

(19)



(11)

EP 3 898 100 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

07.06.2023 Bulletin 2023/23

(51) International Patent Classification (IPC):

B25B 13/06 ^(2006.01) **B25B 15/00** ^(2006.01)
B25B 23/08 ^(2006.01) **B25B 23/10** ^(2006.01)

(21) Application number: **19911851.4**

(52) Cooperative Patent Classification (CPC):

B25B 15/005; B25B 23/108

(22) Date of filing: **04.10.2019**

(86) International application number:

PCT/IB2019/058489

(87) International publication number:

WO 2020/152516 (30.07.2020 Gazette 2020/31)

(54) **ANTI-SLIP FASTENER REMOVER TOOL**

RUTSCHHEMMENDES WERKZEUG ZUM ENTFERNEN VON BEFESTIGUNGSMITTELN

OUTIL ANTIDÉPARANT POUR LA SUPPRESSION DES MOYENS DE FIXATION

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

• **KUKUCKA, Thomas Stefan**
Brandon, Florida 33509 (US)

(30) Priority: **23.01.2019 US 201916255341**
22.08.2019 US 201916548470

(74) Representative: **Loo, Chi Ching et al**
Albright IP Limited

County House
Bayshill Road
Cheltenham, Gloucestershire GL50 3BA (GB)

(43) Date of publication of application:
27.10.2021 Bulletin 2021/43

(56) References cited:

EP-A2- 2 363 245 WO-A1-2011/109040
WO-A1-2015/082283 WO-A1-2015/082283
DE-A1- 3 911 409 RU-C1- 2 387 533
US-A1- 2006 266 168 US-A1- 2018 354 102

(73) Proprietor: **Grip Holdings LLC**
Brandon, FL 33510 (US)

(72) Inventors:

• **KUKUCKA, Paul**
Brandon, Florida 33509 (US)

EP 3 898 100 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

FIELD OF THE INVENTION

[0001] The present invention relates generally to tools designed for tightening or loosening fasteners, in particular bolts and nuts. More specifically, the present invention is an anti-slip fastener remover tool that designed to engaged bolts, nuts, and other similar fasteners with little chance of slippage.

BACKGROUND OF THE INVENTION

[0002] Hex bolts, nuts, screws, and other similar threaded devices are used to secure and hold multiple components together by being engaged to a complimentary thread, known as a female thread. The general structure of these types of fasteners is a cylindrical shaft with an external thread and a head portion that is connected at one end of the cylindrical shaft. The external thread engages a complimentary female thread tapped into a hole or a nut and secures the fastener in place, fastening the associated components together. The head portion receives an external torque force and is the means by which the fastener is turned, or driven, into the female threading. The head portion is shaped specifically to allow an external tool like a wrench to apply a torque to the fastener in order to rotate the fastener and engage the complimentary female threading to a certain degree. This type of fastener is simple, extremely effective, cheap, and highly popular in modern construction. Examples of known fastener remover tools are US 2018/354102 A1 (Advanced Holding Apparatus) showing the preamble of claim 1,

[0003] US 2006/266168 A1 (Combination Driver and Combination Fastener), WO 2015/082283 A1 (Screw and Drive Element Having a Chamber), and EP 2363245 A2 (Fastener System with Stable Engagement and Stick Fit). One of the most common problems in using these types of fasteners, whether male or female, is the tool slipping in the head portion, or slipping on the head portion. This is generally caused by either a worn fastener or tool, corrosion, overtightening, or damage to the head portion of the fastener. Various methods may be used to remove a fastener, some more aggressive than others. Once a fastener head is damaged, a more aggressive method must be implemented to remove a seized fastener. Drilling out the fastener is a common method used by some users to dislodge the fastener. While this method can prove to be effective in some scenarios there is a high risk of damaging the internal threads of the hole.

[0004] The present invention as defined by claim 1 is an anti-slip fastener remover tool that reduces the chance of slippage. The present invention uses a series of integrated engagement segments that bite into the head portion of the fastener and allow for efficient torque transfer between the extractor bit and the head portion of the fastener. Resultantly, the present invention may be used to

tighten or loosen fasteners without worrying about stripping the corners of the fastener.

[0005] The present invention is set forth in the appended set of claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIG. 1 is a perspective view of the present invention, wherein the torque-tool body is outwardly extended from the rotational axis to the plurality of paired engagement features.

FIG. 2 is a side view of the present invention, wherein the torque-tool body is outwardly extended from the rotational axis to the plurality of paired engagement features.

FIG. 3 is a bottom view of the present invention, wherein the torque-tool body is outwardly extended from the rotational axis to the plurality of paired engagement features.

FIG. 4 is a top view of the present invention, wherein the torque-tool body is outwardly extended from the rotational axis to the plurality of paired engagement features.

FIG. 5 is a top view of the present invention, wherein the torque-tool body is outwardly extended from the rotational axis to the plurality of paired engagement features and showing the bisecting line, the first bisecting angle, and the second bisecting angle.

DETAIL DESCRIPTIONS OF THE INVENTION

[0007] All illustrations of the drawings are for the purpose of describing selected versions of the present invention and are not intended to limit the scope of the present invention.

[0008] The present invention is an anti-slip tool used to tighten or loosen a damaged/stripped fastener such as a nut or bolt. Traditional wrench designs transfer the majority of the torque to the damaged/stripped fastener through the lateral corners of the fastener head. Over time, the degradation of the lateral corners reduces the efficiency of transferring torque from the wrench to the fastener head and, as a result, causes slippage. The present invention overcomes this problem by moving the contact point to the lateral sides of the fastener head. This is accomplished through the use of a multitude of teeth. Each of the teeth is positioned to engage or "bite" the lateral surface of the fastener head instead of the lateral corner. This ensures an adequate amount of torque is transferred to the fastener head to initiate rotation and, resultantly, extraction or tighten the damaged/stripped fastener. However, the present invention is also designed to be used with an undamaged or new fastener without causing damage to the fastener when torque is applied in accordance with maximum specified and industry approved torque levels for the particular fas-

tener size or diameter.

[0009] The present invention utilizes a multitude of teeth to engage the sides of the fastener head, damaged or otherwise, in order to efficiently apply torque onto the damaged/stripped fastener. The present invention may be integrated into or utilized by a variety of general tools to increase the torque force applied to a fastener. General tools include, but are not limited to, open-end wrenches, adjustable wrenches, pipe wrenches, socket wrenches, plumber wrench, and other similar fastener engaging tools. The present invention is compatible with female-member based head designs of fasteners. Fasteners which utilize a female-member head design, also known as female fasteners, use the internal lateral surface or the internal cavity of the fastener head to engage a tool for tightening or loosening. In addition, the present invention is compatible with fasteners of a right-hand thread and fasteners of a left-hand thread. Furthermore, the present invention may be altered and configured to fit different types and different sizes of fasteners.

[0010] Referring to FIG. 1-5, the present invention comprises a torque-tool body 1 and a plurality of paired engagement features 3. The torque-tool body 1 is used as the physical structure to apply the corresponding force by the plurality of paired engagement features 3 on the fastener head. For some fasteners, the torque-tool body 1 functions similar to a driver-bit that is sized to fit into an opening of the fastener head in an interlocking manner. The length, width, and diameter of the torque-tool body 1 may vary to fit different sized male/female fasteners. The plurality of paired engagement features 3 prevents slippage during the damaged/stripped fastener extraction and is radially positioned around a rotational axis 2 of the torque-tool body 1 as seen in FIG. 1-4. As a result, the plurality of paired engagement features 3 facilitates the transfer of torque to the male/female fastener by preventing slippage between the torque-tool body 1 and the fastener head.

[0011] The plurality of paired engagement features 3 is distributed into a polygon shape within the torque-tool body 1 and preferably symmetric along the rotational axis 2, wherein the rotational axis 2 centrally traverses through the torque-tool body 1. A symmetrical design is ensured within the present invention to perform equally when rotating the fastener in a clockwise direction or in a counterclockwise direction.

[0012] In reference to FIG. 1, the torque-tool body 1 is outwardly extended from the rotational axis 2 to the plurality of paired engagement features 3. This yields the driver-bit structure for the present invention as the plurality of paired engagement features 3 is distributed about the rotational axis 2 on an external surface of the torque-tool body 1. The driver-bit structure of the torque-tool body 1 associates with the opening of the fastener head so that the plurality of paired engagement features 3 can internally engage with the fastener head.

[0013] The present invention also incorporates an attachment feature which allows an external torque apply-

ing tool to attach to the torque-tool body 1 and increase the torque force applied to the fastener head. In reference to FIG. 2-3, the present invention further comprises an attachment body 10 and an engagement bore 11 that allow an external torque applying tool such as an open ended wrench, a box ended wrench, a combination wrench, an adjustable wrench, and a socket wrench to be attached to the torque-tool body 1. The attachment body 10 is centrally positioned around and along the rotational axis 2 in order to align with the axis of rotation of the external torque applying tool. Furthermore, the attachment body 10 is connected adjacent to the torque-tool body 1. The attachment body 10 is preferably of a hexagonal shaped body with a diameter preferably and slightly larger than the diameter for the torque-tool body 1. However, the attachment body 10 may incorporate a smaller diameter than the torque-tool body 1 depending upon the preferred manufacturing method or design. The engagement bore 11 traverses into the attachment body 10 along the rotational axis 2. The engagement bore 11 is shaped to receive a male attachment member of a socket wrench, wherein the preferred shape of the engagement bore 11 is a square as the majority of socket wrenches utilize a square male attachment member. In alternative embodiments, the shape and design of the engagement bore 11 and the attachment body 10 may vary to be adaptable to different torque applying tools and different attachment means including, but not limited to, square or cylindrical. In an alternative embodiment, an outer surface of the attachment body 10 may have surface gripping treatment applied such as knurling or other alternative methods to increase the friction between torque-tool body 1 and the user's hand.

[0014] A bottom surface of the attachment body 10 is tapered away from the engagement bore 11 so that the plurality of paired engagement features 3 can be driven into the damaged/stripped fastener head by a hammer, without hitting or damaging the engagement bore 11. In other words, a diameter of the attachment body 10 about the engagement bore 11 is slightly larger than a diameter of the attachment body 10 about the torque-tool body 1 so that the bottom surface of the attachment body 10 can be tapered away from the engagement bore 11. In some embodiments of the present invention, the attachment body 10 may not comprise the engagement bore 11 as the attachment body 10 itself functions as the engagement feature between the present invention and the external torque force.

[0015] Additionally, a wrench handle can be peripherally connected to the torque-tool body 1, wherein the wrench handle functions as the external torque applying tool. With respect to the wrench handle, each of the plurality of paired engagement features 3 is extended along a specific length of the torque-tool body 1 thus delineating an empty space within the torque-tool body 1. The aforementioned empty space functions as a receptive cavity for the fastener head so that the plurality of paired engagement features 3 can grip the lateral surface of the

fastener head. The present invention further comprises a fastener-receiving hole that traverses through the torque-tool body 1. The fastener-receiving hole, perpendicular to the rotational axis 2, is positioned opposite the wrench handle and across the torque-tool body 1 thus providing a lateral opening to engage the plurality of paired engagement features 3.

[0016] The attachment body 10 can also incorporate a quick connect feature that is typically used in drills, impact drivers, and screw attachment.

[0017] The plurality of paired engagement features 3 is equally spaced about the torque-tool body 1 to create an enclosed profile as seen in FIG. 4. In order to configure the enclosed profile, the plurality of paired engagement features 3 comprises a first engagement feature 7, a second engagement feature 8, and a bisecting line 6. The first engagement feature 7 and the second engagement feature 8 alternate within the enclosed profile to become intermittent depending on the rotation direction of the tool. The bisecting line 6 separates the first engagement feature 7 and the second engagement feature 8 into equal sections within each of the plurality of paired engagement features 3.

[0018] Furthermore, a cross section for the first engagement feature 7 and a second engagement feature 8 each comprises a bracing section 4 and a cavity section 5 as shown in FIG. 4. More specifically, the bracing section 4 and the cavity section 5 are adjacently connected to each other thus delineating a single engagement feature that cuts into the fastener head during the removal of the damaged/stripped fastener. A top surface of the torque-tool body 1 and the bottom surface of the attachment body 10 are positioned opposite of each other across the plurality of paired engagement features 3, wherein the top surface and the bottom surface are configured as flat surfaces.

[0019] The length of the bracing section 4 and the cavity section 5 and the corresponding angles between the bracing section 4 and the cavity section 5 may vary to create a sharper tooth-like shape for the engagement feature. The first engagement feature 7 is any feature within the plurality of paired engagement features 3 in such a way that the second engagement feature 8 is the feature directly next to the first engagement feature 7 within corresponding the plurality of paired engagement features 3. More specifically, the cavity section 5 of the first engagement feature 7 is adjacently connected to the cavity section 5 of the second engagement feature 8. The cavity section 5 of the first engagement feature 7 and the cavity section 5 of the second engagement feature 8 are oriented towards the rotational axis 2 thus collectively delineating a circular shaped profile. The bracing section 4 of the first engagement feature 7 and the bracing section 4 of the second engagement feature 8 are oppositely positioned of each other about the cavity section 5 of the first engagement feature 7 and the cavity section 5 of the second engagement feature 8. In other words, the cavity section 5 of the first engagement feature

7 and the cavity section 5 of the second engagement feature 8 are adjacently positioned in between the bracing section 4 of the first engagement feature 7 and the bracing section 4 of the second engagement feature 8.

[0020] A first length ratio between the bracing section 4 of the first engagement feature 7 and the cavity section 5 of the first engagement feature 7 is 1: 1.5 to 3.5. A second length ratio between the bracing section 4 of the second engagement feature 8 and the cavity section 5 of the second engagement feature 8 is 1: 1.5 to 3.5. More specifically, in some embodiment, the first length ratio and the second length ratio can be 1:2. In some embodiment, the first length ratio and the second length ratio can be 1:3.

[0021] The present invention further comprises a first connection point and a second connection point. More specifically, the first connection point is delineated as the meeting point of the cavity section 5 and the bracing section 4 of the first engagement feature 7, and the second connection point is delineated as the meeting point of the cavity section 5 and the bracing section 4 of the second engagement feature 8.

[0022] Furthermore, a first bisecting angle 17 of the present invention is delineated between the first connection point and the bisecting line 6 as shown in FIG. 5. Depending upon different embodiment of the present invention, the first bisecting angle can be an acute angle, a right angle, and an obtuse angle.

[0023] Furthermore, a second bisecting angle 18 of the present invention is delineated between the second connection point and the bisecting line 6 as shown in FIG. 5. Depending upon different embodiment of the present invention, the second bisecting angle can be an acute angle, a right angle, and an obtuse angle.

[0024] Furthermore, the first bisecting angle 17 and the second bisecting angle 18 are collectively combined into a 180 degree angle when an imaginary straight line is draw in between the first connection point and the second connection point.

[0025] Furthermore, the first bisecting angle 17 and the second bisecting angle 18 are collectively combined into an angle less than 180 degrees when a first imaginary line is draw parallel to the bracing section 4 of the first engagement feature 7 and intersected through the first connection point, and a second imaginary line is draw parallel to the bracing section 4 of the second engagement feature 8 and intersected through the second connection point.

[0026] Furthermore, the bracing section 4 of the first engagement feature 7 and the bracing section 4 of the second engagement feature 8 are positioned offset of each other. More specifically, the present invention further comprises a first geometric plane and a second geometric plane. The first geometric plane is positioned parallel to the bracing section 4 of the first engagement feature 7, and the second geometric plane that is positioned parallel to the bracing section 4 of the second engagement feature 8 as the first geometric plane and the sec-

ond geometric plane are positioned offset of each other. In other words, the first geometric plane and the second geometric plane are not co-planer within the present invention.

[0027] Preferably, the number of the plurality of paired engagement features **3** in contact with the fastener head is six as the six paired engagement features **3** is equal to 12 single engagement features. In reference to FIG. **4**, a first angle **14** between the first engagement feature **7** is 30 degrees and a second angle **15** between the second engagement feature **8** is 30 degrees. Furthermore, a third angle **16** between each of the plurality of paired engagement features **3** ranges between 121-179 degrees. As a result, an angular orientation between each of the plurality of paired engagement features **3** can be changed according to different embodiments of the present invention. More specifically, some embodiment of the present invention, the third angle **16** can be 130 degrees. Some embodiment of the present invention, the third angle **16** can be 135 degrees. Some embodiment of the present invention, the third angle **16** can be 145 degrees. Some embodiment of the present invention, the third angle **16** can be 150 degrees.

[0028] In some embodiments of the present invention, the plurality of paired engagement features **3** can be tapered away from the rotational axis **2**. In other words, an outer diameter of the plurality of paired engagement features **3** about the top surface of the torque-tool body **1** is smaller than an outer diameter of the plurality of paired engagement features **3** about the attachment body **10**. Additionally, the cavity section **5** of the first engagement feature **7** and the cavity section **5** of the second engagement feature **8** become narrower and shallower from the top surface of the torque-tool body **1** to the attachment body **10**. Even though the cavity section **5** of the first engagement feature **7** and the cavity section **5** of the second engagement feature **8** collectively delineate a circular shaped profile, the present invention is not limited to the circular shaped profile and can be other type of geometric shapes. For example, the cavity section **5** of the first engagement feature **7** and the cavity section **5** of the second engagement feature **8** can delineate a triangular shaped profile within the corresponding bracing sections **4**.

[0029] To remove the damaged/stripped fastener with the present invention, the torque-tool body **1** is positioned within the damaged/stripped fastener so that a significant portion of the plurality of paired engagement features **3** is positioned within the fastener head. The user then simply applies a counter-clockwise torque force to the torque-tool body **1** in order to rotate and remove the damaged/stripped fastener. When a torque force is applied to the torque-tool body **1**, the plurality of paired engagement features **3** "bite" into the lateral sides of fastener head which in turn rotates the damaged/stripped fastener. The present invention is designed to engage partially or fully stripped fastener heads. The present invention overcomes slippage of the fastener head through the use

of the plurality of paired engagement features **3**.

[0030] The present invention is able to drive a fastener on cavity section **5** of the first engagement feature **7** and the cavity section **5** of the second engagement feature **8** in a corresponding lobular fastener design such as Torx, as well as drive a fastener on the outer bracing surface of a socket fastener through the bracing sections **4** of the first engagement feature **7** and bracing sections **4** of the second engagement feature **8**.

[0031] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the invention as hereinafter claimed.

Claims

1. An anti-slip fastener remover tool having a torque-tool body (1) comprises:

a plurality of paired engagement features (3);
 each of the plurality of paired engagement features (3) comprising a first engagement feature (7) and a second engagement feature (8);
 a cross section for the first engagement feature (7) and the second engagement feature (8) each comprising a bracing section (4) and a cavity section (5);
 the plurality of paired engagement features (3) being radially distributed about a rotational axis (2) of the torque-tool body (1);
 the bracing section (4) and the cavity section (5) being adjacently connected to each other so as to form a sharp tooth in between the bracing section (4) and the cavity section (5);
 the sharp tooth being configured to engage, cut or bite a surface of a fastener head;
 the cavity section (5) of the first engagement feature (7) being adjacently connected to the cavity section (5) of the second engagement feature (8) for each of the plurality of paired engagement features (3);
 the cavity section (5) of the first engagement feature (7) and the cavity section (5) of the second engagement feature (8) being oriented towards the rotational axis (2);
 the bracing section (4) of the first engagement feature (7) and the bracing section (4) of the second engagement feature (8) each being straight or flat; and
 the bracing section (4) of the first engagement feature (7) and the bracing section (4) of the second engagement feature (8) being oppositely positioned of each other about the cavity section (5) of the first engagement feature (7) and the cavity section (5) of the second engagement feature (8) for each of the plurality of paired engagement features (3).

ment features (3);

characterised in that a first geometric plane positioned parallel to the bracing section (4) of the first engagement feature (7) and a second geometric plane positioned parallel to the bracing section (4) of the second engagement feature (8) are not co-planar, such that the bracing section (4) of the first engagement feature (7) and the bracing section (4) of the second engagement feature (8) are positioned offset of each other, for each of the plurality of paired engagement features (3).

2. The anti-slip fastener remover tool as claimed in claim 1, wherein a first angle (14) between the first engagement feature (7) is 30 degrees, and wherein a second angle (15) between the second engagement feature (8) is 30 degrees.
3. The anti-slip fastener remover tool as claimed in claim 1, wherein a third angle (16) between each of the plurality of paired engagement features (3) ranges between 121-179 degrees.
4. The anti-slip fastener remover tool as claimed in claim 3, wherein the third angle (16) is 130 degrees.
5. The anti-slip fastener remover tool as claimed in claim 3, wherein the third angle (16) is 135 degrees.
6. The anti-slip fastener remover tool as claimed in claim 3, wherein the third angle (16) is 145 degrees.
7. The anti-slip fastener remover tool as claimed in claim 3, wherein the third angle (16) is 150 degrees.
8. The anti-slip fastener remover tool as claimed in claim 1 comprising:
the torque-tool body (1) being outwardly extended from the rotational axis (2) to the plurality of paired engagement features (3).
9. The anti-slip fastener remover tool as claimed in claim 1, wherein a first length ratio between the bracing section (4) of the first engagement feature (7) and the cavity section (5) of the first engagement feature (7) is 1: 1.5 to 3.5.
10. The anti-slip fastener remover tool as claimed in claim 1, wherein a second length ratio between the bracing section (4) of the second engagement feature (8) and the cavity section (5) of the second engagement feature (8) is 1: 1.5 to 3.5.
11. The anti-slip fastener remover tool as claimed in claim 1 comprises:

an attachment body (10);

an engagement bore (11);

the attachment body (10) being centrally positioned around and along the rotational axis (2); the attachment body (10) being adjacently connected to the torque-tool body (1); and the engagement bore (11) traversing into the attachment body (10) along the rotational axis (2), opposite of the torque-tool body (1).

Patentansprüche

1. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen, das einen Kraftschrauberkörper (1) aufweist, das umfasst:

eine Vielzahl von gepaarten Eingriffsmerkmalen (3);
jedes der Vielzahl von gepaarten Eingriffsmerkmalen (3) umfassend ein erstes Eingriffsmerkmal (7) und ein zweites Eingriffsmerkmal (8);
einen Querschnitt für das erste Eingriffsmerkmal (7) und das zweite Eingriffsmerkmal (8), jeweils umfassend einen Verstrebuungsabschnitt (4) und einen Hohlraumabschnitt (5);
wobei die Vielzahl von gepaarten Eingriffsmerkmalen (3) radial um eine Rotationsachse (2) des Kraftschrauberkörpers (1) verteilt ist;
wobei der Verstrebuungsabschnitt (4) und der Hohlraumabschnitt (5) angrenzend aneinander verbunden sind, um einen spitzen Zahn zwischen dem Verstrebuungsabschnitt (4) und dem Hohlraumabschnitt (5) auszubilden;
wobei der spitze Zahn konfiguriert ist, um in eine Oberfläche eines Befestigungselementkopfs einzugreifen, diese zu schneiden oder greifen;
wobei der Hohlraumabschnitt (5) des ersten Eingriffsmerkmals (7) angrenzend an den Hohlraumabschnitt (5) des zweiten Eingriffsmerkmals (8) für jedes der Vielzahl von gepaarten Eingriffsmerkmalen (3) verbunden ist;
wobei der Hohlraumabschnitt (5) des ersten Eingriffsmerkmals (7) und der Hohlraumabschnitt (5) des zweiten Eingriffsmerkmals (8) in Richtung der Rotationsachse (2) ausgerichtet sind;
wobei der Verstrebuungsabschnitt (4) des ersten Eingriffsmerkmals (7) und der Verstrebuungsabschnitt (4) des zweiten Eingriffsmerkmals (8) jeweils gerade oder flach sind; und
wobei der Verstrebuungsabschnitt (4) des ersten Eingriffsmerkmals (7) und der Verstrebuungsabschnitt (4) des zweiten Eingriffsmerkmals (8) einander gegenüberliegend um den Hohlraumabschnitt (5) des ersten Eingriffsmerkmals (7) und den Hohlraumabschnitt (5) des zweiten Eingriffsmerkmals (8) für jedes der Vielzahl von gepaarten Eingriffsmerkmalen (3) positioniert sind;

dadurch gekennzeichnet, dass

eine erste geometrische Ebene, die parallel zu dem Verstreungsabschnitt (4) des ersten Eingriffsmerkmals (7) positioniert ist, und eine zweite geometrische Ebene, die parallel zu dem Verstreungsabschnitt (4) des zweiten Eingriffsmerkmals (8) positioniert ist, nicht koplanar sind, derart, dass der Verstreungsabschnitt (4) des ersten Eingriffsmerkmals (7) und der Verstreungsabschnitt (4) des zweiten Eingriffsmerkmals (8) für jedes der Vielzahl von gepaarten Eingriffsmerkmalen (3) versetzt voneinander positioniert sind;

2. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, wobei ein erster Winkel (14) zwischen dem ersten Eingriffsmerkmal (7) 30 Grad beträgt und wobei ein zweiter Winkel (15) zwischen dem zweiten Eingriffsmerkmal (8) 30 Grad beträgt.
3. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, wobei ein dritter Winkel (16) zwischen jedem der Vielzahl von gepaarten Eingriffsmerkmalen (3) von zwischen 121-179 Grad reicht.
4. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 3, wobei der dritte Winkel (16) 130 Grad beträgt.
5. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 3, wobei der dritte Winkel (16) 135 Grad beträgt.
6. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 3, wobei der dritte Winkel (16) 145 Grad beträgt.
7. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 3, wobei der dritte Winkel (16) 150 Grad beträgt.
8. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, umfassend: den Kraftschrauberkörper (1), der sich von der Rotationsachse (2) nach außen zu der Vielzahl von gepaarten Eingriffsmerkmalen (3) erstreckt.
9. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, wobei ein erstes Längenverhältnis zwischen dem Verstreungsabschnitt (4) des ersten Eingriffsmerkmals (7) und dem Hohlraumabschnitt (5) des ersten Eingriffsmerkmals (7) 1 : 1,5 bis 3,5 beträgt.
10. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, wobei ein zwei-

tes Längenverhältnis zwischen dem Verstreungsabschnitt (4) des zweiten Eingriffsmerkmals (8) und dem Hohlraumabschnitt (5) des zweiten Eingriffsmerkmals (8) 1 : 1,5 bis 3,5 beträgt.

11. Rutschfestes Werkzeug zum Entfernen von Befestigungselementen nach Anspruch 1, das umfasst:

einen Aufsatzkörper (10);
eine Eingriffsbohrung (11);
wobei der Aufsatzkörper (10) mittig um die Rotationsachse (2) und entlang dieser angeordnet ist; und
wobei der Aufsatzkörper (10) mit dem Kraftschrauberkörper (1) angrenzend verbunden ist.
die Eingriffsbohrung (11) in den Aufsatzkörper (10) entlang der Rotationsachse (2) gegenüber dem Kraftschrauberkörper (1) schwenkt.

Revendications

1. Outil antidérapant pour la suppression des moyens de fixation ayant un corps d'outil dynamométrique (1) comprend :

une pluralité de caractéristiques de mise en prise appariées (3) ;
chacune de la pluralité de caractéristiques de mise en prise appariées (3) comprenant une première caractéristique de mise en prise (7) et une seconde caractéristique de mise en prise (8) ;
une section transversale pour la première caractéristique de mise en prise (7) et la seconde caractéristique de mise en prise (8) comprenant chacune une section de renfort (4) et une section de cavité (5) ;
la pluralité de caractéristiques de mise en prise appariées (3) étant réparties radialement autour d'un axe de rotation (2) du corps d'outil dynamométrique (1) ;
la section de renfort (4) et la section de cavité (5) étant reliées l'une à l'autre de manière adjacente dans le but de former une dent pointue entre la section de renfort (4) et la section de cavité (5) ;
la dent pointue étant conçue pour mettre en prise, couper ou mordre une surface d'une tête de fixation ;
la section de cavité (5) de la première caractéristique de mise en prise (7) étant connectée de manière adjacente à la section de cavité (5) de la seconde caractéristique de mise en prise (8) pour chacune de la pluralité de caractéristiques de mise en prise appariées (3) ;
la section de cavité (5) de la première caractéristique de mise en prise (7) et la section de ca-

- vité (5) de la seconde caractéristique de mise en prise (8) étant orientées vers l'axe de rotation (2) ;
 la section de renfort (4) de la première caractéristique de mise en prise (7) et la section de renfort (4) de la seconde caractéristique de mise en prise (8) étant chacune droite ou plate ; et
 la section de renfort (4) de la première caractéristique de mise en prise (7) et la section de renfort (4) de la seconde caractéristique de mise en prise (8) étant positionnées de manière opposée l'une par rapport à l'autre autour de la section de cavité (5) de la première caractéristique de mise en prise (7) et la section de cavité (5) de la seconde caractéristique de mise en prise (8) pour chacune de la pluralité de caractéristiques de mise en prise appariées (3) ;
caractérisé en ce que
 un premier plan géométrique positionné parallèlement à la section de renfort (4) de la première caractéristique de mise en prise (7) et un second plan géométrique positionné parallèlement à la section de renfort (4) de la seconde caractéristique de mise en prise (8) ne sont pas coplanaires, de telle sorte que la section de renfort (4) de la première caractéristique de mise en prise (7) et la section de renfort (4) de la seconde caractéristique de mise en prise (8) sont positionnées de manière décalée l'une de l'autre, pour chacune de la pluralité de caractéristiques de mise en prise appariées (3).
2. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1, dans lequel un premier angle (14) entre la première caractéristique de mise en prise (7) est de 30 degrés, et un deuxième angle (15) entre la seconde caractéristique de mise en prise (8) est de 30 degrés.
 3. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1, dans lequel un troisième angle (16) entre chacune de la pluralité de caractéristiques de mise en prise appariées (3) est compris entre 121 et 179 degrés.
 4. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 3, dans lequel le troisième angle (16) est de 130 degrés.
 5. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 3, dans lequel le troisième angle (16) est de 135 degrés.
 6. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 3, dans lequel le troisième angle (16) est de 145 degrés.
 7. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 3, dans lequel le troisième angle (16) est de 150 degrés.
 8. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1, comprenant : le corps d'outil dynamométrique (1) s'étendant vers l'extérieur depuis l'axe de rotation (2) jusqu'à la pluralité de caractéristiques de mise en prise appariées (3).
 9. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1, dans lequel un premier rapport de longueur entre la section de renfort (4) de la première caractéristique de mise en prise (7) et la section de cavité (5) de la première caractéristique de mise en prise (7) est de 1: 1,5 à 3,5.
 10. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1, dans lequel un deuxième rapport de longueur entre la section de renfort (4) de la seconde caractéristique de mise en prise (8) et la section de cavité (5) de la seconde caractéristique de mise en prise (8) est de 1: 1,5 à 3,5.
 11. Outil antidérapant pour la suppression des moyens de fixation selon la revendication 1 comprenant :
 un corps de fixation (10) ;
 un alésage de mise en prise (11) ;
 le corps de fixation (10) étant positionné centralement autour et le long de l'axe de rotationnel (2) ;
 le corps de fixation (10) étant relié de manière adjacente au corps d'outil dynamométrique (1) ;
 et
 l'alésage de mise en prise (11) pénétrant dans le corps de fixation (10) le long de l'axe de rotation (2), à l'opposé du corps d'outil dynamométrique (1).

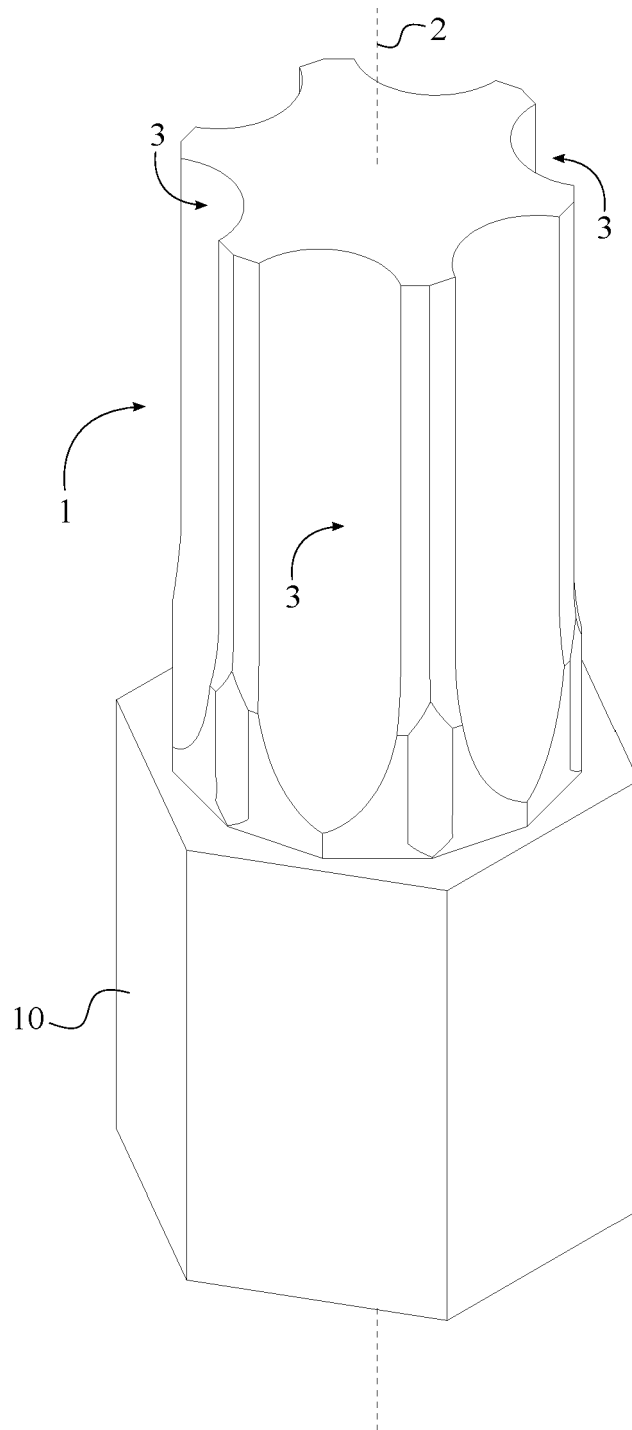


FIG. 1

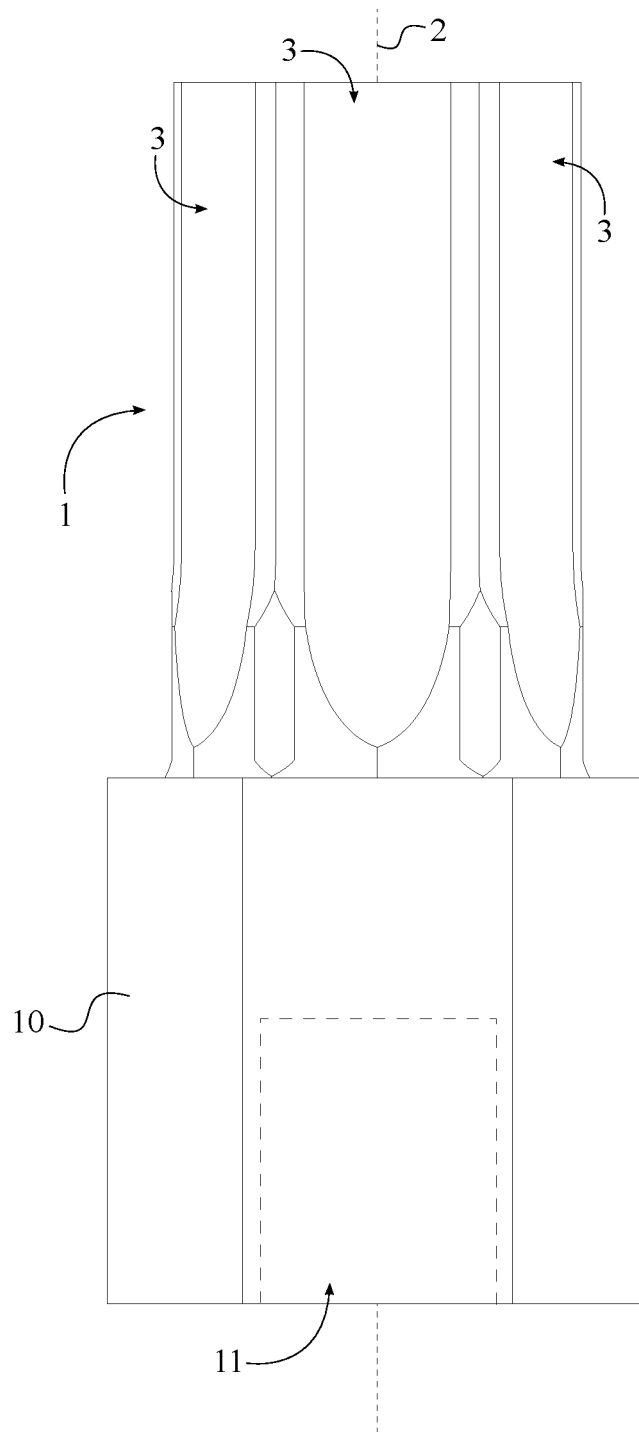


FIG. 2

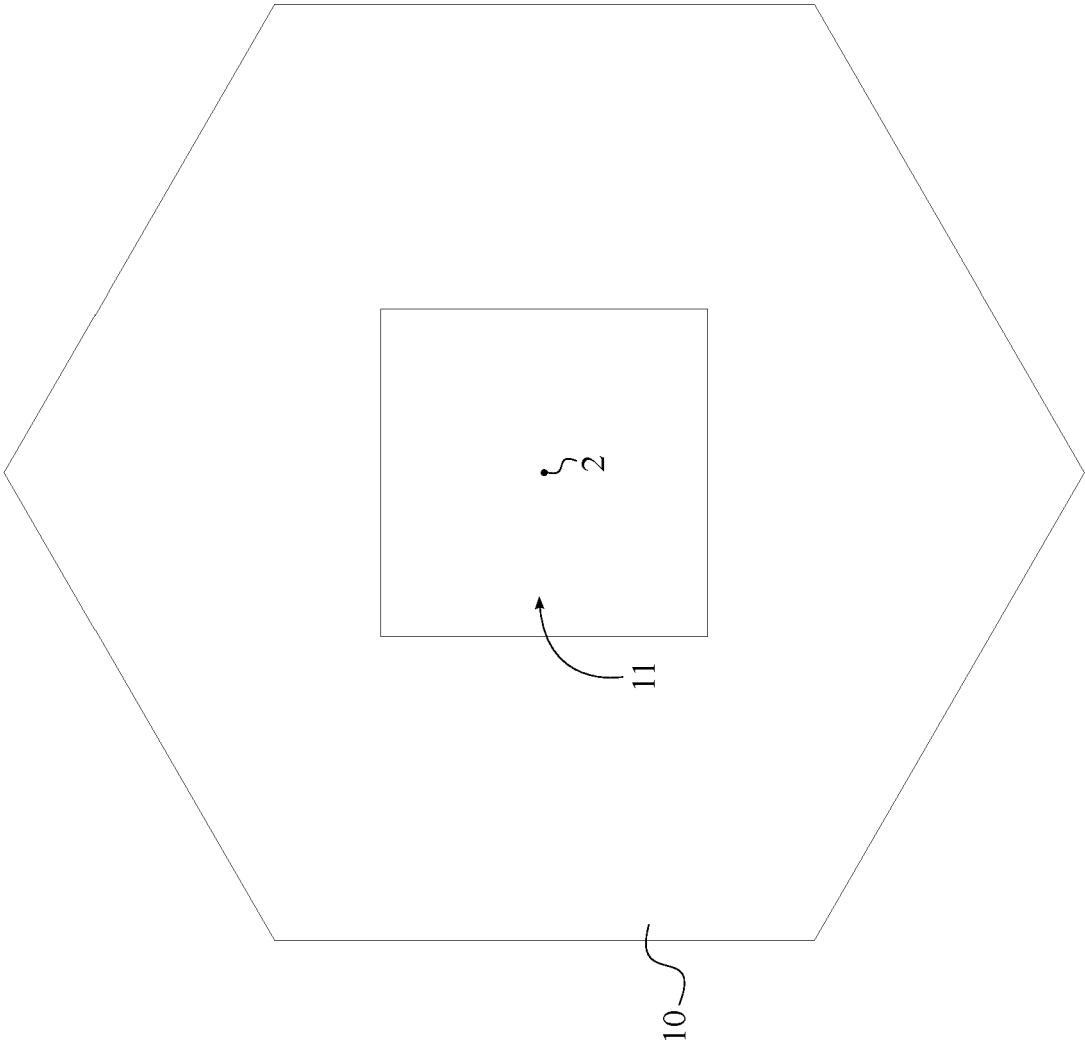


FIG. 3

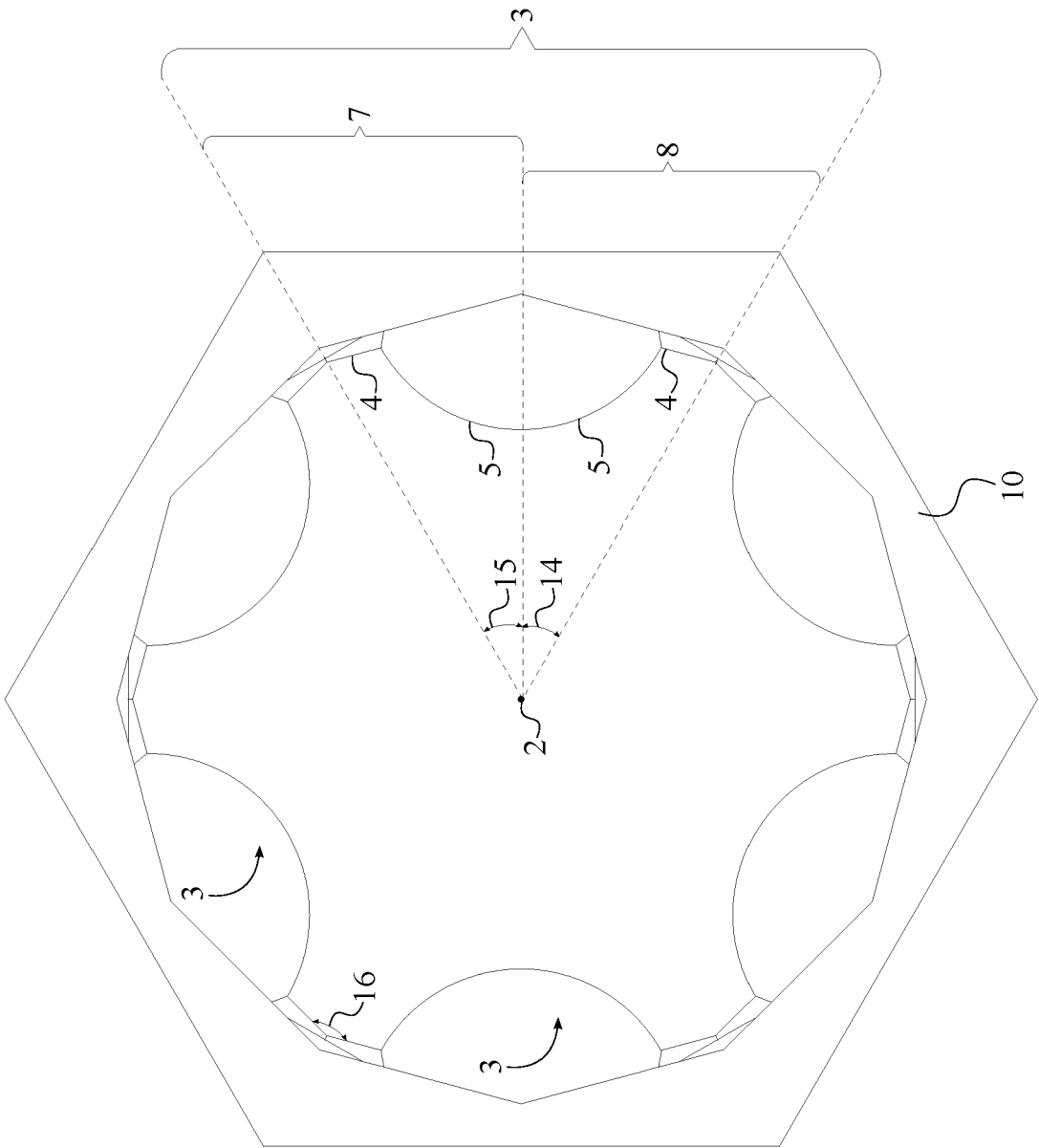


FIG. 4

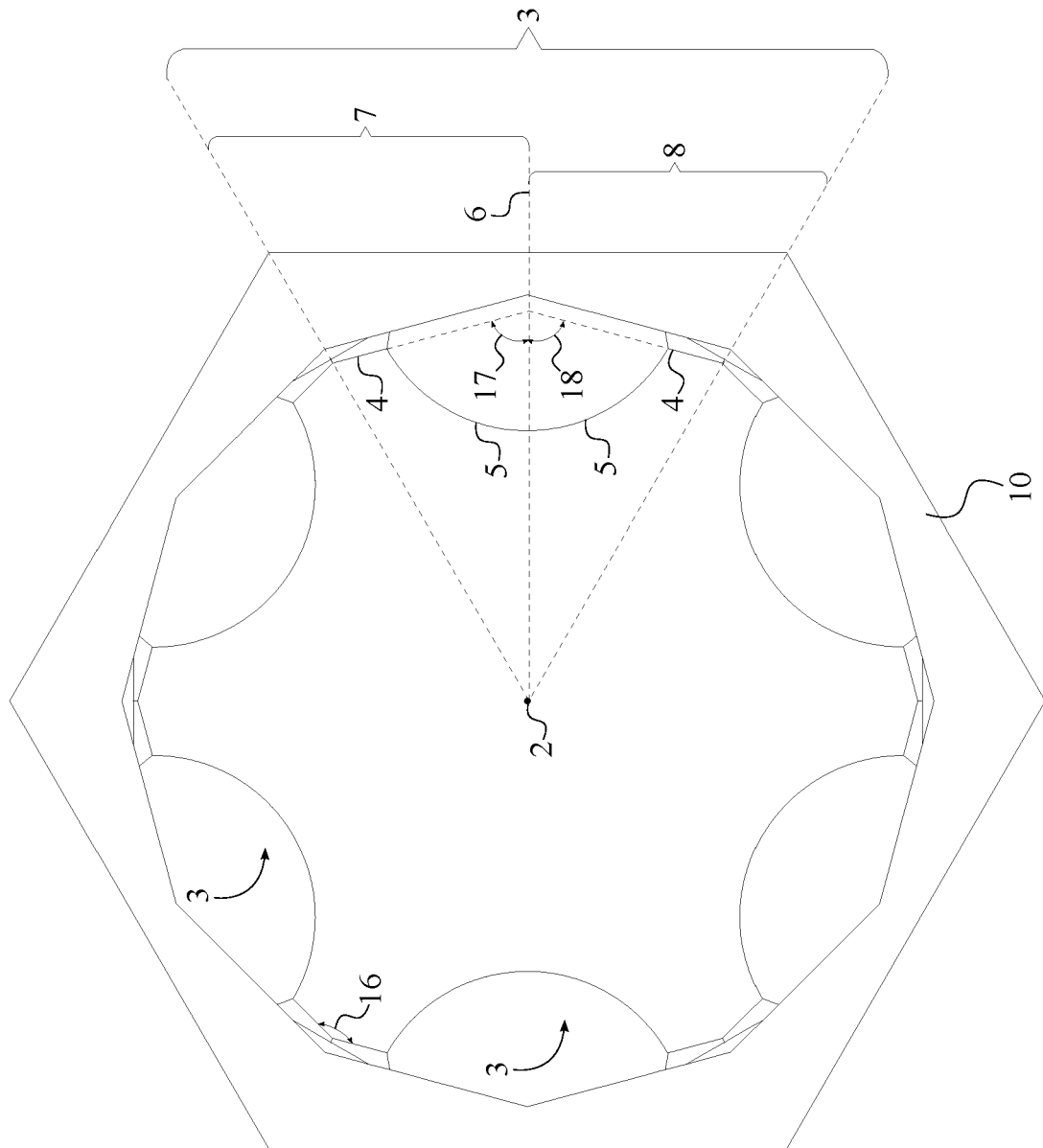


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2018354102 A1 [0002]
- US 2006266168 A1 [0003]
- WO 2015082283 A1 [0003]
- EP 2363245 A2 [0003]