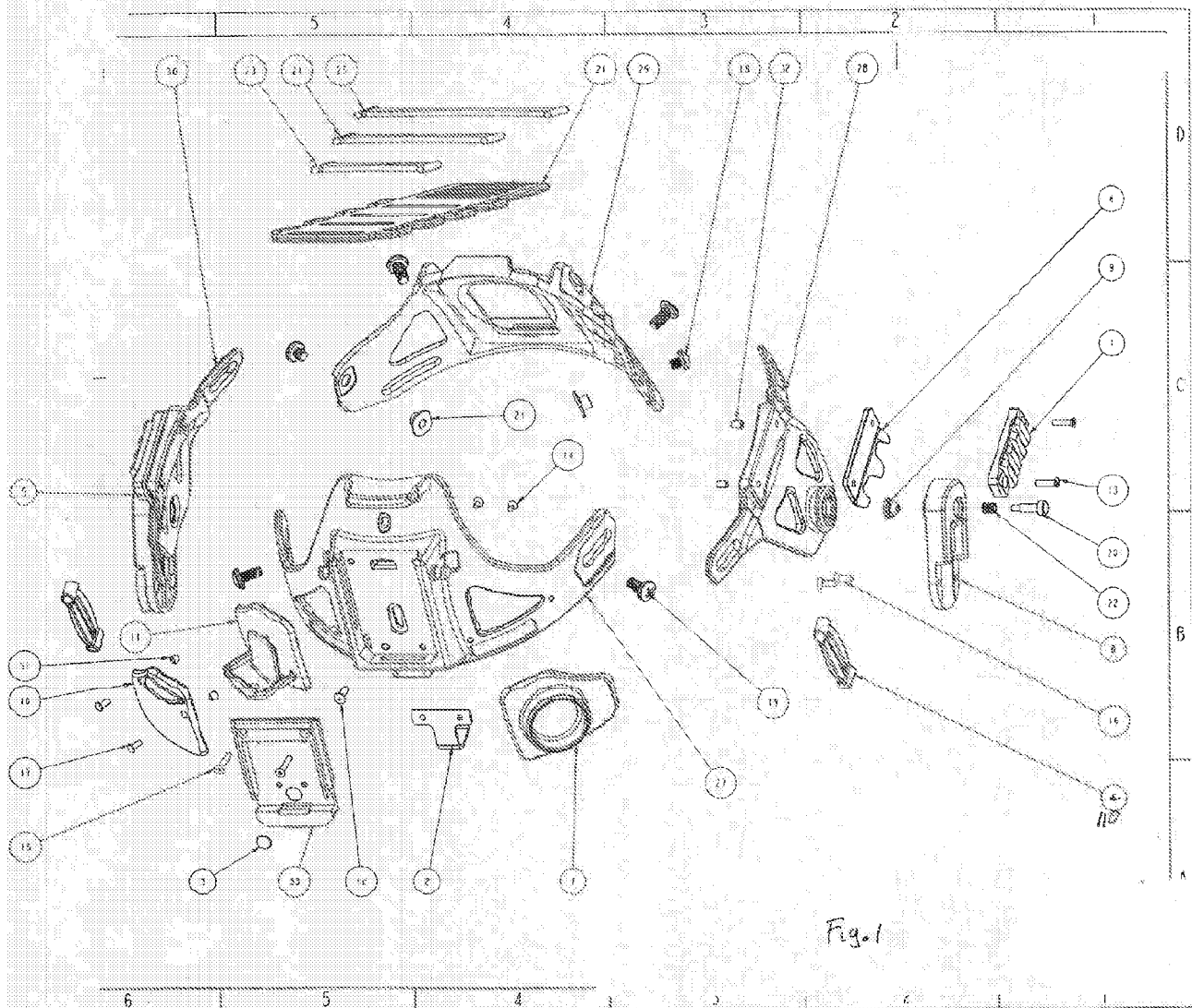
the front frame piece having an NVG mounting portion adapted to support the NVG mounting plate in first and second opposite orientations;

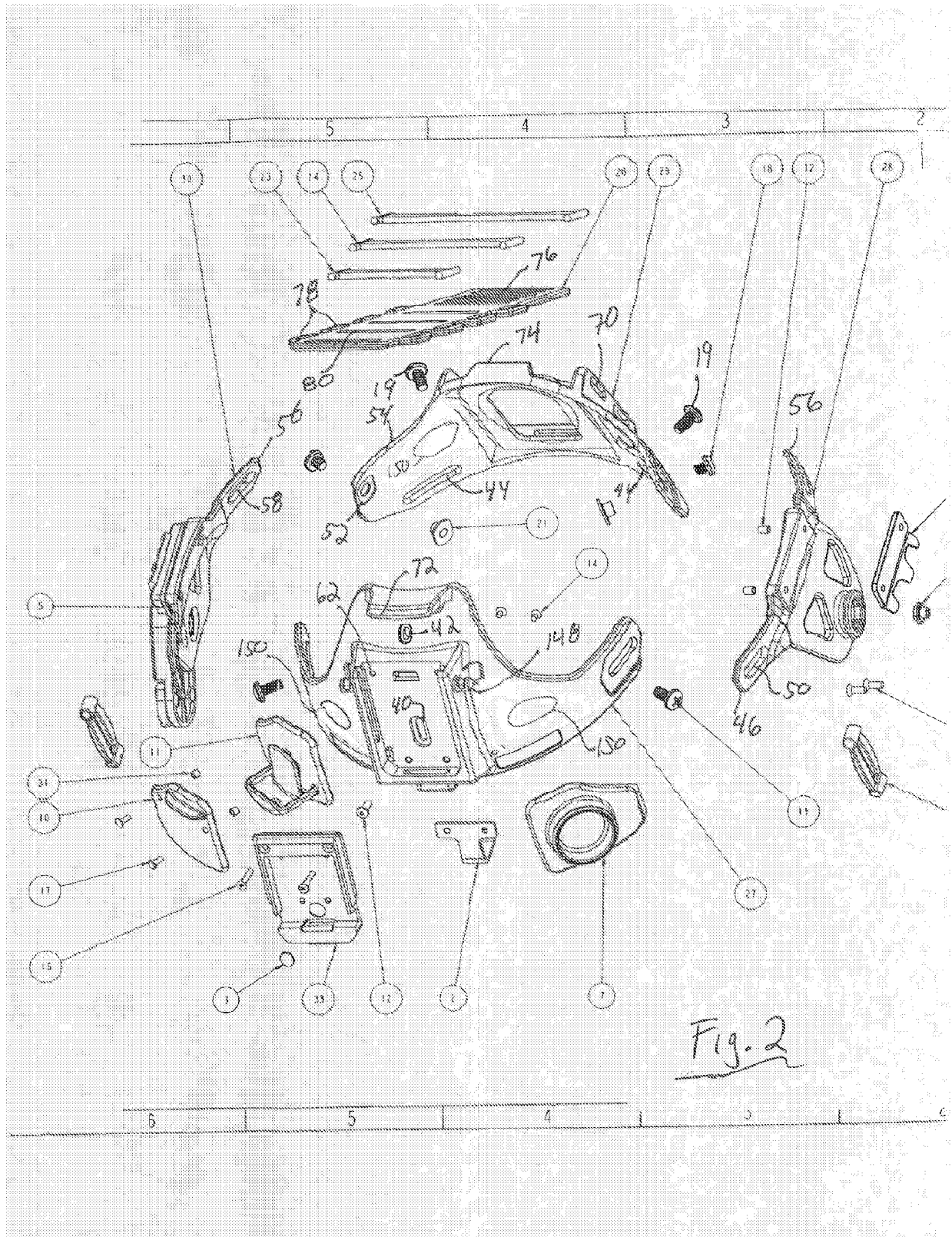
the front frame piece supporting the NVG mounting plate in the first orientations when the first major side surface of the NVG mounting plate engages and supports a Norotos NVG,

the front frame piece supporting the NVG mounting plate in the second orientation when the second major side surface of the NVG mounting plate engages and supports a Wilcox NVG.

7. A platform as set forth in claim 6 wherein the NVG mounting portion of the front frame piece includes two raised portions on opposite sides of a flat central surface, the first major side surface of the NVG mounting plate overlying the flat central surface of the NVG mounting portion when the NVG mounting plate is in the first orientation, and the second major side surface of the NVG mounting plate overlying the flat central surface of the NVG mounting portion when the NVG mounting plate is in the second orientation.

8. A method of mounting goggles on an attachment platform that supports user items on a user's helmet, comprising the steps of:
- removing the central portion of the goggle strap;
 - attaching each end portion of the goggle strap to a respective adaptor;
 - attaching each adaptor to a respective elastic strap; and
 - attaching each elastic strap to a goggle pivot on the platform.





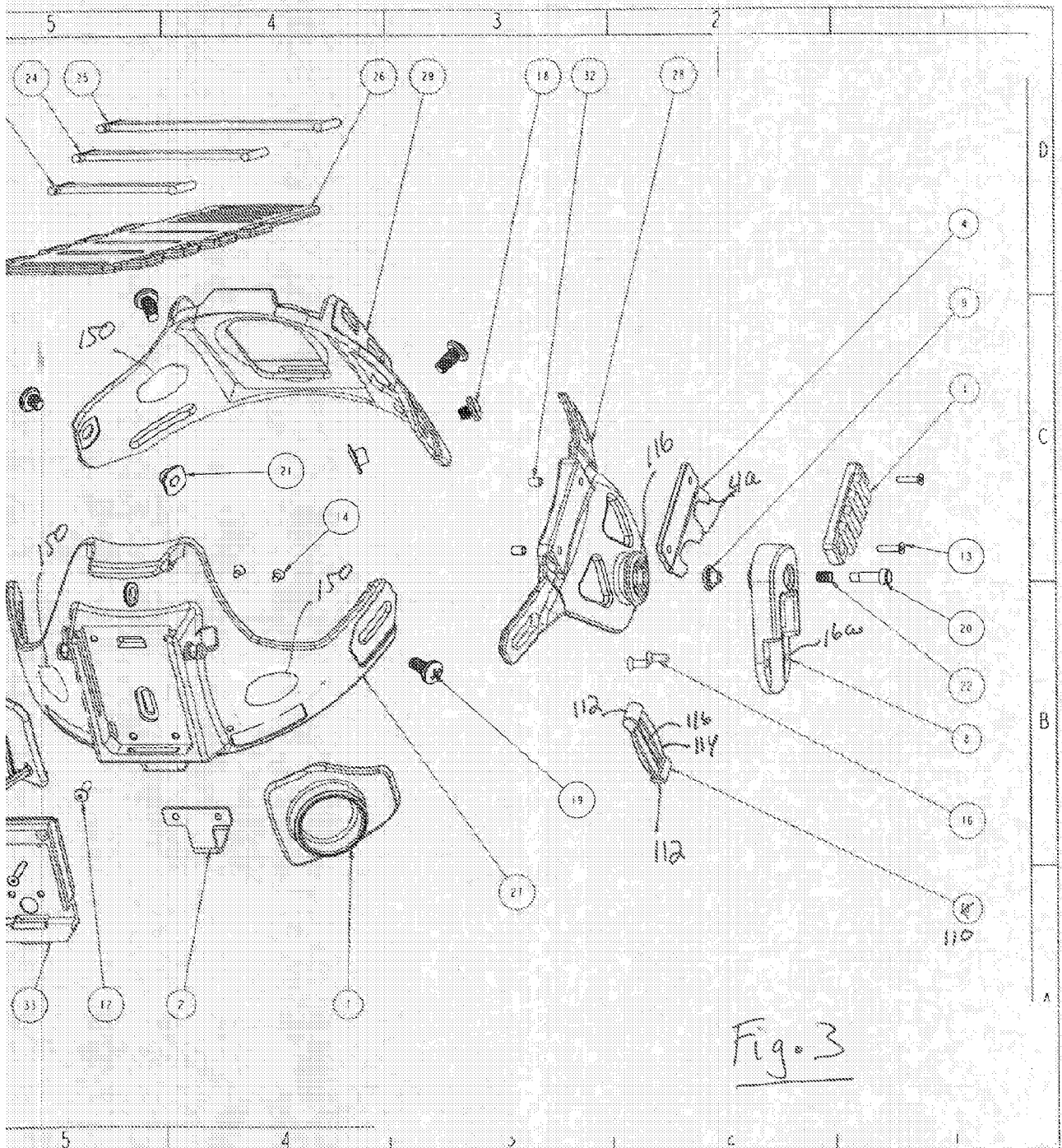


Fig. 4

66



68

67

FIG. 5

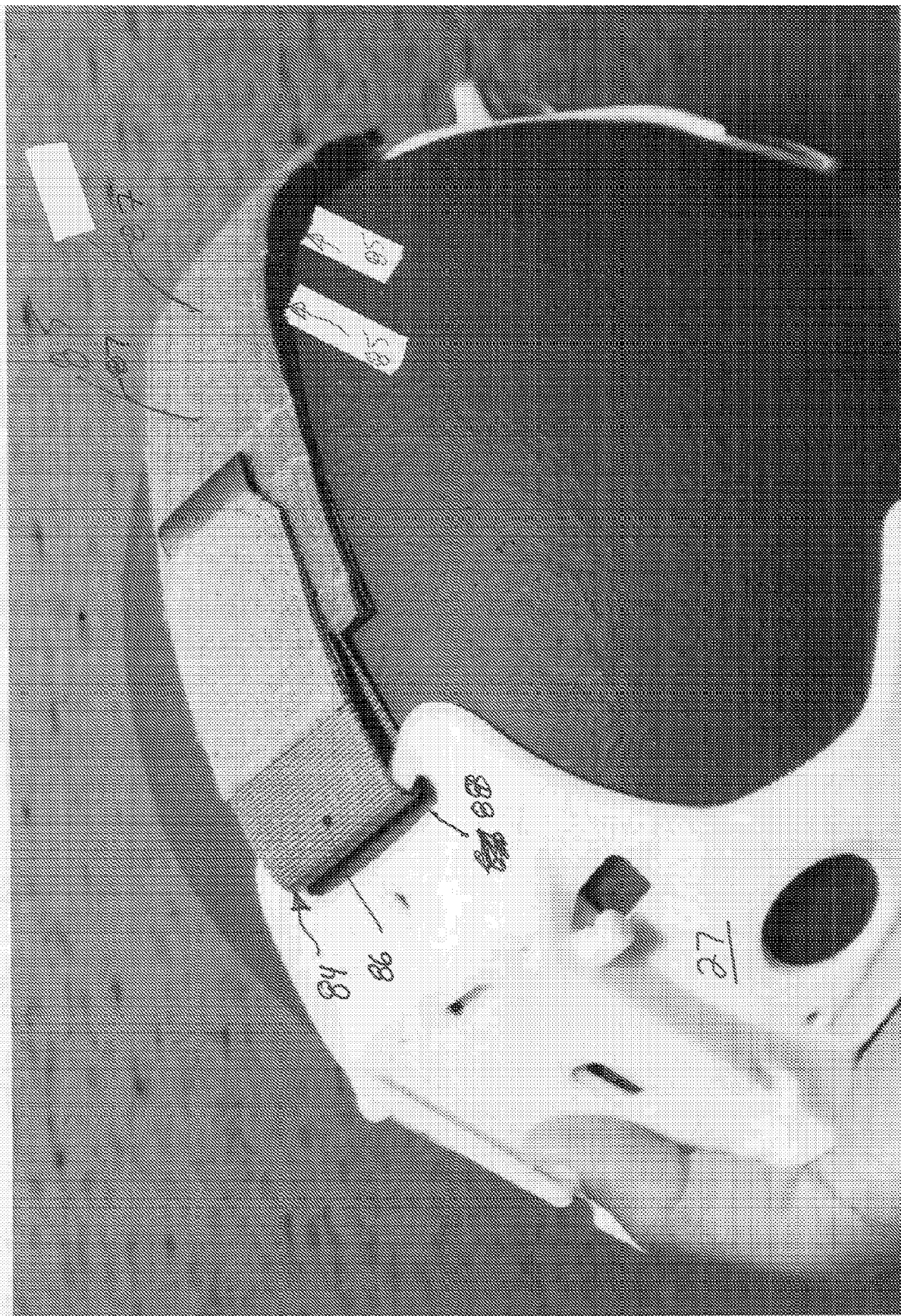


Fig. 6

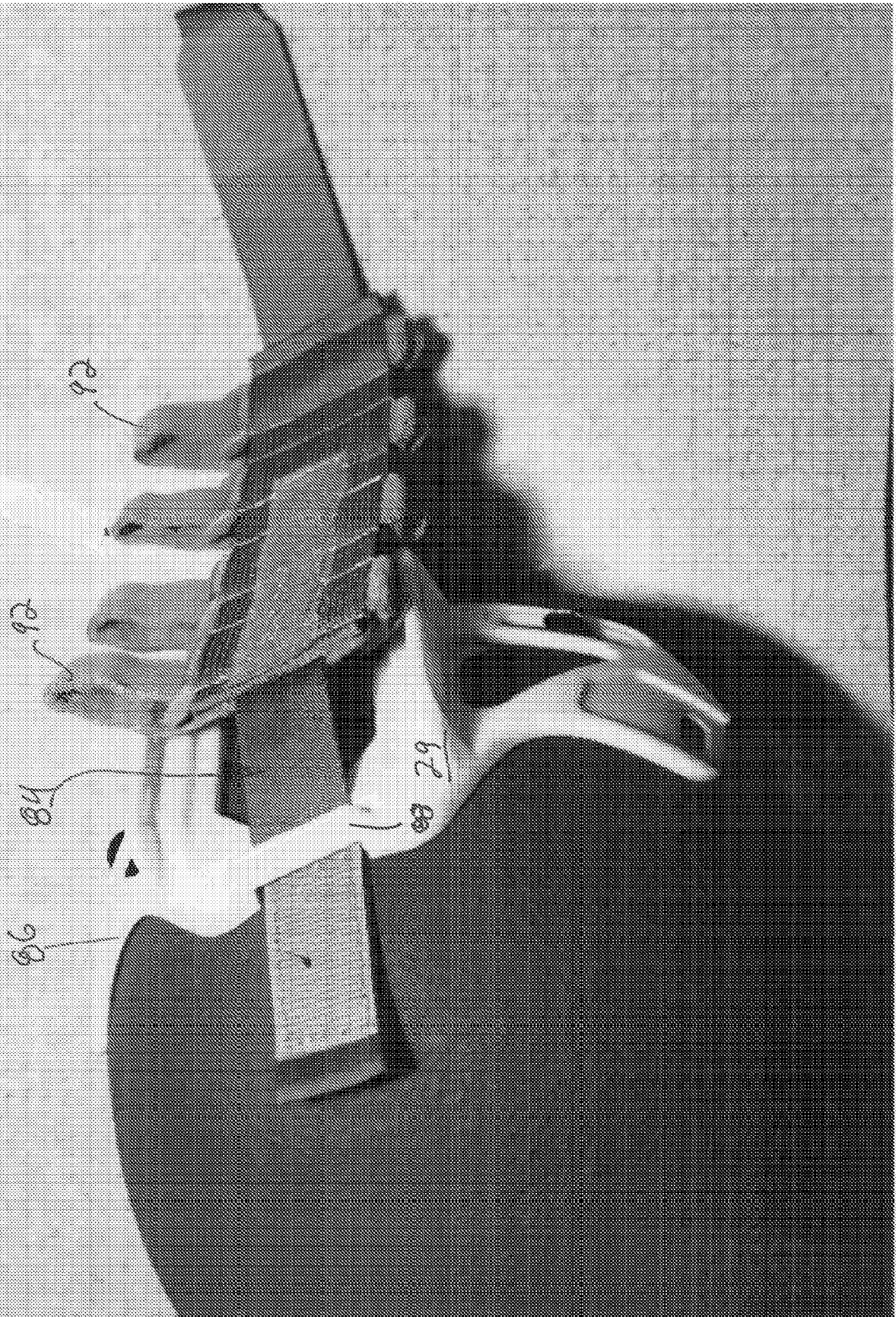


Fig. 7

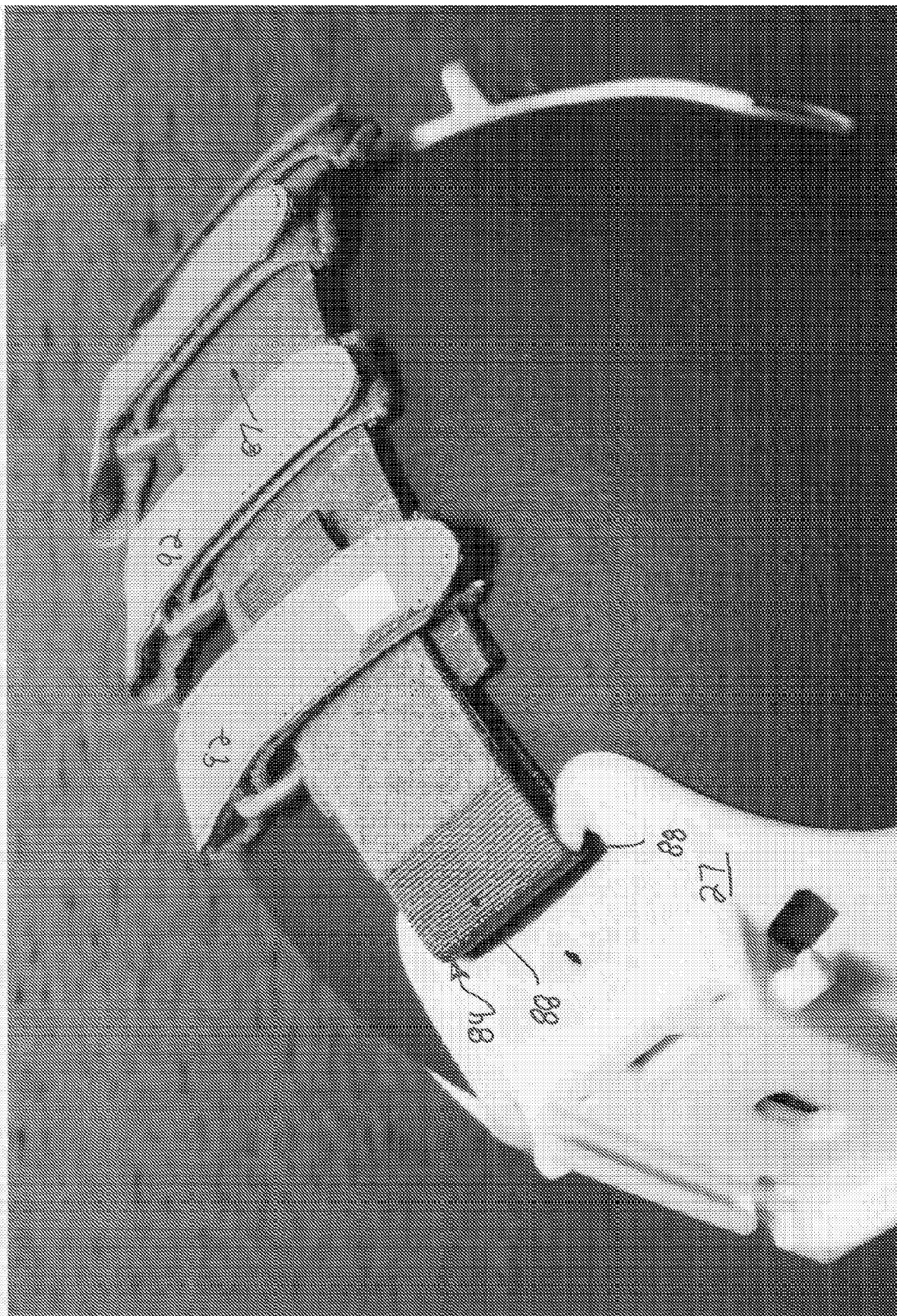
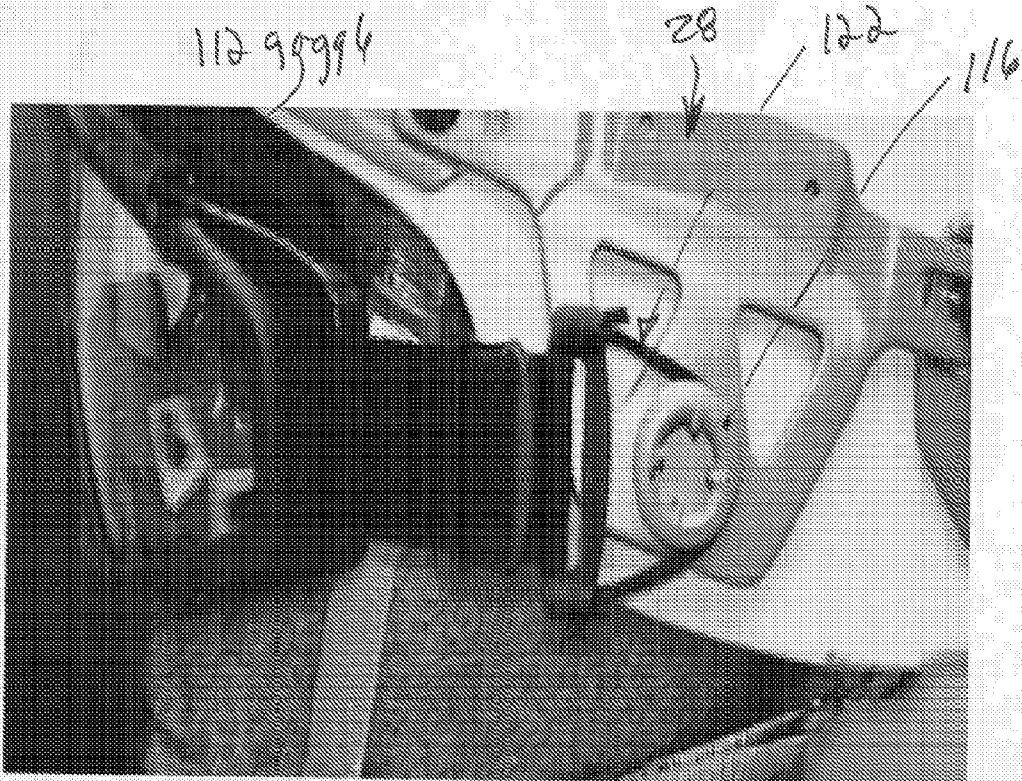


Fig. 8

99=light

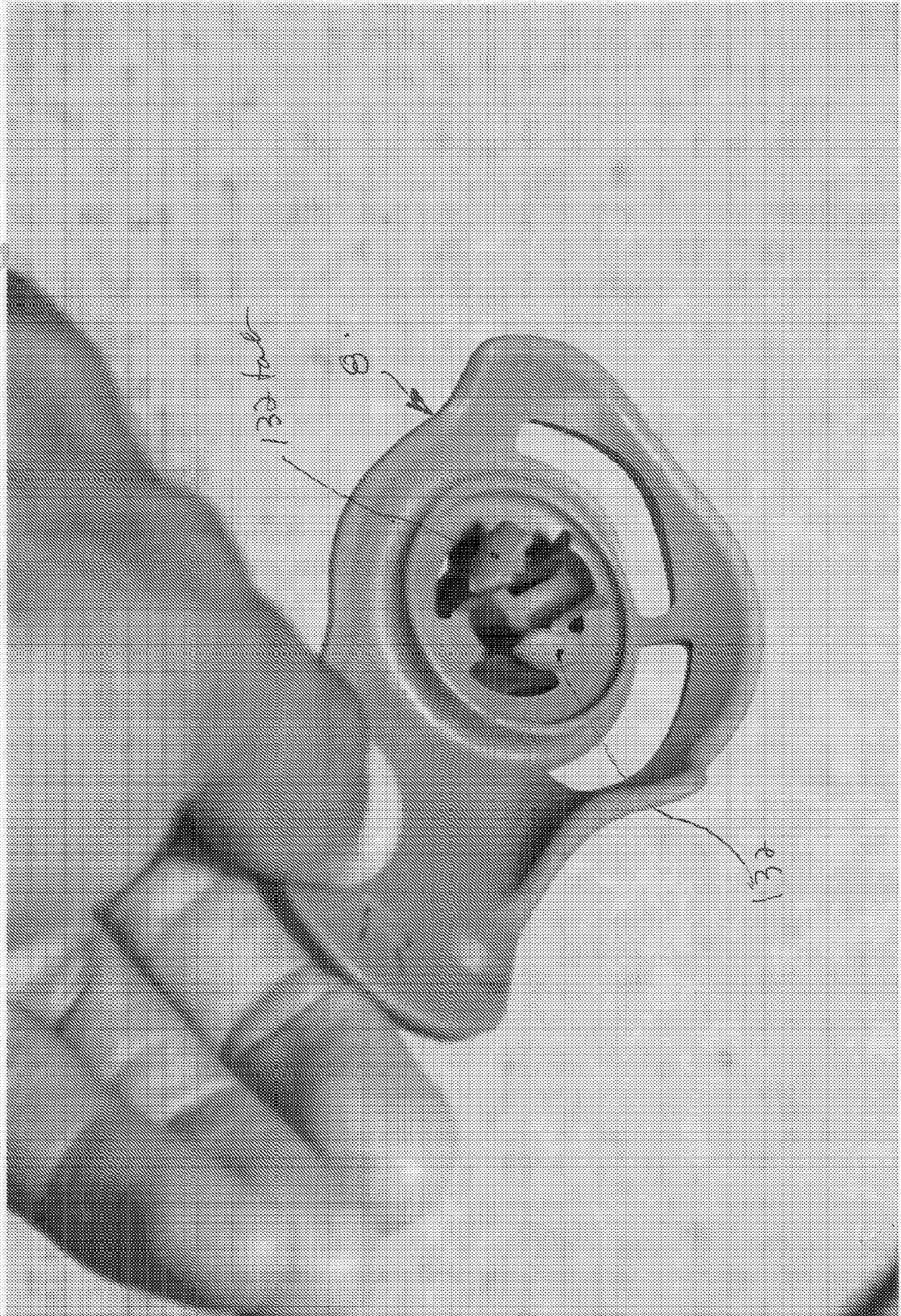


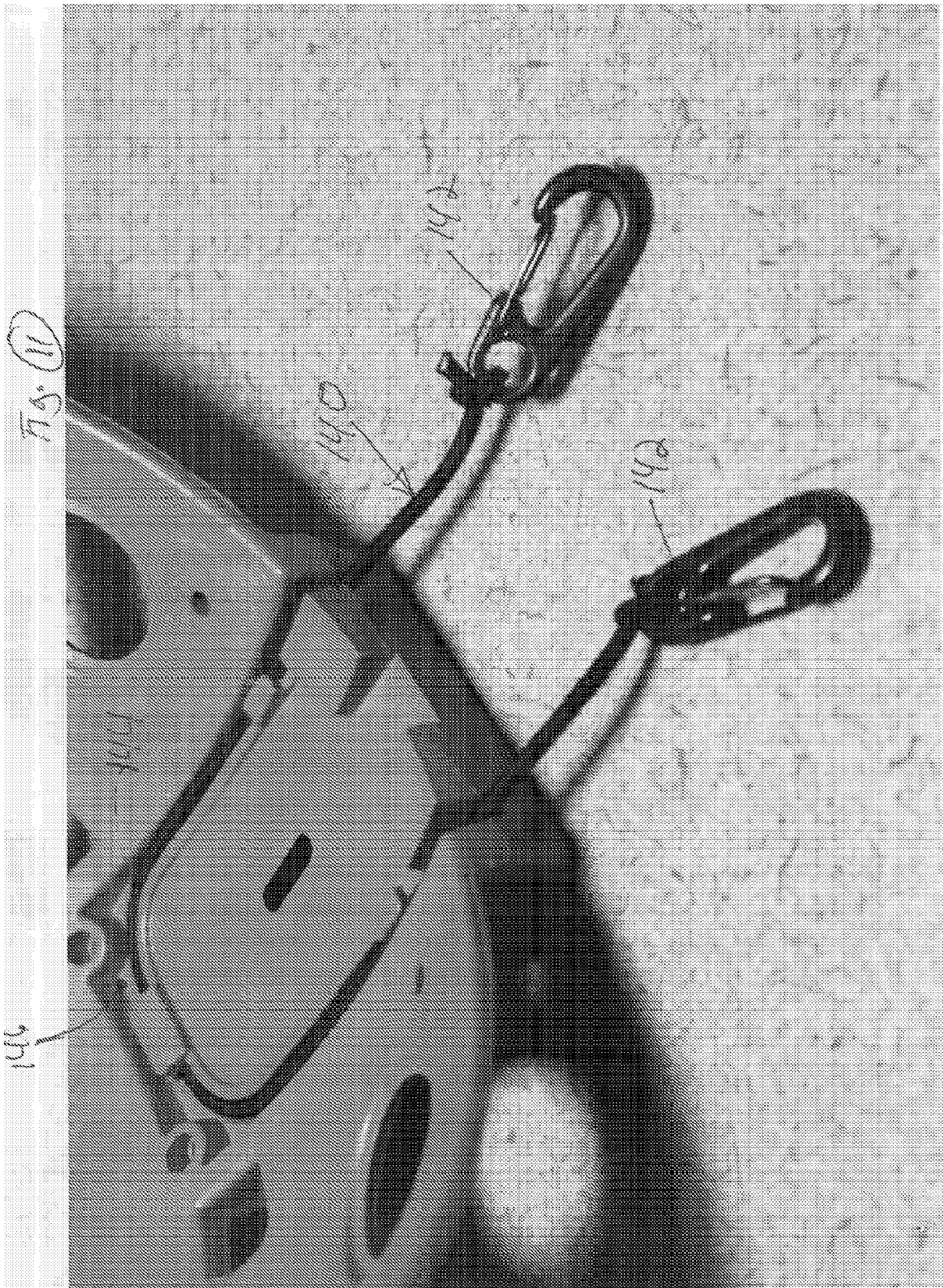


120
web

Fig. 9

Fig. 10





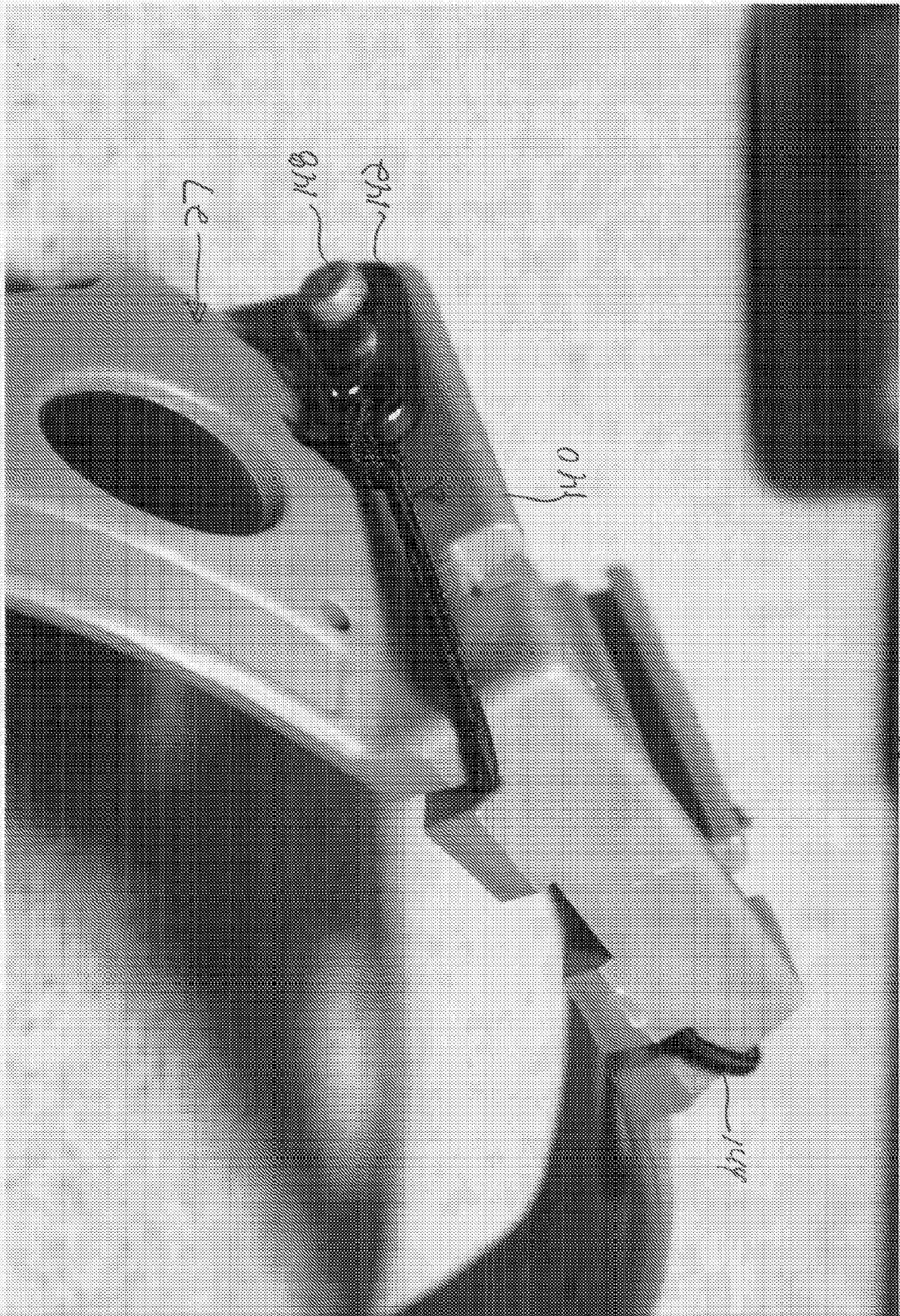


Fig. 12

Fig. 13

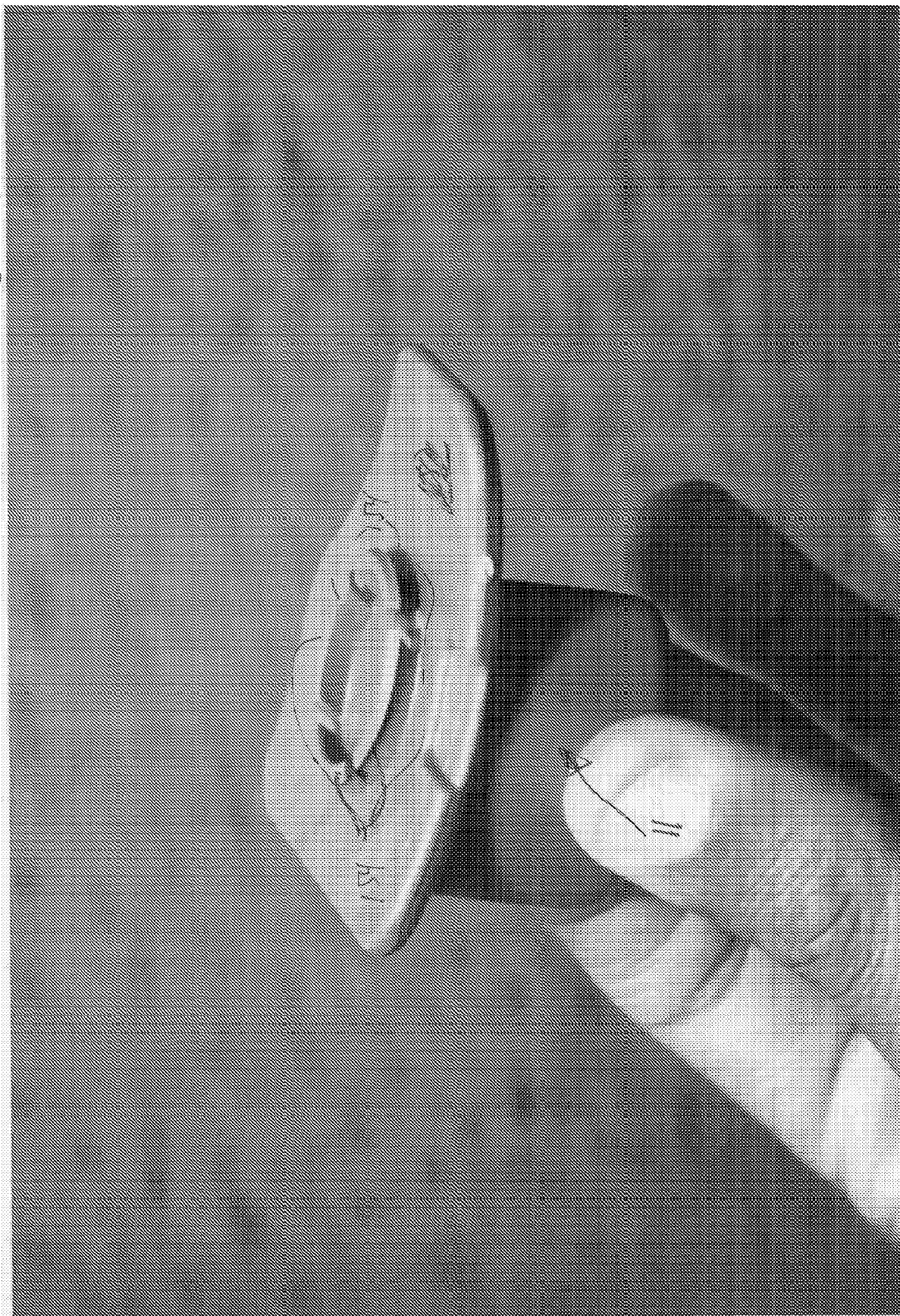


Fig. 14

