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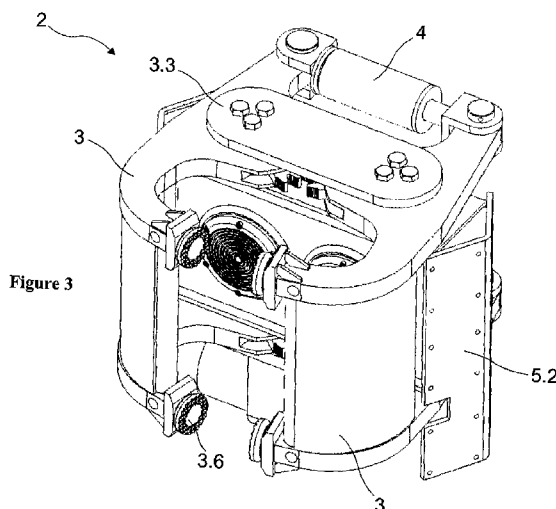
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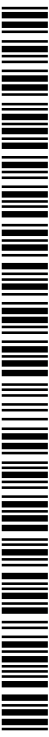
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(54) Title: A GRIPPING MACHINE



(57) Abstract: The present invention relates to a gripping machine (1) which is used for driving and extracting applications of steel-formed materials, profiles and steel pipes called as sheet piles, and has at least one gripping unit (2) that enables to position these materials to the floor in a preferred angle during driving.



A GRIPPING MACHINE

DESCRIPTION

5 **Technical Field**

The present invention relates to a gripping machine which is used for driving and extracting applications of steel-formed materials, profiles and steel pipes called as sheet piles.

10

Background of the Invention

Vibro drivers are used in a wide area upon being mounted on pieces such as steel-formed pipes, profiles; and for the purpose of driving these pieces into the ground or extracting them from the ground. Vibro drivers perform the operation of driving pipe or profiles into the ground by means of their eccentric weights. Steel-formed pipes can enter the ground easily owing to the vibration occurring by means of these weights. Part of the said vibro drivers is positioned onto these steel pipes directly and it is ensured that the steel pipe proceeds inside the ground by means of the vibration generated by thereof. Whereas part of vibro drivers receives this steel pipe, which is preferred to be driven, from a position parallel to the ground plane and takes it to a position vertical to the ground plane and thus enables it to be driven. Part of these vibro driver clutches used today holds the pipe wall thickness by means of a clamp and thereby takes the steel pipe to a vertical position ready to be driven to the ground plane from the parallel position. These type of clamp systems ensure that only pipes with a certain wall thickness are lifted and also their movements during the lifting process is uncontrolled. In addition to this; some clutches grip these components, which generally have a cylindrical structure, from their circumference and take them from horizontal position into vertical position.

The European Patent document no. **EP2597204**, an application in the state of the art, discloses a clamp member which is used for placing the metal plates on a ground. A clamp structure (3) having gripping jaws (6a, 6b) is placed on a vibratory driver. In the invention, a mechanism which holds plate parts and
5 transmits the vibration received from the vibrator to the sheet metal is disclosed.

The European Patent document no. **EP0496167**, another application in the state of the art, discloses a clamp structure which can be moved in a horizontal and a vertical axis by a remote control. Freedom of mobility is provided in carrying
10 components with the said clamp structure.

Summary of the Invention

An objective of the present invention is to realize a gripping machine whereby all
15 kinds of components preferred to be driven can be driven.

Another objective of the present invention is to realize a gripping machine which can grip a component preferred to be driven and applies sufficient force to this component.
20

Detailed Description of the Invention

“A gripping machine” realized to fulfill the objectives of the present invention is shown in the figures attached, in which:
25

Figure 1 is a perspective view of the gripping machine in a gripping status.

Figure 2 is a perspective view of the gripping machine in a non-gripping status.

30 **Figure 3** is a perspective view of the gripping unit together with the housing plate.

Figure 4 is a perspective view of the gripping unit together without the housing plate.

Figure 5 is a perspective view of cross-sectional status of the gripping unit.

5 **Figure 6** is a perspective view of another cross-sectional status of the gripping unit.

Figure 7 is an upper view of the gripping unit in a non-gripping status.

Figure 8 is an upper view of the gripping unit in a gripping status.

Figure 9 is an upper view of the cross-sectional status of the pad so that
10 the spherical member is seen in a non-gripping status of the gripping unit.

The components illustrated in the figures are individually numbered, where the numbers refer to the following:

- 15 1. Gripping machine
 2. Gripping unit
 3. Gripping member
 3.1. Hole
 3.2. Bearing
20 3.3. Housing plate
 3.4. Gear
 3.5. Slot
 3.6. Pad
 3.7. Spherical member
25 4. Driver
 5. Wedge assembly
 5.1. Wedge
 5.2. Wedge surfaces
 5.3. Wedge housing

30

The gripping machine which is used for driving and extracting applications of steel-formed materials, profiles and steel pipes called as sheet piles (1) essentially comprises:

- at least one gripping unit (2) which grips and holds steel-formed materials, profiles and steel pipes and also enables these materials to be positioned to the ground in a preferred angle during driving;
- at least two gripping members (3) which are located on both sides of the gripping unit (2) and operates synchronously so as to hold the material to be gripped;
- at least one hole (3.1) which is located in a region close to the centre of the gripping member (3) and bored so as to fix the gripping member (3) to the gripping unit (2);
- at least one bearing (3.2) which is located in the hole (3.1) and composed so that the gripping member (3) makes a turn around the centreline of this hole (3.1);
- gear (3.4) which is positioned in a region close to the hole (3.1) so that the gripping members (3) operate synchronously and also the pressure force is distributed in a balanced way;
- at least one pad (3.6) which is composed so as to provide entire attachment of the materials to be gripped;
- at least one driver (4) which is positioned on one end of the gripping members (3) and enables the gripping members (3) to move synchronously by applying pressure to both gripping members (3).

In the gripping machine (1) provided in one embodiment of the invention, there is a gripping unit (2) which is used for gripping steel-formed materials, profiles and steel pipes called as sheet piles and for keeping them in this status. The gripping unit (2) grips these materials when they are in a parallel position to the ground plane upon preference and takes them to a position vertical to the ground plane or to any angle that will be driven to the ground by keeping them in this way. Due to the fact that the gripping and keeping transaction is very strong, the material to be

drilled can proceed into the ground directly when a vibration occurs in the gripping unit (2). The wedge assembly (5) is located around the gripping unit (2). The wedge assembly (5) is generated in order to prevent the strong vibration occurring in the gripping unit (2) from being transmitted to the lifts holding the gripping machine (1). There are wedge surfaces (5.2) which are angularly positioned on side parts of the gripping unit (2) in the wedge assembly (5). A large proportion of the vibration occurring in the gripping unit (2) can be absorbed by means of the fact that these wedge surfaces (5.2) are angularly positioned. A plurality of wedges (5.1) is positioned on the wedge surfaces (5.2). These wedges (5.1) are preferably made of rubber material. Thus, vibrations occurring in the gripping unit (2) directly affect these wedges (5.1). These wedges (5.1) absorb all vibration by collecting them on themselves and thus do not bring any damage to lifting machines such as excavator whereby the gripping machine (1) is lifted due to the fact that they are preferably made of rubber material. One part of the wedges (5.1) faces the wedge surfaces (5.2) while the other part thereof faces the wedge housing (5.3). The wedge housing (5.3) provides attachment of both the wedges (5.1) and also the gripping unit (2). Whereas the gripping unit (2) provided in the gripping machine (1) generally consists of two gripping members (3). One driver (4) is mounted to one end of the gripping member (3) so as to provide motion whereas one pad (3.6) is mounted to the other end thereof so that the gripping occurs in a more effective way. A hole (3.1) is provided in the middle part of the gripping member (3) and there is a bearing (3.2) inside this hole (3.1). The gripping member (3) and a vibrator generating vibration can be connected to each other by means of a connection member that is passed through this hole (3.1) located in the gripping member (3). A substantial resistance is given to the hole (3.1) against stresses due to the fact that a bearing (3.2) is fit into the hole (3.1). A housing plate (3.3) is positioned on the upper part of the holes (3.1) in the gripping member (3). By means of this housing plate (3.3), both gripping members (3) are connected to each other and the arising vibrations can be responded synchronously by means of the housing plate (3.3). Besides, two reciprocal gripping members (3) can also be engaged by means of the housing

plate (3.3). In the gripping member (3), there is a gear (3.4) in a region close to the hole (3.1) and also a slot (3.5) wherein these gears (3.4) are maintained and they can be easily disassembled and removed from inside thereof. These gears (3.4) are provided in each of the gripping members (3), the said gears (3.4) are located such that they are engaged and they move in the event that the gripping member (3) is moved around the centreline of the hole (3.1). Due to the fact that these gears (3.4) are placed to a part close to the region where the hole (3.1) is located, a large part of the forces generated by means of the driver (4) are loaded onto these gears (3.4) and thus the value of load reaching the bearing (3.2) located inside the hole (3.1) and the connection member is reduced. The gear (3.4) located in the gripping member (3) is placed into a slot (3.5) here and this gear (3.4) can be easily taken out of the slot (3.5) whenever it is preferred. Thus, the gear (3.4) can be taken out of the slot (3.5) upon being removed and it can be replaced with the new one easily in the event that it is subjected to any breakdown. One pad (3.6) is provided in one end of the gripping member (3). This pad (3.6) is preferably a SAE 4140 steel material, contacts with the component preferred to be gripped and prevents the component from slipping from among the gripping members (3) by providing abrasion resistance by means of the characteristic of SAE 4140 steel. The pad (3.6) can be made of SAE 4140 steel and it can also be made of any kind of steel material that sets a precedent. There is also a spherical member (3.7) inside the pad (3.6) and the spherical member (3.7) has the characteristic of moving freely. The spherical member (3.7) enables the pad (3.6) to be rotated in certain values and thus to fit into the component demanded to be gripped entirely. The driver (4) is mounted to the other end of the gripping member (3) which is not the pad (3.6). The driver (4) is preferably a hydraulic piston. One end of the driver (4) is mounted to the gripping member (3) while the other end thereof is mounted to another gripping member (3). The gripping member (3) ends which are connected to the driver (4) move away from each other and in addition to this the ends where the pads (3.6) are connected approach each other in the event that the driver (4) moves in the opening direction. In cases when it is preferred that gripping is realized, the driver (4) is proceeded in the

opening direction and thus the pads (3.6) move towards each other and holds the component demanded to be gripped. In the event that it is preferred to release the gripped component, the driver (4) is proceeded in the closing direction and in this case, the gripping members (3) end where the driver (4) is connected moves
5 towards each other whereas the ends thereof where the pad (3.6) is connected move in a direction opposite to each other. In this way, the component gripped can be released again.

Operation of the gripping machine (1) is realized as follows: In the event that it is
10 preferred to drive or extract steel-formed materials, profiles and steel pipes called as sheet piles; the gripping machine (1) is approached to the component preferred to be gripped by means of a lift and then the driver (4) is moved in the closing direction. In the event that the driver (4) is moved in the closing direction, the pads (3.6) move away from each other and this transaction continues until the
15 distance between the pads (3.6) is bigger than the diameter of the component preferred to be gripped. After the distance between the pads (3.6) is widened as much as preferred, the component to be gripped is placed between these gripping members (3) and afterwards the driver (4) is moves in the opening direction. In case of this movement, the pads (3.6) proceed towards each other and grip the
20 component to be hold after a while. Henceforth, a further amount of power is given to the driver (4) and thus the component to be gripped is compressed between the pads (3.6) entirely and the component is made ready to be driven/extracted. Henceforward, the driving/extracting process is realized by giving vibration to the gripping machine (1). After the driving/extracting process
25 is completed, the driver (4) is again proceeded in the closing direction this time and enables the pads (3.6) to be removed from each other and thus causes the gripped component to be released. Thus, the driving/extracting process is performed.

CLAIMS

1. A gripping machine (1) which is used for driving and extracting applications of steel-formed materials, profiles and steel pipes called as sheet piles (1)
5 essentially **characterized by**:
- at least one gripping unit (2) which grips and holds steel-formed materials, profiles and steel pipes and also enables these materials to be positioned to the ground in a preferred angle during driving;
 - at least two gripping members (3) which are located on both sides of the
10 gripping unit (2) and operates synchronously so as to hold the material to be gripped;
 - at least one hole (3.1) which is located in a region close to the centre of the gripping member (3) and bored so as to fix the gripping member (3) to the gripping unit (2);
 - 15 - at least one bearing (3.2) which is located in the hole (3.1) and composed so that the gripping member (3) makes a turn around the centreline of this hole (3.1);
 - gear (3.4) which is positioned in a region close to the hole (3.1) so that the gripping members (3) operate synchronously and also the pressure force is
20 distributed in a balanced way;
 - at least one pad (3.6) which is composed so as to provide entire attachment of the materials to be gripped;
 - at least one driver (4) which is positioned on one end of the gripping members (3) and enables the gripping members (3) to move synchronously by applying
25 pressure to both gripping members (3).
2. A gripping machine (1) according to Claim 1, **characterized by** the gripping unit (2) which is used for gripping steel-formed materials, profiles and steel pipes called as sheet piles and for keeping them in this status and grips these
30 materials when they are in a parallel position to the ground plane upon

preference and takes them to a position vertical to the ground plane or to any angle that will be driven to the ground by keeping them in this way.

3. A gripping machine (1) according to Claim 1, **characterized by** the wedge
5 assembly (5) which is located around the gripping unit (2) and is generated in order to prevent the strong vibration occurring in the gripping unit (2) from being transmitted to the lifts holding the gripping machine (1).
4. A gripping machine (1) according to Claim 3, **characterized by** the wedge
10 surfaces (5.2) which are angularly positioned on side parts of the gripping unit (2) in the wedge assembly (5) and a large proportion of the vibration occurring in the gripping unit (2) can be absorbed by means of the fact that they are angularly positioned.
- 15 5. A gripping machine (1) according to Claim 3, **characterized by** the wedge (5.1) which are positioned on the wedge surfaces (5.2) more than one and preferably made of rubber material.
- 20 6. A gripping machine (1) according to Claim 3, **characterized by** the wedge (5.1) which absorbs all vibration by collecting them on themselves and thus does not bring any damage to lifting machines such as excavator whereby the gripping machine (1) is lifted due to the fact that it is preferably made of rubber material.
- 25 7. A gripping machine (1) according to Claim 1, **characterized by** the gripping member (3) wherein one driver (4) is mounted to one end thereof so as to provide motion whereas one pad (3.6) is mounted to the other end thereof so that the gripping occurs in a more effective way.
- 30 8. A gripping machine (1) according to Claim 1, **characterized by** the hole (3.1) which is provided in the middle part of the gripping member (3) and there is a bearing (3.2) inside thereof and also ensures that the gripping member (3) and

a vibrator generating vibration can be connected to each other by means of a connection member that is passed through thereof.

9. A gripping machine (1) according to Claim 1, **characterized by** the bearing
5 (3.2) which gives substantial resistance to the hole (3.1) against stresses due to the fact that it is fit into the hole (3.1).
10. A gripping machine (1) according to Claim 1, **characterized by** the housing
10 plate (3.3) which is positioned on the upper part of the holes (3.1) in the gripping member (3) and connects both gripping members (3) to each other and enables to respond the arising vibrations synchronously
11. A gripping machine (1) according to Claim 1, **characterized by** the gear (3.4)
15 which is located in a region close to the hole (3.1) in the gripping member (3) and moves in the event that the gripping member (3) is moved around the centreline of the hole (3.1).
12. A gripping machine (1) according to Claim 1, **characterized by** the gear (3.4)
20 on which a large part of the forces generated by means of the driver (4) are loaded due to the fact that it is placed to a part close to the region where the hole (3.1) is located and thus reduces the value of load reaching the bearing (3.2) located inside the hole (3.1) and the connection member.
13. A gripping machine (1) according to Claim 1, **characterized by** the slot (3.5)
25 wherein the gear (3.4) located in the gripping member (3) is placed and the gear (3.4) can be easily taken out of it whenever it is preferred.
14. A gripping machine (1) according to Claim 1, **characterized by** the gear (3.4)
30 which can be taken out of the slot (3.5) upon being removed and it can be replaced with the new one easily in the event that it is subjected to any breakdown.

15. A gripping machine (1) according to Claim 1, **characterized by** the pad (3.6) which is located in the end of the gripping member (3) and is preferably a SAE 4140 material, contacts with the component preferred to be gripped and prevents the component from slipping from among the gripping members (3) by providing abrasion resistance by means of the characteristic of SAE 4140 steel.
16. A gripping machine (1) according to Claim 1, **characterized by** the spherical member (3.7) which is located inside the pad (3.6) and has the characteristic of moving freely, thus enables the pad (3.6) to be rotated in certain values and to fit into the component requested to be gripped entirely.
17. A gripping machine (1) according to Claim 1, **characterized by** the driver (4) which is mounted to the other end of the gripping member (3) that is not the pad (3.6), and is preferably a hydraulic piston.
18. A gripping machine (1) according to Claim 1, **characterized by** the driver (4) one end of which is mounted to the gripping member (3) while the other end thereof is mounted to another gripping member (3).
19. A gripping machine (1) according to Claim 1, **characterized by** the gripping member (3) ends of which that are connected to the driver (4) move away from each other and in addition to this the ends thereof where the pads (3.6) are connected approach each other in the event that the driver (4) moves in the opening direction.
20. A gripping machine (1) according to Claim 1, **characterized by** the driver (4) which is proceeded in the opening direction and thereby moves the pads (3.6) towards each other and thus ensures that the component demanded to be gripped is hold in cases when it is preferred that gripping is realized.

21. A gripping machine (1) according to Claim 1, **characterized by** the driver (4) which is moved in the closing direction in the event that it is preferred to release the gripped component and in this case, the gripping members (3) ends where the pad (3.6) is connected move in a direction opposite to each other.

5

Figure 1

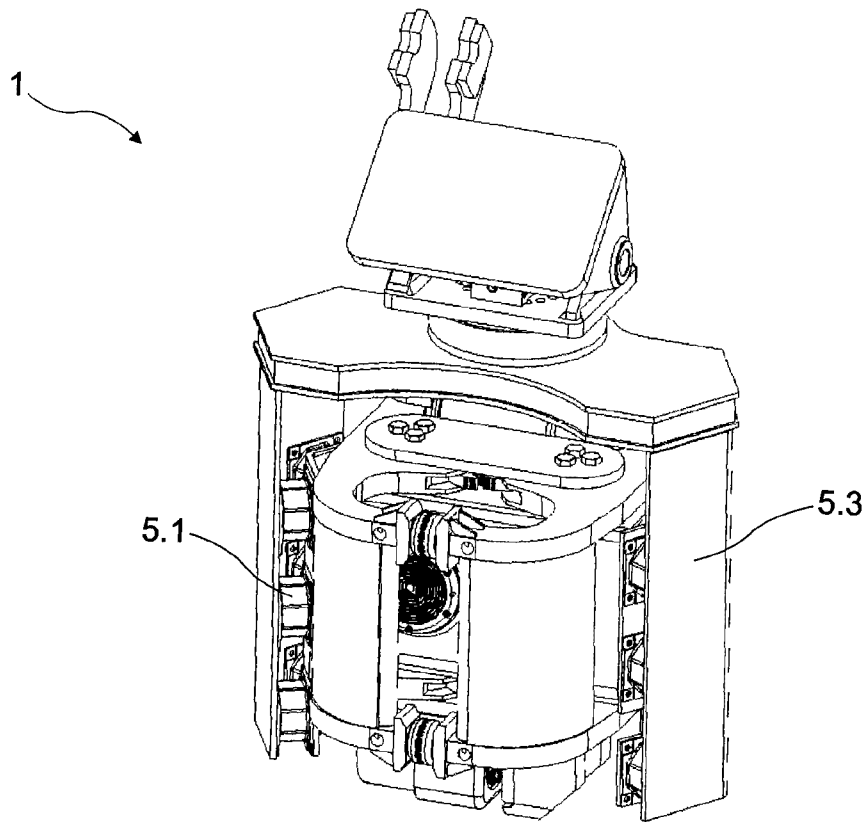


Figure 2

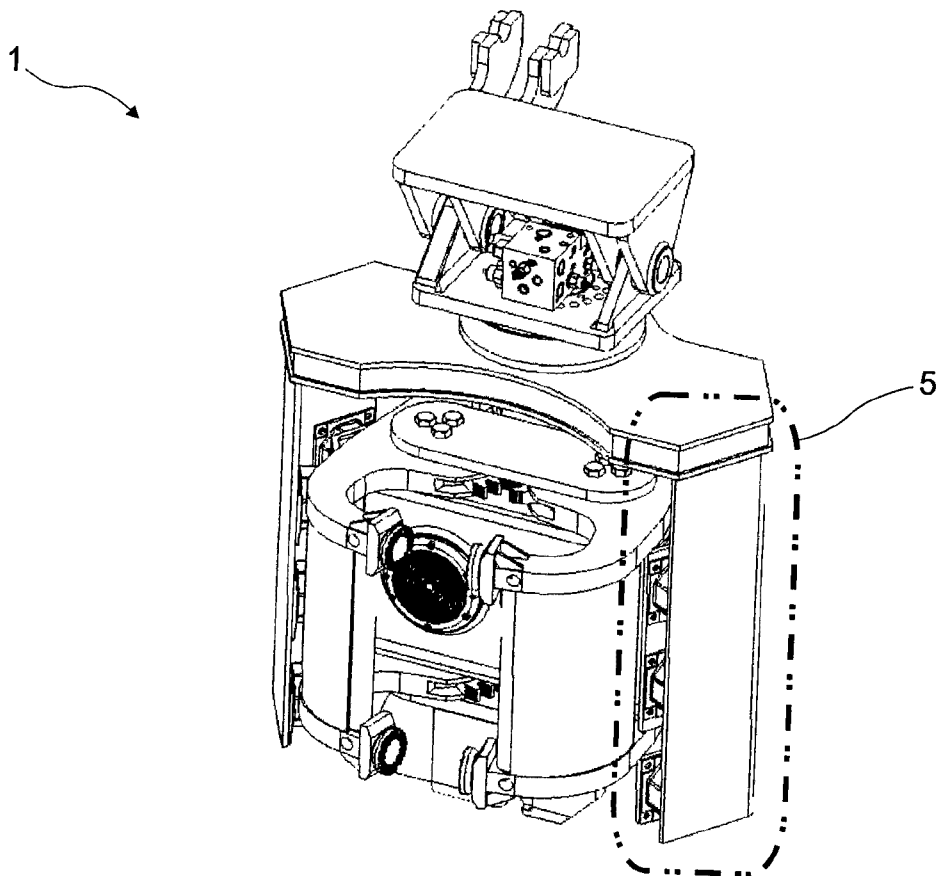


Figure 3

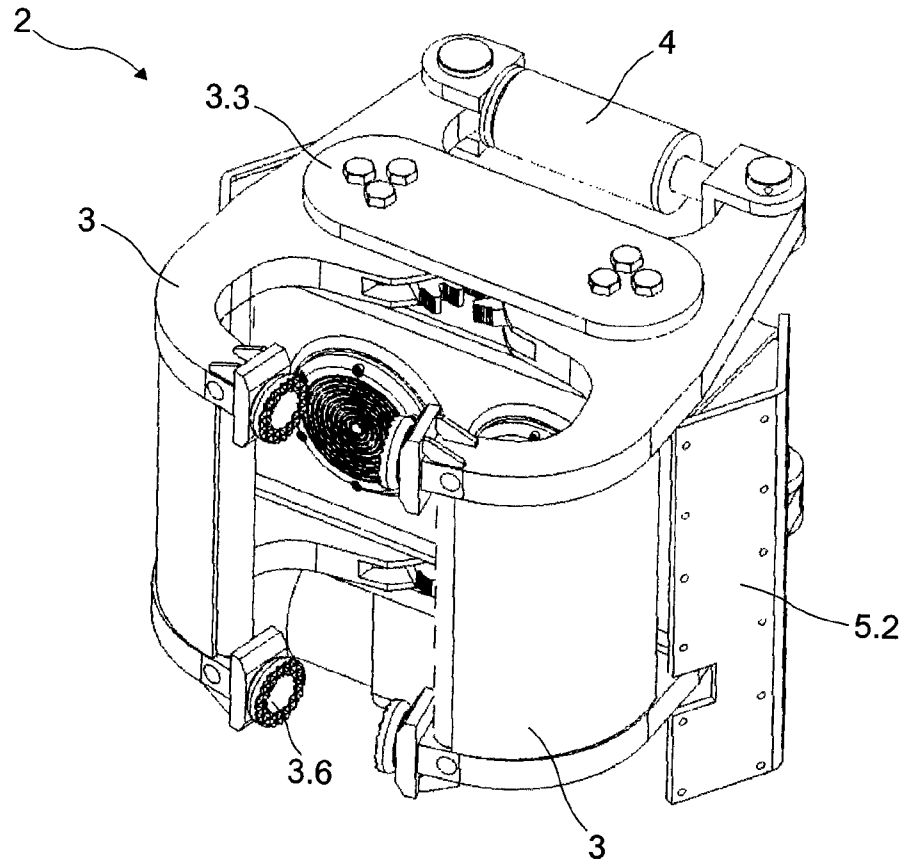


Figure 4

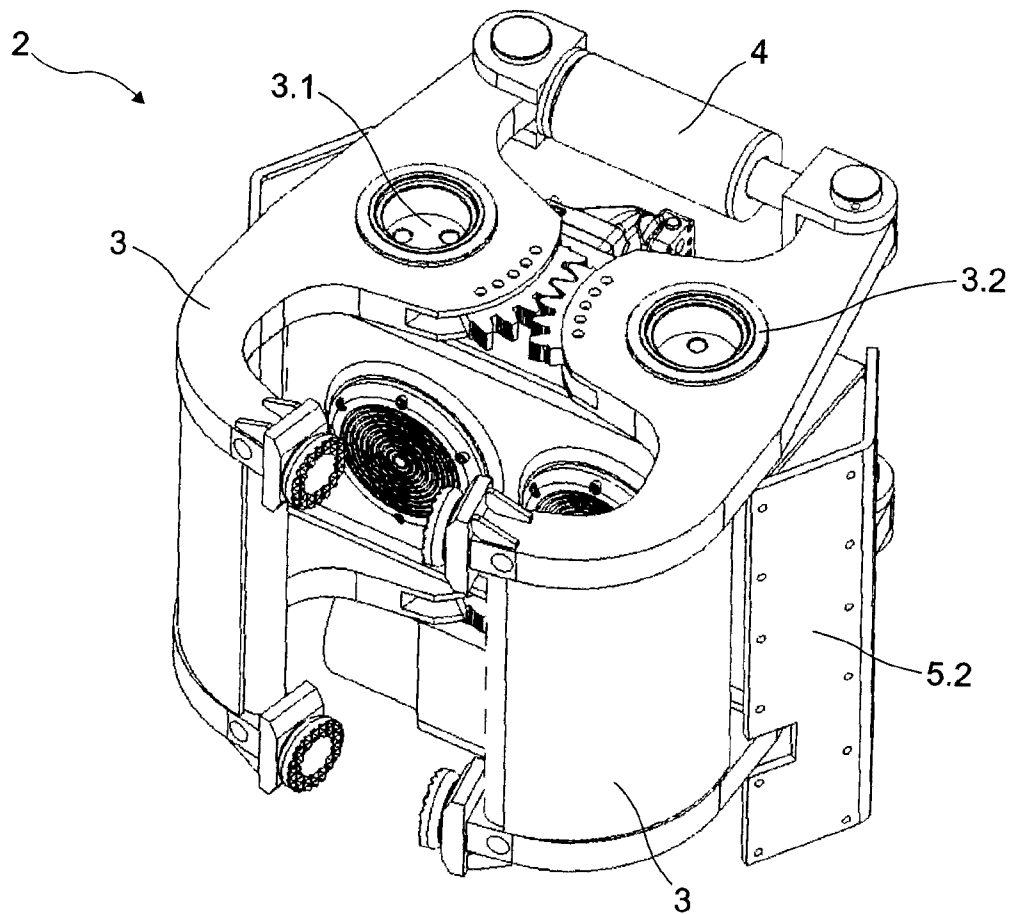


Figure 5

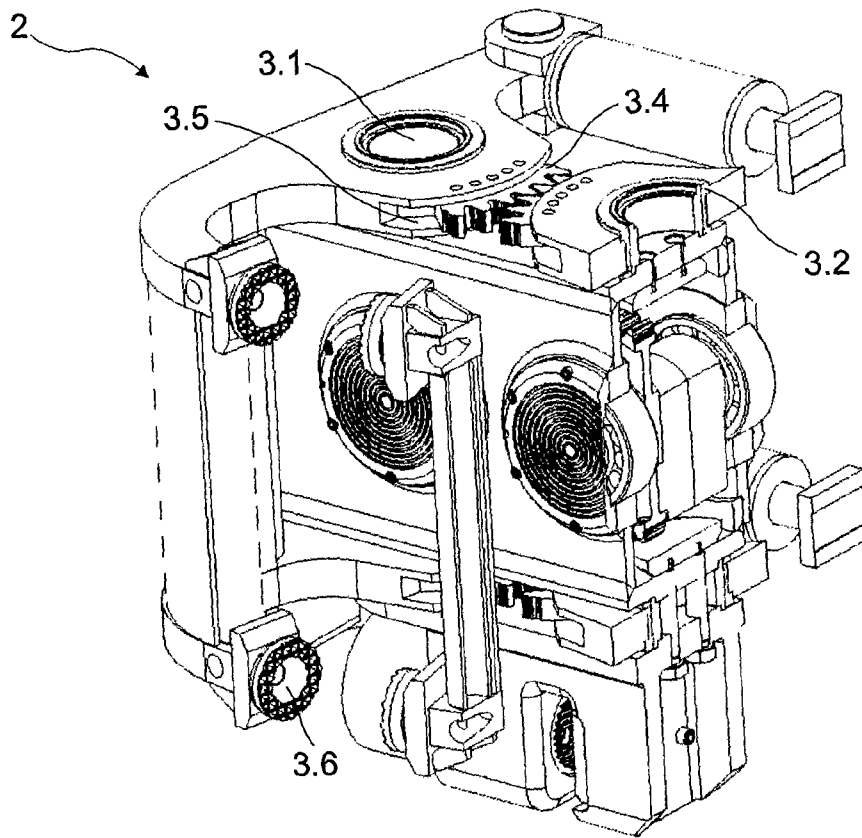


Figure 6

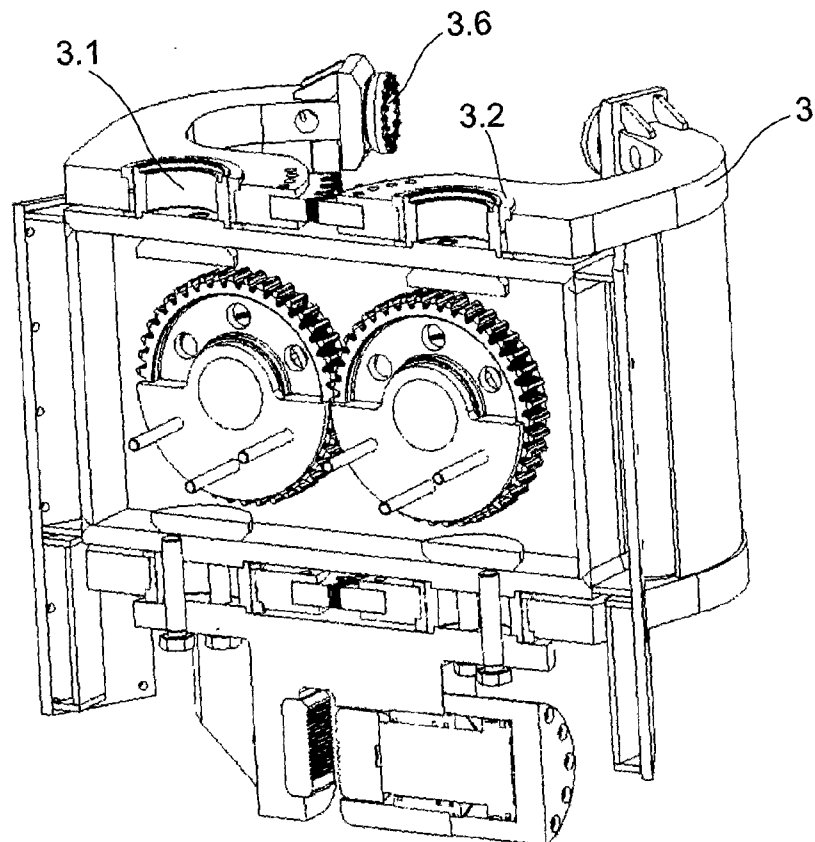


Figure 7

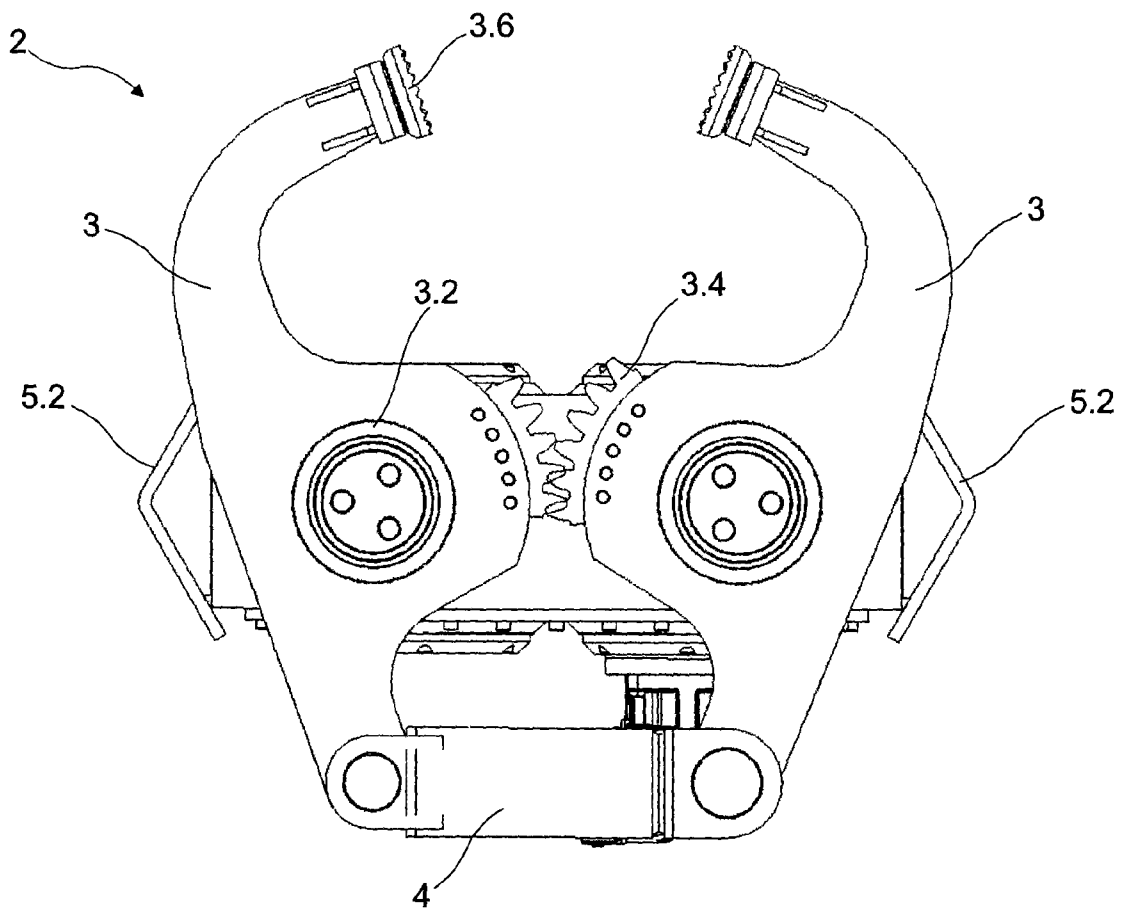


Figure 8

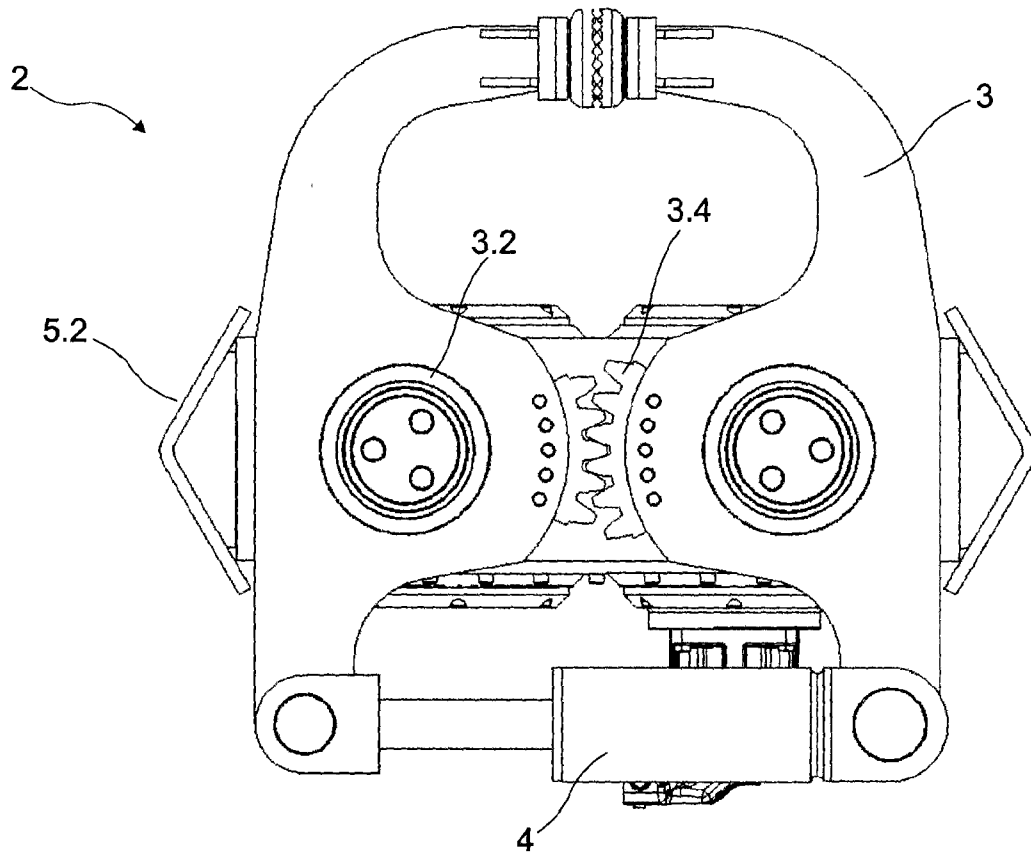
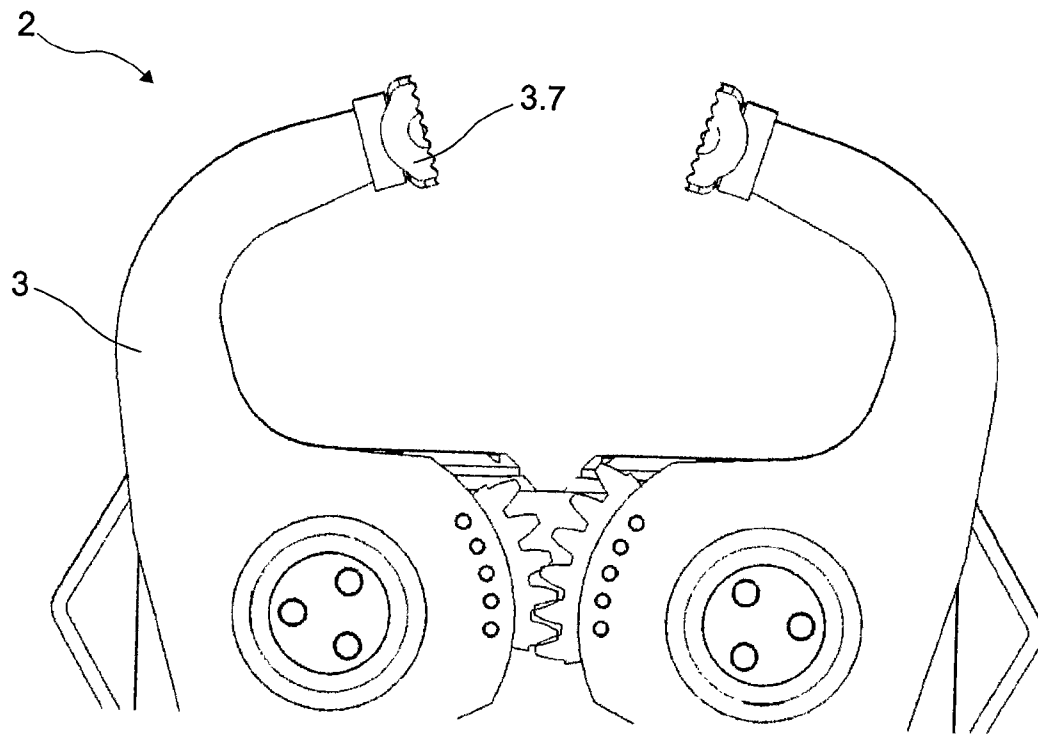


Figure 9



INTERNATIONAL SEARCH REPORT

International application No

PCT/TR2015/000283

A. CLASSIFICATION OF SUBJECT MATTER

INV. E02D7/18 E02D11/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E02D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2 597 204 A1 (P T C [FR]) 29 May 2013 (2013-05-29) the whole document -----	1-21
A	EP 0 496 167 A1 (KENCHO KOBE CO LTD [JP]) 29 July 1992 (1992-07-29) the whole document -----	1-21
A	EP 2 003 252 A1 (INNOVATIVE PILE DRIVING PRODUC [US]) 17 December 2008 (2008-12-17) the whole document -----	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

24 March 2016

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/TR2015/000283

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2597204	A1	29-05-2013	EP 2597204 A1 29-05-2013
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