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Tallagnon

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(54) **SYSTEM OF ENTANGLEMENT AVOIDANCE**

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F16G 11/10 (2006.01)
D07B 9/00 (2006.01)
F16G 11/06 (2006.01)
B66C 1/34 (2006.01)

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

CPC **D07B 9/00** (2013.01); **F16G 11/06** (2013.01); **F16G 11/10** (2013.01); **B66C 1/34** (2013.01)

(58) **Field of Classification Search**

CPC D07B 9/00; F16G 11/046; Y10T 24/3969; Y10T 24/3958; Y10T 24/3973; Y10T 403/4345

See application file for complete search history.

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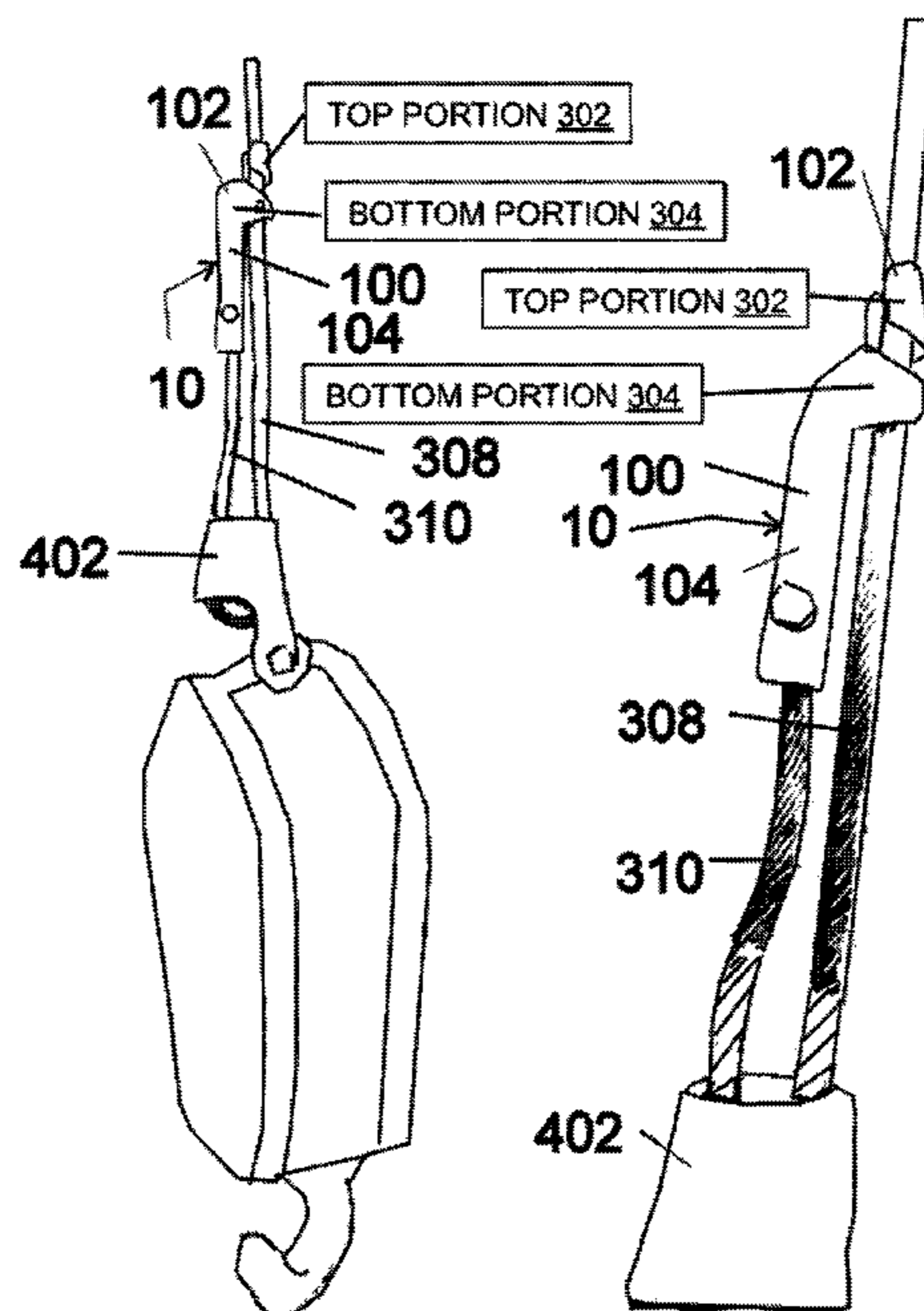
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(57) **ABSTRACT**

A wire rope entanglement avoidance device includes a guide component including a top portion and bottom portion, the top portion and bottom portion shaped along a curvature, the top portion and bottom portion arranged in rotational opposition along a length of material and adapted to fit around the wire rope and a sheath, disposed at an offset from the guide component, adapted to fit over a dead end of the wire rope.

2 Claims, 9 Drawing Sheets



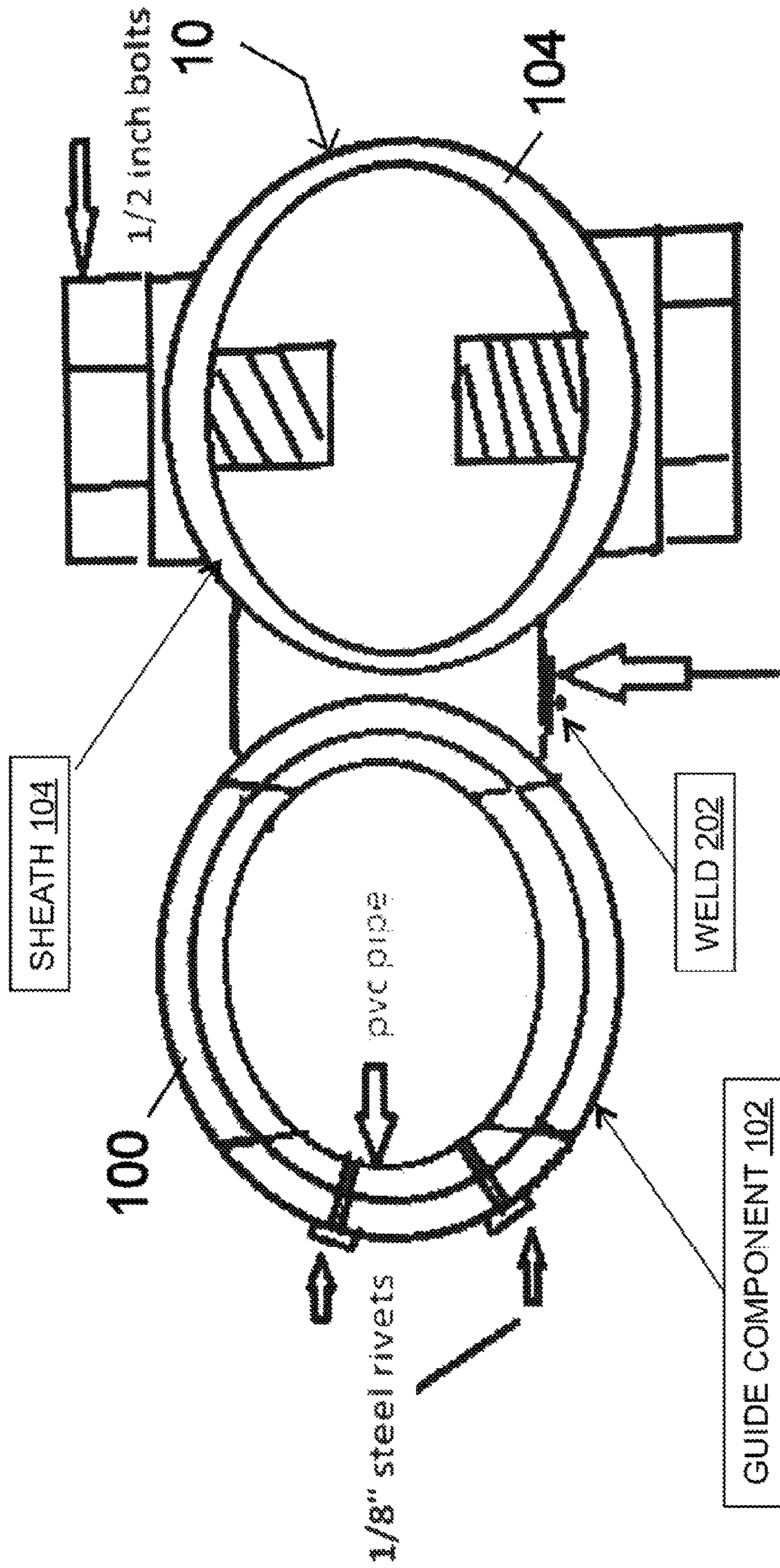
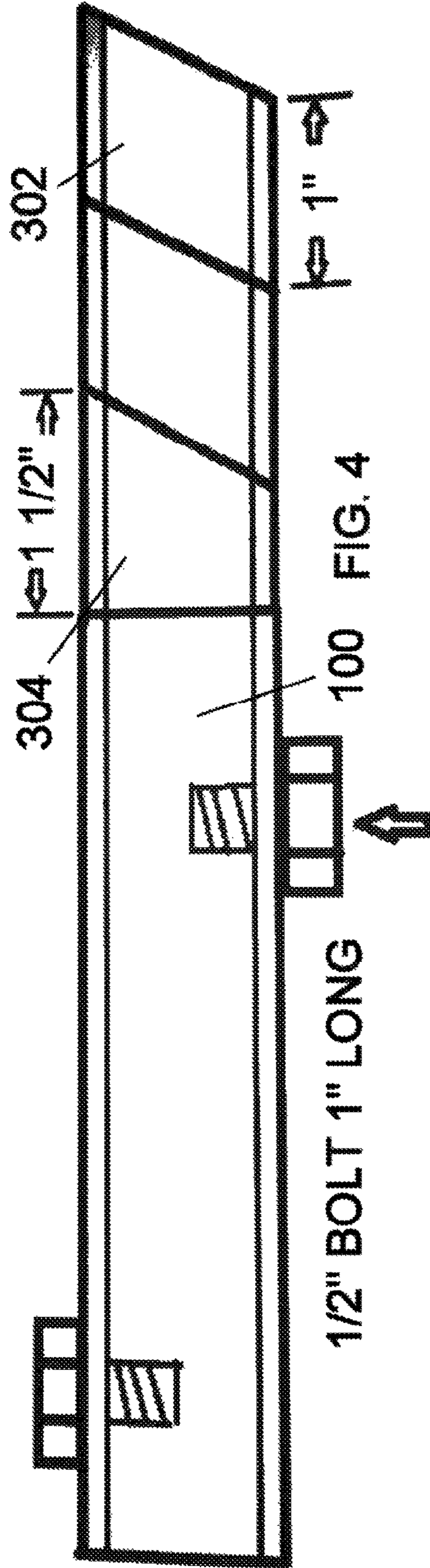
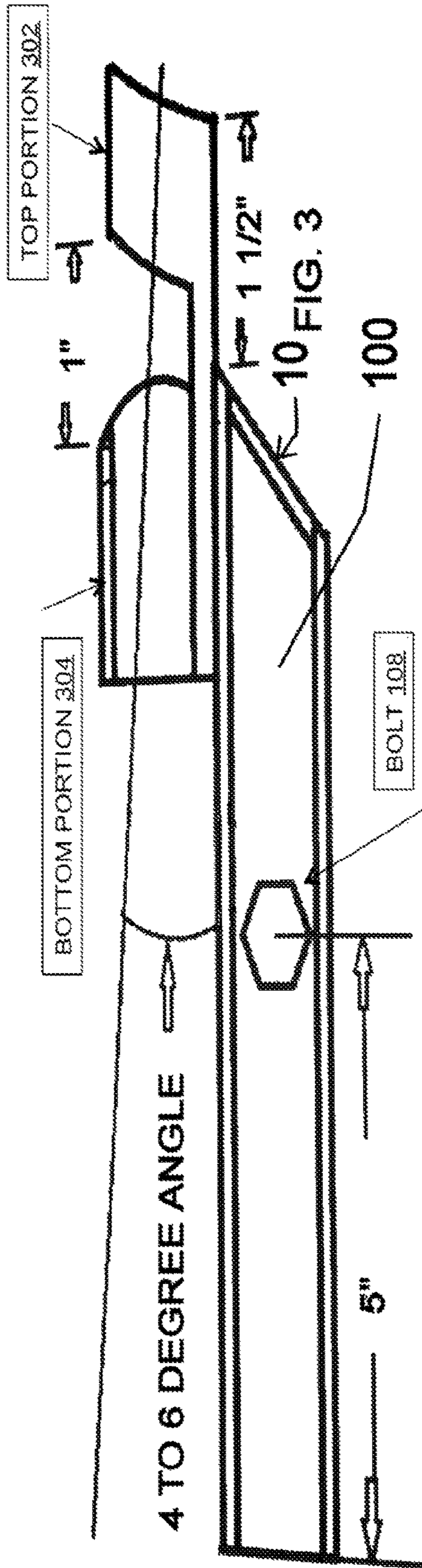


FIG. 2



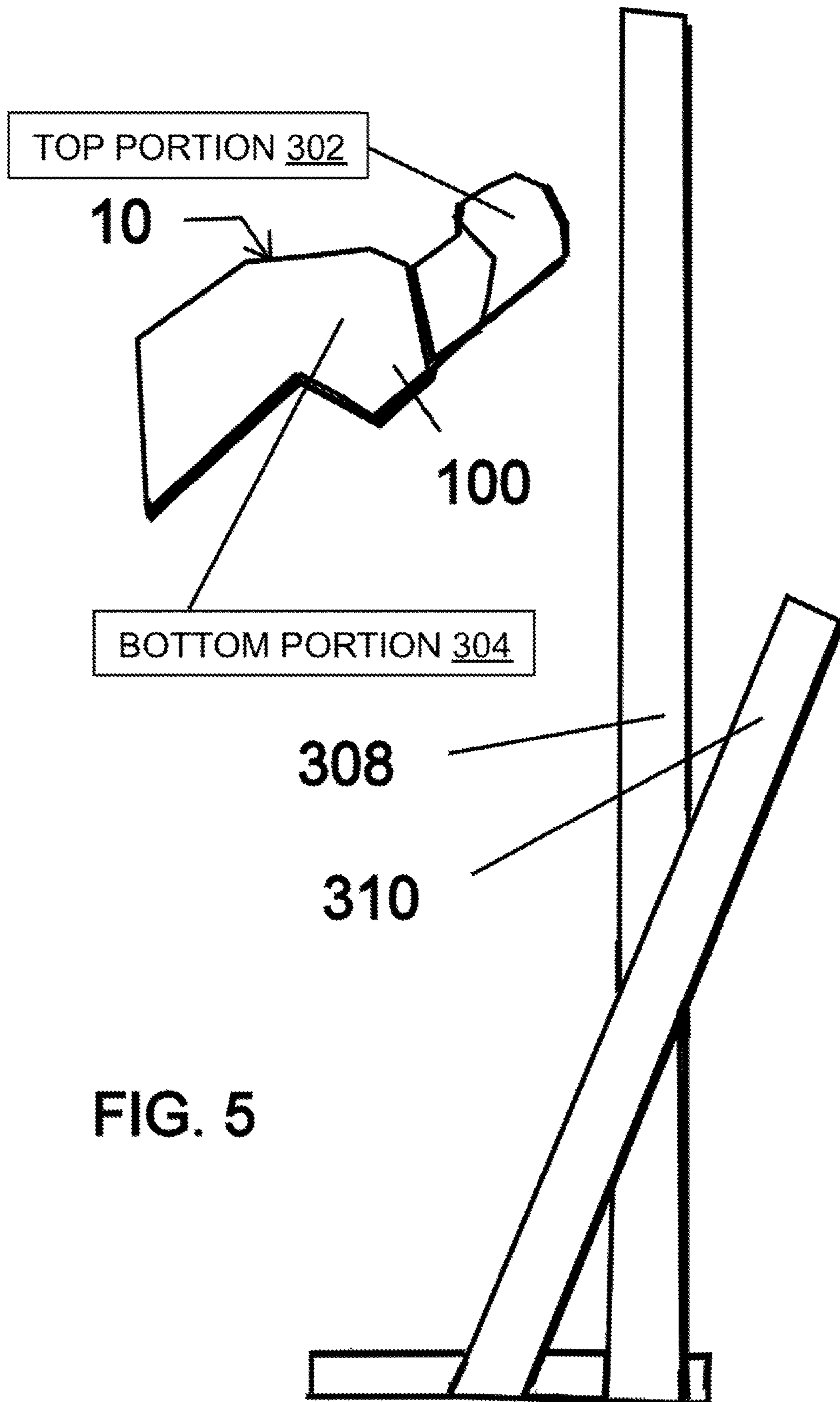


FIG. 5

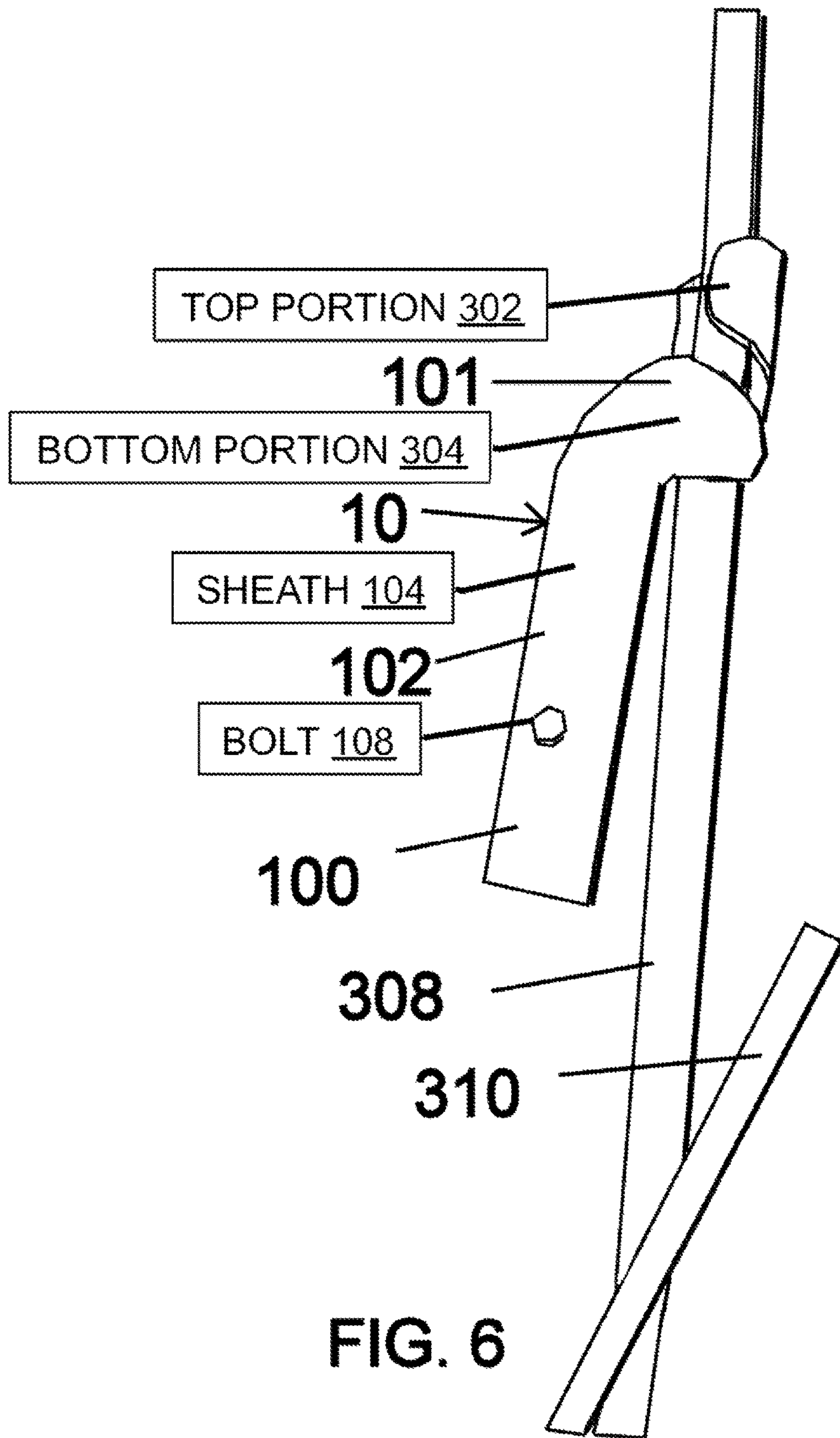


FIG. 6

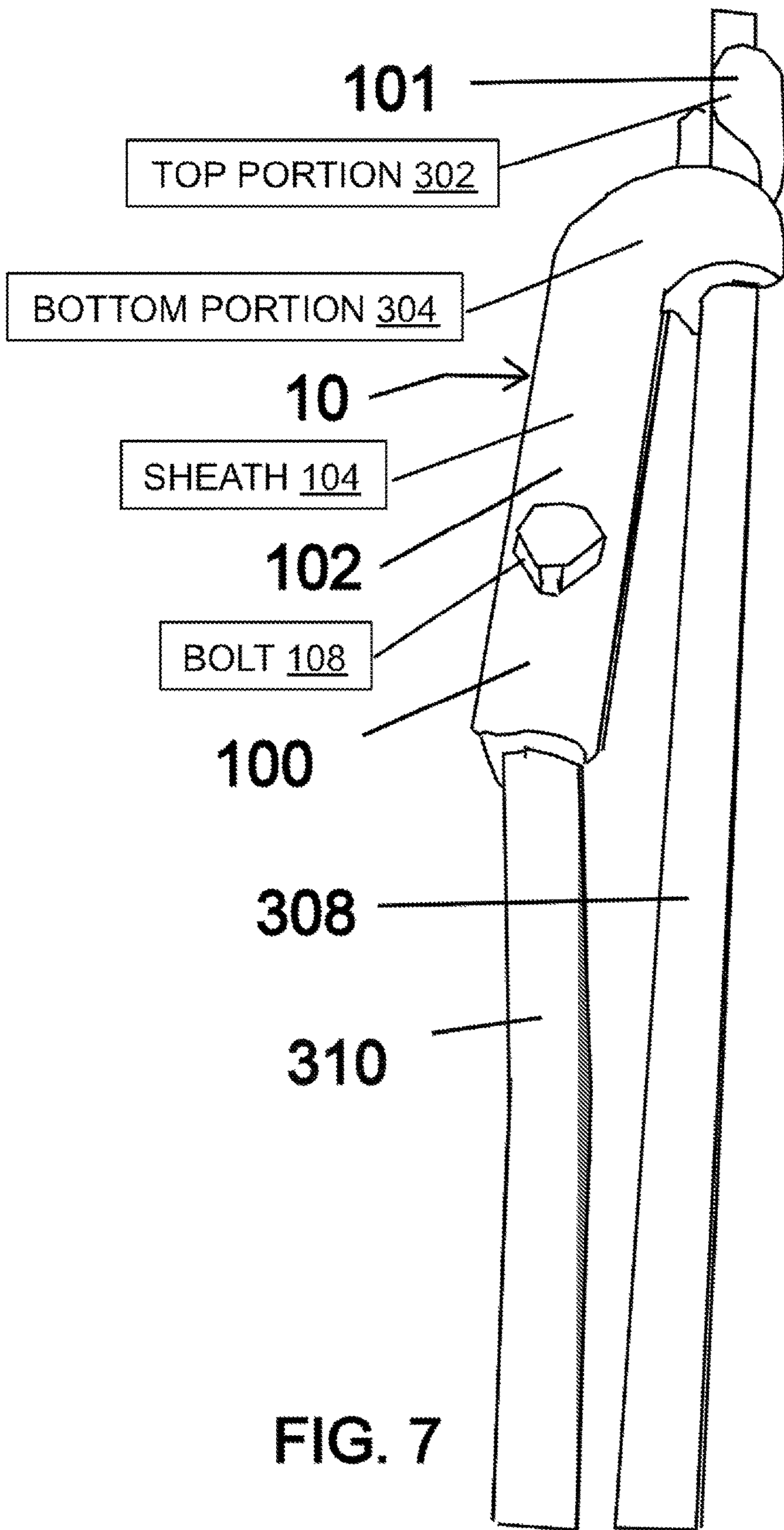
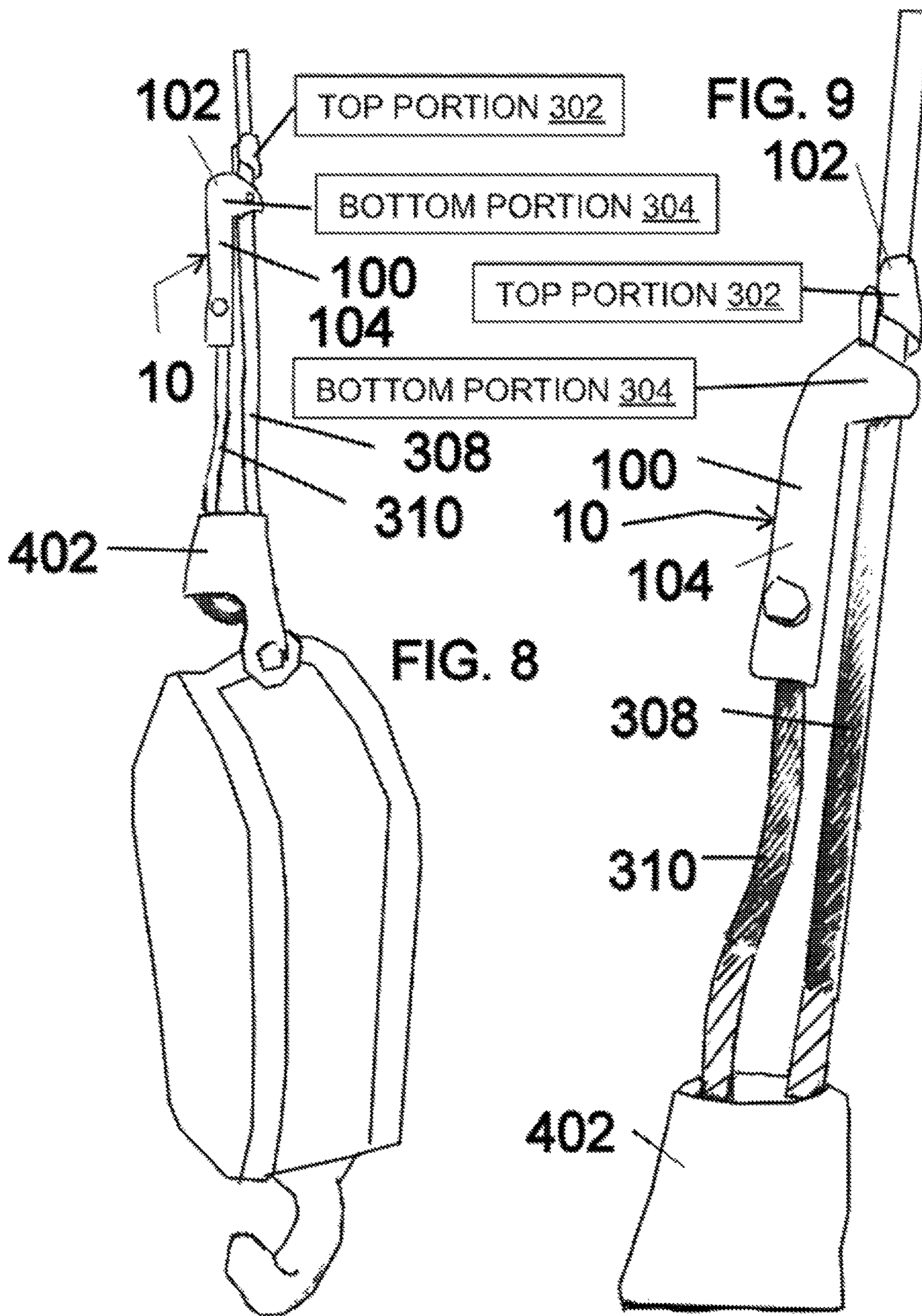
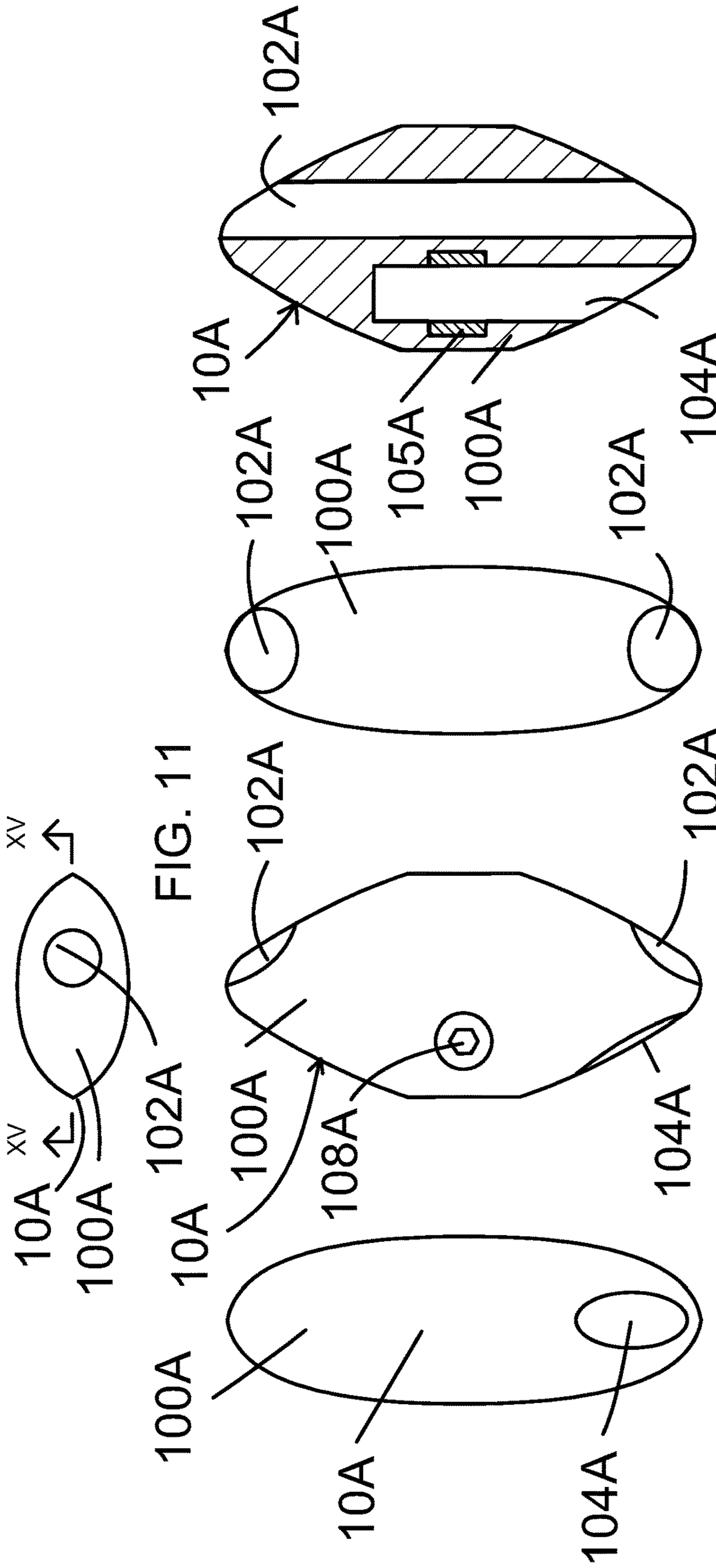
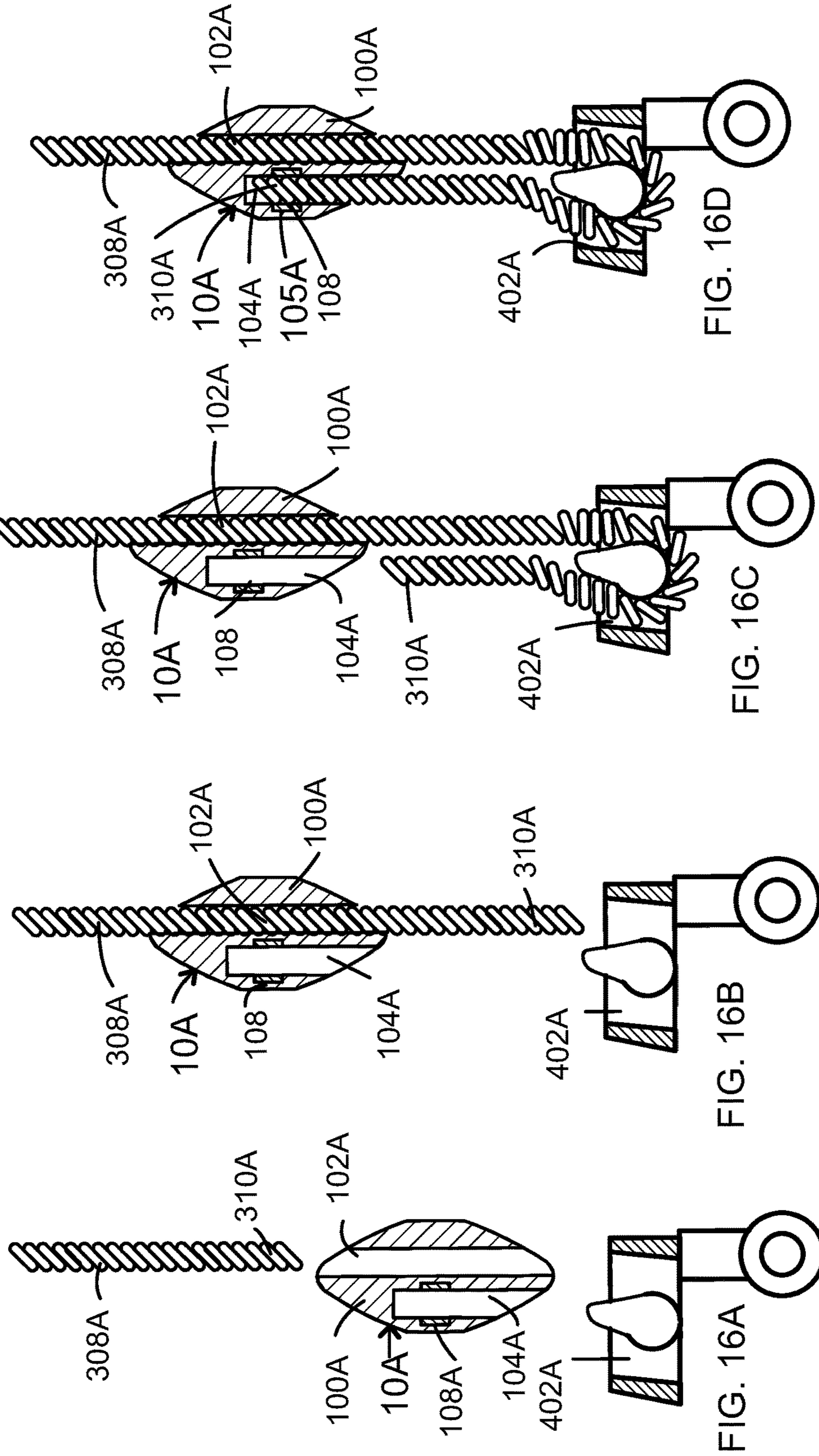


FIG. 7







SYSTEM OF ENTANGLEMENT AVOIDANCE**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application No. 62/306,410 filed Mar. 10, 2016, which is hereby incorporated by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

This invention has been created without the sponsorship or funding of any federally sponsored research or development program.

FIELD OF THE INVENTION

This disclosure relates to a device for terminating wire rope.

BACKGROUND OF THE INVENTION

Wedge socket assemblies have been used to terminate wire ropes on mobile cranes, however, their use is not without drawbacks. For example, even after the wedge and socket are properly installed and seated, the dead end may protrude from the socket, and in certain applications, become entangled during operation of the crane such as with tree branches or other component of the crane.

There remains a need for securing the dead end of a terminated wire rope on a crane to avoid entanglement and provide high visibility, such as visibility through trees.

BRIEF SUMMARY OF THE INVENTION

In an aspect, a wire rope entanglement avoidance device may include a guide component including a top portion and bottom portion, the top portion and bottom portion shaped along a curvature, the top portion and bottom portion arranged in rotational opposition along a length of material and adapted to fit around the wire rope and a sheath, disposed at an offset from the guide component, adapted to fit over a dead end of the wire rope. This may further include one or more bolts to secure the device to the wire rope. In essence, the wire rope entanglement avoidance device creates a smooth non-concave surface from a point beyond the far edge of the dead end of the wire rope to a point on the live end of the wire rope and above the end of the dead end. This surface prevents anything from getting between or getting caught between the dead end and the free end of the wire rope.

These and other systems, methods, objects, features, and advantages of the present invention will be apparent to those skilled in the art from the following detailed description of the preferred embodiment and the drawings.

All documents mentioned herein are hereby incorporated in their entirety by reference. References to items in the singular should be understood to include items in the plural, and vice versa, unless explicitly stated otherwise or clear from the text. Grammatical conjunctions are intended to express any and all disjunctive and conjunctive combinations of conjoined clauses, sentences, words, and the like, unless otherwise stated or clear from the context.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention and the following detailed description of certain embodiments thereof may be understood by reference to the following figures:

FIG. 1 depicts a side view of an embodiment of the sheath terminator.

FIG. 2 depicts a top view of an embodiment of the sheath terminator.

FIG. 3 depicts a left view of an embodiment of the sheath terminator.

FIG. 4 depicts a front view of an embodiment of the sheath terminator.

FIG. 5 depicts a view of the sheath terminator before attachment to the wire rope dead end.

FIG. 6 depicts a view of the sheath terminator attached to the live end of the wire rope.

FIG. 7 depicts a view of the sheath terminator attached to the live end of the wire rope and being slipped over the dead end of the wire rope.

FIG. 8 depicts the sheath terminator in place over the dead end of a wire rope.

FIG. 9 depicts the sheath terminator in place over the dead end of a wire rope.

FIG. 10 depicts a left side view of a second embodiment of the entanglement avoidance device.

FIG. 11 depicts a top view of the second embodiment the entanglement avoidance device.

FIG. 12 depicts a front view of the second embodiment the entanglement avoidance device.

FIG. 13 depicts a bottom view of the second embodiment of the entanglement avoidance device.

FIG. 14 depicts a right side view of the second embodiment of the entanglement avoidance device.

FIG. 15 depicts a sectional view, taken along line XV-XV of FIG. 11, of the second embodiment of the entanglement avoidance device.

FIG. 16A depicts the wire rope outside, but in line with, the second embodiment of the entanglement avoidance device and the terminator becket.

FIG. 16B depicts the wire rope passed through the guide component of the second embodiment of the entanglement avoidance device.

FIG. 16C depicts the wire rope passed through the guide component of the second embodiment of the entanglement avoidance device and then passed through the becket.

FIG. 16D depicts the wire rope passed through the guide component of the second embodiment of the entanglement avoidance device, then passed through the becket, and finally the wire rope dead end enclosed in the entanglement avoidance device sheath.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, a side view of an embodiment of the sheath terminator **100** is depicted. The guide component **102** is located in the uppermost portion of the terminator. In embodiments, the guide component **102** and sheath **104** are molded from a single piece of material, however, it should be understood that the portions **102**, **104** may be welded together or otherwise assembled securely. The guide component **102** may include two pieces of curved material, the top portion **302**, and the bottom portion **304**, arranged in rotational opposition along a length of material and adapted to fit around a rope, such as a wire rope. The device creates a smooth non-concave surface **10** from a point beyond a far edge of the dead end of the wire rope to a point on the live end of the wire rope and above the end of the dead end, said surface preventing anything from getting between or getting caught between the dead end and the free end of the wire rope. In an example, the width of the guide component may

be 1¼ inches in length. In an example, the length of the portion of the guide component **102** situated above the sheath portion **104** may be about 1½ inches in length. The sheath **104** may be 7 inches long in its shortest dimension and of 1¼ inches diameter. One or more bolts **108**, such ½

inch bolts, may be used to secure the position of the terminator once it has been placed on a wire rope.

In an embodiment, the sheath **104** may be cylindrically shaped or alternatively, may be square, triangular or any other suitable shape.

In embodiments, the terminator **100** may be manufactured from steel pipe, such as steel pipe with ⅛ inch thickness, aluminum-steel alloys, or any other suitable material. In embodiments, the terminator may include various other materials molded on to the metal of the sheath and/or guide component. For example, a plastic material, such as polyvinyl chloride (PVC), polypropylene (PP), or polyethylene (PE), may be molded on to one or more portions of the terminator that contact the wire rope. The molding may be an overmolding on the entirety of the terminator portions or may just be placed on the inner surfaces of the curved portions of the guide component and/or an inner surface of the sheath **104**. FIG. 2 depicts a top view of an embodiment of the sheath terminator **100** including PVC pipe molded on to portions of the guide component. Steel rivets may be used to secure the PVC to the metal of the guide component **102**. The sheath **104** and guide component **102** may be joined together with a weld **202**, such as a weld with steel wire.

FIG. 3 depicts a left view of an embodiment of the sheath terminator **100**. In embodiments, the distance between the open edges of the two portions, the top portion **302** and the bottom portion **304**, of the guide component may be about 1 inch. The two portions of the guide component may be disposed with respect to one another such that a line drawn between the center of the lower edge of the top portion and the center of the upper edge of the low portion is at an angle of 4 to 6 degrees from a line running down the length of the terminator. The distance between the center of the bolt **108**, which may be about 1 inch long, to the bottom edge of the terminator may be about 5 inches.

FIG. 4 depicts a front view of an embodiment of the sheath terminator **100**. The top portion of the guide component may be about 1 inch long.

FIG. 5 depicts a view of the sheath terminator **100** before attachment to the wire rope **308**. The sheath terminator **100** is being tilted towards the wire rope **308** in preparation for engaging the top portion **302** and bottom portion **304** of the guide component. The sheath **104** is offset from the guide component so that it can fit over the adjacent portion of wire rope forming the dead end **310**.

FIG. 6 depicts a view of the sheath terminator **100** attached to the live end of the wire rope **308**. The top portion **302** and bottom portion **304** of the guide component have engaged the live end of the wire rope **308** in order to guide the sheath **104** into position over the dead end **310** of the rope **308**. Once the sheath terminator **100** is in place, one or more bolts **108** may be tightened to secure the sheath terminator **100** to the dead end **310** of the rope **308**.

Referring now to FIG. 7, the sheath terminator **100** has been attached to the live end of the wire rope **308** via the guide component **102** and the sheath **104** is being slipped over the dead end **310** of the wire rope **308**.

FIG. 8 depicts the sheath terminator **100** in place with the guide component **102** engaging the live end of the rope **308** and the sheath in place over the dead end **310** of the wire rope **308**. FIG. 8 depicts the sheath terminator **100** in addition to other components **402** of the crane, which may

include one or more of a Crosby™ clamp, a Crosby™ terminator wedge socket (**402**), terminator becket, crane blocks, reeve crane blocks, handling blocks, crane hooks, and the like.

FIG. 9 depicts the sheath terminator **100** in place with the guide component **102** engaging the live end of the rope **308** and the sheath **104** in place over the dead end **310** of the wire rope **308**. FIG. 9 depicts the sheath terminator **100** in addition to other components **402** of the crane, including one or more of a Crosby™ clamp, a Crosby™ terminator wedge socket (**402**), terminator becket, crane blocks, reeve crane blocks, handling blocks, crane hooks, and the like.

FIG. 10 depicts a left side elevation view of a second embodiment of the entanglement avoidance device **100A** shown in FIG. 12. FIG. 10 shows the blind bore **104A**.

FIG. 11 depicts a plan view of a second embodiment of the entanglement avoidance device **100A** shown in FIG. 12. FIG. 11 shows the through bore **102A**.

FIG. 12 depicts a front elevation view of a second embodiment of the entanglement avoidance device **100A** shown in FIG. 12. FIG. 12 shows the blind bore **104A**, the through bore **102A**, and the bolt **108A**.

FIG. 13 depicts a right side elevation view of a second embodiment of the entanglement avoidance device **100A** shown in FIG. 12. FIG. 13 shows the through bore **102A**.

FIG. 14 depicts a bottom view of a second embodiment of the entanglement avoidance device **100A** shown in FIG. 12. FIG. 14 shows the blind bore **104A**, and the through bore **102A**.

FIG. 15 depicts a sectional view, taken along line XV-XV of FIG. 11, of the second embodiment of the entanglement avoidance device shown in FIG. 12. FIG. 15 shows the blind bore **104A**, the through bore **102A**, and the band **105A** surrounds the blind bore **104A**, and that carries the bolt **108A**.

FIG. 16A depicts the wire rope **308A** outside, but in line with, an embodiment of the entanglement avoidance device **100A** and the terminator becket **402A**.

FIG. 16B depicts the wire rope **308A** passed through the guide component, namely, the through bore **102A** of an embodiment of the entanglement avoidance device **100A**.

FIG. 16C depicts the wire rope **308A** passed through the guide component, namely, the through bore **102A** of an embodiment of the entanglement avoidance device **100A** and then passed through and locked in the terminator **402A**. The dead end **310A** extends upward.

FIG. 16D depicts the wire rope **308A** passed through the guide component, namely, the through bore **102A** of an embodiment of the entanglement avoidance device **100A** and then passed through and locked in the terminator **402A**. The dead end **310A** extends upward. The entanglement avoidance device **100A** is lowered so that the dead end **310A** is passed into the blind bore **104A** and locked in the blind bore **104A**, by the cooperation of the peripheral band **105A** with the bolt **108A** (not shown). The device creates a smooth non-concave surface **10A** from a point beyond a far edge of the dead end of the wire rope to a point on the live end of the wire rope and above the end of the dead end, said surface preventing anything from getting between or getting caught between the dead end and the free end of the wire rope.

In embodiments, the sheath terminator **100A** may be co-assembled with, co-molded with, or welded to the Crosby™ terminator wedge socket, terminator becket, or Crosby™ clamp. In embodiments, wire rope for cranes may be sold with associated sheath terminators.

While the invention has been disclosed in connection with the preferred embodiments shown and described in detail,

various modifications and improvements thereon will become readily apparent to those skilled in the art. Accordingly, the spirit and scope of the present invention is not to be limited by the foregoing examples, but is to be understood in the broadest sense allowable by law.

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What is claimed is:

1. A method for preventing entanglements between a dead end and a live end of a wire rope, said method comprising the steps of:

- a.) providing a body, wherein the body comprises a first 10
guide component that is configured at an offset from a second sheath portion of the body by a curved portion of the body;
- b.) placing the first guide component of the body on the live end of the wire rope, 15
- c.) threading the wire rope through a terminator wedge socket so that the dead end is aligned adjacent to the live end; and
- d.) inserting the dead end of the wire rope into the second sheath portion of the body so that the second sheath 20
portion of the body covers an end of the dead end and secures the dead end adjacent to the live end by the offset.

2. A method as recited in claim 1, which produces a smooth non-concave surface from a point beyond a far edge 25
of the dead end of the wire rope to a point on the live end of the wire rope and above the end of the dead end.

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