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(54) **CASING MECHANISM TO FORM CASINGS IN SURFACE DRILLING**

(57) The present invention relates to a casing mechanism, which is included in a drilling rig, to form casings in surface drilling processes and in piles construction, in which one or more portions of tube are driven into the ground, removing the soil and/or other materials from its interior, in order for it to be subsequently filled, preferably with concrete. An advantageous rotation means installed in the drilling rig together with the force directed by the thrust/extraction means towards the ground to be drilled, transferred to the tube to be driven by the displacement structure of the mechanism through the grip piece coupled to it in the drilling rig, allows the casing mechanism to form casings in surface drilling, to achieve a simple and advantageous configuration integrated into said drilling rig.

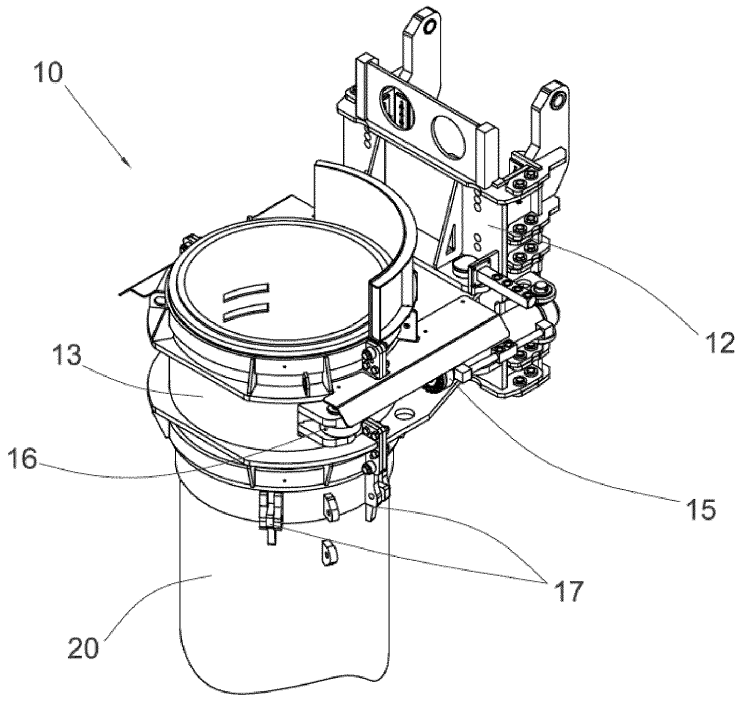

Fig. 2

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Description

[0001] The present invention relates to a casing mechanism, which is included in a drilling rig, to form casings in surface drilling processes and in piles construction, in which one or more portions of tube are driven into the ground, removing the soil and/or other materials from its interior, in order for it to be subsequently filled, preferably with concrete.

Background of the invention

[0002] In the state-of-the-art casing devices included in the same drilling rig are currently known, used for drilling surfaces to create concrete piles, wherein tubes are introduced into the surface to be drilled, forming a casing and removing the soil or material that is inside the jacketing.

[0003] The functioning of the mechanisms known until now is usually based on the driving of a casing tube by a device coupled to the drilling rig, this action being performed by means of a hammering system of the tube from this mechanism, which needs a high force of hammering to nail, and a considerable time for the driving of the casing tube into the ground or surface to be drilled with this tube.

[0004] There are other tube driving systems that make the use of independent devices of the drilling rig necessary, which need a dead weight to be able to perform the driving, with the consequent problem of the costs associated with the purchase-rent of the above-mentioned auxiliary devices and the times and works of installation to perform the driving of the tubes that form the case of the pile, before the drilling.

Description of the invention

[0005] The casing mechanism to form casings in surface drilling described in the present invention enables the aforementioned inconveniences to be solved, presenting other advantages that will be described below.

[0006] This invention is based on a casing mechanism that is installed in the drilling rig itself, in the drilling guide tower, fixed and guided on it, by means of a displacement structure and with push/extraction means that act on said displacement structure.

[0007] This casing mechanism is made up of at least one tube grip piece, with the possibility of having a rotation movement on an axis concentric to that of the tube to be driven into the ground or surface and which is coupled to the displacement structure of the casing mechanism by the guide tower of the drill. This tube grip piece has a dimension that allows the grip of the tube to be driven, as well as, preferably, the passage through it of the auger, thus carrying out, in turn, the guidance of said auger. This grip piece is connected to a rotation means that allow it to execute the rotation in either direction of rotation.

[0008] The tube grip piece to be driven has a means of connection to this tube which has to be inserted in the area to be drilled and thus form the casing of the pile. Thanks to these means of connection, the tube is fixed to the grip piece, making the grip piece and the tube to be driven move in solidarity.

[0009] The rotation means that generate the rotation movement of the grip piece of the tube to be driven perform an alternate movement in each direction of rotation, which creates an oscillating rotary movement in the axis of the tube to be driven.

[0010] This, together with the force directed by the thrust/extraction means towards the ground to be drilled, transferred to the tube to be driven by the displacement structure of the mechanism through the grip piece coupled to it, allows the casing mechanism to form casings in surface drilling, to achieve a simple and advantageous configuration integrated into the drilling rig, and therefore with lower costs and maintenance than the current ones, by effectively driving the tube that has to form the pile casing, with a lower driving time, thanks mainly to the reduction of unproductive time costs, which are minimised thanks to the casing mechanism being able to be moved at the same time as the drilling rig and two different machines not being necessary to act on the same pile, with the consequent times of placement, action and displacement to release the position involved in the systems known until now.

Brief description of the figures

[0011] In order to better understand the description made, a set of drawings has been provided which, schematically and solely by way of non-limiting example, represents a practical case of embodiment.

Figure 1 is an elevational view of the casing mechanism installed in the drilling rig.

Figure 2 is a perspective view of the casing mechanism connected to a tube.

Figure 3 is a plan view of the casing mechanism.

Description of a preferred embodiment

[0012] In the present preferred embodiment of the invention, the casing mechanism (10) to form casings in surface drilling processes is installed in the tower guide (11) of a ground drilling rig, as can be seen in figure 1, to which it is joined via this guide tower (11) by a displacement structure (12), on which some thrust/extraction cylinders (21) act, in order for the corresponding push forces in the driving or extraction to be applied if the casing is to be removed. These thrust/extraction cylinders (21) can be of the pneumatic or hydraulic cylinder type, and are fixed on the guide tower (11) to perform the thrust or extraction pressure onto the moving structure (12).

[0013] This displacement structure (12) includes, as can be seen in figures 2 and 3, a crown (13) or an open ring, as a grip piece of the tube (20) to be driven, through which passes the auger (14) of the guide tower (11) of the drilling rig, where said crown (13) has the capacity to rotate around the axis it forms, having the same axis of rotation as the auger (14), without moving said axis, and therefore the crown (13), from its position with respect to the displacement structure (12).

[0014] The structure (12) has two pneumatic arms (15), formed by two pistons that are connected to each of the two transmission points (16) of the movement of the pneumatic arms (15) to the crown (13). The longitudinal displacement of the piston rod of the pneumatic arm (15) becomes a rotary movement of the crown (13) as the transmission point (16) has an articulation/pivoting system in such a way that the crown (13) rotates without displacing its pivot axis or its position in the displacement structure (12). These pneumatic arms (15) are located on each side of the crown (13).

[0015] The movement of the pneumatic arms (15) is alternating, i.e. when one arm is extended the other arm retracts, creating an oscillating rotation movement of the crown (13) in its axis of rotation.

[0016] The crown (13) has means of fixing (17) a casing tube (20) in its lower part, leaving the axes concentric: that of the crown (13), that of the auger (14) and that of the tube (20). In this way, once the movements between the crown (13) and the tube (20) are joined by this fixation, the oscillatory rotation of the crown (13) will be transferred to the tube (20).

[0017] The casing mechanism (10) with the tube fixed to it is positioned in such a way that the tube comes into contact with the ground to be drilled. As the set is open, and with a free diameter slightly larger than that of the auger (14), it allows the auger (14) to pass through its interior section so that once the casing is performed, the earth can be removed from the casing.

[0018] The oscillatory movement of the pneumatic arms (15) that is transmitted to the tube, allows the tube to be driven in an easier way that involved with the known systems, using the pressure exerted by the thrust/extraction cylinders (21), with the drilling rig during the driving process of the tube (20) being able to be used complementarily like dead weight.

[0019] Although reference has been made to a specific embodiment of the invention, it is clear to a person skilled in the art that the casing mechanism to form casings in surface drilling processes described is susceptible to numerous variations and modifications, and that all the details mentioned can be substituted by others technically equivalent ones, without departing from the scope of protection defined by the attached claims.

Claims

1. Casing mechanism to form casings in surface drilling, which drives a tube into the ground to be drilled to make a casing, **characterised in that** the mechanism (10) is installed in the guide tower (11) of a drilling rig by means of a displacement structure (12), which carries out the fixing and guiding in this guide tower (11), this casing mechanism (10) being formed, at least, by a tube grip piece (13) with the possibility of having a rotation movement on a concentric axis to that of the tube (20) to be driven into the ground or surface, wherein this tube grip piece (13) is coupled to the displacement structure (12) of the casing mechanism (10) by the guide tower (11) of the drilling rig, the means of thrust/extraction (21) acting on this displacement structure (12), the tube grip piece (13) is connected to a rotation means (15,16) that act on it causing this rotation movement in any of the two rotation directions and where the tube grip piece (13) to be driven has means of joining to this tube (20), by which the tube (20) is fixed to the grip piece (13), the rotating movement of this grip piece (13) and the tube (20) to be driven being in solidarity.

2. Casing mechanism to form casings in surface drilling in accordance with claim 1, wherein the rotation means (15,16) that generate the rotation movement of the tube grip piece (13) to be driven, perform an alternate movement in each direction of rotation, which creates an oscillating rotary movement.

3. Casing mechanism to form casings in surface drilling in accordance with claim 2, wherein the rotation means (15,16) are formed by two pneumatic arms (15) that transfer each of the movements of each of the arms (15) to the grip piece (13) in order for this grip piece (13) to be rotated in each direction.

4. Casing mechanism to form casings in surface drilling in accordance with claim 1, wherein the tube grip piece (13) is formed by a crown (13) that has a dimension that allows the auger (14) to pass through it.

5. Casing mechanism to form casings in surface drilling in accordance with claim 1, wherein the thrust/extraction means are formed by pneumatic or hydraulic thrust/extraction cylinders (21) fixed to the guide tower (11) by performing push or extraction pressure on the displacement structure (12).

6. Casing mechanism to form casings in surface drilling according to claims 1 and 2, wherein the thrust/extraction means (21) transmit the weight of the guide tower (11) by means of the displacement structure (12) and the grip piece (13) to transmit greater driving force.

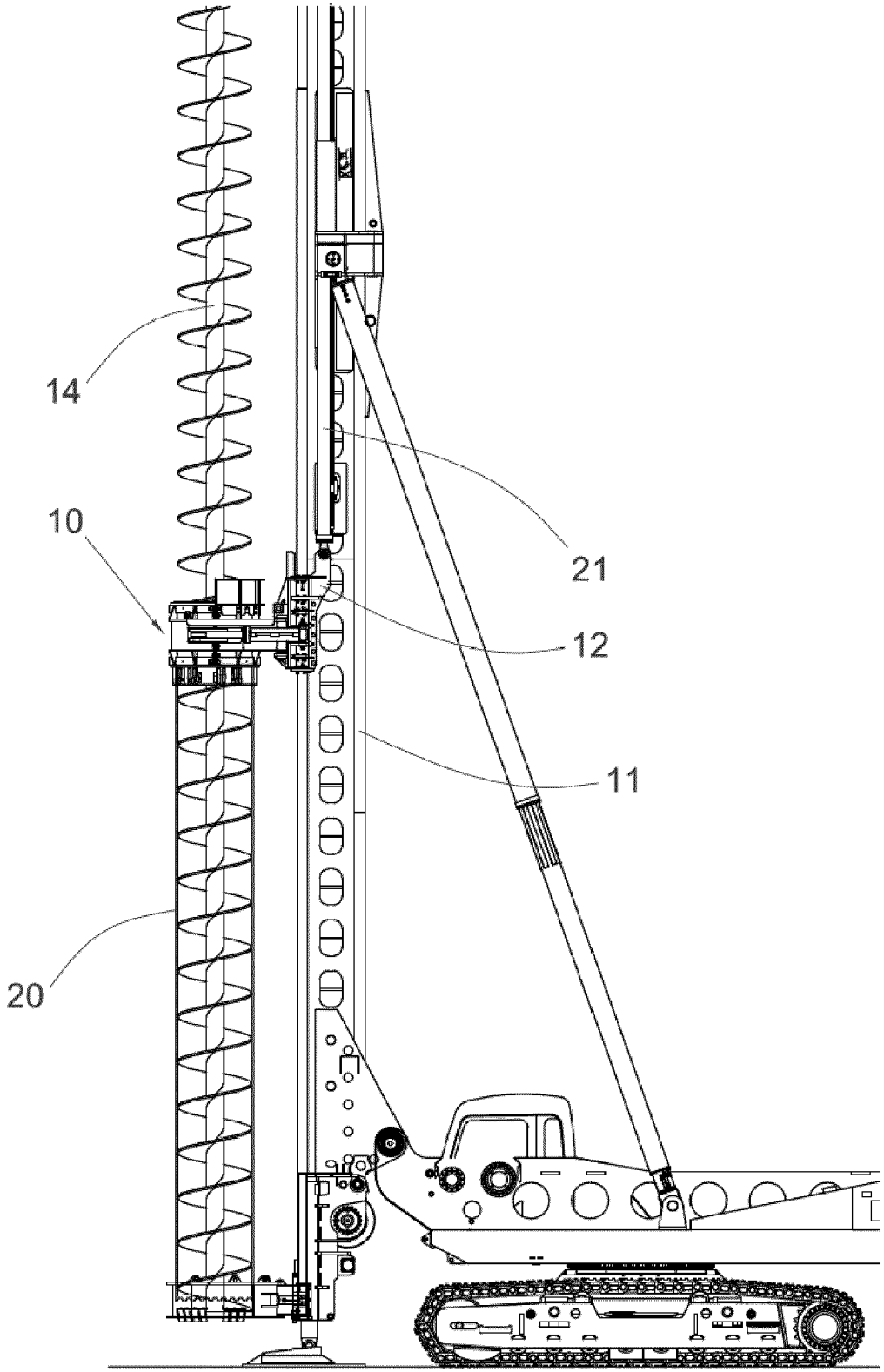

Fig. 1

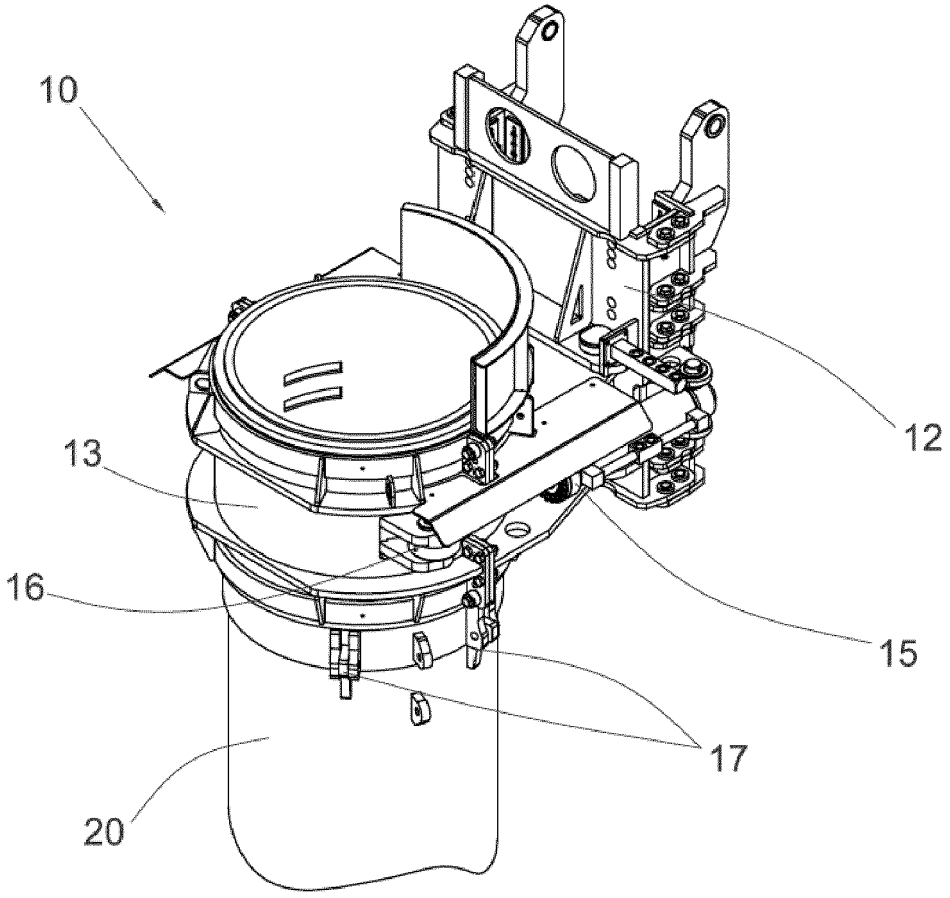

Fig. 2

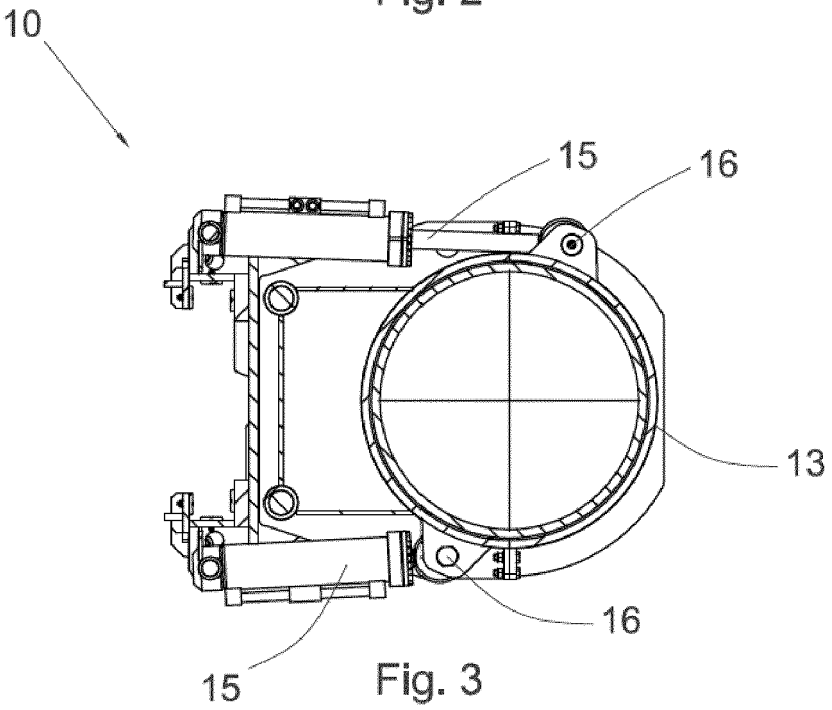

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 9421

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2015/259871 A1 (DITILLO ALESSANDRO [IT] ET AL) 17 September 2015 (2015-09-17) * page 5, paragraph 42 - paragraph 44; figures 1,5,5B * -----	1,2,4-6 3	INV. E21B3/025 E21B19/08
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X	US 2001/009204 A1 (STANSFIELD LEWIS [GB]) 26 July 2001 (2001-07-26) * figure 1 * -----	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 September 2019	Morrish, Susan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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