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(72) Inventor; and

(71) Applicant: **ABDELSHAFY, Ahmed, Bahaei, Mohamed** [EG/EG]; Road 254, building 15A, Degla,Maadi, Cario (EG).

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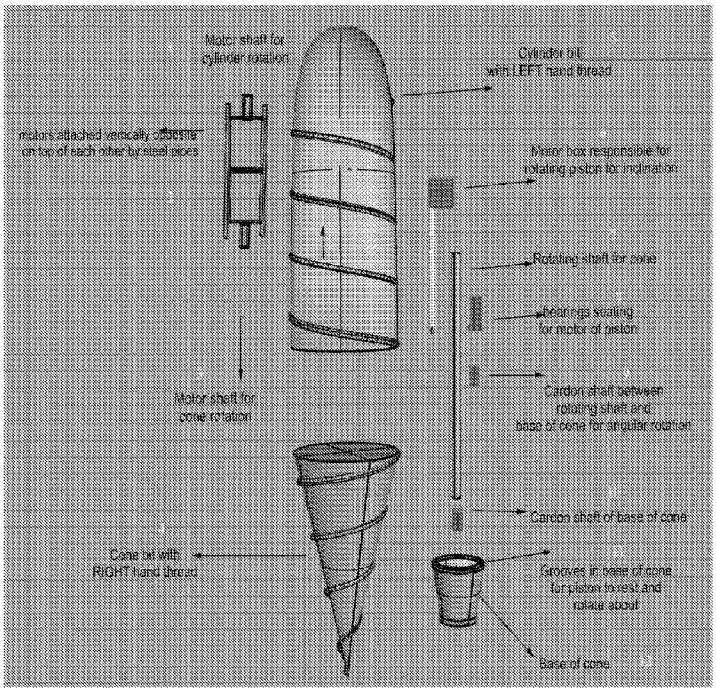
(54) **Title:** AN ADVANCED AUTONOMOUS DRILLING TOOL



(57) **Abstract:** An advanced autonomous drilling tool consisting of a cone and a cylinder(As shown in the figure)helical spiral from the outside, the cylinder is helical from left to right and the cone is helical spiral from right to left. Inside the cylinder are two motors stuck together on bearings opposite each other vertically motor responsible for rotating the cone in the right direction The other is responsible for rotating the cylinder in the left direction. The machine is able to drill wells by itself without using long pipes connected to the drilling rig like what is used now. The helical shape gives depth with rotation and acts as a hook for the machine. The difference in the helical shape between the cylinder and the cone gives torque and counter torque The rotation is caused by the force of the tool in the layers of the earth and the rock layers and friction

[Continued on next page]

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An advanced autonomous drilling tool

Technical field:oil well drilling engineering

Background art:

The equipment currently used in petroleum drilling consists of drill bits and drill pipes, which are a set of drilling pipes with the drill bit attached at the end that breaks through the layers of the earth to reach the target depth through the rotation of the gears on the drill collars equipped with steel teeth. There are openings in the drill bit for the pumping of the drilling fluid used to facilitate the drilling process, which is pumped through those openings, allowing for the removal of the drilling waste from the sand bottom to top. By pumping it through those openings, where the excavation products are raised and removed from the sand and rocks to the top of the ground to avoid blocking the pipes and obstructing the drilling process. After completing the drilling and fracturing of a depth of about twenty or thirty meters, the well to be drilled, a process of connecting several other pipes is performed.sequentially according to the depth to be excavated to increase its length. This delays the drilling process and increases the financial cost, in addition to the fact that the process of drilling oil wells may often require digging in the depths of the earth, which requires other equipment and an increase in spending on the drilling process. In addition to the above, the excavation process needs, in most cases, to fill the void created between the excavation pipes and the layers of earth around theThese pipes are covered with a cement layer to stabilize the soil. All of the above-mentioned operations to complete the drilling of wells, in addition to any other obstacles that may hinder the drilling process, require a lot of effort.Funds, heavy technical equipment, and giant drilling rigsto operate the work of this equipment, as well as electricity generators and the energy required to operate this equipment.

The method currently used in the field of drilling oil wells(As previously referred to in the previous item)You need to use many pipes according to the target depth to reach the layer of soil saturated with oil, in addition to the use of pellet, clay and cement to preserveOn the work that has been accomplished in drilling the well and preventing the collapse of the layers of the earth.

The problems of the prior art can be summarized as follows:
The drilling process takes time and that translates to more money.
Increasing financial spending on the drilling process.

Disclosure of Invention Full description:

Use the entire too (cone and cylinder) to drill wells.

The use of motors to rotate the cone and cylinder opposite to each other with opposite spirals of the tapered helical cone and cylinder to penetrate the layers of the earth and controling the angles of the path of the cone hydraulicallythrougharms inside the cone where it is pushed right or left and in any direction(as shown in the figure).
The tool operates by using motors placed inside the tool above each other facing in opposite direction and rotating each cone and cylinder in opposite directions but moving in same path and the cone is righ handed spiral and cylinder is left handed spiral so they will both move in same path.
And for directional drilling operation, arms inside the tool (as shown in figures) are hydraulically pushed on the base of the cone from the inside at the opposite of the desired angle like the gimbal mechanism.
Inside it there are two motors responsible for the rotation of the cone and the cylinder in the opposite direction, which gives thetool a fixed frame to rotate by rotating the two motors inside the cylinder (each of them is responsible for the rotation of the cylinder and the cone) opposite to each other (as shown in a drawing), which is the basis for the rotation and operation of the entire machine. The rotation of the two motors against each other and the rotation of the cone and the cylinder against each other at the same time gives counter torque to the two motors without a fixed frame (the rig and drill pipes responsible for the torque in the current drilling operation using old methods)(As shown in the diagrams).

Device Components:

The autonomous drilling tool consists of a helical cone, spirally shaped from the outside, rising from right to left. And a cylinder outside of which is a helical spiral rising from left to right. At the top of the cone and inside the cylinder, there are two motors inside it, responsible for rotating the cone and the cylinder in the opposite direction.(As shown in the figure)Connected from the motor above the cone to a shaft inside the cone to rotate the cone. From the inside there is a basic column with a cardan shaft to grant different angles, and from the top of the column there is a small box placed on two bearings, inside which is a motor and gears onball bearings below it to rotate it to the desired angle and then the hydraulic arm attached to the base of the cone is pushed from inside. Like gimbal mechanism

(illustrated in the figure)

Operation method:

As shown before, after digging the first part in the ground(Rat Hall)The too is placed inside the hole and the tool is turned and rotated. With the tool going down into the ground, the hole is closed by means of the BOP, meaning that only the cable connected to the too is visible from the surface of the earth. Then compressed air is pumped through the BOP, and then the drilling process is completed as it is through the cable connected to the surface. This explains the lack of need for any WOB pipes due to the spiral shape of the upward spiral from the outside and with the power of the motors rotating within the layers. And to change the angle of the cone, the hydraulic arm is pushed to the desired angle, and with the presence of the cardan shaft, the cone is turned or its angle is changed, like gimbal mechanism

The entire system is suspended by cable from the top of the design to the crown block in the rig.
To stabilize the cone and cylinder and ensure the rotation of the cone and the cylindernot the motors inside the cylinder and cone The cylinder is at the top of the cone in the form of a helical right hand spiral, cylinder of the same diameter(As shown in the figure)with left hand spiral, but moving in the same direction as they also rotate oppositely and the use of two motors inside the cylinder, one responsible for the rotation of the cone in one direction and the other motor responsible for the rotation of the cylinder in the other direction to stabilize the cone and the cylinder within the path

of the spiral resulting from the rotation of the cone, but in the opposite direction.
The rotation of the cone and the cylinder is opposite to each other, but in the same path.
Both motors act as fixed frames for each other that ensures the rotation of the entire tool.
This gives the cone drive a stable frame ensuring that the cone rotates and drills instead of the motor rotates and the cone is stationary and also for the cylinder motor and the cylinder itself.

The two motors are positioned opposite each other verticallyAnd each motor rotates a cone and a cylinder opposite each other, which means that the rotation of the two motors is reversed afterGives an opposite torque to the other. (anti-torque)

The method of drilling the machine eliminates the presence of cracking residues because there are no spaces between the cone and the cylinder and between the ground, which means that the rocks will be cut and grinded without the presence of cracking residues resulting from drilling; No drilling

residue Proven use of compressed air to combat ground pressure(formation pressure)

using a cone in drilling by cutting and compressing the rocks awayand the expansion of the well eliminates the presence of fracturing rocks that must be removed. With the clarification of the absence of cracking residues, it is possible to pump compressed air through the BOP from the top to counter the pressure resulting from the layers of the earth, with the safety of the drilling process and the completion of (formation pressure).

New in the matter of the invention:

The novelty in the matter of the invention is summarized in the development of the concept and method of oil well drilling operations, as follows:

Replacing Drill Pipes and Bits to My design which is an autonomous drilling tool (as shown in the figure)And when it is turned on, the process of digging in the layers of the earth takes place without the need for pipes and bits, i.e. this cone will cut and grind the layers of the earth without the need for operationscracking. This cone can be operated at different angles by controlling its path that entered the layers of the earth.

Exploitation method:

The development of oil well drilling operations using the autonomous drilling tool leads to the following:

. Save time in drilling operations.
. Reducing the cost of spending on drilling operation:

Brief description of the drawing:

1/3:

Shows a detailed and explosive form of a machineFully engraved:

1: Cylinder drive shaft
2:The two motors above each other as shown, connected with steel bolts to tighten them together,
3: Two motors on top of each other, both in opposite directions

4: Cone drive shaft

5: A helical cone, spirally shaped from the outside, right handed spiral

6: A helical cylinder, spiral from the outside left handed spiral

7: A small motor responsible for rotating the pistonhydraulic for direction drilling.

8: Cone shaft connected to the motor shaft

9: The bearing of the hydraulic press motor

10:Cardan shaft start: separates the motor shaft from the cone for rotational angles.

11: The end of the cardan shaft is inside the base of the cone

12:Grooves at the base of the cone to which the hydraulic piston is attached:

13: the base of the cone

2/3:

Shows the complete shape of the autonomous drilling toolfrom outside.

3/3:

Explains the rotation of the cone and its motor responsible for the rotation, the rotation of the cylinder and its motor, and how to generate torque for rotation and the operation of the entire tool resulting from the force of the reaction of the motors together(anti-torque) opposite to each other.

1. direction of rotation of the cylinder
2. Reverse direction of rotation on the motor resulting from the rotation of the cylinder
3. direction of rotation of the cone
4. Reverse direction of rotation on the motor caused by the rotation of the cone

Claims:

The first element: The autonomous drilling tool consists of a helical cone rising from right to left and a cylinder with a helical shape outside ascending from the left to the right above the cone, inside it there are two motors responsible for rotating the cone and the cylinder in the opposite direction;

Reverse rotation provides counter torque to each of the motors giving cone and cylinder fixed points and torqueto rotate and drill.

The second element : As in the first element, the shape of the outer cone in the form of spiral rising from right to left to give depth with the rotation within the layers of the earth and the shape of the outer cylinder spiral rising from left to right.It gives torque and fixed frame and anti-torque for the tool to rotate about and stability to the motors and helps in the grinding process.

The third element: As in the first element, inside the cone there is a primary shaft connected to the tool at the end by a cardan shaft to allow free angle rotation and to transfer rotation in different angles.

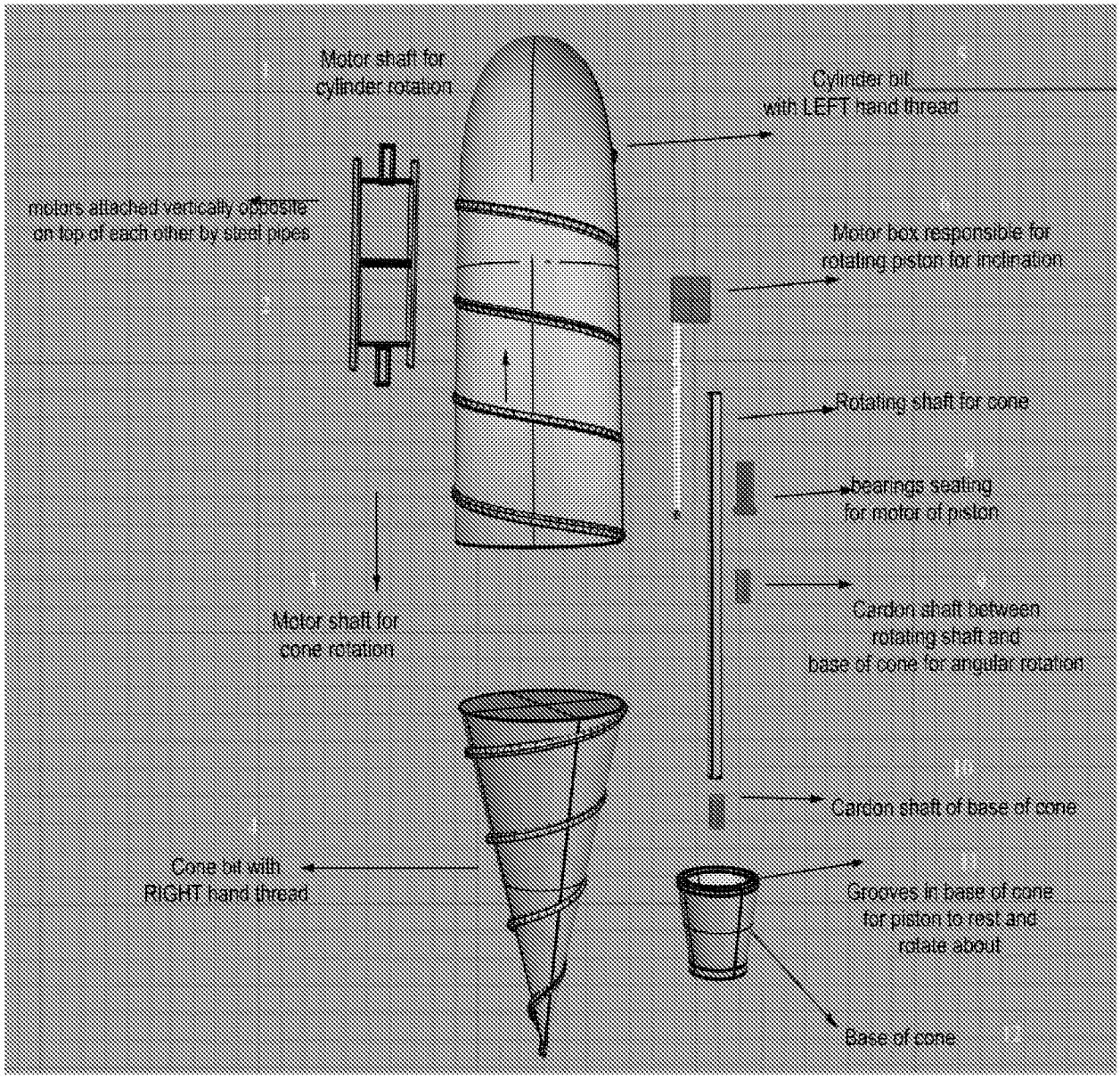
Fourth element: As in the first element, inside the cone there is a base welded inside the cone connected to the cardan shaft to rotate the cone

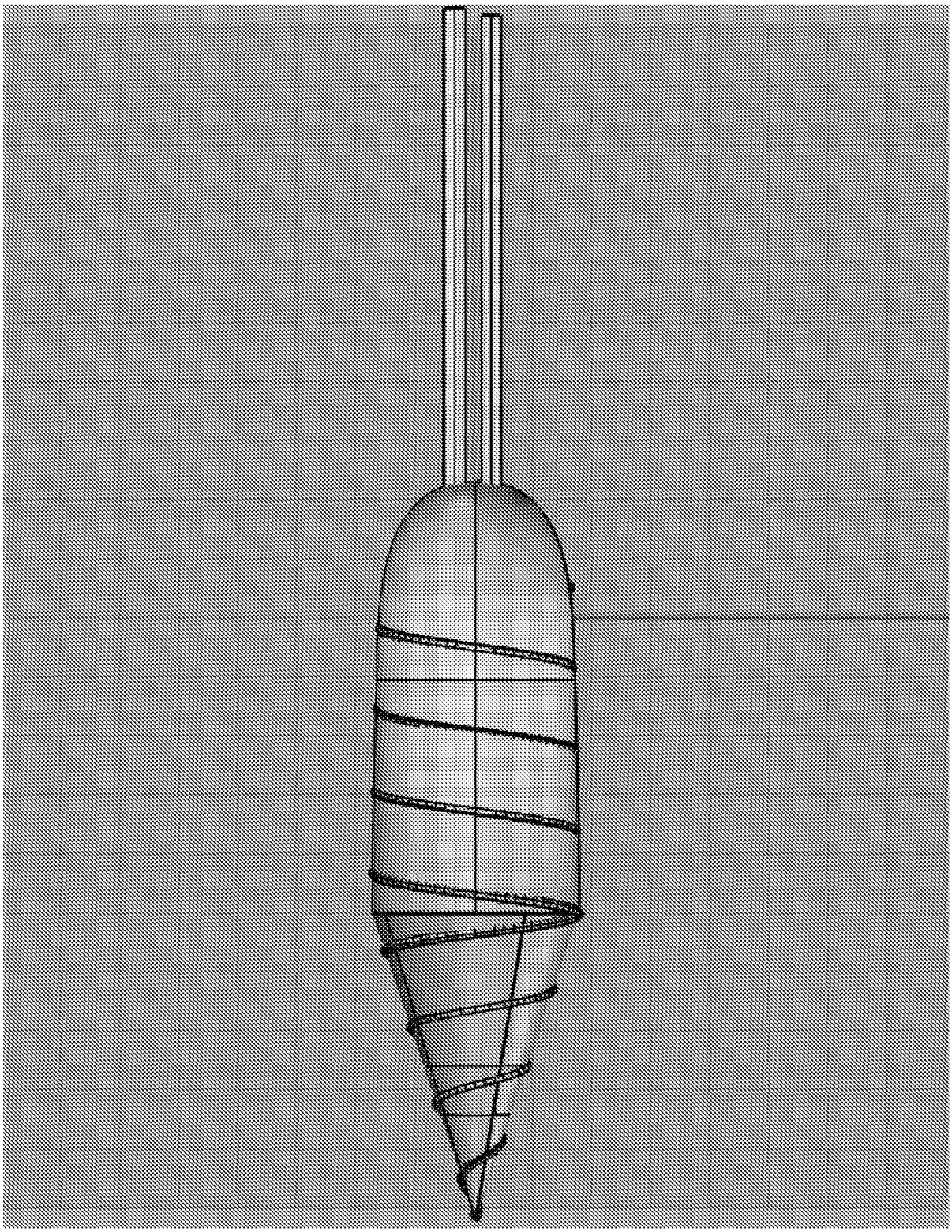
Fifth element:As in the first element, inside the cone there is a small box on a bearing with a motor responsible for rotating the hydraulic shaft (gimbal mechanism used)

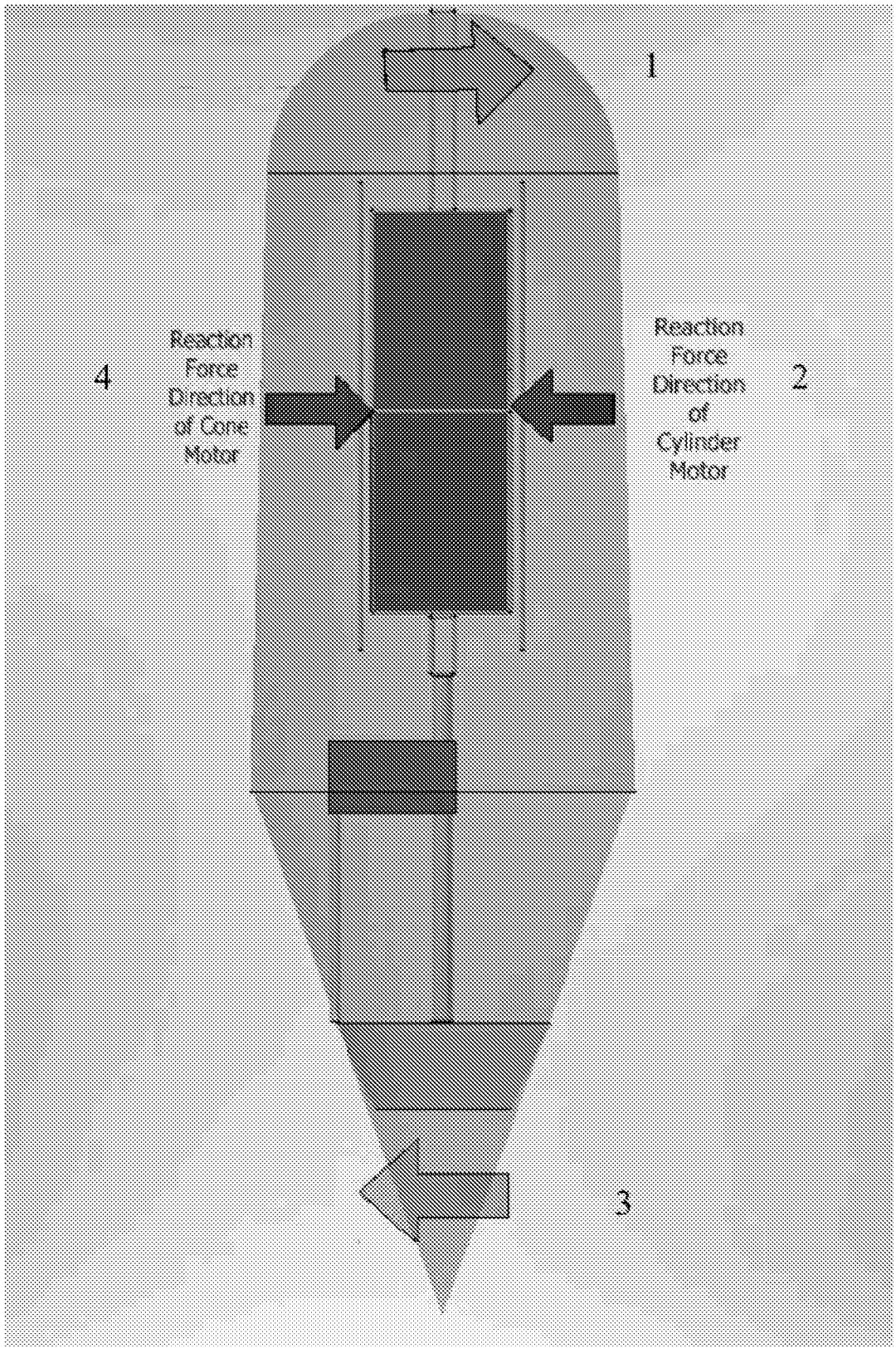
Sixth element: as in the first element, inside the cone are two gears, one on the main shaft and one inside the box,the gear on the bearing gives the gear inside the box to rotate around the main shaft for direction drilling angle

The seventh element: As in the first element, inside the cone there is a hydraulic shaft connected to the small box to push the welded basewith the angle-giving cone.

The eighth element: As in the first element, two motors are placed oppositely above each other to rotate the cone and the cylinder in opposite directions in order to give anti-torque to ensure the rotation and drilling


Motor shaft for cylinder rotation
Cylinder bit with LEFT hand thread
motors attached vertically opposite on top of each other by steel pipes
Motor box responsible for rotating piston for inclination
Rotating shaft for cone
bearings seating for motor of piston
Motor shaft for cone rotation
Cardon shaft between rotating shaft and base of cone for angular rotation
Cardon shaft of base of cone
Cone bit with RIGHT hand thread
Grooves in base of cone for piston to rest and rotate about
Base of cone




1
4
Reaction Force Direction of Cone Motor
Reaction Force Direction of Cylinder Motor
2
3