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(54) **UNIVERSAL GROUND ENGAGING SOCKET**

(57) A ground engaging socket (100) for supporting and securing a post, comprising a socket body (10) for receiving a post, the socket body having a receiving surface (11) at the proximal end (21); a wedge clamping system (30) with an actuating means (32); and at least one aperture (15) on the receiving surface (11) to access the actuating means (32) whereby actuation of the wedge clamping system (30) changes the relative position of part of the wedge clamping system (30) to the socket body (10) thus enabling the socket (100) to support and engage a variety of post shapes and sizes.

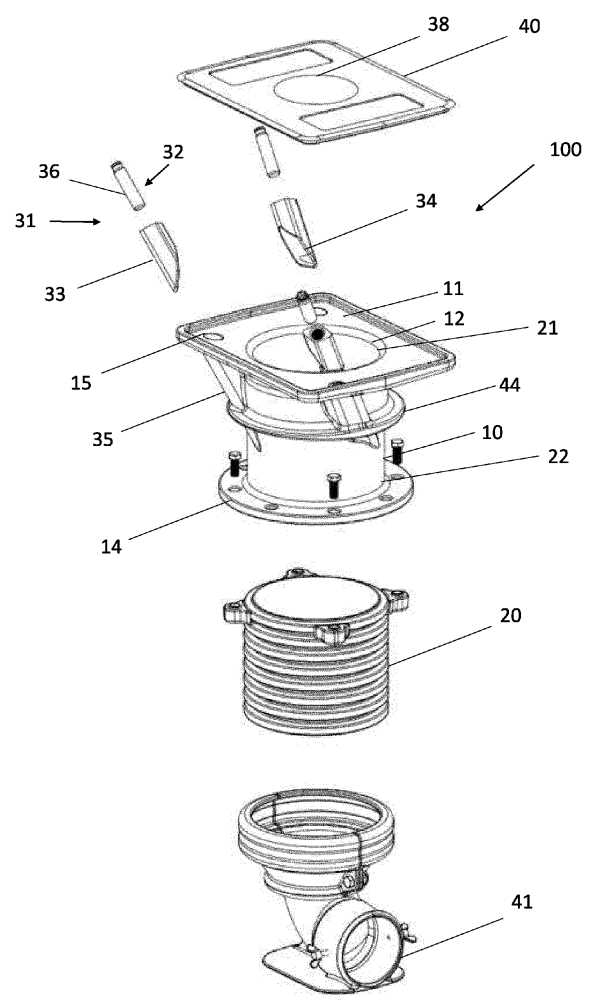


Figure 1

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Description

Object of the Invention

[0001] This invention relates to a ground retention socket including a retaining means capable of supporting and securing posts, poles, bollards or other street furniture of various sizes, shapes and dimensions.

Background to the Invention

[0002] Ground retention sockets are buried below ground level and allow for easy insertion and removal of a bollard, post, pole or other street furniture when the need arises without requiring ground excavation, thereby preventing possible damage to the bollard or the like in use. The installed ground engaging socket itself is reusable if posts, bollards or other street furniture need to be replaced for any reason, including for example impact damage. The ground engaging socket provides excellent stability for the post or bollard or the like when in place.

[0003] GB 2 254 349 disclosed a device for supporting a pole including a housing having a circular opening for receiving the lower end of a pole and also having an adjacent chamber comprising a locking mechanism to provide security with regards to unintended tampering. However, a drawback of the device disclosed in GB 2 254 349 was the relative inconvenience experienced by the user in accessing the setscrews of the locking mechanism through the side chamber when seeking to actuate the setscrews in order to retain or release a pole. This drawback was mitigated by EP 2 110 478 which discloses a holding means having an alternative access and operating mechanism for a device which supports or retains a pole or the like. The holding means of said device has been adapted in such a way that a user can actuate the holding mechanism directly from the top surface of the device, without having to reach into a side access chamber. However, the holding or retaining device as disclosed in EP 2 110 478 is not suitable for use across a variety of sizes or shapes of poles or bollards or the like. The holding or retaining device as disclosed in EP 2 110 478 is instead more suited to accommodate square or cylindrical units, be they poles, bollards or other street furniture, of a specific size. A unique size of ground engaging socket is required for each unit of different dimensions.

[0004] Accordingly, the present invention offers a new variation on earlier ground engaging sockets wherein the holding or clamping means of such a ground engaging socket is adapted to receive and hold any one of a range of different shapes, sizes and dimensions of poles, posts, bollards or the like, within a ground engaging socket, thereby providing a "universal ground engaging socket". The ground engaging socket according to the invention, can thus also accommodate installation units of a variety of shapes, in addition to standard square or cylindrical units. The ground engaging socket is provided in several

standard sizes (for example small, medium, and large) such that each size of ground engaging socket is suitable to accommodate any one of a number of posts which falls within a predefined range of sizes and a range of shapes.

Summary of the Invention

[0005] According to a first embodiment of the invention there is provided a ground engaging socket for supporting and securing a post, comprising

a socket body for receiving a post, having a through hole with a longitudinal axis which extends from a proximal end of the socket body to a distal end of the socket body;
the socket body having a receiving surface at the proximal end;
a wedge clamping system with an actuating means; and
at least one aperture on the receiving surface to access the actuating means; whereby actuation of the wedge clamping system changes the relative position of part of the wedge clamping system to the socket body thus enabling the socket to support and engage a variety of post shapes and sizes.

[0006] Preferably, the wedge clamping system is inclined with respect to a longitudinal axis of the ground engaging socket.

[0007] Preferably, the wedge clamping system includes at least one wedge element and at least one corresponding wedge chamber for receiving the at least one wedge element and through which the at least one wedge element is movable in a direction parallel to the longitudinal axis of the wedge chamber.

[0008] Preferably, each of the at least one wedge chambers is inclined at an angle of between 1° to 89°, preferably 30° to 60° and most preferably an angle of 45° to the longitudinal axis of the ground engaging socket.

[0009] Preferably, each wedge element comprises a proximal end and a distal end and where in the distal end is tapered to provide a curved tapered surface.

[0010] Preferably, each wedge element comprises an actuating means.

[0011] Preferably, the actuating means is a threaded bolt and a longitudinal bolt chamber.

[0012] Preferably, the longitudinal bolt chamber comprises a threaded section or an integrated nut, for engagement with the threaded bolt.

[0013] Preferably, the ground engaging socket further comprises a cover for fitting to the receiving surface to cover and protect the socket body.

[0014] Preferably, the ground engaging socket further comprises feature for connection to an extension member.

[0015] Preferably, there is provided a kit of parts comprising the ground engaging socket and an extension

member which is attached to the ground engaging socket through the feature.

[0016] Preferably, the sizes (outside diameter) of posts or similar units which can be retained in the ground engaging socket according to the invention can range from approximately 50mm to 500mm.

[0017] Preferably, the installation depths of posts or similar units in the present ground engaging socket can range from approximately 300mm to 1250 mm.

[0018] Preferably, the wedge clamping system in the socket body is adaptable to accommodate and secure posts or similar units or varying shapes and dimensions, rather than only square or cylindrical units, thereby making the ground engaging socket versatile and multifaceted in its use and alleviating the need of using separate ground engaging sockets for separate sizes and shapes of posts.

[0019] Advantageously, the multiple wedge elements design of the ground engaging socket provides the ability to adjust the alignment of the retained post or similar units, whilst at the same time maintaining secure, non-rocking clamping ability at any position of the retained post.

[0020] Advantageously, the wedge clamping system is so aligned within the socket body that it imparts a downwards vertical force, which in conjunction with the tapered distal wedge end body, prevents any minor movement in the longitudinal plane of the socket body. Furthermore, the wedge clamping system prevents any minor movement of the post or similar unit in radial or tangential planes.

[0021] Preferably, the kit of parts further comprises a base receiver for attachment to the extension member.

[0022] Preferably, there is provided method of assembling a ground engaging socket comprising the steps of:

Inserting a threaded bolt into a longitudinal bolt chamber of a wedge element such that at least part of the bolt is protruding from the longitudinal bolt chamber,

Inserting the wedge element into a wedge chamber so that at least part of the threaded bolt is protruding from the wedge chamber through the aperture of the receiving surface,

Fixing a circlip to the part of the bolt which is protruding through the aperture such that the bolt can no longer retract completely back into the wedge chamber,

Repeating the above steps for each wedge element provided in the wedge clamping system.

[0023] Preferably, a method of supporting and securing a post is provided comprising the steps of:

Assessing the size and shape of the post to be sup-

ported and secured and choosing a ground engaging socket of suitable size;

Choosing an appropriate wedge clamping system based on shape and size of post.

Choosing an appropriate number of wedge elements of the wedge clamping system to be included in the ground engaging socket

Inserting the post into a through hole of a socket body of the ground engaging socket;

Engaging an activation means to activate the wedge clamping system until the post is securely retained.

Placing a cover over the receiving surface in order to secure and protect the socket body.

[0024] Additional attributes of the ground engaging socket include the wedge clamping system having a high strength, reusable design capable of surviving vehicle impact and allowing easy installation and replacement of posts or the like without the need for repeated expensive excavation and disruption.

[0025] The scope of the present invention is not limited to just the preferred embodiments but includes all the plausible variants notably those concerning the construction and alignment of the wedge clamping system within the housing of the present ground engaging socket.

Brief Description of the Drawings

[0026]

Figure 1 is an exploded perspective view of an embodiment of the ground engaging socket according to the invention;

Figure 2 is a cross-sectional exploded view of the ground engaging socket of Figure 1;

Figure 3 is a perspective view of the ground engaging socket of Figure 1 with a cover in place to secure and protect the socket body;

Figure 4 is an exploded perspective view of various elements of the invention including the wedge element, the threaded nut and the circlip;

Figure 5 is a magnified cross-sectional view of the wedge clamping system in use within the socket body;

Figure 6a is perspective view of the wedge body from an aspect which illustrates the proximal end of the wedge body;

Figure 6b is perspective view of the wedge body of Figure 6a from an alternative aspect;

Figure 7a is side view of the wedge body;

Figure 7b is side view of the wedge body of Figure 7a from an alternative aspect;

Figure 8 is a cross sectional view of the wedge clamping system wherein the bolt is fully threaded into the longitudinal bolt chamber of the wedge body and the wedge body is in a retracted position in the wedge chamber;

Figure 9 is an alternative view of the wedge clamping system of Figure 8 wherein the bolt is partially threaded into the longitudinal bolt chamber of the wedge body and part of the wedge body protrudes into the through hole;

Figure 10a is a perspective view of a post engaged in a ground engaging socket;

Figure 10b is a side view of the post engaged in the ground engaging socket of Figure 10a; and

Figure 10c is a plan view of the post engaged in the ground engaging socket of Figure 10a.

Detailed Description

[0027] The invention will hereafter be more particularly described with reference to the accompanying drawings, which show by way of example only an embodiment of a ground engaging socket 10 according to the invention and components thereof.

[0028] Referring to Figure 1, the ground engaging socket 100 according to the invention comprises a socket body 10 having a proximal end 21 and a distal end 22, a through hole 12 which is centrally located along the longitudinal axis of the socket body 10 from the distal end 22 of the socket body 10 to the proximal end 21 of the socket body 10, a wedge clamping system 30 and a cover 40.

[0029] As illustrated in Figure 1, the socket body 10 includes a receiving surface 11 on the proximal end 21 of the socket body 10, which, in plan view, is preferably substantially rectangular in shape. The through hole 12, which is centrally located along the longitudinal axis of the socket body 10 and thus passes through the receiving surface 11, extends from the receiving surface 11 (which is at the proximal end 21 of the socket body 10) to the distal end 22 of the socket body 10 and is suitable for receiving a post (wherein the term post will be understood to include pole, bollard and other similar elongate bodies).

[0030] In use, the wedge clamping system 30 is located within the socket body 10. In use, the cover 40 is placed

on the receiving surface 11 to seal the socket body 10 and thus provide security and protection of the socket body 10. The cover 40 may be a flexible rubber sheet, or a metal plate or a plastic insert.

[0031] The distal end 22 of the socket body 10 comprises a connecting element 14 for connection to an extension member 20. The connecting element 14 may take the form of a bolted flange, clamping mechanism, welding geometry etc. The socket body 10 also comprises a central flange 44, located at an intermediate position between the distal end 22 of the socket body 10 and the proximal end 21 of the socket body 10. The flange 44 provides reinforcement to the socket body 10 in order to support the forces which are generated by the wedge elements 31 when they interact with the post. The extension member may be connected at its other end to a base receiver 41. The base receiver 41 assists in locating and supporting the base of the inserted pole and, in use, is fully submerged below the ground. The base receiver 41 may incorporate additional features which support a drainage function, cable routing etc.

[0032] The socket body comprises at least one wedge chamber 35. Preferably the socket 10 comprises two wedge chambers 35. Most preferably the socket body comprises three wedge chambers 35. The receiving surface 11 comprises at least one, preferably two, most preferably 3, apertures 15. Each wedge chamber 35 is open ended at both ends. Each wedge chamber 35 can be accessed through a corresponding aperture 15 on the receiving surface 11. Each wedge chamber 35 can also be accessed through a corresponding circumferential aperture 16 on the interior surface 43 of the through hole 12 of the socket body 10. The at least one aperture 15 is located at an outer corner of the receiving surface 11. If multiple apertures 15 are present, they are also located at outer corners of the receiving surface 11. Alternative positions for the apertures could be used depending upon, for example, the number of apertures required.

[0033] In the preferred embodiment, the wedge clamping system 30 comprises three wedge elements 31 which can be actuated to support and secure a range of different dimensions and sizes of post such that the post can be secured and retained within the ground engaging socket. Individually, each wedge element 31, has the form of an extruded rhombus with rounded or chamfered corners. Each wedge element 31 comprises at least two parts; an actuating means 32, and a wedge body 33 comprising a proximal wedge body end 17 and a distal wedge body end 18. The distal wedge body end 18 is tapered. The resulting tapered surface 34 is curved with a largely convex shape. The wedge element 31 is substantially V shaped on one end when viewed from a side aspect. The curved tapered surface 34 is such that each corner length (from distal wedge body end 18 to proximal wedge body end 17) of the extruded rhombus is a different length

[0034] In the preferred embodiment, the actuating means 32 is a threaded bolt 36 and a longitudinal bolt chamber 39. Each wedge element 31 further comprises

the longitudinal bolt chamber 39 into which the corresponding threaded bolt 36 can be threaded. The longitudinal bolt chamber 39 may be threaded or unthreaded. If the longitudinal bolt chamber 39 is unthreaded, then it is necessary to provide an integrated nut so that the threads of the threaded bolt 36 have something to engage in. In use, the wedge element 31 is typically provided in place within the socket body 10. The bolt 36 may be held in place with a circlip 37. The circlip 37 prevents the bolt 36 from retracting completely into the wedge chamber 35 due to the presence of an inner circumferential lip 42 or axially narrowed section of the longitudinal bolt chamber. Thus, an end of the bolt 36 can pass through the axially narrowed section of the longitudinal bolt chamber 39 during installation, however, once the circlip 37 is in place, the inner circumferential lip 42 prevents the bolt 36 from retracting back through the axially narrowed section. The bolt 36 is thus free to turn but constrained in the direction of the longitudinal axis of the longitudinal bolt chamber 39. In an alternative embodiment, a nut may be used to secure the bolt 36 in place and ensure that the bolt 36 cannot retract completely inside the wedge chamber 35.

[0035] In order to actuate the wedge element 31, each bolt 36 is accessed through its corresponding aperture 15 in the receiving surface 11. The threaded bolt 36 is held in place due to its engagement in the longitudinal bolt chamber 39. The bolt 36 is actuated by screwing the bolt 36 into either the threaded section of the longitudinal bolt chamber 39 or by screwing the bolt 36 into the integrated nut. In use, as shown in Figure 5, the wedge body 33 cannot rotate due to the close fit of the outer shape of the proximal wedge body end 17 to the inner surface of the wedge chamber 35. Thus, engaging the threaded bolt 36 in the threaded section of the longitudinal bolt chamber 39 forces the wedge body 33 to move through the wedge chamber 35 towards the post. In use, the position of the bolt 36 is fixed in relation to the socket body 10 so as the bolt 36 engages with the threads of the threaded section of the longitudinal bolt chamber 39, the wedge element 31 moves away from the post and thus widens clamping space which is defined between the curved tapered surfaces 34 of each wedge element 31 which protrude into through hole 12 of the socket body 10, or the space between the wedge elements 31 and the interior surface 43 of the through hole 12, thus widening the space to receive a post or disengaging from a post which is already being supported. When the bolt 36 engages with the threads in a reverse direction, the wedge element 31 moves towards the post thus narrowing the space to receive a post or indeed tightening on a post which is already in place. In use, the curved tapered surface 34 of each wedge body 10 will be partially in contact with the exterior of the post to be supported when the wedge clamping system 30 is actuated.

[0036] It is not necessary for the full curved tapered surface 34 area to be in contact with the post. Likewise, in use, all 4 sides of the wedge element 31 will not be in

contact with the wedge chamber 35 concurrently, typically when the wedge element 31 is extended and securing the post in place, only two sides of the wedge element 31 will be in contact with the wedge chamber 35.

[0037] In the preferred embodiment, each of the three wedge elements 31 are inserted into individual wedge chambers 35 which are accessible through the apertures 15 on the receiving surface 11 of the socket body 10. In alternative embodiments, either one, two or more wedge elements 31 may be used with a corresponding number of apertures 15 and wedge chambers 35. The wedge chamber 35 is shaped to correspond to the wedge element 31 such that the proximal end of the wedge element (which is not tapered) achieves a close fit within the wedge chamber 35 so that the wedge element 31 can slide freely within the wedge chamber 35 but the wedge element 31 is effectively constrained from rotational movement about the longitudinal axis of the wedge chamber 35. The wedge chamber 35 thus effectively constrains the wedge element 31 in place.

[0038] The size of the ground engaging socket 100 (small, medium, large) determines the size and shape of the post which can be accommodated. The wedge elements 31 will accommodate any shape or size of post that fits into the ground engaging socket 100.

[0039] The number of wedge elements 31 which need to be activated also depends on the relative space (or fit) between post and the interior surface 43 of the through hole 12 of the socket body 10. For example, a small space (or gap) between the post and the interior surface 43 of the through hole 12 of the socket body 10 will mean that the post is already somewhat constrained by the interior surface 43 of the through hole 12 of the socket body 10 and thus only one wedge element 31 may be required in order to fix the position of the post in the ground engaging socket 100. A large space (or gap) between the post and the interior surface 43 of the through hole 12 of the socket body 10 typically requires the activation of at least two wedge elements 31 in order to centralise the post within the ground engaging socket 100 and securely retain it in position. Consequently, either a single wedge element 31 can be actuated in the ground engaging socket 100 to securely retain the post in position or multiple wedge elements 31 can be actuated in combination in the ground engaging socket 100 to securely retain the post in position.

[0040] The wedge clamping system 30 will typically be produced from stainless steel, cast steel or ductile iron. Composite materials or mechanical plastics may be used in some instances. For posts of an outer diameter range from 100mm to 230 mm, the overall length of the wedge element 31 will vary. The most common overall lengths of wedge element 31 are approximately 110mm - 120mm long, with width which are typically in the range 25mm - 35mm.

[0041] The top cover 40 is placed on top of the receiving surface 11 such that the central opening 38 for receiving a post in the cover 40 is in line with the through

hole 12 in the receiving surface 11, thus covering and protecting the socket body 10 whilst also providing a clear passageway through the top cover 40 and the receiving surface 11 thus allowing the post to be positioned within the opening 38 and through hole 12.

[0042] For the purpose of securing and retaining varying shapes, sizes and dimensions of posts, the wedge clamping system 30 of the ground engaging socket 100 according to the invention is operable by way of the actuation of one or more individual wedge elements 31 (depending on the embodiment) within wedge chambers 35 which lie at an inclined plane to the longitudinal axis of the socket body 10, so that it is possible to create various clamping positions and depths per the requirement of the post which needs to be supported and secured. For example, a smaller post may require the wedge elements 31 to be more fully extended inside the ground engaging socket 100 (also referred to as more fully protruding into the through hole 12) whereas a post of a larger outer diameter will not require the same level of extension of the wedge elements 31.

[0043] In a preferred embodiment, each of the three wedge elements 31 are inserted into individual wedge chambers which lie at an inclined angle to the longitudinal axis of the ground engaging socket (wherein the longitudinal axis of the ground engaging socket 100 is understood to be perpendicular to the major surface of the receiving surface 11). The angle at which the wedge chambers 35 are positioned in relation to the longitudinal axis of the ground engaging socket 100 is within the range of 1° to 89°, preferably 30° to 60° and most preferably an angle is 45° to the longitudinal axis.

[0044] Typically, the wedge elements 31 are assembled in the socket body 10 prior to delivery, such that it is only necessary for the user to insert a post into the ground engaging socket 100 and then actuate the actuating means 32 in order to actuate at least one wedge element 31 and thus extend the distal end 18 of the wedge element 31 to the preferred position, thus securing the post.

[0045] It is to be understood that the invention is not limited to the specific details described herein, which are given by way of examples only and various modifications and alterations are possible without departing from the scope of the invention as defined in the appended claims.

Claims

1. A ground engaging socket (100) for supporting and securing a post, comprising

a socket body (10) for receiving a post, having a through hole (12) with a longitudinal axis which extends from a proximal end (21) of the socket body (10) to a distal end of the socket body (22); the socket body (10) having a receiving surface (11) at the proximal end (21); a wedge clamping

system (30) with an actuating means (32); and at least one aperture (15) on the receiving surface (11) to access the actuating means (32); whereby actuation of the wedge clamping system (30) changes the relative position of part of the wedge clamping system (30) to the socket body (10) thus enabling the socket (100) to support and engage a variety of post shapes and sizes.

2. The ground engaging socket (100) of Claim 1, wherein the wedge clamping system (30) is inclined with respect to a longitudinal axis of the ground engaging socket (100).
3. The ground engaging socket (100) according to any preceding claim, wherein the wedge clamping system (30) includes at least one wedge element (31) and at least one corresponding wedge chamber (35) for receiving the at least one wedge element (31) and through which the at least one wedge element (31) is movable in a direction parallel to the longitudinal axis of the wedge chamber (35).
4. The ground engaging socket (100) according to any preceding claim, wherein each of the at least one wedge chambers (35) is inclined at an angle of between 1° to 89°, preferably 30° to 60° and most preferably an angle of 45° to the longitudinal axis of the ground engaging socket (100).
5. The ground engaging socket (100) of previous Claim 4, wherein each wedge element (31) comprises a proximal end (17) and a distal end (18) and where in the distal end (18) is tapered to provide a curved tapered surface (34).
6. The ground engaging socket (100) of any preceding claim wherein the actuating means (32) is a threaded bolt (36) and a longitudinal bolt chamber (39).
7. The ground engaging socket (100) of previous Claim 6 wherein the longitudinal bolt chamber (39) comprises a threaded section or an integrated nut, for engagement with the threaded bolt (36).
8. The ground engaging socket (100) of any preceding claim further comprising a cover (40) for fitting to the receiving surface (11) to cover and protect the socket body (10).
9. The ground engaging socket (100) of any preceding claim further comprising a connecting element (14) for connection to an extension member (20).
10. A kit of parts in accordance with Claim 9 further comprising an extension member (20) which is attached to the ground engaging socket (100) through the con-

necting element (14).

11. A kit of parts in accordance with Claim 10 further comprising a base receiver (41) for attachment to the extension member (14). 5

12. A method of assembling a ground engaging socket (100) comprising the steps of:

1. Inserting a threaded bolt (36) into a longitudinal bolt chamber (39) of a wedge element (31) such that at least part of the threaded bolt (36) is protruding from the longitudinal bolt chamber (39); 10
2. Inserting the wedge element (31) into a wedge chamber (35) so that at least part of the threaded bolt (36) is protruding from the wedge chamber (35) through the aperture (15) of the receiving surface (11); 15
3. Fixing a circlip (37) to the part of the threaded bolt (36) which is protruding through the aperture (15) such that the threaded bolt (36) can no longer retract completely back into the wedge chamber (35); and 20
4. Repeating steps 1- 3 for each of the wedge elements. 25

13. A method of supporting and securing a post comprising the steps of: Inserting a post into the through hole (12) of the socket body (10) of a ground engaging socket (100) according to any of preceding Claims 1 - 11: 30

Assessing the size and shape of the post to be supported and secured and choosing a ground engaging socket (100) of suitable size; 35
Engaging the activation means (32) to activate the wedge clamping system (30) until the post is securely retained; and
Placing a cover (40) over the receiving surface (11) in order to secure and protect the socket body (10). 40

14. A system for supporting and securing a post comprising; 45

ground engaging socket (100) comprising a wedge clamping system (30) with an actuating means (32);
a socket body (10) for receiving a post having a through hole (12) with a longitudinal axis which extends from a proximal end (21) of the socket body (10) to a distal end (22) of the socket body (10); 50
the socket body (10) having a receiving surface (11) to access the actuating means (32) which is in communication with the through hole (12) and through which the wedge clamping system 55

(30) is actuatable;

whereby actuation of the wedge clamping system (30) changes the relative position of the wedge clamping system (30) to the socket body (10) thus enables the socket (100) to support and secure a variety of post shapes and sizes.

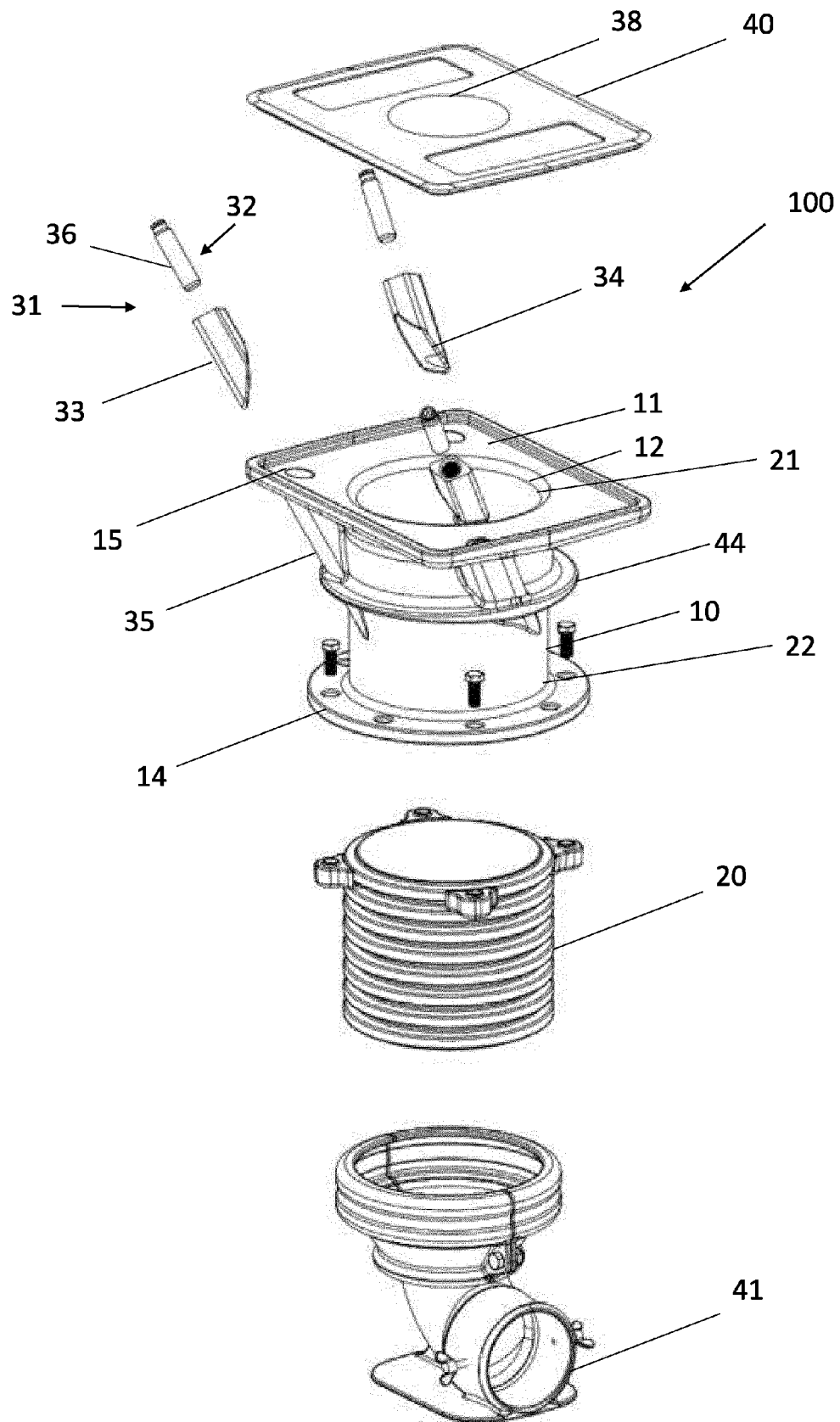


Figure 1

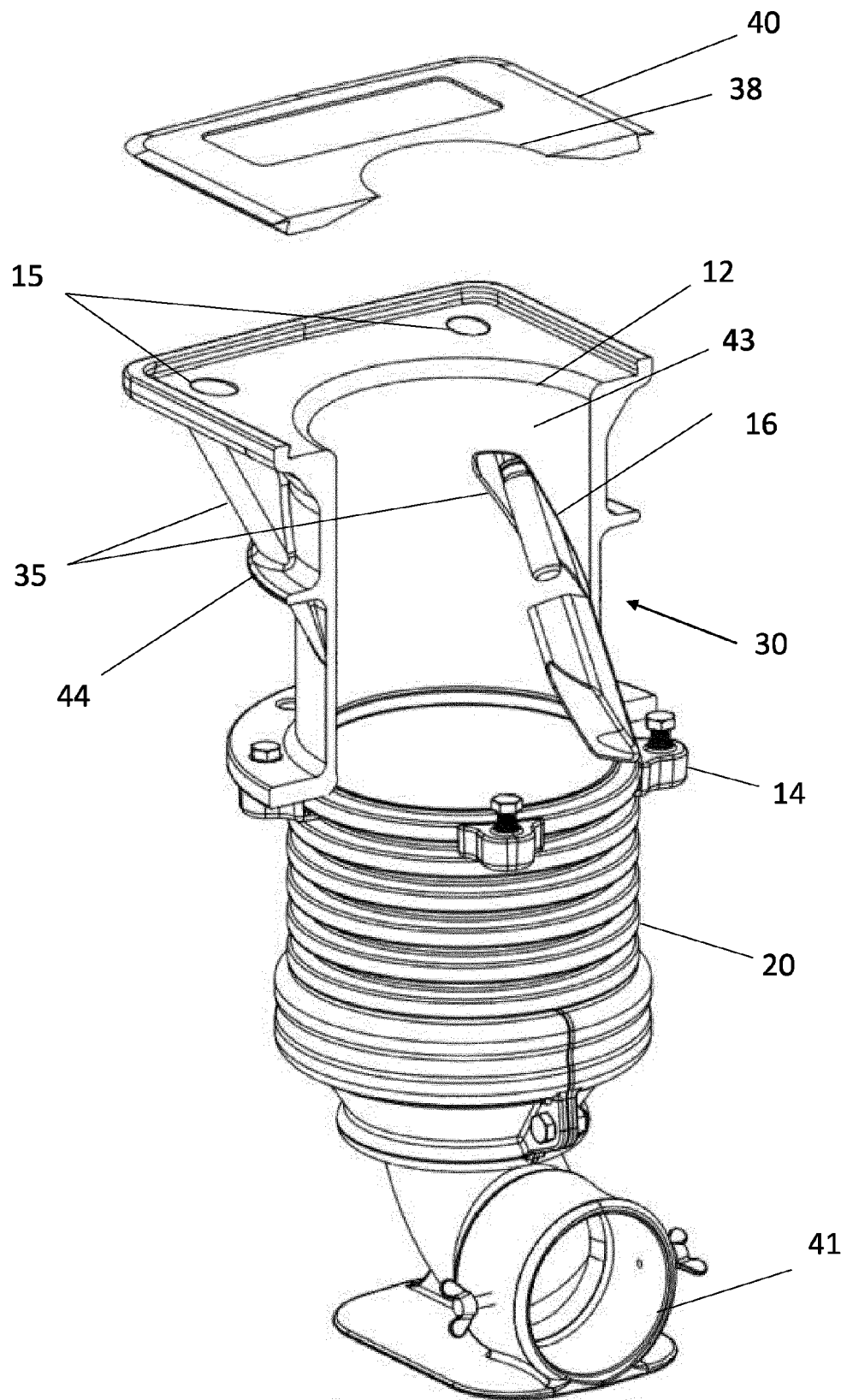


Figure 2

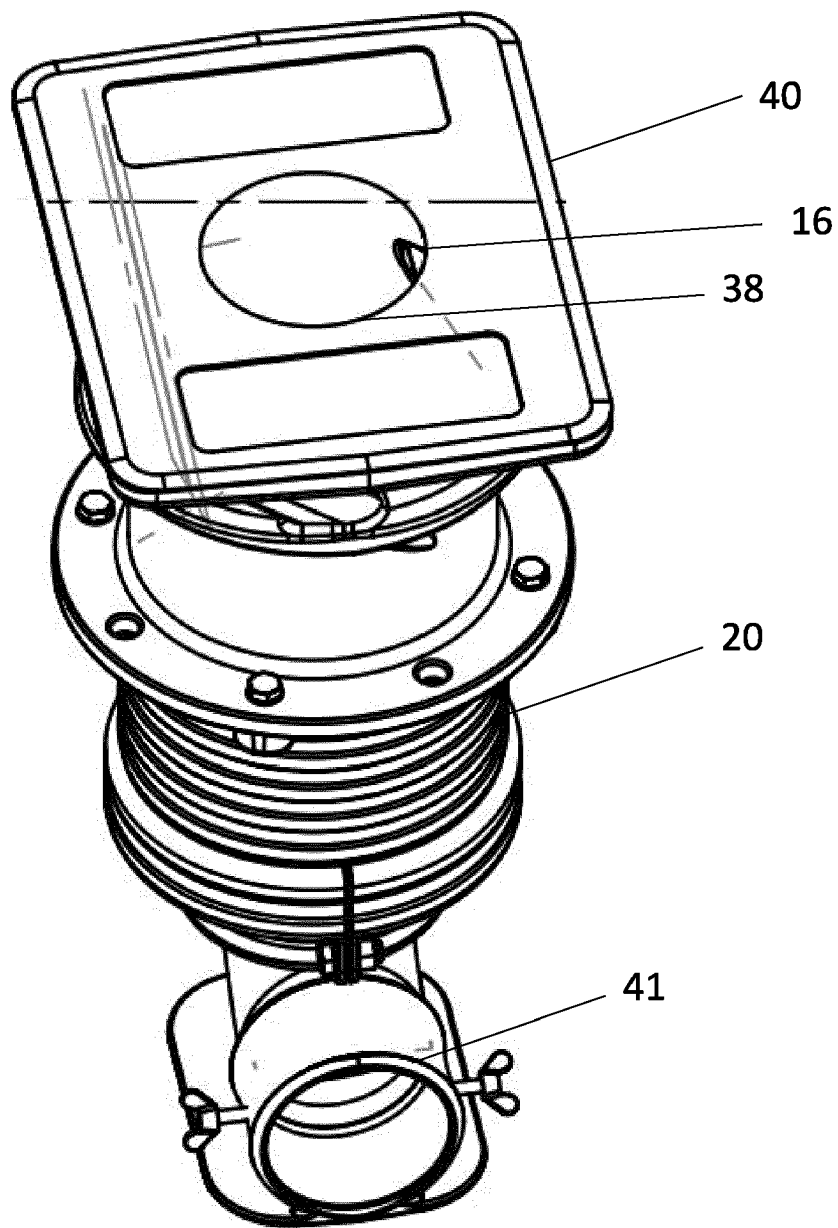


Figure 3

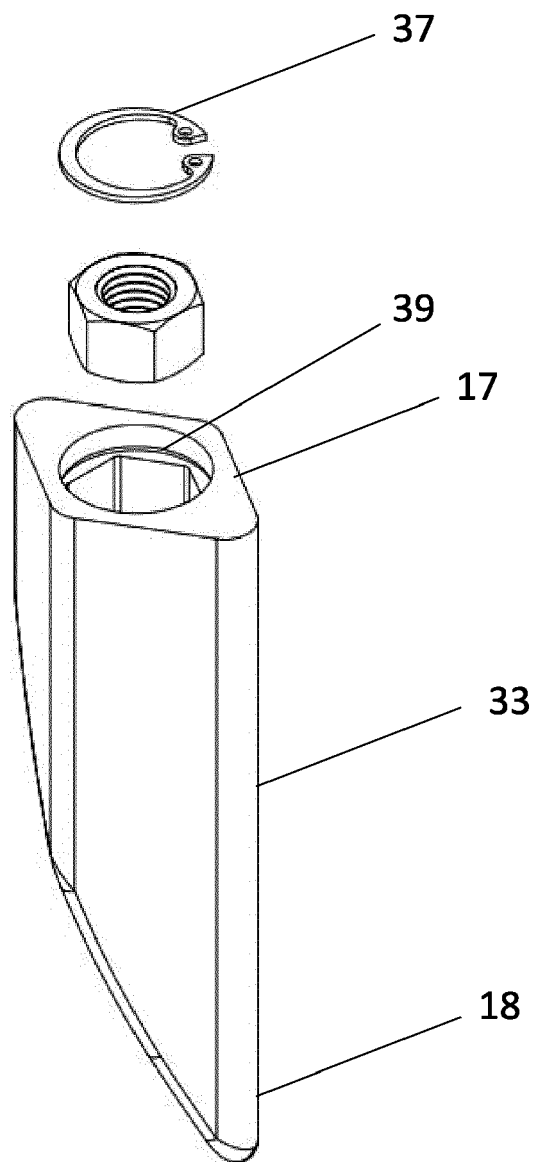


Figure 4

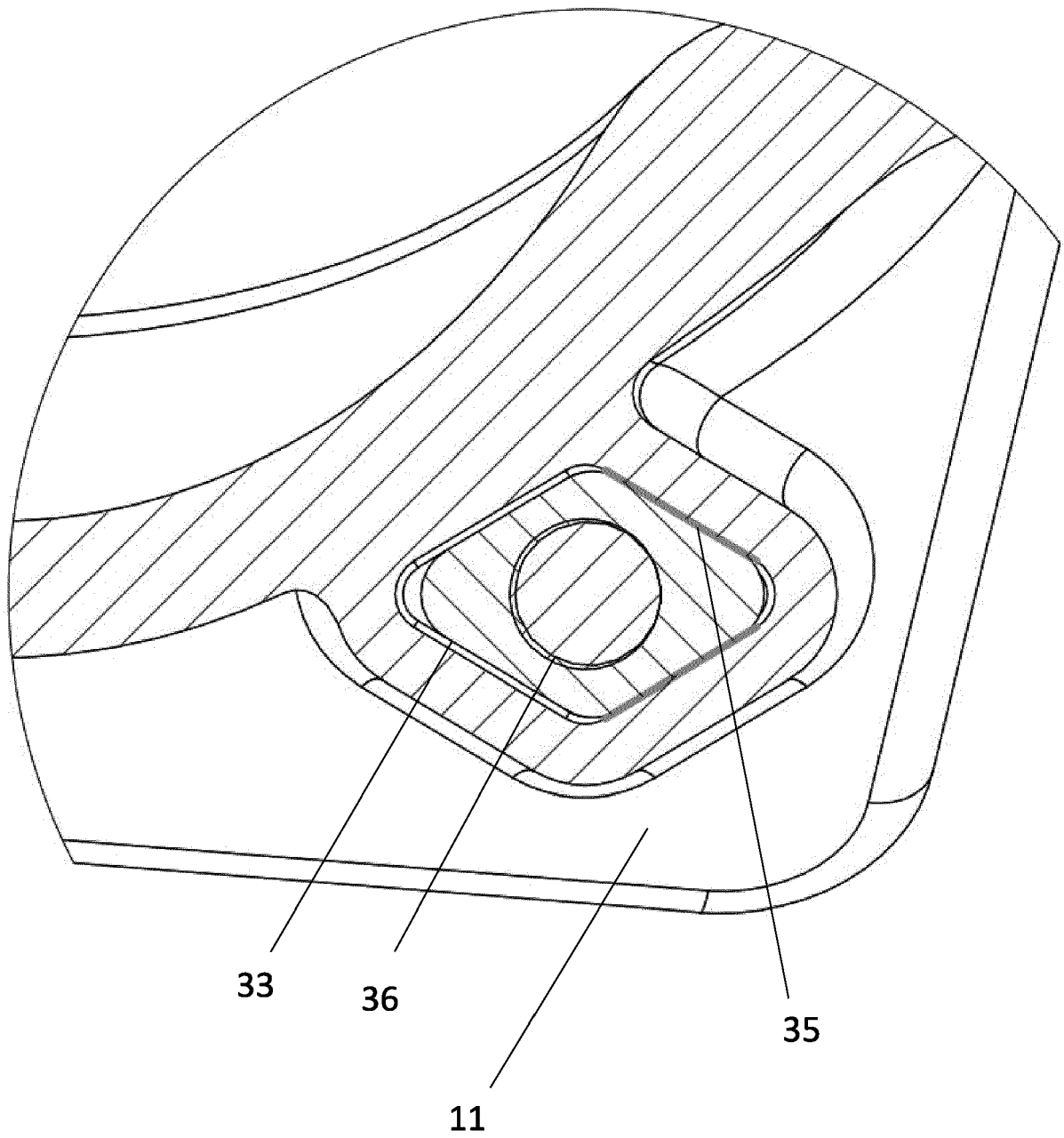


Figure 5

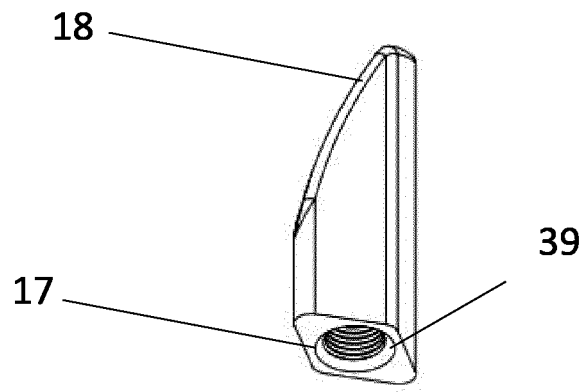


Figure 6a

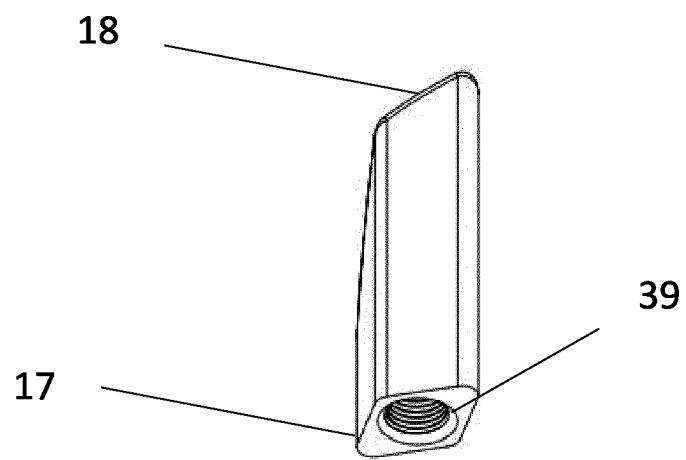


Figure 6b

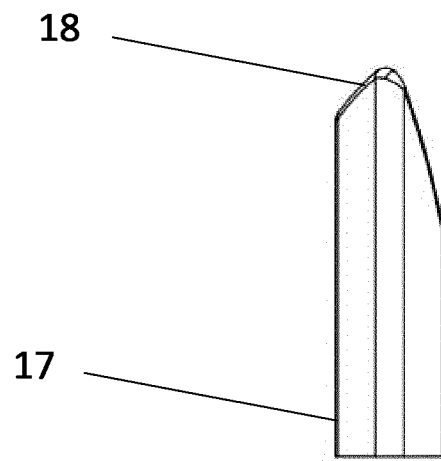


Figure 7a

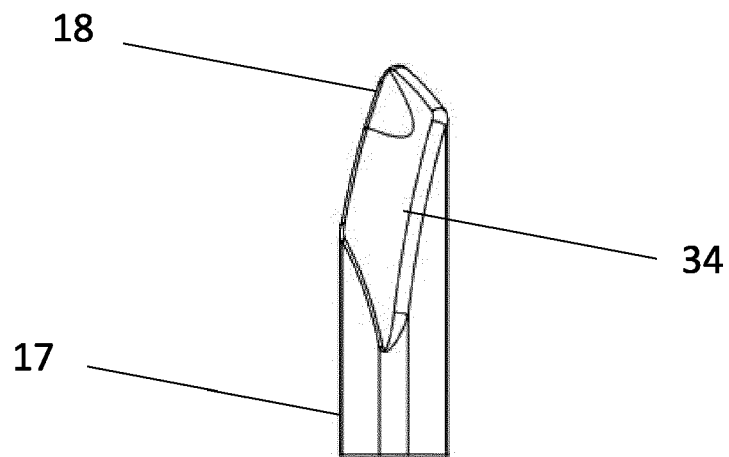


Figure 7b

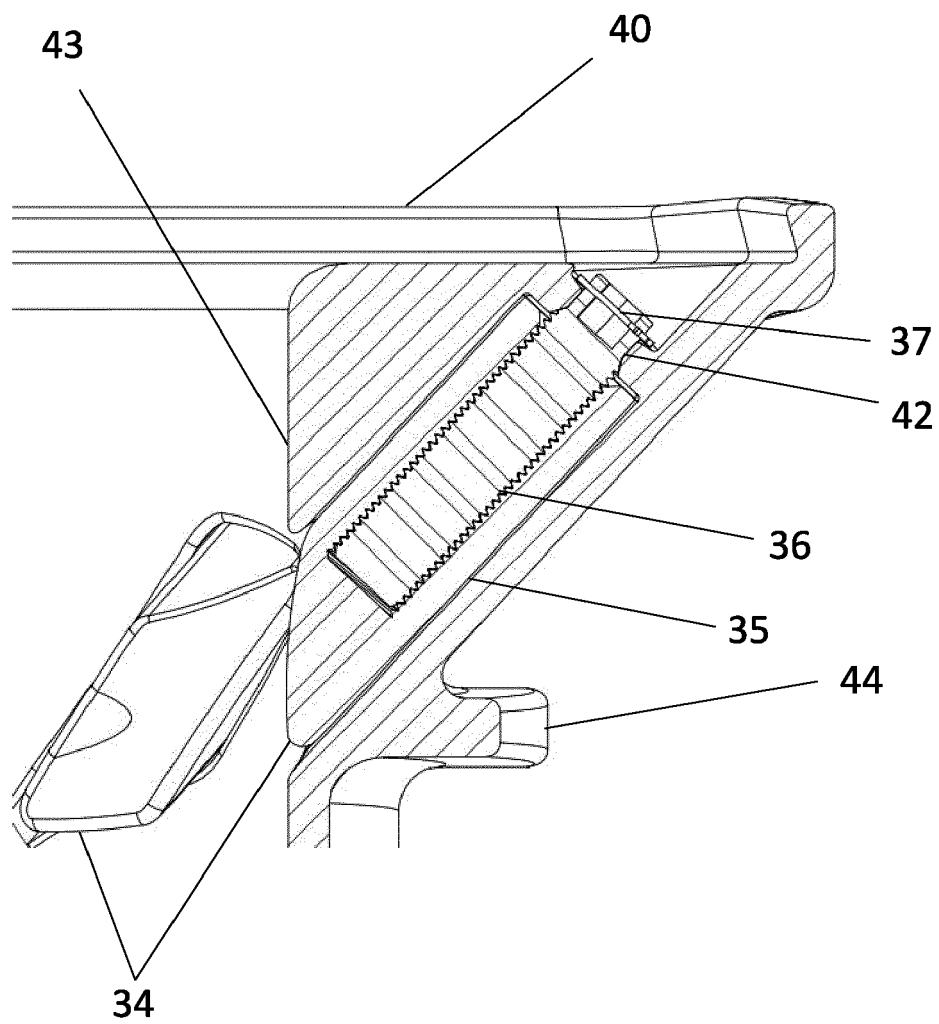


Figure 8

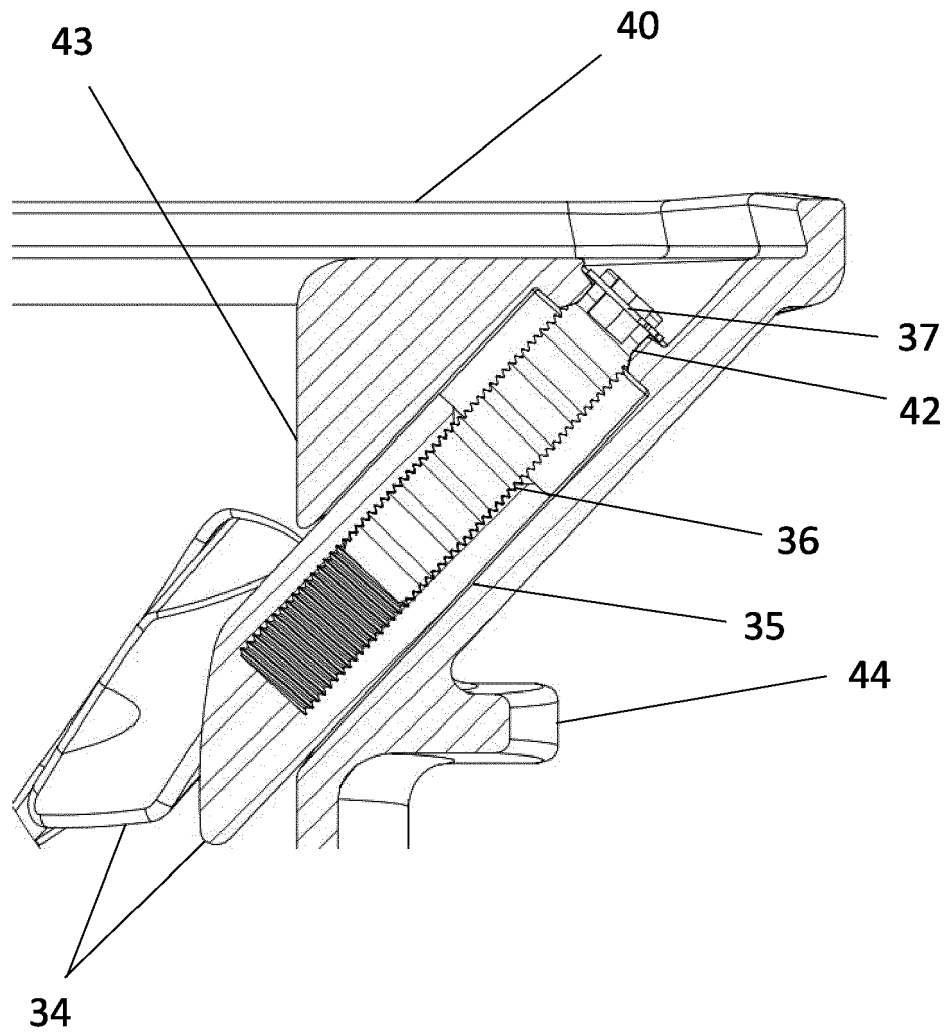


Figure 9

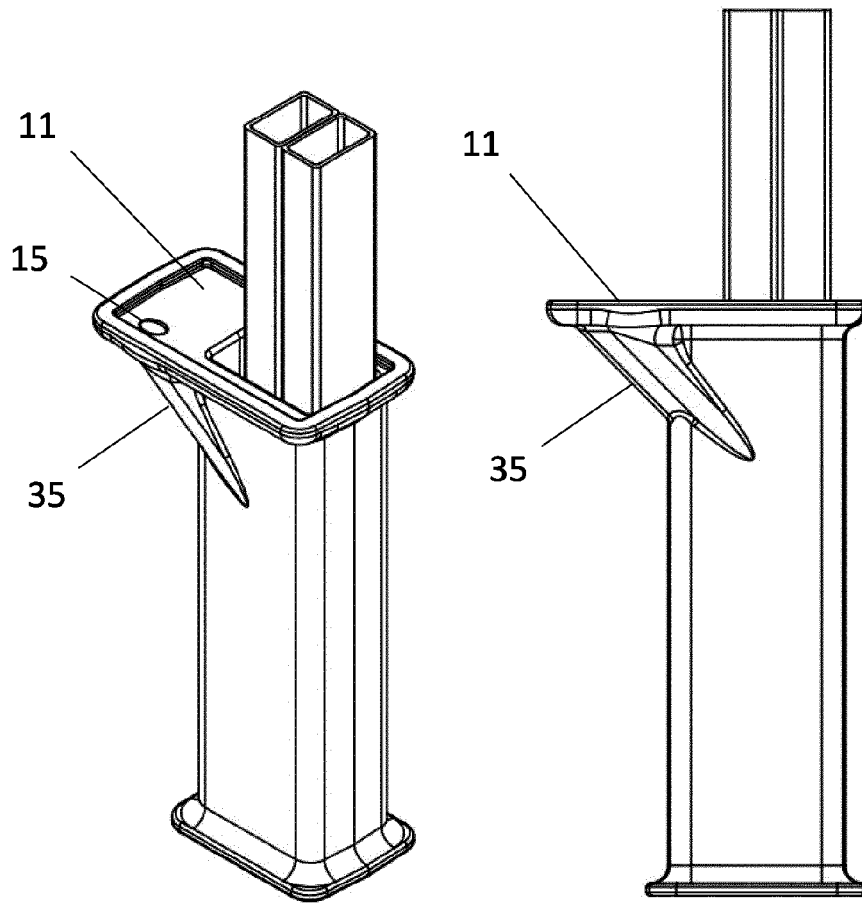


Figure 10a

Figure 10b

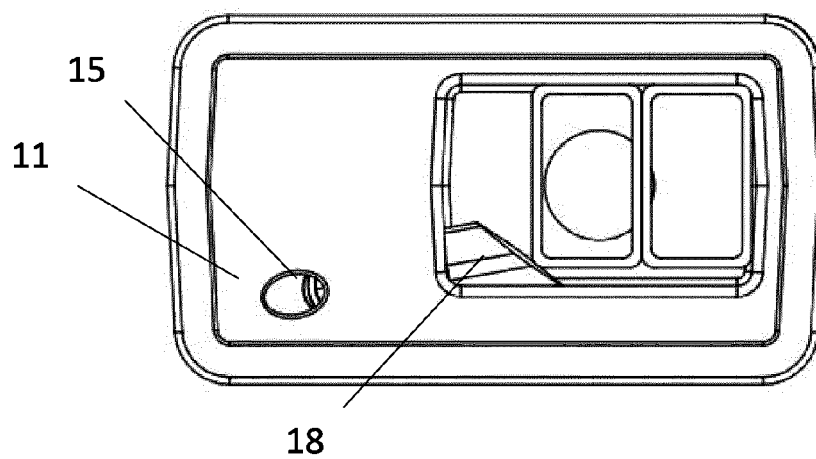


Figure 10c



EUROPEAN SEARCH REPORT

Application Number

EP 22 20 6784

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 1 388 268 A (KNUTSON ALFRED W) 23 August 1921 (1921-08-23)	1, 2, 14	INV. E01F9/685
A	* the whole document *	3-11, 13	E04H12/22
A	WO 2015/086787 A1 (INNOVATIVE PRODUCTS LTD [IE]) 18 June 2015 (2015-06-18) * page 3, line 23 - page 4, line 19; figures 1-5 *	1-11, 13, 14	
A	US 2009/025332 A1 (RICHARDS DEAN EVAN [NZ]) 29 January 2009 (2009-01-29) * paragraphs [0087] - [0088]; figures 1, 13A-13F *	1, 13, 14	
			TECHNICAL FIELDS SEARCHED (IPC)
			E01F E04H
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		31 March 2023	Flores Hokkanen, P
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)



Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-11, 13, 14

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11, 13, 14

**Ground engaging socket with wedge clamping system for a post
and method of supporting and securing a post**

2. claim: 12

**Method of assembling a ground engaging socket inserting a
wedge element into a wedge chamber and holding it in place**

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-03-2023

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REFERENCES CITED IN THE DESCRIPTION

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- EP 2110478 A [0003]