

(19) **DANMARK**

(10)

DK 180497 B1



(12)

PATENTSKRIFT

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **B66C 1/66 (2006.01)** **E01C 19/52 (2006.01)**
- (21) Ansøgningsnummer: **PA 2020 00168**
- (22) Indleveringsdato: **2020-02-11**
- (24) Løbedag: **2020-02-11**
- (41) Alm. tilgængelig: **2021-05-27**
- (45) Patentets meddelelse bkg. og publiceret den: **2021-05-27**
- (73) Patenthaver:
Josef Fahoum, Grønlandsvej 2, 8800 Viborg, Danmark
- (72) Opfinder:
Josef Fahoum, Grønlandsvej 2, 8800 Viborg, Danmark
- (74) Fuldmægtig:
InnovatorLAB v/Marcus Reinholdt Pedersen, Viborggade 74, 2. th., 2100 København Ø, Danmark
- (54) Titel: **Lifting Apparatus**
- (56) Fremdragne publikationer:
US 2005/0224773 A1
US 3307871 A
US 3583753 A
US 4838595 A
WO 86/05471 A1
US 2002/0084660 A1
- (57) Sammendrag:
A lifting apparatus (100) for lifting an object (102) is disclosed. The lifting apparatus (100) comprises an elongated member (104) and an intermediate member (106). The elongated member (104) having a pair of slots (122 and 124), which are separated by a wedge section (110) at a bottom portion. The intermediate member (106) is bisected at its middle portion (130) into two members (126 and 128) with each barb (118). The intermediate member (106) is disposed within a recess (105) of the elongated member (104) by applying force, whereby the applied force causes the barbs (118) to expand outwards via the slots (122 and 124) for securing the object (102). The elongated member (104) and the intermediate member (106) are secured via a locking rod (108) and a chain sling (120) is secured to both ends of the locking rod (108) for safely lifting the object (120).

Fortsættes...

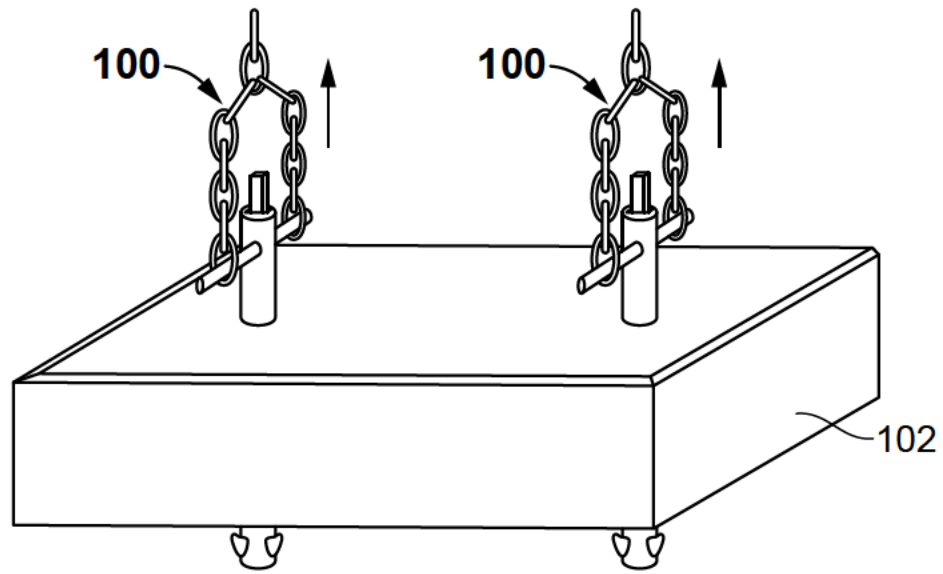


FIG. 1

LIFTING APPARATUS

TECHNICAL FIELD OF THE INVENTION

5 The invention disclosed herein generally relates to a lifting apparatus. More particularly, the present invention relates to a lifting apparatus for easily and safely lifting objects, for example, damaged stones or tiles having both regular and irregular shapes from an interlocking pavement.

10 BACKGROUND

 One of the most common injuries sustained by construction workers, maintenance crews and those engaged in similar work involves the back due to stresses placed on it by lifting and carrying heavy and awkward objects. Injuries to the hands and
15 feet are also relatively common as workers are frequently required to lift and move heavy objects, for example, stones or tiles and consequently are difficult to grasp.

 For example, pavements are made of stones, which are solidly anchored to the adjacent stones. In particular, it is difficult to lift or pull out individual, e.g., damaged or
20 sunken stones from existing interlocking pavements, which may consist of composite stone, tiles, clinker brick, natural stones, and slabs of various shapes, and to replace said stones with corresponding new ones. Currently, workers using different tools and devices, for example, hammer and chisel, and the like for pulling out the damaged stones from existing interlocking pavements. However, the process is relatively cumbersome,
25 difficult, and time-consuming.

 One such a prior art device is described in EP0551828 to Maryan et al., discloses a device for lifting individual laid paving stones out of their interlocking arrangement, two thin lamellas in each case being guided movably up and down in a rigid
30 C-shaped guide and being provided at least in the region of the lower end with resilient

abutment knobs which in the normal state project at least at one end beyond one plane of the lamella, each lamella being connected to a tappet with the aid of which the lamella is movable up and down. However, the operation of the device is difficult and the worker may feel difficult to operate for lifting the stones.

5

Another prior art, US 2005/0224773 of *O'Neill*, discloses a lift mechanism for use in raising ground trench covers includes an axially extending housing, a cam located at one end of the housing, and a latch located at the other end of the housing. Rotational cam movement drives movement of the latch between retracted and actuated positions.

10 The cam is connected to a latch driving mechanism, which may include springs and/or cables of unequal strength and/or unequal length. However, above-mentioned prior art fails to disclose an alternative design to obtain a lifting apparatus to support lifting beneath the surface for lifting an object, configured with an elongated member is separated by at least one wedge section at the bottom portion, and the intermediate
15 member is bisected at its middle portion into two members with each barb at a distal end, wherein the intermediate member is configured to dispose within the recess of the elongated member by applying force, whereby the force applied on the intermediate member causes the barbs to expand outwards via the pair of slots for securing the object, and the locking rod enabling a user to lift at least one object by using a chain sling.

20

In the light of above-mentioned problems, there is a need for a lifting apparatus for easily and safely lifting objects, for example, stones or tiles having both regular and irregular shapes. Further, there is also need for a lifting apparatus that permits the workman to handle them more conveniently and rapidly and to lift at least one object, for
25 example, stone or tile at once with greater safety and with the expenditure of less effort to himself than would be were lifted by hand.

SUMMARY OF THE INVENTION

This summary is provided to introduce a selection of concepts in a simplified form that is further disclosed in the detailed description of the invention. This summary is not intended to identify key or essential inventive concepts of the claimed subject matter, nor is it intended for determining the scope of the claimed subject matter.

The present invention discloses a lifting apparatus. More particularly, the present invention relates to a lifting apparatus for easily and safely lifting objects, for example, damaged stones or tiles having both regular and irregular shapes from an interlocking pavement.

In one embodiment, the lifting apparatus is configured to enable a person to safely and conveniently lift the object, for example, a stone with minimum effort. In one embodiment, the lifting apparatus comprises a plurality of components, which are securely assembled as a single device to lift the object using at least one chain sling. In one embodiment, at least one or more lifting apparatus are used for safely pulling and lifting heavy objects. In an exemplary embodiment, the lifting apparatus is used to lift or pull out individual, e.g., damaged or sunken stones from existing interlocking pavements, which may consist of composite stone, tiles, clinker brick, natural stones, and slabs of various shapes, and to replace said stones with corresponding new ones.

In one embodiment, the lifting apparatus comprises a plurality of components such as, but not limited to, an elongated member, an intermediate member, and a locking rod or crosspiece. In one embodiment, the elongated member comprises a recess, configured to receive the intermediate member. In one embodiment, the elongated member further comprises at least a pair of holes at a top portion and at least a pair of slots at a bottom portion. In one embodiment, the elongated member is an elongated cylindrical member. In one embodiment, the elongated member and the intermediate member are secured via the locking rod.

In one embodiment, the intermediate member is secured to the elongated member using the locking rod. In one embodiment, the locking rod is inserted via the holes of both elongated member and the intermediate member, respectively, for securing the elongated member to the intermediate member, thereby enabling a user to safely and conveniently lift at least one object using a chain sling.

In one embodiment, the intermediate member having at least one hole at a proximal end. In one embodiment, the intermediate member is bisected at its middle portion into two members with each barb at a distal end. The intermediate member is configured to dispose within the recess of the elongated member by applying force, whereby the force applied on the intermediate member causes the barbs to expand outwards via the pair of slots for securing the object.

In one embodiment, the elongated member defining a recess, wherein the elongated member comprises a pair of holes at a top portion and at least a pair of slots, which are separated by at least one wedge section at a bottom portion. In one embodiment, the wedge section could be, but not limited to, a triangular-shaped wedge section. In one embodiment, the elongated member is made of a material includes, but not limited to, steel and iron.

In one embodiment, the intermediate member is bisected at its middle section into two members with each barb at a distal end. In one embodiment, the intermediate member is made of a sturdy and flexible material. When the force applied on the intermediate member causes the barbs to expand outwards via the pair of slots for securing the object, for example, a stone or tile. In one embodiment, the locking rod is configured to secure the intermediate member to the elongated member. In one embodiment, the locking rod is inserted via the holes of the elongated member and the intermediate member, respectively. In one embodiment, the locking rod is made of a

sturdy material. In another embodiment, the locking rod is made of a material includes, but not limited to, steel or iron.

5 Other objects, features and advantages of the present invention will become apparent from the following detailed description. It should be understood, however, that the detailed description and the specific examples, while indicating specific embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of the invention, is better understood when read in conjunction with the appended drawings. For illustrating the invention, exemplary constructions of the invention are shown in the drawings. However, the invention is not limited to the specific methods and structures disclosed herein. The description of a method step or a structure referenced by a numeral in a drawing is applicable to the description of that method step or structure shown by that same numeral in any subsequent drawing herein.

10

FIG. 1 exemplarily illustrates a perspective view of a lifting apparatus used for lifting an object, for example, a stone or a tile in an embodiment of the present invention.

15

FIG. 2 exemplarily illustrates a perspective view of the lifting apparatus in one embodiment of the present invention.

FIG. 3 exemplarily illustrates a top view of the lifting apparatus in one embodiment of the present invention.

20

FIG. 4 exemplarily illustrates a sectional view of the lifting apparatus in one embodiment of the present invention.

25

FIG. 5 exemplarily illustrates a perspective view of an elongated member of the lifting apparatus in one embodiment of the present invention.

FIG. 6 exemplarily illustrates a perspective view of an intermediate member of the lifting apparatus in one embodiment of the present invention.

30

FIG. 7 exemplarily illustrates a perspective view of a locking rod of the lifting apparatus in one embodiment of the present invention.

FIG. 8 exemplarily illustrates a perspective view of a chain sling of the lifting apparatus in one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, a lifting apparatus **100** used for lifting an object **102**, for example, a stone or tile in one embodiment is disclosed. In one embodiment, the lifting apparatus **100** is configured to enable a person to safely and conveniently lift the object **102**, for example, a stone with minimum effort. In one embodiment, the lifting apparatus **100** comprises a plurality of components, which are securely assembled as a single device to lift the object **102** using at least one chain sling **120** (shown in FIG. 8). In one embodiment, at least one or more lifting apparatus **100** are used for safely pulling and lifting heavy objects. In an exemplary embodiment, the lifting apparatus **100** is used to lift or pull out individual, e.g., damaged or sunken stones from existing interlocking pavements, which may consist of composite stone, tiles, clinker brick, natural stones, and slabs of various shapes, and to replace said stones with corresponding new ones.

In one embodiment, the apparatus **100** is configured to safely lifting heavy, regular and odd shaped, objects. In one embodiment, the lifting apparatus **100** could be used by at least one or two individuals to raise and lower heavy objects with minimum strain and effort. In one embodiment, the lifting apparatus **100** could be operated with cables, chains, and hooks using boom trucks, backhoes, etc. to lift objects that are too heavy to be lifted by two individuals.

Referring to FIGs. 2-3, the lifting apparatus **100** of the present invention is disclosed. In one embodiment, the lifting apparatus **100** comprises a plurality of components such as, but not limited to, an elongated member **104**, an intermediate member **106**, and a locking rod or crosspiece **108**. In one embodiment, the elongated member **104** comprises a recess **105**, configured to receive the intermediate member **106**. In one embodiment, the elongated member **104** further comprises at least a pair of holes **112** (shown in FIG. 5) at a top portion and at least a pair of slots (**122** and **124**) (shown in FIG. 5) at a bottom portion. In one embodiment, the elongated member **104** and the

intermediate member **106** are secured via the locking rod **108**. In one embodiment, the elongated member **104** is an elongated cylindrical member.

In an exemplary embodiment, the lifting apparatus **100** could be used to safely and conveniently lift the stone or tile. At one step, the user or worker drills the stone or tile to make at least one hole. Then, the elongated member **104** is inserted through the hole until it surpasses the bottom of the stone. At another step, the intermediate member **106** is inserted into the recess **105** of the elongated member **104** until barbs **118** (shown in FIG. **4**) are expanded outwards via the pair of slots (**122** and **124**) (shown in FIG. **5**) by applying force on it. At another step, the locking rod **108** is inserted via the holes (**112** and **116**) of the elongated member **104** and the intermediate member **106**, respectively, for securing the elongated member **104** to the intermediate member **106**. Further, at another step, the chain sling **120** is removably secured to both ends of the locking rod **108** for safely lifting the stone or tile. In some embodiments, at least two or more lifting apparatus **100** are used for safely lifting heavy stones or tiles.

Referring to FIG. **4**, a sectional view of the lifting apparatus is disclosed. In one embodiment, the intermediate member **106** is secured to the elongated member **104** using the locking rod **108**. In one embodiment, the locking rod **108** is inserted via the holes (**112** and **116**) (shown in FIGs. **5** and **6**) of both elongated member **104** and the intermediate member **106**, respectively, for securing the elongated member **104** to the intermediate member **106**, thereby enabling a user to safely and conveniently lift at least one object **102** using a chain sling **120**.

In one embodiment, the intermediate member **106** having at least one hole **116** (shown in FIG. **6**) at a proximal end. In one embodiment, the intermediate member **106** is bisected at its middle portion **130** (shown in FIG. **6**) into two members (**126** and **128**) (shown in FIG. **6**) with each barb **118** (shown in FIG. **6**) at a distal end. The intermediate member **106** is configured to dispose within the recess **105** of the elongated member **104** by applying force, whereby the force applied on the intermediate member **106** causes the

barbs **118** to expand outwards via the pair of slots (**122** and **124**) for securing the object **102**.

Referring to FIG. 5, the elongated member **104** of the lifting apparatus **100** is disclosed. In one embodiment, the elongated member **104** defining a recess **105**, wherein the elongated member **104** comprises a pair of holes **112** at a top portion and at least a pair of slots (**122** and **124**), which are separated by at least one wedge section **110** at a bottom portion. In one embodiment, the wedge section **110** of could be, but not limited to, a triangular-shaped wedge section. In one embodiment, the elongated member **104** is made of a material includes, but not limited to, steel and iron.

Referring to FIG. 6, the intermediate member **106** of the lifting apparatus **100** is disclosed. In one embodiment, the intermediate member **106** is bisected at its middle section **130** into two members (**126** and **128**) with each barb **118** at a distal end. In one embodiment, the intermediate member **106** is made of a sturdy and flexible material. When the force applied on the intermediate member **106** causes the barbs **118** to expand outwards via the pair of slots (**122** and **124**) for securing the object **102**, for example, a stone or tile.

Referring to FIG. 7, the locking rod **108** of the lifting apparatus **100** is disclosed. In one embodiment, the locking rod **108** is configured to secure the intermediate member **106** to the elongated member **104**. In one embodiment, the locking rod **108** is inserted via the holes (**112** and **116**) of the elongated member **104** and the intermediate member **106**, respectively. In one embodiment, the locking rod **108** is made of a sturdy material. In another embodiment, the locking rod **108** is made of a material includes, but not limited to, steel or iron. Referring to FIG. 8, the chain sling **120** of the lifting apparatus **100** is disclosed. In one embodiment, the chain sling **120** could removably secure to both ends of the locking rod **108** as shown in FIG. 1. In one embodiment, the chain sling **120** could safely lift objects, for example, stones or tiles by securely engaging to the lifting apparatus **100**.

The advantages of the present invention include the lifting apparatus **100** could be manufactured in various sizes such that it could be used to lift heavy objects. The lifting apparatus **100** is easy to manufacture, lightweight, inexpensive, and easy to handle for the user or worker. The lifting apparatus **100** that permits the workman to handle them more conveniently and rapidly and to lift at least one object, for example, stone or tile at once with greater safety and with the expenditure of less effort to himself than would be were lifted by hand.

The foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present concept disclosed herein. While the concept has been described with reference to various embodiments, it is understood that the words, which have been used herein, are words of description and illustration, rather than words of limitation. Further, although the concept has been described herein with reference to particular means, materials, and embodiments, the concept is not intended to be limited to the particulars disclosed herein; rather, the concept extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims. Those skilled in the art, having the benefit of the teachings of this specification, may affect numerous modifications thereto and changes may be made without departing from the scope and spirit of the concept in its aspects.

KRAV

1. Et løfteapparat (**100**) til sikkert at løfte et objekt (**102**), omfattende et langstrakt element (**104**) defineret ved en fordybning (**105**), hvor det aflange element (**104**)
5 har et par huller (**112**) i den øverste del og mindst et par riller (**122** og **124**), et mellemliggende element (**106**) der har mindst et hul (**116**) i en proksimal ende og en låsestang (**108**) konfigureret til at indsætte via huller (**112** og **116**) i begge aflange elementer (**104**) og mellemelement (**106**), henholdsvis til fastgørelse af det aflange element (**104**) og mellemelement (**106**), kendetegnet ved:
10 det aflange element (**104**) er adskilt af mindst en kilesektion (**110**) ved en bunddel og mellemelementet (**106**) halveret ved sin midterste del (**130**) i to elementer (**126** og **128**) hver med en modhage (**118**) i den fjerneste ende, hvor det mellemliggende element (**106**) er konfigureret til at disponere i fordybningen (**105**) i det aflange element (**104**) til at anvende
15 kraft, hvorved kraften anvendes på mellemelementet (**106**) der forårsager modhagerne (**118**) til at bevæge sig udad via parret af riller (**122** og **124**) til sikring af objektet (**102**), og låsestangen (**108**) der gør det muligt for en bruger at løfte mindst et objekt (**102**) ved hjælp af en kædeslynge (**120**).
- 20 2. Løfteapparatet (**100**) ifølge krav 1, hvor det langstrakte element (**104**) er lavet af stål og jern.
3. Løfteapparatet (**100**) ifølge krav 1, hvor låsestangen (**108**) er lavet af stål og jern.
- 25 4. Løfteapparatet (**100**) ifølge krav 1, hvor kilesektionen (**110**) af det aflange element (**104**) er en trekant formet kilesektion.
5. Løfteapparatet (**100**) ifølge krav 1, hvor det langstrakte element (**104**) er et aflangt cylindrisk element.

6. Løfteapparatet (**100**) ifølge krav 1, hvor kædeslyngen (**120**) er konfigureret til aftagelig fastgørelse i begge ender af låsestangen (**108**).

1/4

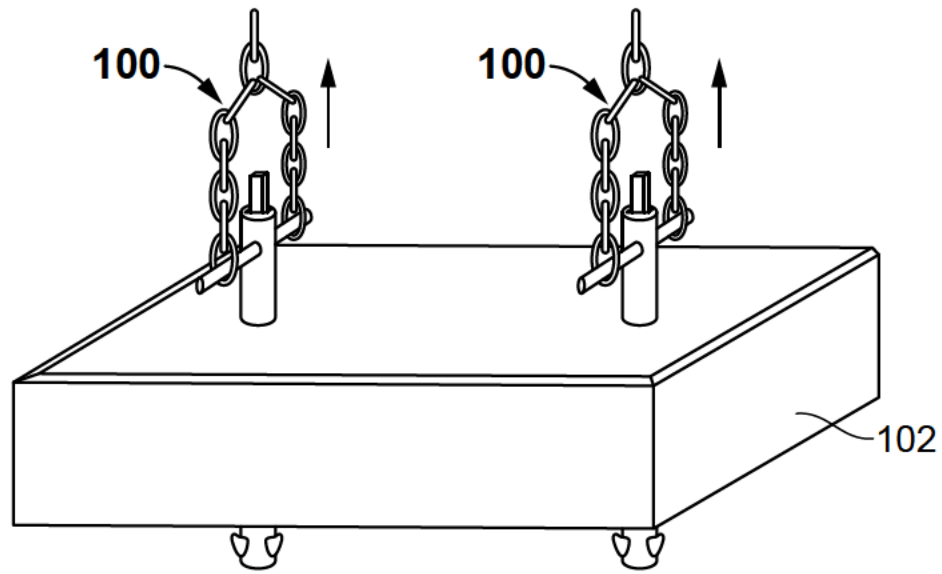


FIG. 1

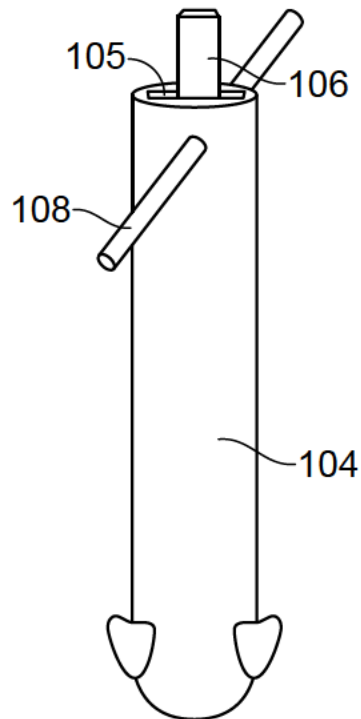


FIG. 2

2/4

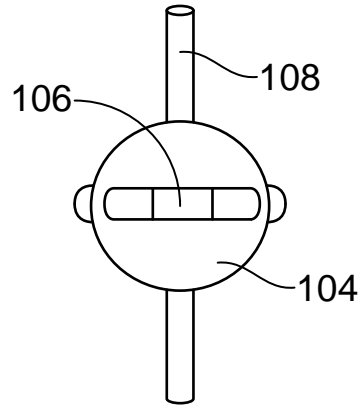


FIG. 3

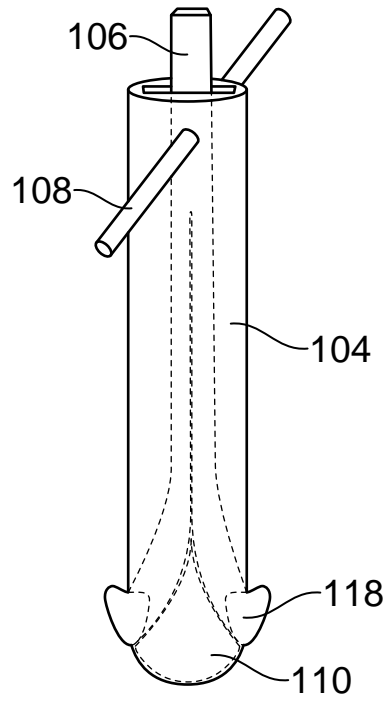


FIG. 4

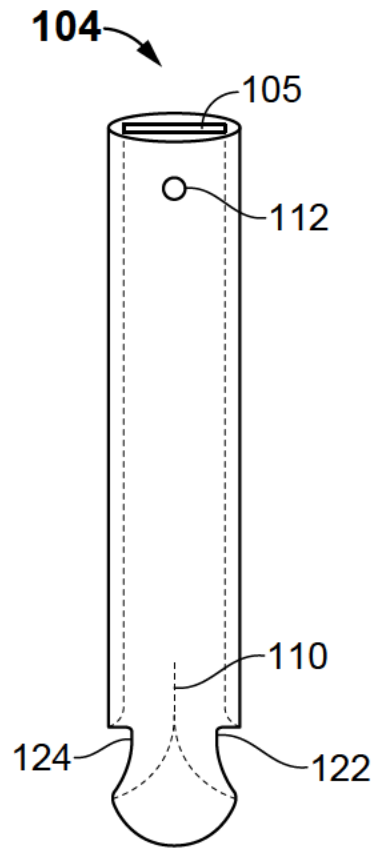


FIG. 5

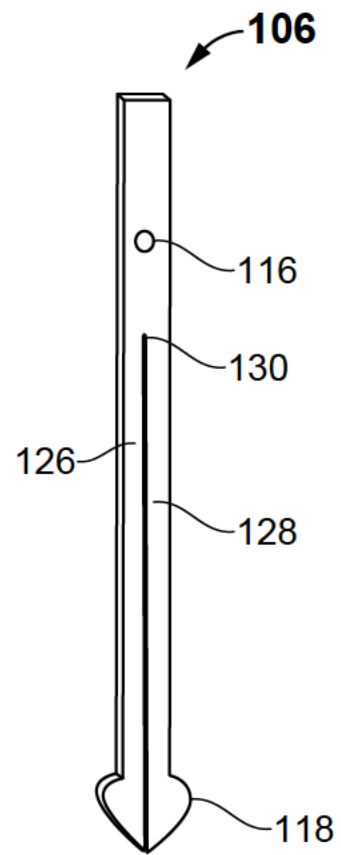


FIG. 6

4/4



FIG. 7

120

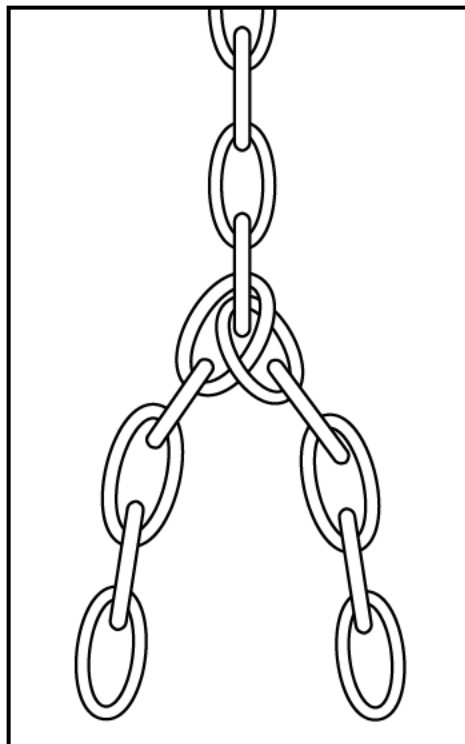


FIG. 8