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(54) **HOOK WITH LATCH AND TRIGGER MECHANISM ASSEMBLY**

HAKEN MIT VERRIEGELUNG- UND AUSLÖSEMECHANISMUS

CROCHET AVEC MÉCANISME DE VERROUILLAGE ET DE DÉCLENCHEMENT

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## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention.

**[0001]** The present invention relates to a hook for lifting loads with a locking latch having a trigger mechanism for disengaging the lock in order to move the latch from a closed to an open position. 2. Prior Art.

**[0002]** Various types of industrial hooks are utilized for lifting large loads. The hook assembly will typically have a body with an open saddle for receiving a load or rigging for the load. In some cases, the hook assembly includes a latch for closing the saddle of the hook so that the load or rigging cannot be dislodged or removed from the hook unless the latch is moved to an open position.

**[0003]** The body of the hook, in turn, will be connected to rigging, such as a wire line to raise the load. The hook may feature an eye, a clevis, a swivel or other attachment mechanism.

**[0004]** For example, Applicant manufactures and markets a line of hooks under the SHUR-LOC brand that feature self-locking latches.

**[0005]** Various types of handles have been added to the body of the hook either as a separate, add-on device or as a part of the body of the hook. In some cases, a finger or thumb moves a button or switch outside of the handle to activate or deactivate the lock.

**[0006]** Notwithstanding the foregoing, there remains a need to provide a hook with a locking latch wherein the trigger mechanism is entirely within the handle.

**[0007]** Furthermore, there remains a need to provide a hook with a locking latch which will only be unlocked by retraction of a finger trigger.

**[0008]** WO 2007/071896 provides a hook according to the preamble of claim 1 having a load-bearing portion, wherein the hook comprises a handle coupled to the load-bearing portion, the handle defining an area separate from the load-bearing portion.

**[0009]** WO 2009/093074 relates to a hook, which may for example be used with a crane to lift heavy loads. In one example, the hook has a load-bearing portion and an arm portion where the arm portion can pivot relative to the load-bearing portion between open and closed configurations.

**[0010]** AU 2006201627 discloses a lifting hook with a safety attachment. The lifting hook comprises a hook member, a latch pivotally attached to the hook member, and a locking latch engageable with the pivotal latch in an arrangement whereby the pivotal latch is prevented from being pivoted relative to the hook member unless the locking latch is disengaged from the pivotal latch.

**[0011]** Patent documents US 1546208 and US 1711440 relate generally to a hook for hoisting engagement with elevators attached to rods, tubing or casing, and hooks designed especially for use in oil fields.

**[0012]** FR 2432471 provides a lifting hook designed to

meet the safety requirements of automatic locking and ease of maneuvering for both heavy and light loads. It essentially comprises two parts, a suspension part with a comma-shaped shank, and a hook.

### SUMMARY OF INVENTION

**[0013]** According to the present invention, there is provided a hook with locking latch and trigger mechanism assembly, the assembly comprising: a hook having a body and an open saddle; a latch pivotable between a closed position and an open position; a finger handle extending from said body; a finger trigger within a space formed between said finger handle and said body, said trigger movable between a rest position and a retracted position permitting movement of said latch to said open position; a tension spring urging a wedge lock toward said closed position, and an elongated activating pin attached to said finger trigger, wherein said latch includes a recess and said activating pin activates a wedge lock to engage said recess in said latch, and characterized in that the wedge lock is pivotally attached to the hook body with a trigger pin.

**[0014]** In an example not forming part of the invention, a compression spring surrounds an activating pin attached to said finger trigger.

**[0015]** In another example, said finger trigger is pivotally attached to said finger handle.

**[0016]** In another example, said finger trigger includes an extending slide actuator which is pivotally connected to said latch.

**[0017]** In another example, said activating pin is pivotally attached to said latch. Typically, a compression spring is provided surrounding said activating pin.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### [0018]

Figure 1 illustrates a side view and Figure 2 illustrates a rear view of a first preferred embodiment of a hook with latch and trigger mechanism assembly constructed in accordance with the present invention; Figure 3 illustrates a sectional view taken along section line 3-3 of Figure 1; Figure 4 illustrates a sectional view taken along section line 4-4 of Figure 2; Figure 5 illustrates a perspective view of the latch and trigger mechanism apart from the assembly; Figure 6 illustrates an exploded view of the latch and trigger mechanism shown in Figure 5; Figures 7 through 11 illustrate an example of a hook with latch and trigger mechanism assembly not forming part of the present invention; Figures 12 through 16 illustrate another example of a hook with latch and trigger mechanism assembly not forming part of the present invention; Figures 17 through 20 illustrate another example of

a hook with latch and trigger mechanism assembly not forming part of the present invention; and Figures 21 through 26 illustrate another example of a hook with latch and trigger mechanism assembly not forming part of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0019]** The embodiments discussed herein are merely illustrative of specific manners in which to make and use the invention and are not to be interpreted as limiting the scope of the instant invention.

**[0020]** While the invention has been described with a certain degree of particularity, it is to be noted that many modifications may be made in the details of the invention's construction and the arrangement of its components without departing from the scope of this disclosure. It is understood that the invention is not limited to the embodiments set forth herein for purposes of exemplification.

**[0021]** Referring to the drawings in detail, Figure 1 illustrates a side view while Figure 2 illustrates a rear view of a first preferred embodiment of a hook with latch and trigger mechanism assembly 10. Figure 3 illustrates a sectional view taken along section line 3-3 of Figure 2, while Figure 4 illustrates a sectional view taken along section line 4-4 of Figure 1. The assembly 10 includes a body 12 and a saddle 14 for receipt of a load or rigging for the load (not shown).

**[0022]** The assembly 10 also includes a latch 16, which is pivotable about a pivot axis 18. The latch 16 is shown in the closed position in Figures 1 through 4. When the latch is in the open position (not shown), a load or rigging may be inserted or removed.

**[0023]** The assembly 10 also includes a finger handle 20 which extends from and is integral with the body 12. A retractable finger trigger 22 is located entirely within a space formed between the finger handle 20 and the body 12.

**[0024]** In the present embodiment, the latch 16 is integral with a shank 24 although other arrangements are possible within the scope of the invention as claimed.

**[0025]** The finger trigger 22 is movable between a normal rest position shown in Figures 1 through 4 and a retracted position (not shown). The retracted position permits movement of the latch 16 from a closed to an open position. As can be appreciated, the finger trigger 22 can be operated without moving any of the fingers or the hand from the handle 20 and without moving any finger outside of the handle 20.

**[0026]** The finger trigger 22 is pivotally connected to an elongated activating or pull connector pin 30 at one end of the pin by a pull pin 28. The opposite end of the elongated activating pin 30 engages a trigger wedge lock 32.

**[0027]** Figure 5 illustrates a perspective view of the latch locking and trigger mechanism apart from the as-

sembly 10 as a whole. Figure 6 illustrates an exploded view of the latch locking and trigger mechanism shown in Figure 5.

**[0028]** The wedge lock 32 is pivotally connected to the activating pin 30 by a connector pin 36. One end of the wedge lock 32 rotates about a trigger pin 34 which is held in place in the body 12 (not seen in Figures 5 or 6). The opposed end of the wedge lock 32 is received in a recess 38 in the latch 16 (visible in Figure 3) in order to retain the latch 16 in the closed and locked position.

**[0029]** A torsion spring 26 surrounds the trigger pin 34 and urges the wedge lock 32 into the recess 38 in the latch 16. When the finger trigger 22 is retracted, the elongated activating pin 30 is likewise retracted, causing the wedge lock 32 to become disengaged from recess 38 of the latch 16. Accordingly, when the finger trigger 22 is retracted, the latch 16 may be manually opened with respect to the body 12. Conversely, when the finger trigger 22 is returned to the normal rest position by force of the spring 26, the wedge lock 32 engages the recess in the latch 16.

**[0030]** Returning to a consideration of Figures 1, 2 and 3, the shank 24 may terminate in an eye 40 in order to connect to other connectors or lifting equipment (not shown). Alternatively, the shank 24 may be connected to other known elements, such as a stationary eye, shank, clevis or rotating bail.

**[0031]** Figures 7 through 11 illustrate an example of a hook with latch and trigger mechanism assembly 50 not forming part of the present invention.

**[0032]** Figure 7 illustrates a side view of the assembly 50 with a latch 56 in a closed position. Figure 8 illustrates the assembly 50 with the latch 56 in an open position. Figure 9 illustrates a sectional view of the assembly 50 in Figure 7. Figures 10 and 11 illustrate alternate perspective views of the assembly 50.

**[0033]** The assembly 50 includes a body 52 and a saddle 54 for receiving a load or rigging for a load (not shown). The latch 56 is urged to a closed position shown in Figure 7 by placing a load in a saddle 54 which causes the body 52 to rotate about the pivot pin 60 until it engages the latch 56. The latch 56 moves to an open position by moving in toward the saddle 54, however, other arrangements are possible.

**[0034]** A finger handle 62 extends from and is integral with the body 52. A retractable finger trigger 64 is located entirely within a space formed by the finger handle and body.

**[0035]** The retractable finger trigger 64 is connected to one end of an elongated pin 66 (seen in Figure 9), which is received through an opening in the body 52. A compression spring 68 surrounds the elongated pin 66 in order to urge the retractable trigger 64 toward the rest position so that the latch 56 is in closed position. The opposed end of the pin 66 will rest against a shoulder 70 of the latch 56. When the pin 66 is in the rest position as seen in Figures 7 and 9, movement of the latch 56 from the closed position is prevented. When the finger trigger

64 is retracted, as shown in Figure 8, the pin 66 is retracted and the latch 56 can be manually rotated to the open position.

**[0036]** The finger trigger 64 can be operated without moving any of the fingers or the hand of the operator from the handle 62 and without moving any finger outside of the handle 62.

**[0037]** A shank 48 may terminate in an eye, clevis or other termination (not shown) in order to connect with other connectors of lifting equipment.

**[0038]** Figures 12 through 16 illustrate another example of a hook with latch and trigger mechanism assembly 74 not forming part of the present invention. Figure 12 illustrates a side view of the assembly 74 with a latch 80 in a closed position. Figure 13 illustrates a side view of the assembly 74 with the latch 80 in an open position. Figure 14 illustrates a sectional view through the assembly 74 shown in Figure 12. Figures 15 and 16 illustrate alternate perspective views of the assembly 74.

**[0039]** The assembly 74 includes a body 76 and a saddle 78 for receiving a load or rigging. The latch 80 rotates about a pivot 88 and moves between a closed position shown in Figure 12 and an open position shown in Figure 13. The pivot 88 acts as an axis for rotation of the latch 80.

**[0040]** A finger handle 82 extends from and is integral with the body 76.

**[0041]** A paddle trigger 84 is located entirely within a space formed by the handle 82 and the body 76. The paddle trigger 84 is pivotally connected to the handle 82 at axis 85 so that movement of the paddle trigger 84 moves an elongated activating pin 86. A compression spring 87 surrounds the elongated activating pin 86 to urge the pin to engage a shoulder in the latch 80.

**[0042]** The paddle trigger 84 can be operated without moving any of the fingers or the hand of the operator from the handle 82 or without moving any of the fingers outside of the handle 82.

**[0043]** A shank 91 may terminate in an eye, clevis or other termination (not shown) in order to connect with other connectors of lifting equipment.

**[0044]** Figures 17 through 20 illustrate another example of a hook with latch and trigger mechanism assembly 92 not forming part of the present invention. Figure 17 illustrates a side view of the assembly 92 with a latch 102 in a closed position. Figure 18 illustrates a side view of the assembly 92 with the latch 102 in an open position. Figures 19 and 20 illustrate alternate perspective views of the assembly 92.

**[0045]** The assembly 92 includes a body 94 and a saddle 96 for receipt of a load or rigging for a load (not shown). The latch 102 rotates about a pivot 106 between a closed position shown in Figure 17 and an open position shown in Figure 18.

**[0046]** A finger handle 98 extends from and is integral with the body 94. A trigger 100 is located entirely within a space formed by the finger handle 98 and the body 94.

**[0047]** The finger trigger 100 has a slide extension 104 for pivotal connection at connector 105 to the latch 102

for movement of the latch 102 between a closed position shown in Figure 17 and an open position shown in Figure 18.

**[0048]** Retraction of the finger trigger 100 moves the slide extension 104 which moves the latch 102 to an open position. The finger trigger 100 can be operated without moving any of the fingers or the hand of the operator from the handle 98 or without moving any of the fingers outside of the handle.

**[0049]** Figures 21 through 26 illustrate another example of a hook with latch and trigger assembly 108 not forming part of the present invention. Figure 21 illustrates a side view of the assembly 108 with a latch 114 in a closed position. Figure 22 illustrates a sectional view of the assembly 108 shown in Figure 21. Figure 23 illustrates a side view of the assembly 108 with the latch 114 in an open position, while Figure 26 illustrates a perspective view of the assembly 108 as shown in Figure 23 with the latch 114 in the open position. Figures 24 and 25 illustrate alternate perspective views of the assembly 108 which includes a body 112 and a saddle 110 for receipt of a load or rigging for a load (not shown).

**[0050]** The latch 114 rotates about a pivot pin 124 to permit movement of the latch 114 between a closed position shown in Figures 21 and 22 and an open position shown in Figures 23 and 26.

**[0051]** A finger handle 116 extends from and is integral with the body 112. A retractable trigger 118 is located entirely within a space formed by the body 112 and the finger handle 116. The trigger 118 is connected to one end of an activating pin 120 visible in Figure 22. The opposed end of the activating pin 120 is pivotally connected to the latch 114 at pivot 126. A spring 122 urges the latch 114 to the closed position.

**[0052]** When the finger trigger 118 is retracted, the activating pin 120 is likewise retracted (overcoming the force of the spring), causing the latch 114 to open.

**[0053]** A shank 128 may terminate in an eye, clevis or other termination (not shown) in order to connect with other connectors or lifting equipment.

**[0054]** The various examples provide a hook assembly with a trigger mechanism to move the latch while the operator's finger remains in the space between the finger handle and the body.

## Claims

1. A hook with locking latch and trigger mechanism assembly (10), which hook assembly comprises:

- a hook having a body (12) and an open saddle (14);
- a latch (16) pivotable between a closed position and an open position;
- a finger handle (20) extending from said body (20);
- a finger trigger (22) within a space formed be-

tween said finger handle (20) and said body (12), said trigger (22) movable between a rest position and a retracted position permitting movement of said latch (16) to said open position;  
 a wedge lock (32);  
 a tension spring (26) urging the wedge lock (32) toward said closed position; and  
 an elongated activating pin (30) attached to said finger trigger (22), wherein said latch (16) includes a recess (38) and said activating pin (30) activates the wedge lock (32) to engage said recess (38) in said latch (16), and **characterized in that** said wedge lock (32) is pivotally attached to said hook body (12) with a trigger pin (34).

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## Patentansprüche

1. Hakenanordnung mit Sicherungsfalle und Auslösemechanismus (10), wobei die Hakenanordnung Folgendes aufweist:

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einen Haken mit einem Körper (12) und einem offenen Sattel (14);  
 eine Falle (16), die zwischen einer geschlossenen Stellung und einer offenen Stellung schwenkbar ist;  
 einen Fingergriff (20), der sich von dem genannten Körper (20) erstreckt,  
 einen Fingerauslöser (22) in einem zwischen dem genannten Fingergriff (20) und dem genannten Körper (12) gebildeten Zwischenraum, wobei der genannte Auslöser (22) zwischen einer Ruhestellung und einer zurückgezogenen Stellung, die eine Bewegung der genannten Falle (16) in die genannte offene Stellung zulässt, bewegbar ist;  
 eine Keilsperre (32);  
 eine Spannfeder (26), die die Keilsperre (32) in Richtung auf die genannte geschlossene Stellung drängt; und  
 einen länglichen Aktivierungsbolzen (30), der an dem genannten Fingerauslöser (22) angebracht ist, wobei die genannte Falle (16) eine Aussparung (38) beinhaltet und der genannte Aktivierungsstift die Keilsperre (32) aktiviert, um in der genannten Aussparung (38) in der genannten Falle (16) in Eingriff zu kommen, und **dadurch gekennzeichnet, dass** die genannte Keilsperre (32) mit einem Auslöserstift (34) schwenkbar an dem genannten Hakenkörper (12) angebracht ist.

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crochet comprenant :

un crochet possédant un corps (12) et une selle ouverte (14) ;  
 un verrou (16) apte à pivoter entre une position fermée et une position ouverte ;  
 une poignée pour doigts (20) s'étendant à partir dudit corps (20) ;  
 un déclencheur pour doigts (22) au sein d'un espace formé entre ladite poignée pour doigts (20) et ledit corps (12), ledit déclencheur (22) étant mobile entre une position de repos et une position rétractée permettant un mouvement dudit verrou (16) jusqu'à ladite position ouverte ;  
 un dispositif de blocage à cale (32) ;  
 un ressort de tension (26) poussant le dispositif de blocage à cale (32) vers ladite position fermée ; et  
 une broche d'activation allongée (30) attachée audit déclencheur pour doigts (22), ledit verrou (16) incluant une partie creuse (38) et ladite broche d'activation (30) activant le dispositif de blocage à cale (32) afin d'emboîter ladite partie creuse (38) dans ledit verrou (16), et **caractérisé en ce que** ledit dispositif de blocage à cale (32) est attaché de manière pivotante audit corps de crochet (12) à l'aide d'une goupille de déclencheur (34).

## Revendications

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1. Crochet avec ensemble de mécanisme de verrou de verrouillage et de déclencheur (10), cet ensemble

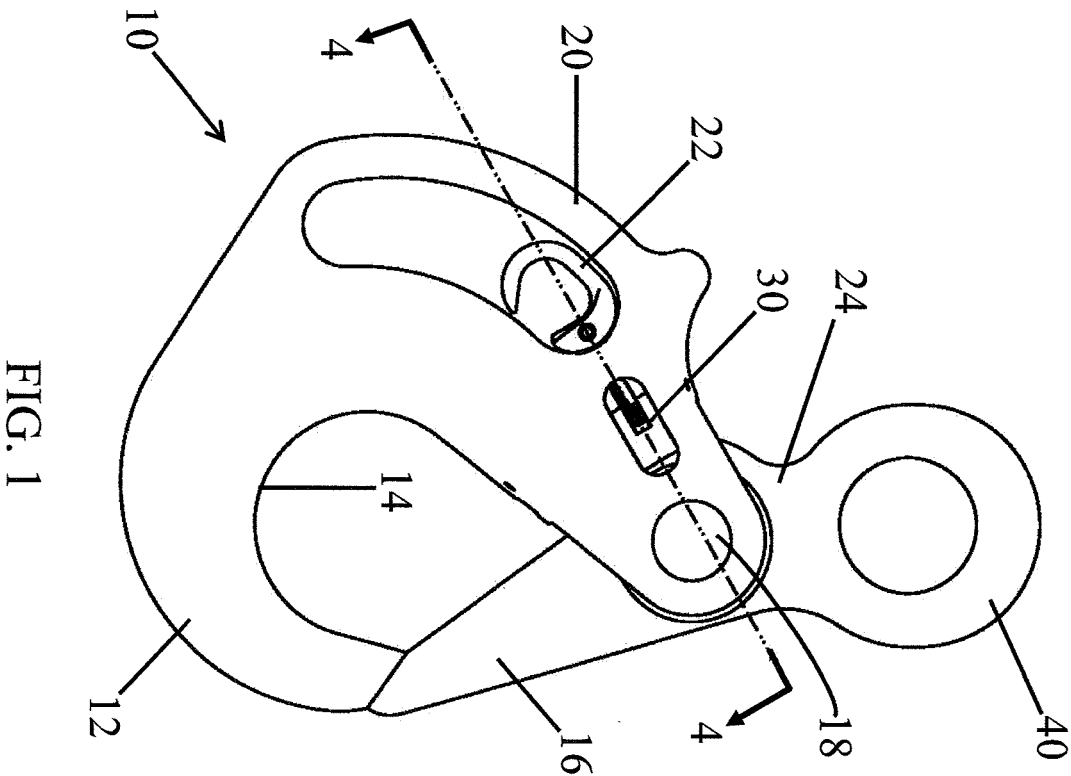


FIG. 1

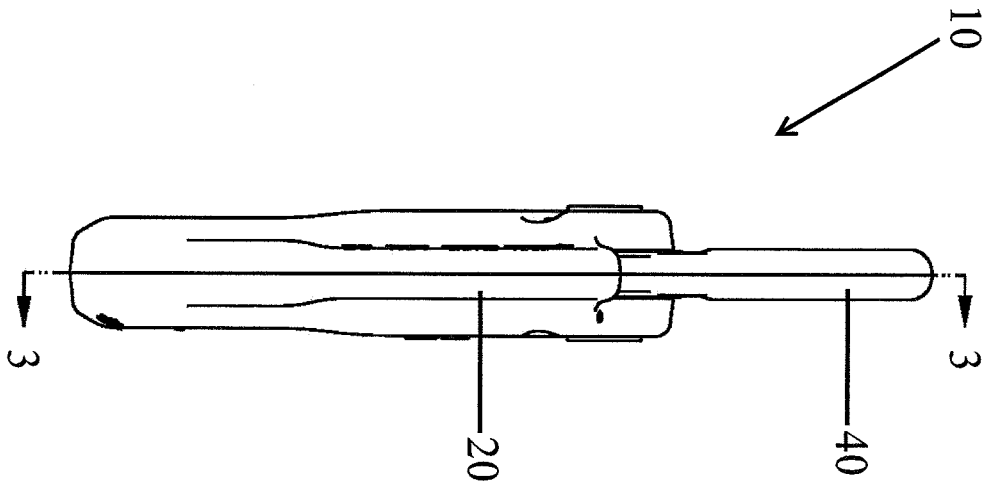


FIG. 2

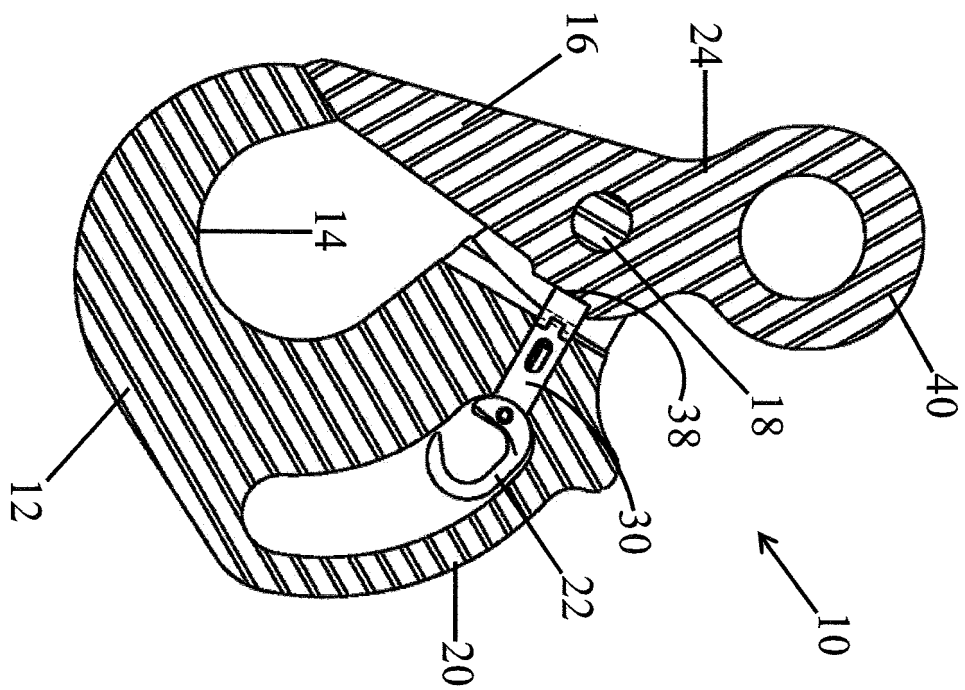


FIG. 3

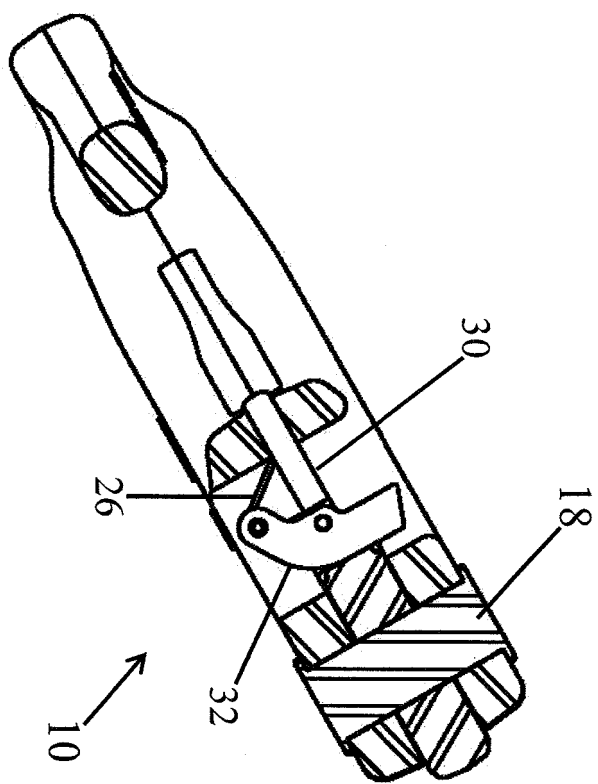


FIG. 4

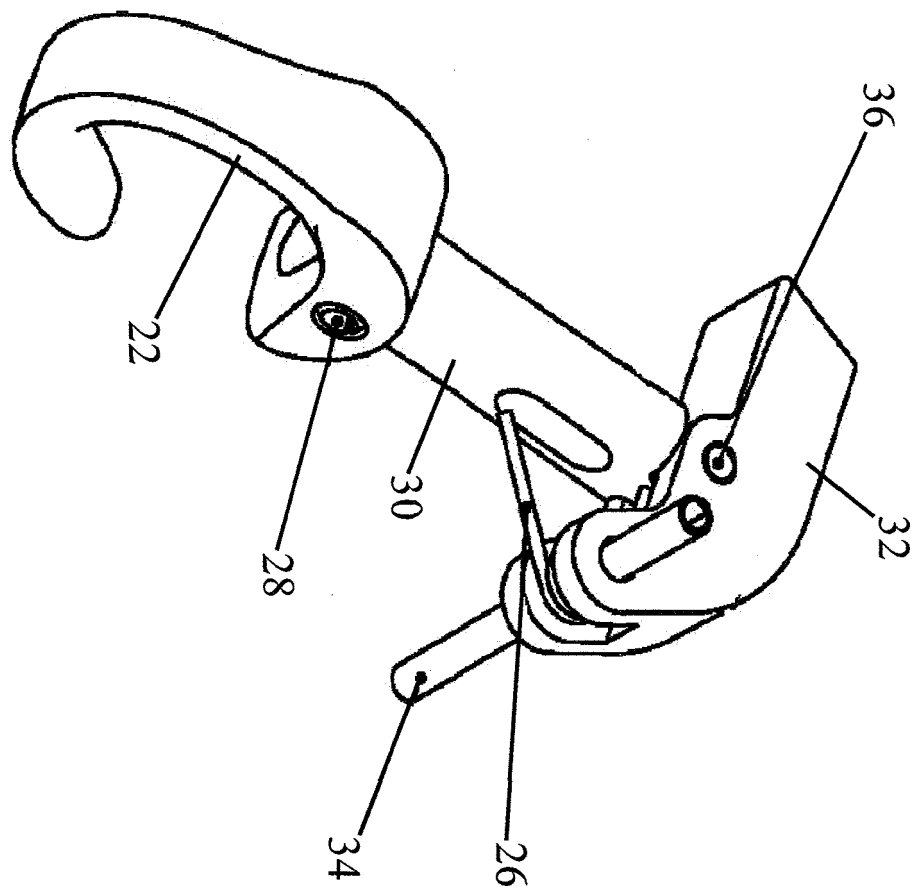


FIG. 5

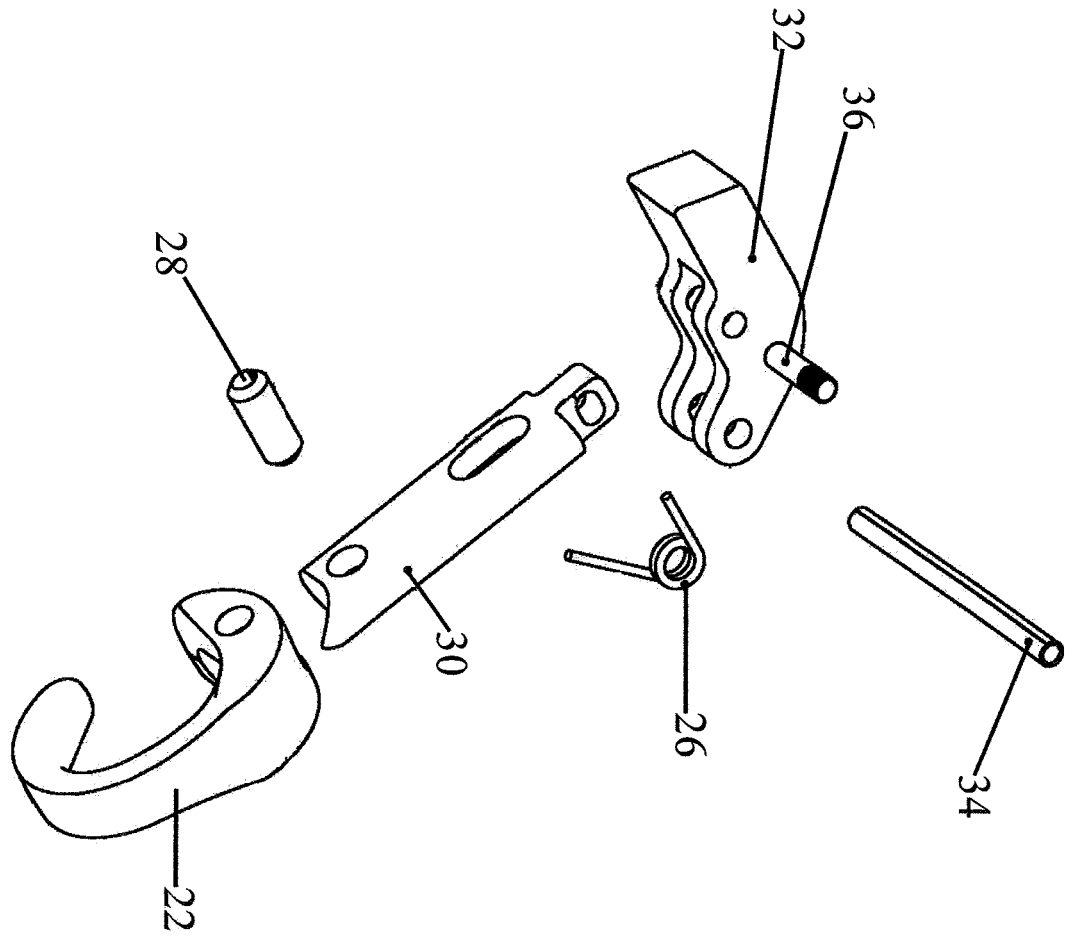
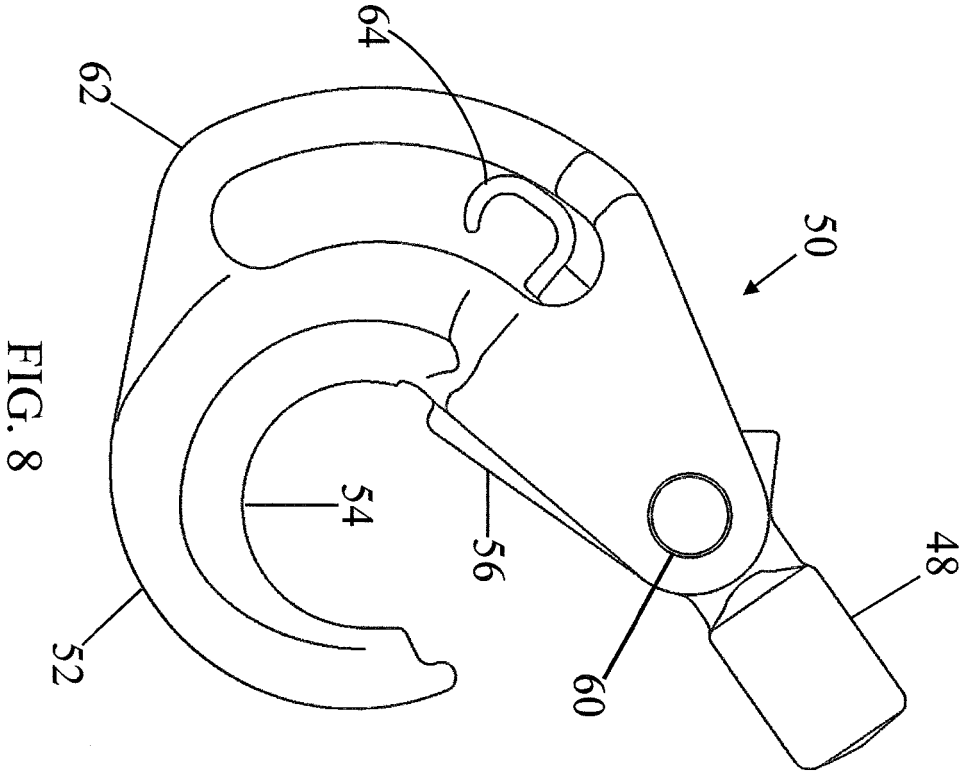
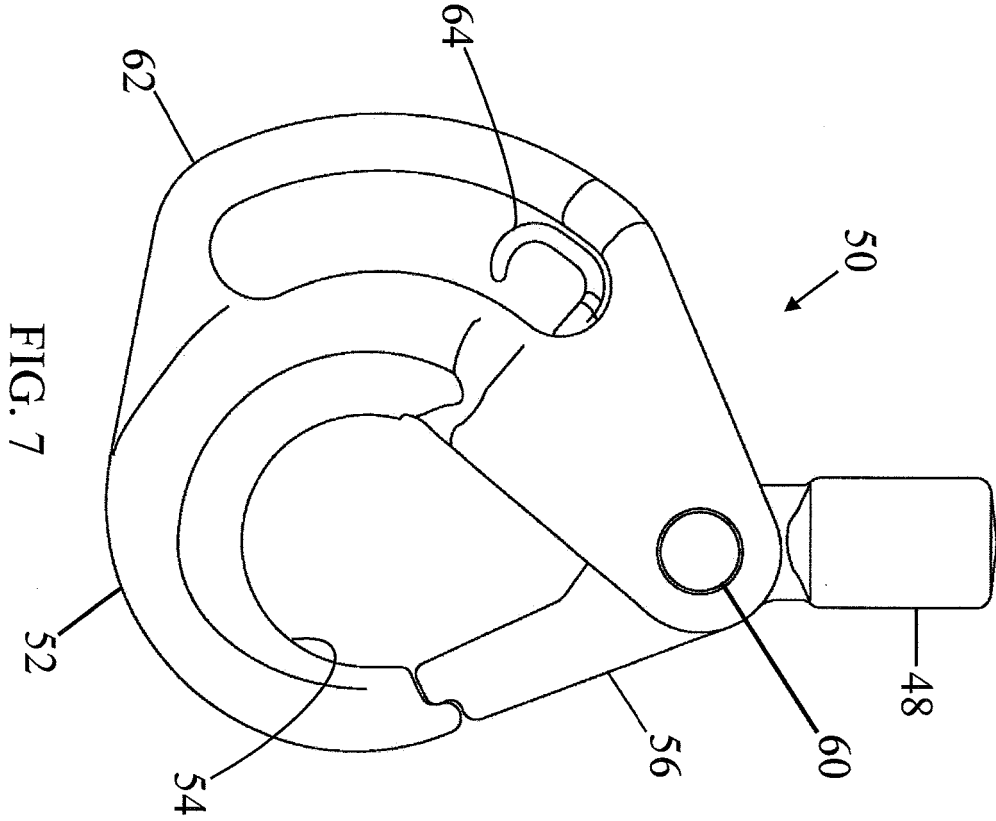
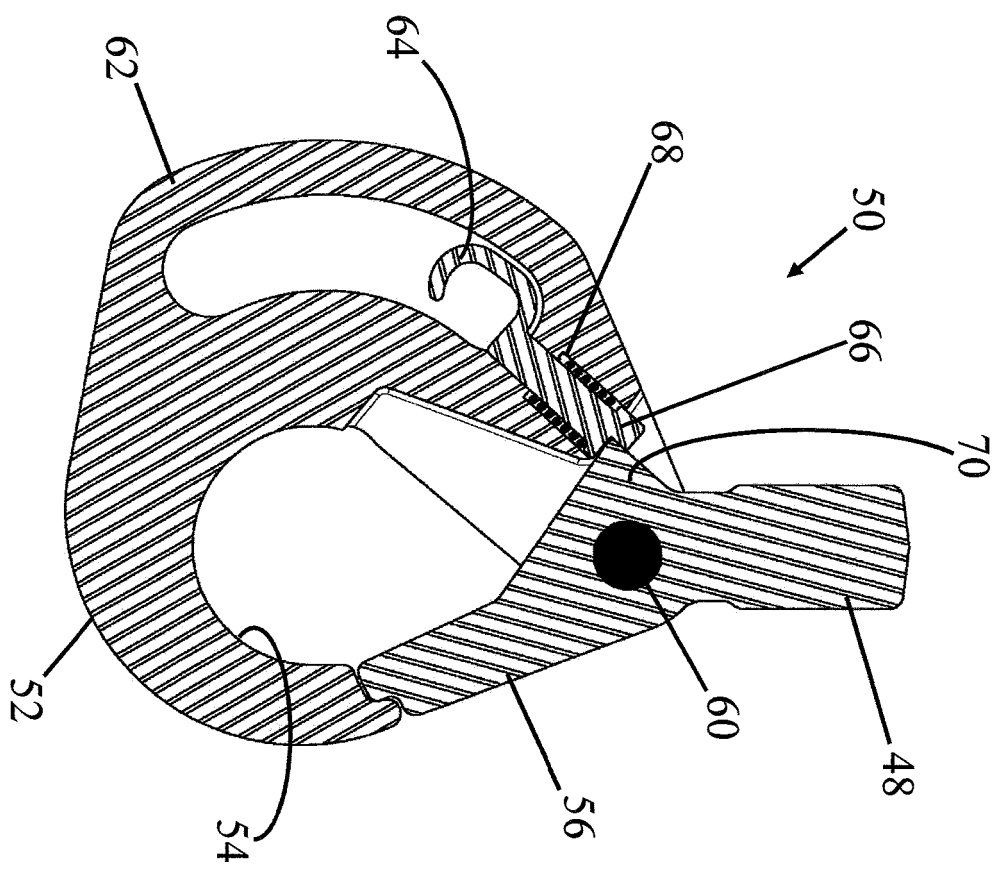
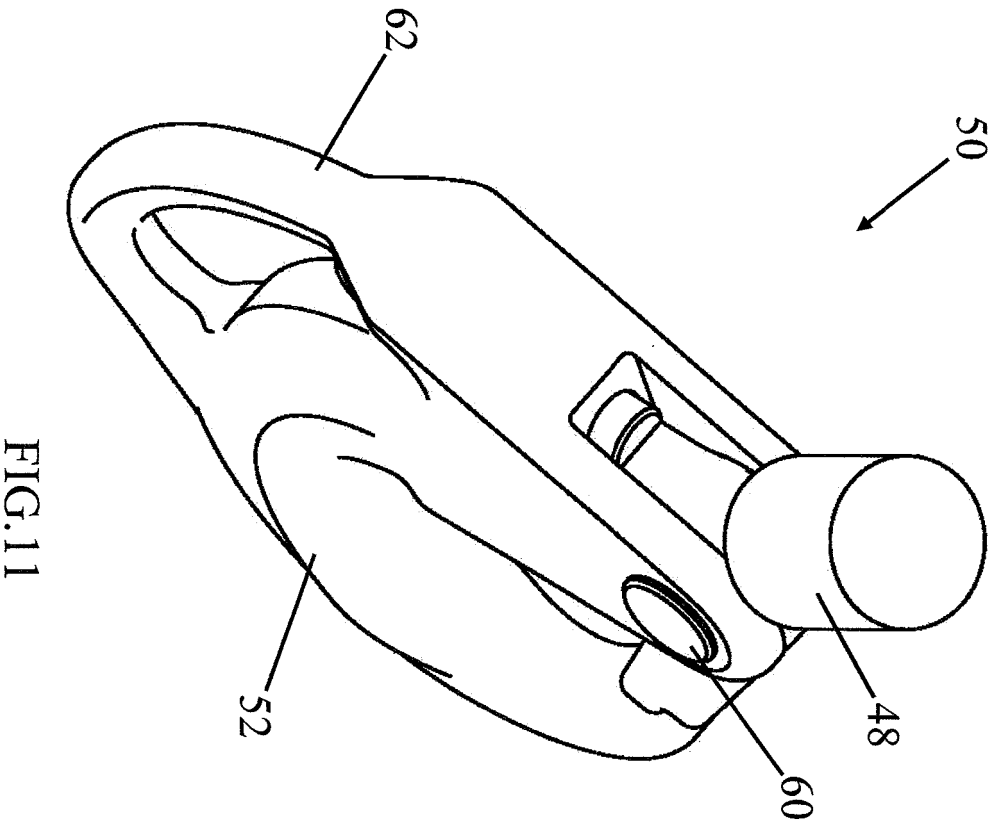
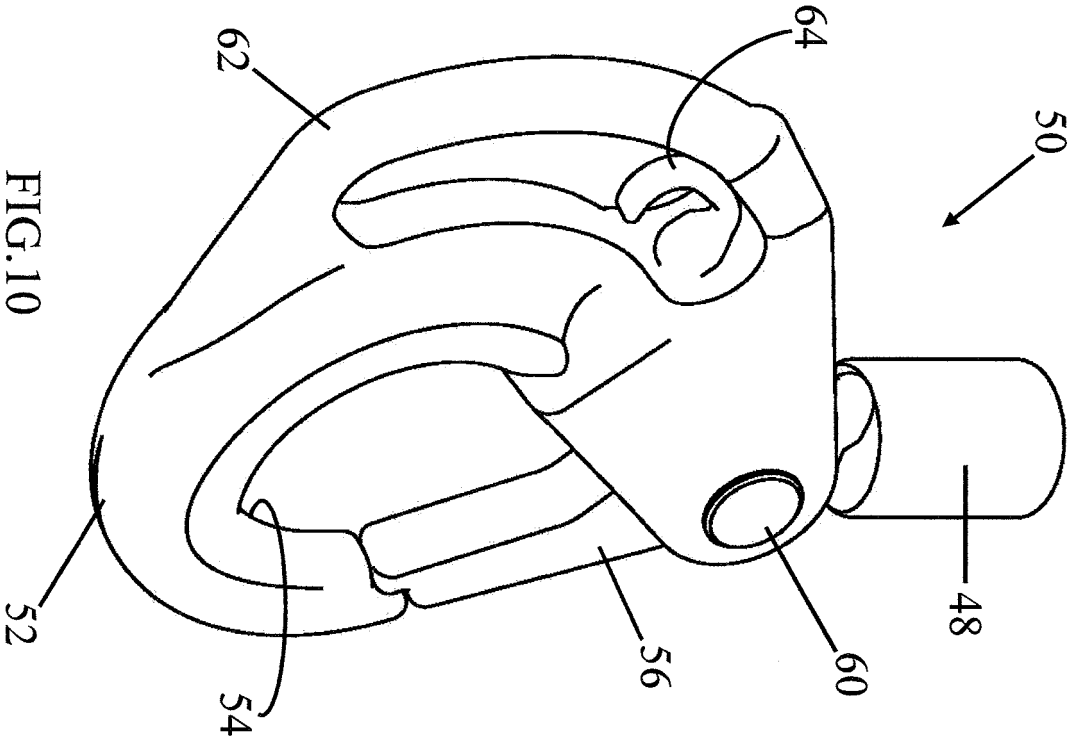
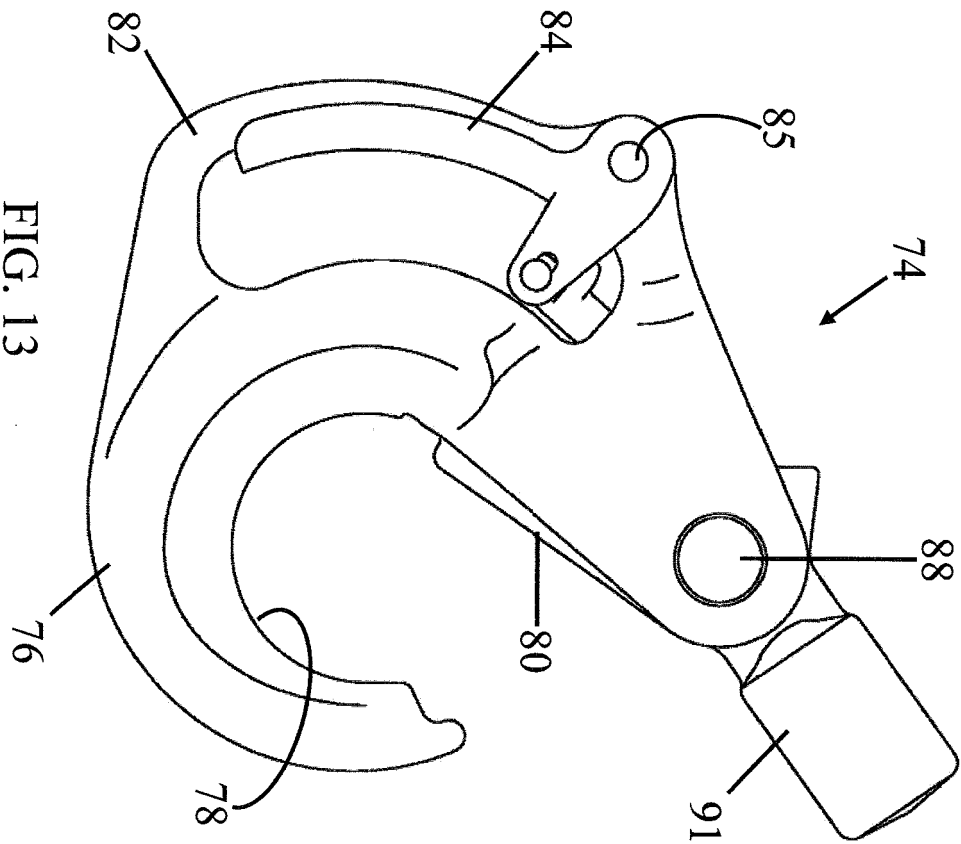
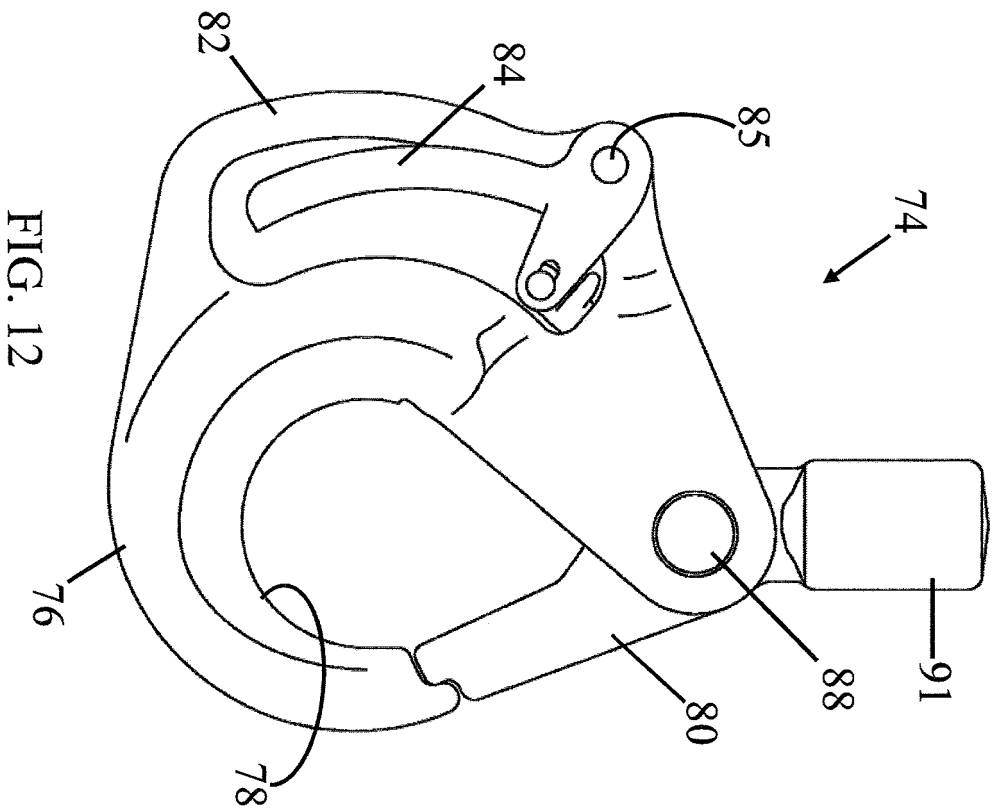


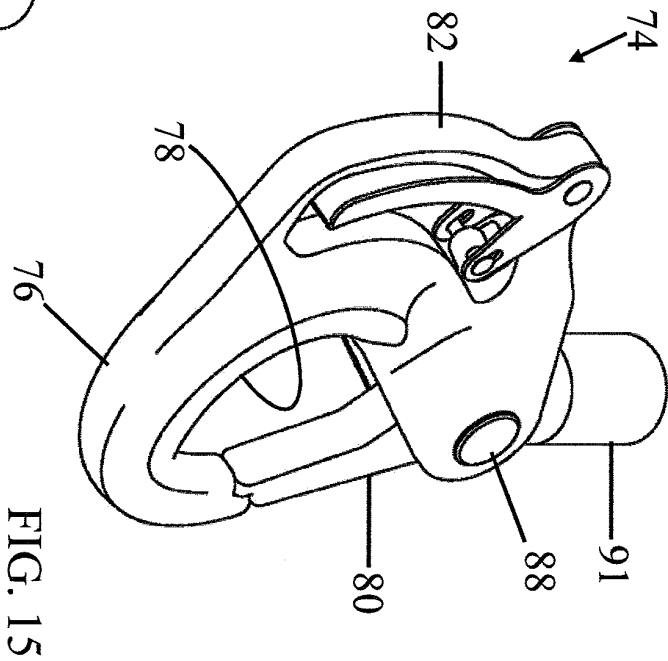
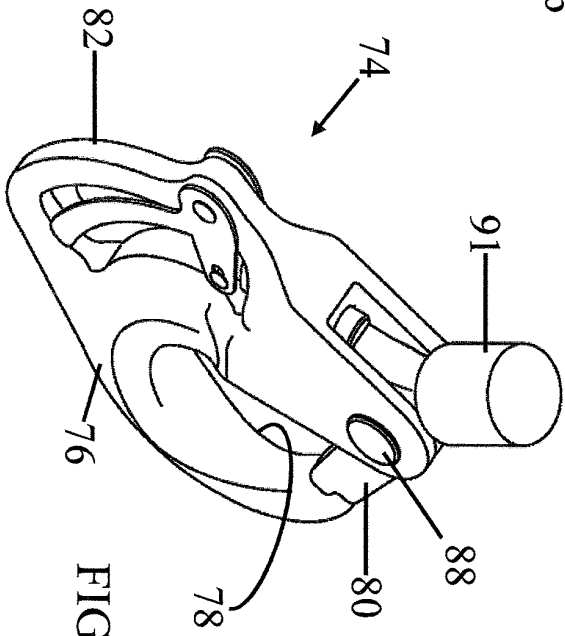
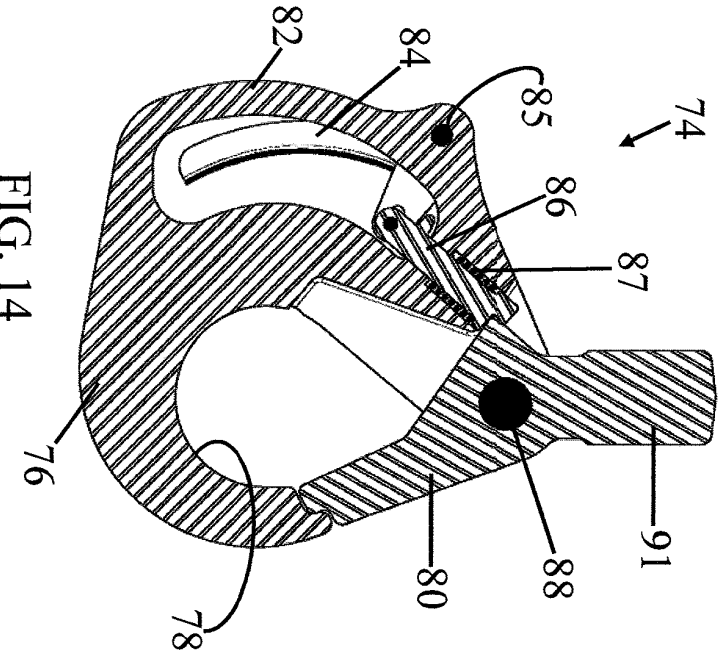
FIG. 6











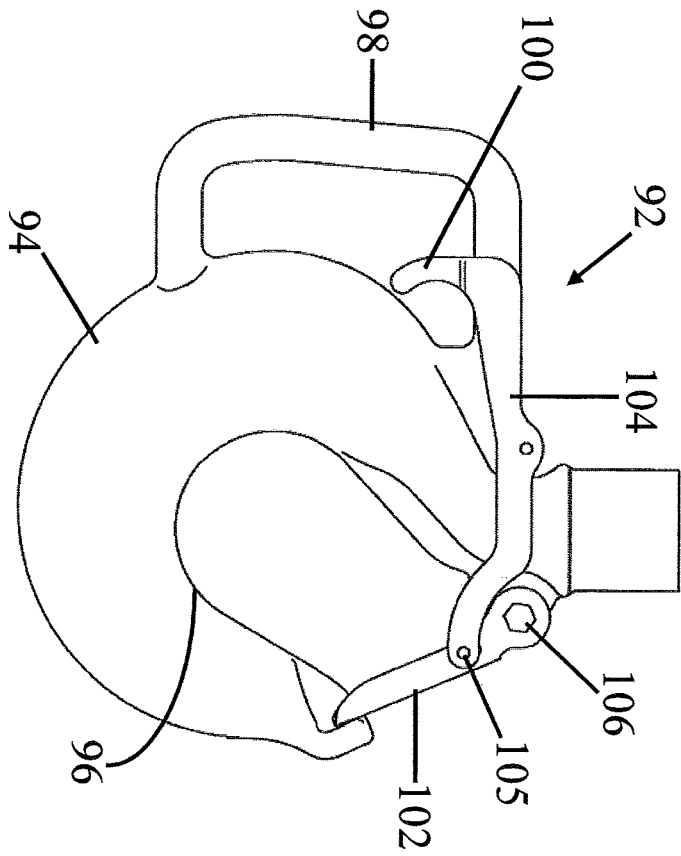


FIG. 17

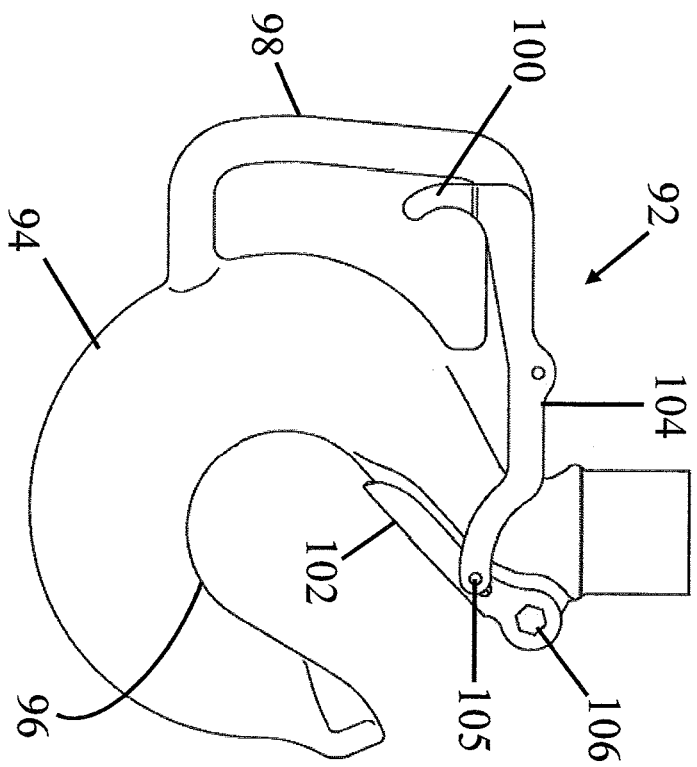


FIG. 18

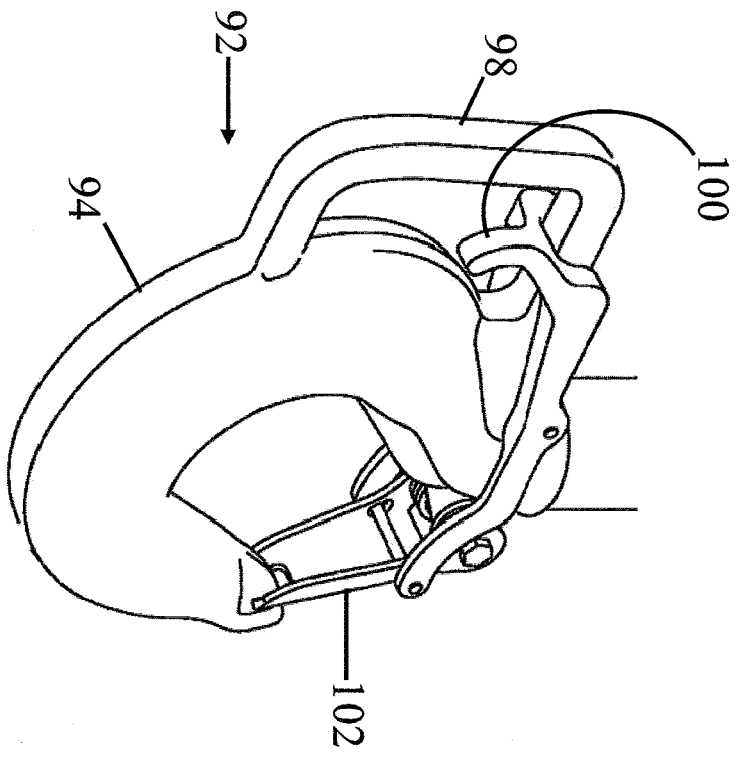


FIG. 19

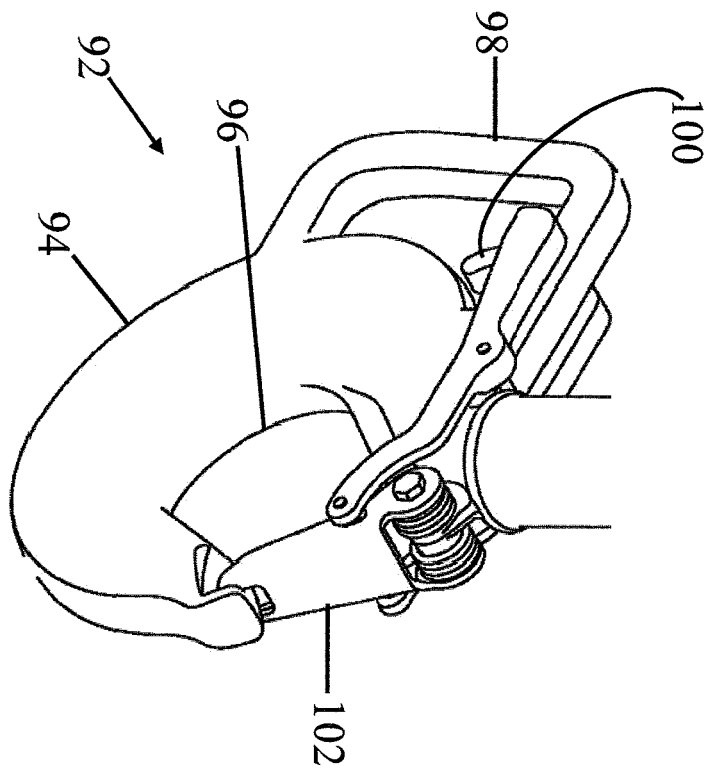
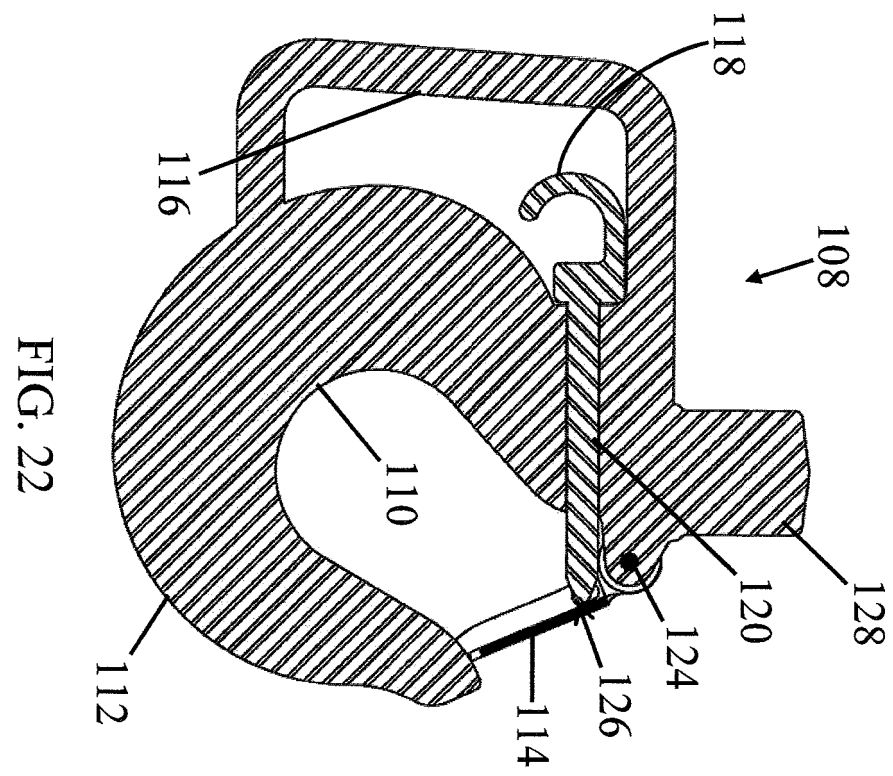
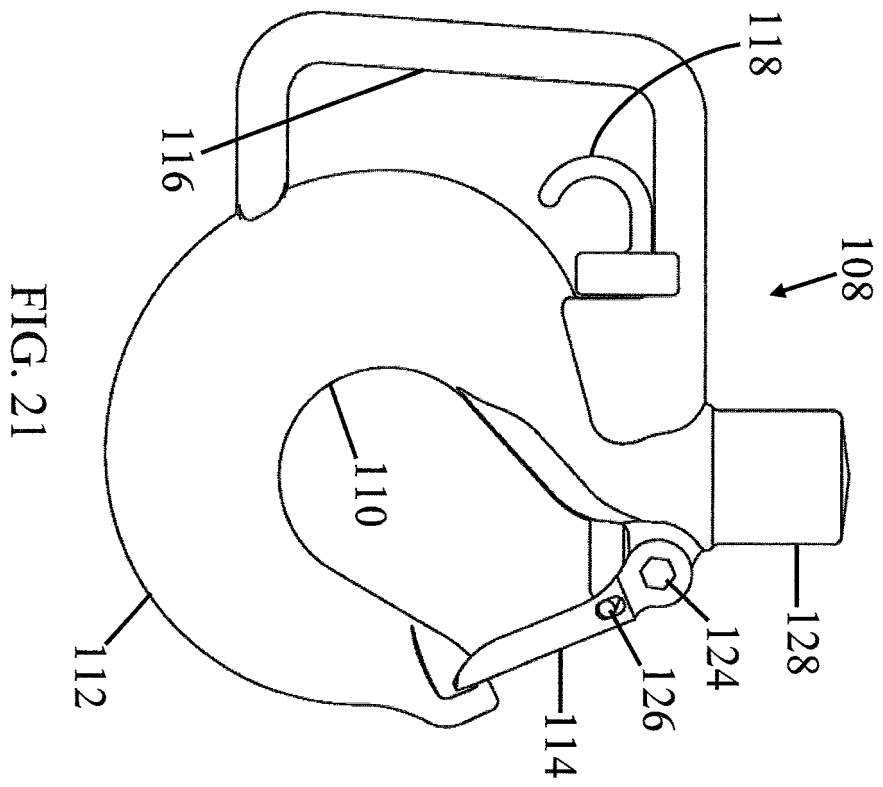
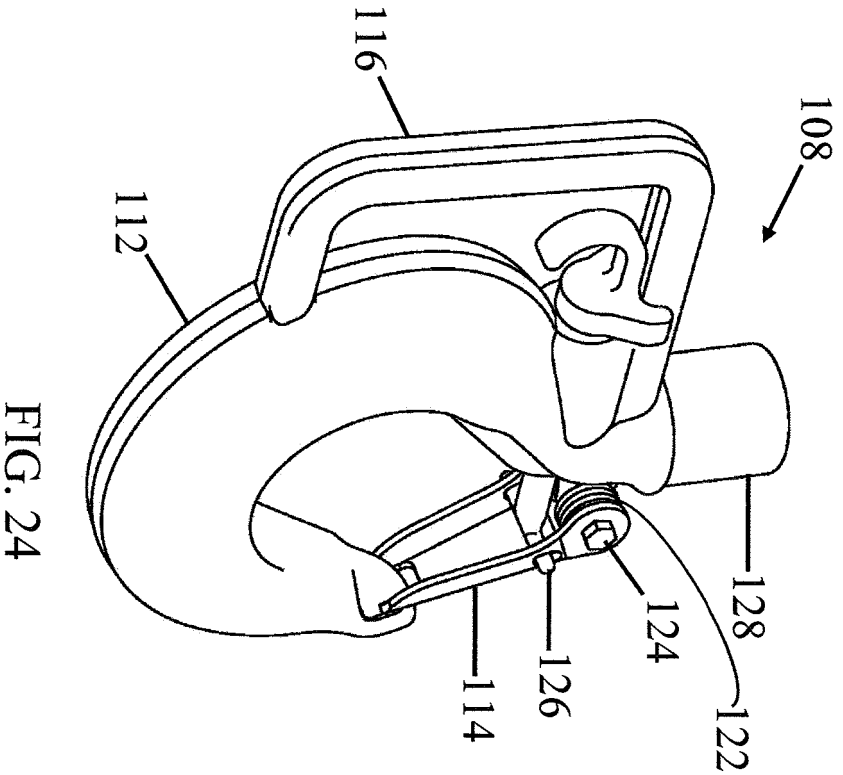
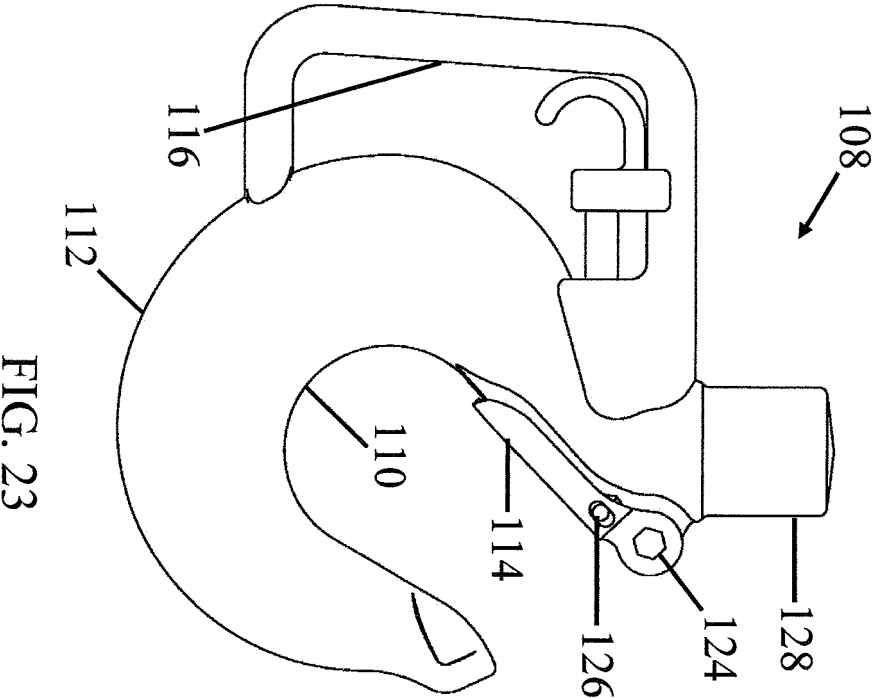


FIG. 20





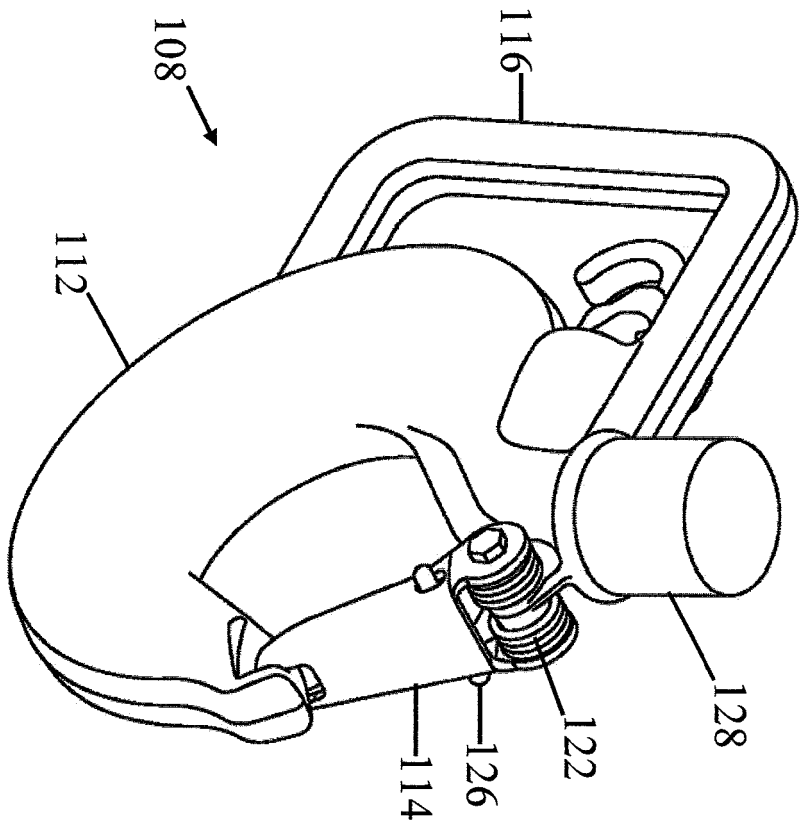


FIG. 25

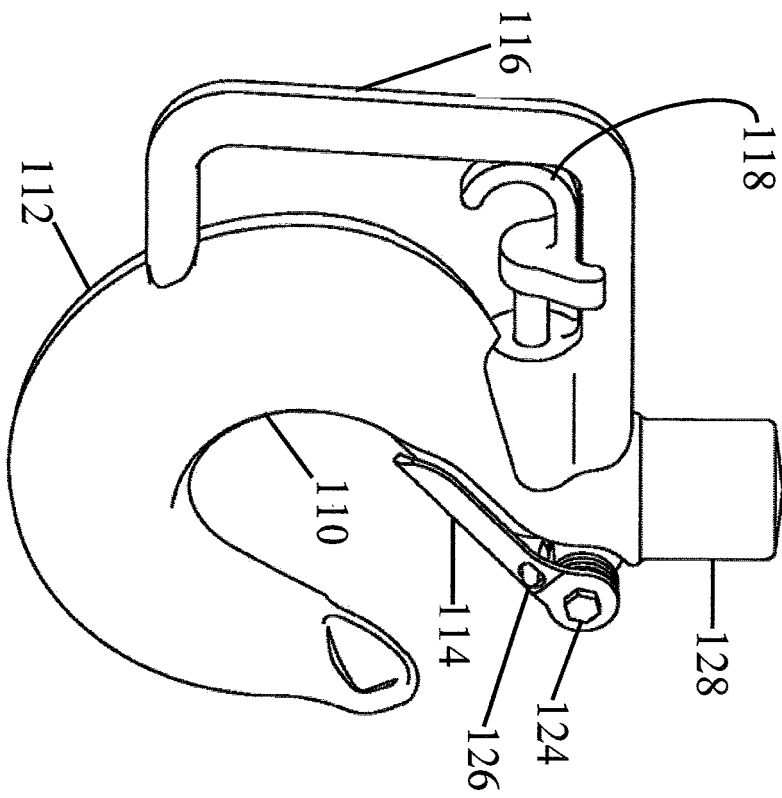


FIG. 26

**REFERENCES CITED IN THE DESCRIPTION**

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