



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.08.2012 Bulletin 2012/32

(51) Int Cl.:
B25D 1/02 (2006.01) B25D 1/16 (2006.01)
E04H 17/26 (2006.01)

(21) Application number: **12152059.7**

(22) Date of filing: **23.01.2012**

(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
Designated Extension States:
BA ME

(71) Applicant: **Vallès Salvadó, Jordi**
17852 Serinya (ES)

(72) Inventor: **Vallès Salvadó, Jordi**
17852 Serinya (ES)

(74) Representative: **Curell Suñol S.L.P.**
Passeig de Gràcia 65 bis
08008 Barcelona (ES)

(30) Priority: **07.02.2011 ES 201130110 U**

(54) **Stake driving device**

(57) A stake driving device (1) comprising a receiving socket (2) forming a receiving cavity (18) for accommodating the first strike end (102) of a stake (100) to be driven into the ground (106). The device is provided with impact means (4) and a longitudinal guide (6) to guide the impact means (4). Said impact means (4) are movable on the guide (6) between a first position remote from the socket (2) and a second position in which the impact means (4) deliver a driving impulse on an impact area (16) of the receiving socket (2) towards the first end (102) of the stake (100).

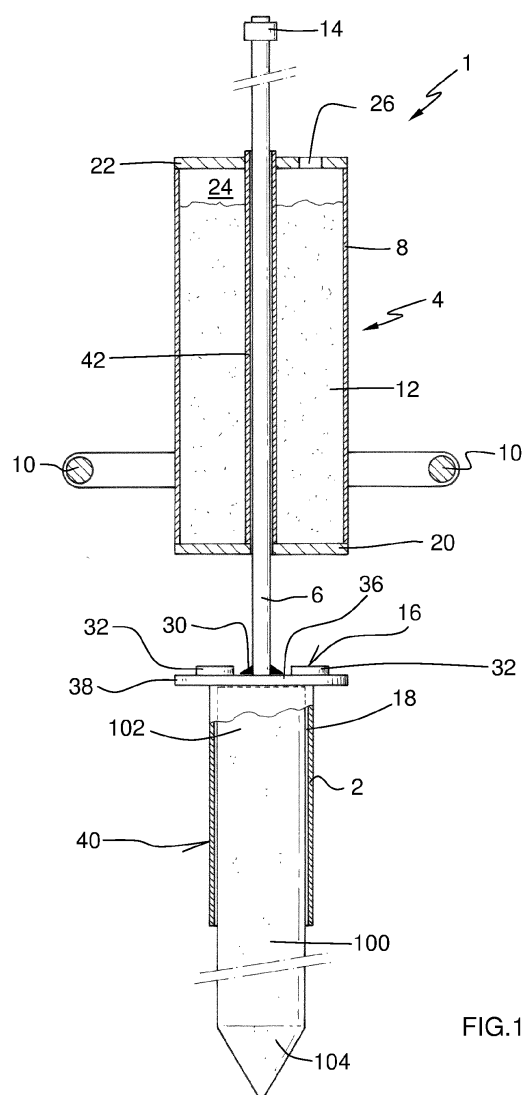


FIG.1

Description

Field of the invention

[0001] The invention relates to a stake driving device comprising a receiving socket forming a receiving cavity for accommodating the first striking end of a stake to be driven into the ground.

State of the art

[0002] In the construction of fencing, stakes distributed more or less regularly are used to support the fence. Normally the stakes are driven into the ground simply with a mallet. For effective driving it is important that the mallet be relatively heavy. Thus, particularly when the stake is made of wood, the end of the stake which is struck usually splinters easily.

[0003] In order to solve this problem, document US20090044664 discloses an auxiliary device for driving stakes having the features set out in the preamble of claim 1. The purpose of the receiving socket is to try and avoid that the wooden stake splinters when the user strikes the end of the stake receiving the impacts with a mallet or hammer.

[0004] The device of document US20090044664 also incorporates a shaft as a holding handle provided above the striking socket, destined to receive the impacts of the mallet and transmit them towards the stake. Additionally, at the end of the shaft remote from the socket, the device is provided with a protective flange to prevent the user from hitting himself on the hand with which he is holding the device. However, this flange can be deformed, so that if a particularly off-center blow is delivered at one of the edges of the flange occurs, it may happen that the flange is deformed and the user accidentally strikes his hand or wrist.

[0005] It should also be mentioned that the device of the state of the art additionally requires a mallet or hammer for delivering the impacts. While striking, the user has one hand occupied holding the device. For that reason, the user can only use a mallet of a relatively light weight. This does not represent, a priori, a problem for small diameter stakes. However, in the case of stakes having a large diameter, where the resistance to driving is greater, the user must make an additional effort while striking with the mallet to facilitate the penetration of the stake into the ground. This additional effort has direct repercussions in the wrist joint, so that in the long run undesired injuries may occur.

Summary of the invention

[0006] It is an object of the invention to propose a stake driving device that improves the safety of use and the ergonomics thereof. This object is obtained by means of a stake driving device of the type first mentioned above, **characterized in that** it further comprises impact means

and a longitudinal guide for guiding impact means, the impact means being movable on the guide between a first position remote from of the socket and a second position in which the impact means deliver a driving impulse on a impact area of the receiving socket towards the first end of the stake.

[0007] Thanks to the impact means guide, off center strikes on the device are avoided, so that the safety of use and the ergonomics thereof are improved. On the other hand, since the impact means are guided in the device itself, they allow a greater force to be exerted than by means of the use of a mallet. With the mallet the user must perform a rotatory movement with which he must try to hit the right spot on the device, whereas the impact means of the invention make a safer and more effective linear movement, since they may be allowed to fall under their own weight or be safely driven from the remote position.

[0008] Alternatively the impact means may comprise a spring type preload mechanism that fires a mass. In this way, the user does not necessarily have to make the additional effort of striking and if he so wishes it is not absolutely necessary either for him to hold the impact means at the time of the impact. In other words, he can drive the impact means, and release them just before impacting on the socket. In this way, from an ergonomic point of view, the user does not directly receive the most injurious effects of the reactive force of the device on his wrists.

[0009] The invention further includes a number of preferred features that are object of the dependent claims and the utility of which will be highlighted hereinafter in the detailed description of an embodiment of the invention.

[0010] Thus, a further object of the invention is that the device should be very simple and easy to use. Thus, preferably the impact means comprises a mass to take advantage of the force of gravity when delivering the impact.

[0011] It is important, that the device, at least at the time of acquisition should not weigh much. This facilitates the carriage and storage of the device, at least before being marketed. Thus, particularly preferably, the impact means comprises a container accessible from the outside thereof and which may be filled with the mass. The user may thereby fill the device with the desired mass, such as, for example, concrete mortar.

[0012] It is also desirable that the device may be transported in a simple way. A considerable mass is an advantage during the stake driving process. However the same mass represents a disadvantage when the device is not being used. Thus, preferably the mass is a granular material for being introduced into and removed from said container. The container can be filled up on the job site itself with sand. Optionally, also it may be filled with granulated lead or the like.

[0013] Preferably, the impact means comprises two diametrically opposed handgrips for cooperating in the

movement of impact means between the first and second positions. Again, the ergonomics of use of the device is improved thereby. The handgrips can simply be two tangential or radial handles, but also they include, for example, a wheel type handgrip.

[0014] Also with the object of facilitating the storage of the device preferably, the receiving socket comprises connecting means demountable from the guide.

[0015] Another object of the invention consists of making it possible for one same device to allow for driving different stake sizes. To this end, preferably, the receiving socket comprises means for adaptation to different stake sizes. In the invention a socket will be understood to be a member such as to allow the strike end of the stake to be held firmly. However, particularly preferably, the adaptor means are formed by a plurality of interchangeable receiving sockets, adaptable to different stake sizes.

[0016] Also with a view to improving the safety of use, the guide comprises a stop at the end thereof remote from said socket. In this way the possibility of the impact means coming apart from the guide during the stake driving process is avoided. Particularly preferably the stop is demountable from the guide, which allows the impact means to be separated from the guide to facilitate the storage of the device or the replacement of damaged or worn parts of the device.

[0017] The invention also contemplates the need for driving stakes of large diameters or particularly tall stakes to guarantee that the stake is correctly oriented before the stake driving process. In this case the aid of a second person may be necessary during the stake driving process. In order to avoid any risk during use, preferably below the impact area the socket comprises an upper plate that forms a safety rim that projects outwardly from the main body of the socket and the main body of the socket is of such a height that it forms a holding area for accommodating at least one hand of an adult person. Thanks to this, the assistant can hold the device, while his companion looks after reciprocatingly moving the impact means.

[0018] Likewise, the invention also includes other features of detail illustrated in the detailed description of an embodiment of the invention and in the accompanying figures.

Brief description of the drawings

[0019] Further advantages and features of the invention will be evident from the following description, in which, without any limiting character, preferred embodiments of the invention are disclosed, with reference to the accompanying drawings in which:

Figure 1 is longitudinal section view of the stake driving device according to the invention.

Figure 2 is a plan view from above of the device of Figure 1.

Figure 3 is longitudinal section view of detail of the stake receiving socket area of a second embodiment of the device.

Figures 4 and 5 are side views explanatory of the principle of operation of the driving device according to the invention.

Detailed description of embodiments of the invention

[0020] As may be seen in the Figures, the stake driving device 1 according to the invention comprises a lower hollow-metallic-cylinder like receiving socket 2. Inside the socket 2 there is formed a receiving cavity 18 adapted to receive the first end 102 of a stake 100 to be driven into the ground 106. This first end 102 corresponds to the end on which the impacts are delivered when driving the stake 100.

[0021] Above the socket 2, the device 1 is provided with impact means 4 mounted on a longitudinal guide 6 fixedly attached to and concentric with the socket 2. In an alternative embodiment, the guide 6 might not be concentric. Thus, the guide could be formed by two lateral guides guiding the means 4 disposed between both guides. Thus, the invention is not limited to the guide 6 being concentric.

[0022] In this case, the impact means 4 are formed by a container 8 as a cylindrical body. The container 8 is provided with a first lower plate 20, welded to the cylindrical body. At the top, container 8 is closed with a second upper plate 22. Additionally, the container 8 is provided with a guide sleeve 42 extending between the first and second plates 20, 22 to avoid it being jammed during guidance.

[0023] Through the second upper plate 22 access may be had to the inner chamber 24. In this case, access is made through an orifice 26 which may be closed with a stopper 28, shown only in Figure 2. Alternatively the plate 22 could be simply screwed into the cylindrical body of the container 8.

[0024] A mass 12 may be introduced through the orifice 26 to fill the inner chamber 24. Preferably, the mass 12 is a granular material that can be introduced and removed at will, such as, for example, sand or granulated lead. However, the inner chamber 24 could also be filled with a curable mass 12, such as mortar or the like.

[0025] The container 8 is also provided with two handgrips 10 to handle it during the driving of the stake 100. In this case two handgrips 10 have been shown parallel to the tangents to the cylindrical outer surface of the container 8. Alternatively they could be also radial handgrips or a hand wheel.

[0026] Hereinafter the way of using of the device according to the invention is explained. First, the user inserts the first end 102 of the stake 100 in the receiving cavity 18 of the socket 2 and the second end 104 of the stake 100 is placed on the ground 106 in the initial driving position shown in Figure 4.

[0027] Using the diametrically opposed handgrips 10,

the user moves the impact means 4 on the guide 6 up to a first position remote from the socket 2 (Figure 4). The stop 14 at the end remote from the socket 2 delimits the stroke of the container 8.

[0028] From this first position the user allows the impact means 4 to drop in the direction of the arrow A to a second position (Figure 5) in which the impact means 4 deliver a driving impulse on the first end 102 of the stake 100. This impulse may derive from the acceleration caused by the effect of gravity on the impact means 4. Optionally, when a greater driving force is required, the user also can impel container 8 through the handgrips 10 to additionally accelerate the mass and increase the force created. In both cases, at the end of the stroke thereof, the container 8 impacts on the first plate 20 on an impact area 16 of the receiving socket 2 and the impulse is transmitted to the stake 100. In the state of the art, when delivering the blow, the user must hold the mallet firmly. However, in the invention, because the impact means 4 are fixedly attached to the guide 6, the user does not need to make a considerable force to hold the device 1 at the time of the impact, so that he does not receive either the most important part of the reaction of the stake 100 on the device 1. Thanks to this, both the ergonomics, and the effectiveness of the driving device 1 are improved.

[0029] The socket 2 serves, firstly, as a centering member of the device 1, whereby it is also possible to make very effective strikes and with a pressure uniformly distributed over the first end 102. Furthermore, in the case of wooden stakes 100, the socket 2 prevents the first end 102 from splintering.

[0030] It should also be noted that in the device 1 of Figures 1 and 2, the guide 6 is welded to the socket 2 by means of a welding seam 30. Thus, so as not to damage the welding seam 30, spacers 32 forming the impact area 16 are provided. Also, when the guide 6 is welded to the socket 2, the stop 14 at the opposite end of the guide is removable. To this end, the stop 14 is, for example, a screw tightened on the guide 6. Where necessary, the container 8 may be demounted to transport the device 1 in separate pieces or to repair damaged parts. Optionally, one same device 1 may have several sockets 2 of different diameters with welded guide 6 to be able to interchange them and to adapt them better to the stake 100 to be driven.

[0031] Alternatively, the socket 2 is provided with connecting means 34 demountable from the guide 6. In this case the connecting means 34 are formed by a threaded connexion between the end of the guide 6 opposite the end provided with the stop 14 and the upper plate 36 of the socket 2. Thanks to this, the device 1 can be dismantled for storage and transport in a more convenient way.

[0032] On the other hand, the invention also contemplates the possibility of the socket 2 comprising means for adaptation to different stake sizes. For example, the socket 2 may have a chuck-type system allowing variation of the diameter. This chuck also defines a receiving

cavity 18 for accommodating the first end 102 of the stake 100. Nevertheless, preferably, when socket 2 is demountable from the guide 6, the adaptor means are formed by a plurality of interchangeable receiving sockets 2, adaptable to different stake 100 diameters.

[0033] The device 1 contemplates an additional improvement for the case of stakes 100 of large dimensions. Thus, below the impact area 16, the upper plate 36 of the socket 2 forms a safety rim 38 projecting outwardly from the main body of the socket 2. Additionally, the main body of the socket 2 is provided with a height such that it forms a holding area 40 for accommodating at least one hand of an adult person. Very tall stakes 100 or those having large diameters may require that two people take part in the stake driving process. To this end, the first person holds the device 1 by the holding area 40 and has the task of holding the stake 100 vertical. On the other hand, the second person has the task of delivering the necessary impacts for the driving in the way explained in previous paragraphs. The safety rim 38 prevents the assistant from accidentally placing his hand in the impact area 16.

[0034] Finally, it should be noted that the device according to the invention is appropriate for driving both wooden and metal stakes.

Claims

1. A stake driving device (1) comprising a receiving socket (2) forming a receiving cavity (18) for accommodating the first strike end (102) of a stake (100) to be driven into the ground (106), **characterized in that** it further comprises
 - [a] impact means (4), and
 - [b] a longitudinal guide (6) to guide said impact means (4),
 said impact means (4) being movable on said guide (6) between a first position remote from said socket (2) and a second position in which said impact means (4) deliver a driving impulse on an impact area (16) of said receiving socket (2) towards said first end (102) of said stake (100).
2. Device according to claim 1, **characterized in that** said impact means (4) comprise a mass (12).
3. Device according to claim 2, **characterized in that** said impact means (4) comprise a container (8) accessible from the outside thereof and which may be filled with said mass (12).
4. Device according to claim 3, **characterized in that** said mass (12) is a granular material for being introduced into and removed from said container (8).

5. Device according to any of the claims 1 to 4, **characterized in that** said impact means (4) comprises two diametrically opposite handgrips (10) for cooperating in the movement of said impact means (4) between said first and second positions. 5
6. Device according to any of the claims 1 to 5, **characterized in that** said receiving socket (2) comprises connecting means (34) demountable from said guide (6). 10
7. Device according to claim 6, **characterized in that** said receiving socket (2) comprises means for adaptation to different stake (100) sizes. 15
8. Device according to claim 7, **characterized in that** said adaptor means are formed by a plurality of interchangeable receiving sockets (2), adaptable to different stake (100) sizes. 20
9. Device according to any of the claims 1 to 8, **characterized in that** said guide (6) comprises a stop (14) at the end thereof remote from said socket (2).
10. Device according to claim 9, **characterized in that** said stop (14) is demountable from said guide (6). 25
11. Device according to any of the claims 1 to 10, **characterized in that** below said impact area (16) said socket (2) comprises an upper plate (36) forming a safety rim (38) projecting outwardly from the main body of said socket and **in that** the main body of said socket (2) is provided with a height such as to form a holding area (40) for accommodating at least one hand of an adult person. 30
35

40

45

50

55

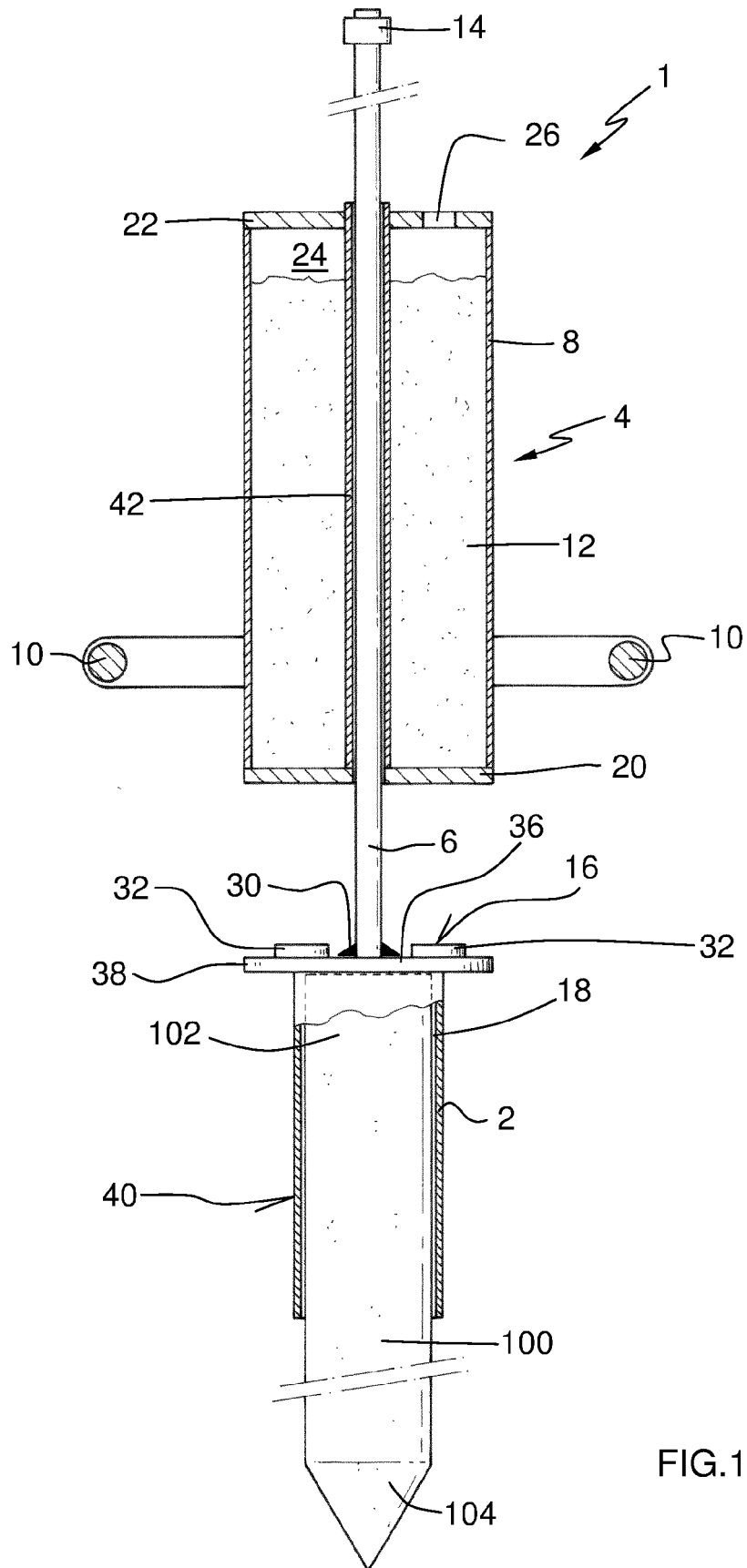


FIG.1

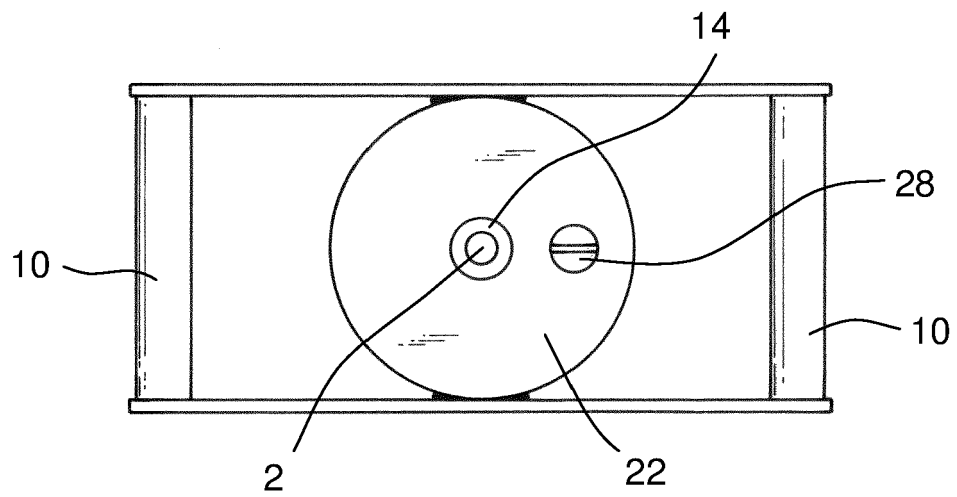


FIG. 2

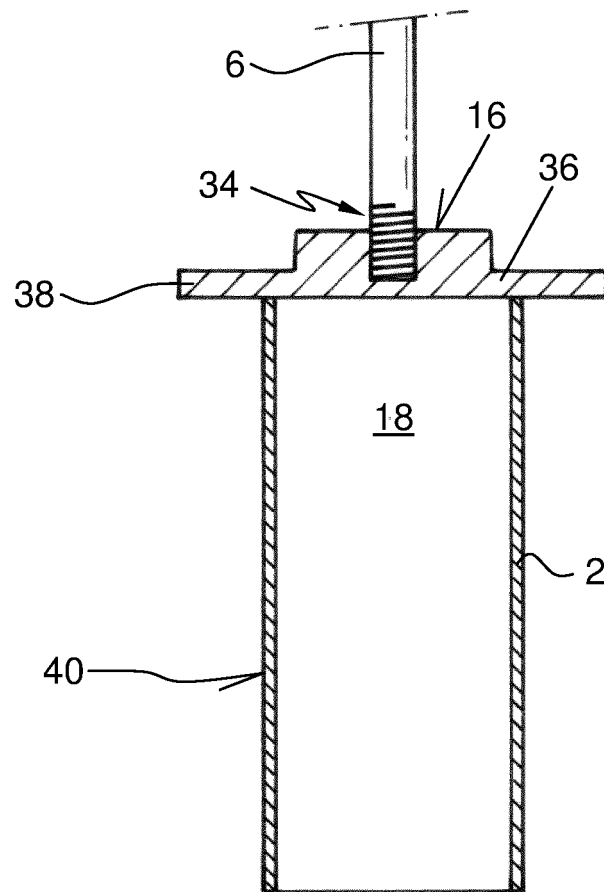


FIG. 3

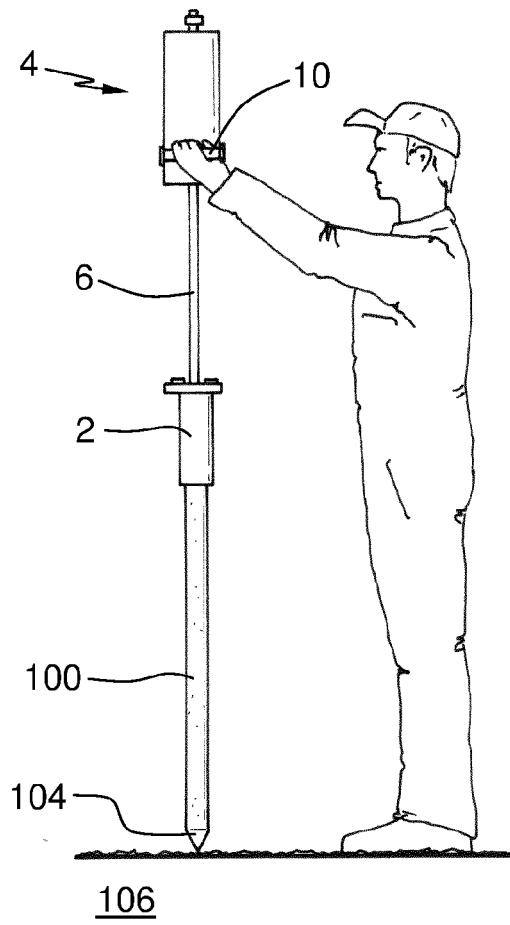


FIG. 4

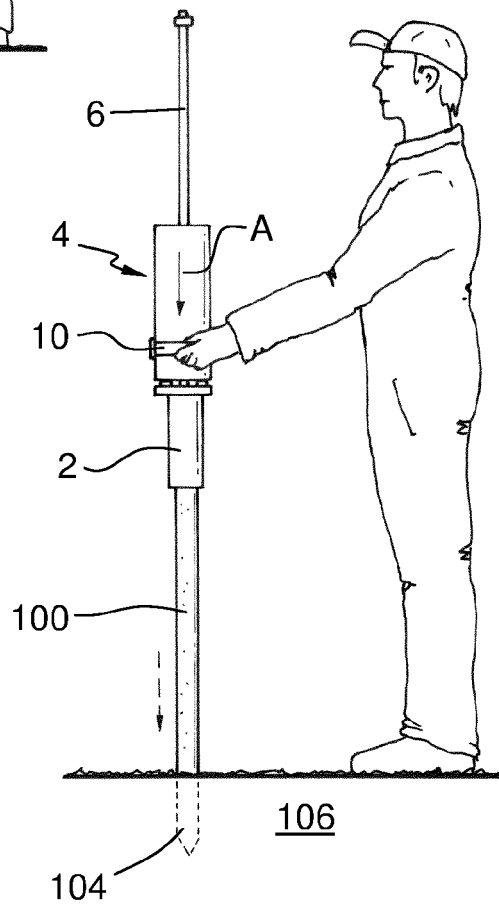


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 12 15 2059

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	BE 434 830 A (T.E. HOLMAN) 10 June 1939 (1939-06-10)	1-10	INV. B25D1/02 B25D1/16 E04H17/26	
A	* page 9, lines 4-6; figures 1,12 *	11		
X	US 5 542 479 A (STACHLER THOMAS H [US] ET AL) 6 August 1996 (1996-08-06)	1,2,5-10		
Y	* column 2, line 3 - column 3, line 52; figures 1,2 *	3,4,11		
X	US 6 935 436 B1 (WILLISTON CHRISTOPHER A [DE]) 30 August 2005 (2005-08-30)	1,2,5-9		
Y	* column 3, line 18 - column 4, line 33; figures 1,3 *	3,4,11 10		
X	US 2007/181320 A1 (MASON ROBERT [US]) 9 August 2007 (2007-08-09)	1,2,5,9, 11		
Y	* paragraphs [0020] - [0028]; figures 1-3,6 *	3,4 6-8,10		
X	US 2 629 985 A (TAYLOR MCDOWELL JOHN SAMUEL) 3 March 1953 (1953-03-03)	1,2,5,9, 10		TECHNICAL FIELDS SEARCHED (IPC) B25D E04H
Y	* column 1, line 48 - column 2, line 46; figures 1-3 *	3,4,11 6-8		
Y	WO 2006/024114 A1 (VAN DEN EYNDE FRANK [BE]) 9 March 2006 (2006-03-09)	3,4		
A	* page 2, lines 1-10; figure 1 *	2		
Y	US 2008/257113 A1 (NEUMARKEL ARTHUR F [US]) 23 October 2008 (2008-10-23)	11		
A	* paragraph [0023]; figures 1,2 *	1-10		
A	WO 2010/030194 A1 (BELSEY MAXWELL DEREK [NZ]; GRAY TERRY JOHN [NZ]) 18 March 2010 (2010-03-18) * page 17, lines 1-18; figure 4 *	2-4		
The present search report has been drawn up for all claims				
Place of search The Hague		Date of completion of the search 27 April 2012	Examiner Rilliard, Arnaud	
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				

 1
EPO FORM 1503 03.82 (P04C01)

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

EP 12 15 2059

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.

27-04-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
BE 434830	A	10-06-1939	NONE	
US 5542479	A	06-08-1996	NONE	
US 6935436	B1	30-08-2005	NONE	
US 2007181320	A1	09-08-2007	NONE	
US 2629985	A	03-03-1953	NONE	
WO 2006024114	A1	09-03-2006	BE 1016174 A6 WO 2006024114 A1	04-04-2006 09-03-2006
US 2008257113	A1	23-10-2008	NONE	
WO 2010030194	A1	18-03-2010	AU 2009292248 A1 CN 102143904 A EP 2334587 A1 NZ 571026 A US 2011162491 A1 WO 2010030194 A1	18-03-2010 03-08-2011 22-06-2011 30-09-2010 07-07-2011 18-03-2010

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 20090044664 A [0003] [0004]