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(72) Inventor: **Chan, Yao-Pang**
Yongjing Township
Changhua County 512 (TW)

(74) Representative: **Reinhardt, Harry et al**
Reinhardt & Pohlmann Partnerschaft,
Grünstrasse 1
75172 Pforzheim (DE)

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(71) Applicant: **Chan, Yao-Pang**
Yongjing Township
Changhua County 512 (TW)

(54) **Drilling machine**

(57) A drilling machine comprises a power motor unit (3) coupled with a spiral rod (2) and a drill bit shaft (1) and assembled in a mounting frame using a positioning disc. The arbor of power motor mounted on the mounting frame directly drives the drill bit shaft. The spiral rod is disposed at the periphery of the drill bit shaft. A plurality of cutters (12) are arranged between drill bit and spiral rod at the outer perimeter of the drill bit with a hollow guide notch above the cutters. The spiral rod (2) is mounted in the positioning disc (21) and engage a plurality of planet gears (23). When the arbor of power motor turns, it directly drives the drill bit shaft, drives the fast turning of the drive gear at the periphery of the drill bit shaft, resulting in different turning speeds with the drill bit shaft turning slowly and the spiral rod turning fast.

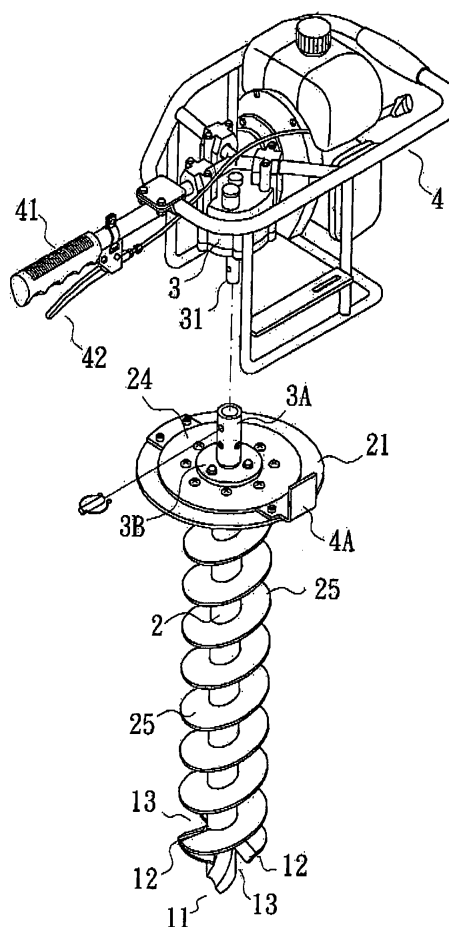


FIG. 3-A

Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present structure relates to a drilling machine that operates through a power motor unit in a mounting frame to produce varying turning speeds for the rotary rod and the drill bit shaft to allow smooth drilling in one try. In addition, through the turning of rotary rod, drilled materials are continuously and rapidly brought to the surface through a guide notch to achieve smooth drilling in different occasions while easing the burden on the hands of operator.

DESCRIPTION OF THE RELATED ART

[0002] Currently drilling in soil runs into a problem where the driller would continuously and automatically bore downward as the machine is pulled down by gravity. Although the drill bit is able to bore a hole and there are grooves around the bit to remove the drilled soil, the drill bit often gets stuck as it bores down further for the speed of soil removal cannot catch up with the drilling speed. Moreover, as the soil itself is loose and soft, the soil adjacent to the hole bored tends to cave into the hole and "envelop" the drill bit, making it more likely to get stuck. For the same reason that the chip removal speed cannot stay up with the drilling speed, the same problem occurs when drilling in wood, cement, metal or other materials that the deeper the drill bit goes, the more difficult it becomes to remove the chips produced. As the drill bit does the drilling and constantly rubs with the chips that are not removed in time, the drill bit not only gets stuck easily, it is also subject to severe wear and tear, which is far from being ideal. Thus this invention is proposed.

SUMMARY OF THE INVENTION

[0003] The primary object of the present invention is to provide a drilling machine comprising a power motor unit coupled with a spiral rod and a drill bit shaft assembled in a mounting frame using a positioning disc. The arbor of power motor directly drives the drill bit shaft. A plurality of cutters and a hollow guide notch above the cutters are arranged at the outer perimeter of the drill bit of drill bit shaft. The spiral rod at the periphery of drill bit shaft matches and engages a plurality of planet gears through a drive gear, which are then assembled into one body by two rotating discs. As such, when the arbor of power motor turns, it directly drives the drill bit shaft, and at the same time, drives the fast turning of drive gear at the periphery of drill bit shaft. Thus when drilling a hole, the center tip of drill bit first aligns in position and then drills downward to guide the peripherally arranged cutters to perform rotary cutting and drilling, thereby achieving smooth drilling and easing the burden on the hands of

operator.

[0004] Another object of the present invention is to provide a drilling machine, wherein the top of the spiral rod is mounted in the positioning disk through a drive gear and engage a plurality of planet gears, which are then assembled into one body between two rotating discs. As such, when the arbor of power motor turns, it directly drives the drill bit shaft, as well as the turning of connecting plate and rotating disc, which causes the plurality of planet gears positioned between two rotating discs to travel along the inner annular gear of positioning disc and leads to the fast turning of drive gear at the periphery of drill bit shaft, thereby resulting in slow turning of drill bit shaft and fast turning of spiral rod.

[0005] Yet another object of the present invention is to provide a drilling machine, wherein when drilling a hole at a predetermined position, the spiral rod with turning speed faster than the drill bit would continuously and rapidly remove chips from the cutting to surface through the guide notch and spiral blades. As such, it is less likely for the drill bit to get stuck or sustain serious wear as in prior art. The burden on the hands of the operator also becomes less, which are prone to injury from continuous vibration.

[0006] A further object of the present invention is to provide a drilling machine, wherein the drill bit can be changed in light of the material to be drilled when it is applied to drilling farm soil, civil work, cement, steel plate, mining or geological survey.

[0007] Yet another further object of the present invention is to provide a drilling machine, wherein the number of teeth of planet gears situated between two rotating discs and travelling along the internal annular gear of positioning disc can be adjusted in view of the worksite condition. As such, the drive gears arranged at the periphery of drill bit shaft can have different turning speeds for cutting and drilling.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is an exploded view of the invention.

FIG. 2 is a perspective view of the invention after assembly.

FIG. 3A is a perspective view of the invention after assembly in a mounting frame (1).

FIG. 3B is a perspective view of the invention after assembly in a mounting frame (2).

FIG. 4-A is a partial cut-away view of the invention (1).

FIG. 4-B is a partial cut-away view of the invention (2).

FIG. 5A is a diagram showing the operation of the invention coupled with accessory equipment (1).

FIG. 5B is a diagram showing the operation of the invention coupled with accessory equipment (2).

FIG. 6A shows an embodiment of the invention (1).

FIG. 6B shows an embodiment of the invention (2).
 FIG. 6C shows an embodiment of the invention (3).
 FIG. 7 shows another embodiment of the invention (2).
 FIG. 8 shows another embodiment of the invention (3).
 FIG. 9 shows another embodiment of the invention (4).

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] Referring to FIG. 1, FIG. 2, FIG. 3A and FIG. 3B, the drilling machine of the invention comprises a power motor unit 3 coupled with a spiral rod 2 and a drill bit shaft 1 with different turning speeds, which are assembled in a mounting frame 4, the mounting frame 4 being assembled with a handle 41 for holding by both hands of the operator and a linear switch 42. The arbor 31 of power motor 3 in the mounting frame 4 is directly coupled to the drill bit shaft 1 through a sleeve 3A and a connecting plate 3B. A spiral rod 2 is arranged at the periphery of drill bit shaft 1. Between the drill bit 11 and spiral rod 2 at the periphery of drill bit 11, there are provided a plurality of cutters 12 and a hollow guide notch 13 above the cutters 12. At the top of spiral rod 2, a drive gear 22 is situated in a positioning disc 21 and match a plurality of planet gears, the outer periphery of respective planet gear 23 engaging the internal annular gears of positioning disc 21, while its inside engaging the drive gear 22 on spiral rod 2, which are assembled into one body between two external rotating discs 24. The entire positioning disc 21 is then mounted in the mounting frame 4 through connecting bracket 4A. As such, when the arbor 31 of power unit 3 rotates, it directly drives the turning of drill bit shaft 1 as the arbor is directly coupled to the drill bit shaft 1 through the sleeve 3 and connecting plate 3B (as shown in FIG. 4-A). At this time, because the arbor 31 of power motor 3 drives the turning of connecting plate 3B and rotating discs 24, the plurality of planet gears 23 situated between two rotating discs 24 travel along the inner annular teeth 211 of positioning disc 21 (as shown in FIG. 4-B), which in turn drives the turning of drive gear 22 situated at the periphery of drill bit shaft 1. Even under the design where the teeth of both drive gear 22 and planet gear 23 are less than the teeth of inner gear 211 of positioning disc 21, it leads to the faster turning of spiral rod 2 attached to and situated under the drive gear 22. As such, it results in different turning speeds with drill bit shaft 1 turning slower than spiral rod 2.

[0010] When boring a hole in soil (as shown in FIGS. 6A, 6B and 6C) with the invention held in hands or using an accessory equipment (as shown in FIGS. 5A, 5B and 5C), align the center tip 111 of drill bit 11 of the drill bit shaft 1 in position and drill downward. In turn, it will guide the peripherally arranged cutters 12 to perform rotary cutting and boring. Because the cutting diameter of cutters 12 is bigger than the working diameter of center tip 111,

while the outer diameter of rotary blade 25 is bigger than the rotary cut diameter of cutters 12, the soil A1 bored during the drilling will be continuously and rapidly brought out of hole A2 through a guide groove 112 and the guide notch 13 above the cutter 12 under the action of rotary blade 25 turning faster than the drill bit 11. As such, it is less likely for the drill bit to get stuck or sustain serious wear as in prior art. The burden on the hands of the operator also becomes less, which are prone to injury from continuous vibration.

[0011] The drill bit 11 can be changed in view of the material to be drilled, such as soil A, wood B (as in FIG. 7), cement C (as in FIG. 8), or metal when it is applied to drilling farm soil, civil work, cement, steel plate, or even mining or geological survey (as shown in FIG. 9). Also in view of the occasion, the matching ratio between the teeth of planet gears 23 and the teeth of drive gear 22 disposed at the periphery of drill bit shaft 1 may be adjusted to produce different turning speeds for the drive gear and make the drilling process smoother.

Claims

1. A drilling machine comprising a power motor unit coupled with a spiral rod and a drill bit shaft and assembled in a mounting frame using a positioning disc, the arbor of power motor directly driving the drill bit shaft, a plurality of cutters being arranged at the outer perimeter of the drill bit of the drill bit shaft and having a hollow guide notch above, the spiral rod at the periphery of the drill bit shaft matching and engaging a drive gear and a plurality of planet gears in the positioning disc and being assembled into one body between two rotating discs, such that when the arbor of power motor turns, it directly drives the drill bit shaft, and at the same time, drives the fast turning of drive gear at the periphery of the drill bit shaft; when drilling a hole, the downward drilling of center tip of the drill bit in turn guides the peripherally arranged cutters to perform rotary cutting and drilling, thereby achieving smooth drilling while easing the burden on the hands of operator.
2. A drilling machine as claimed in claim 1, wherein the spiral rod is positioned in the positioning disc through a drive gear at its top and engages a plurality of planet gears, which are assembled into one body between two outer rotating discs, such that when the arbor of power motor turns, it directly drives the drill bit shaft, and at the same time, drives the turning of a connecting plate and the rotating discs such that the plurality of planet gears between two rotating discs would travel along the inner annular gear of the positioning disc, leading to the fast turning of the drive gear at the periphery of the drill bit shaft and resulting in different turning speeds with the drill bit shaft turning slower than the spiral rod.

3. A drilling machine as claimed in claim 1, wherein when drilling a hole at a predetermined position, under the action of spiral rod turning faster than drill bit, the material drilled is continuously and rapidly brought out of a hole through the rotary blades without being stuck or seriously wearing the drill bit, thereby achieving smooth and fast drilling, while easing the burden on the hands of operators which are prone to injury from continuous vibration.
4. A drilling machine as claimed in claim 1, wherein the drill bit is made of different materials in view of the drilling occasion for applications to drilling farm soil, civil work, cement, steel plate, mining or geological survey.
5. A drilling machine as claimed in claim 1, wherein the number of teeth of planet gears traveling along the inner annular gear of positioning disc situated between two rotating discs can be adjusted such that the drive gear at the periphery of the drill bit shaft can work under varying turning speeds in cutting and drilling.

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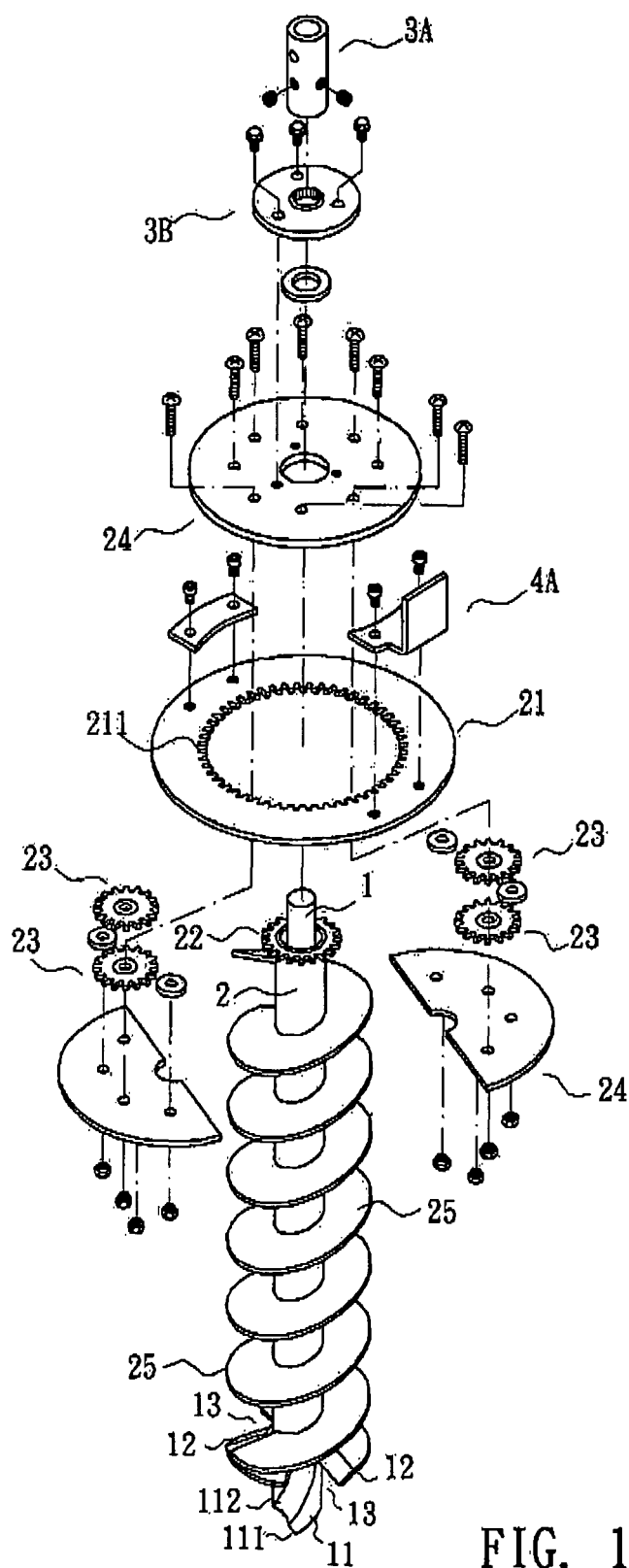
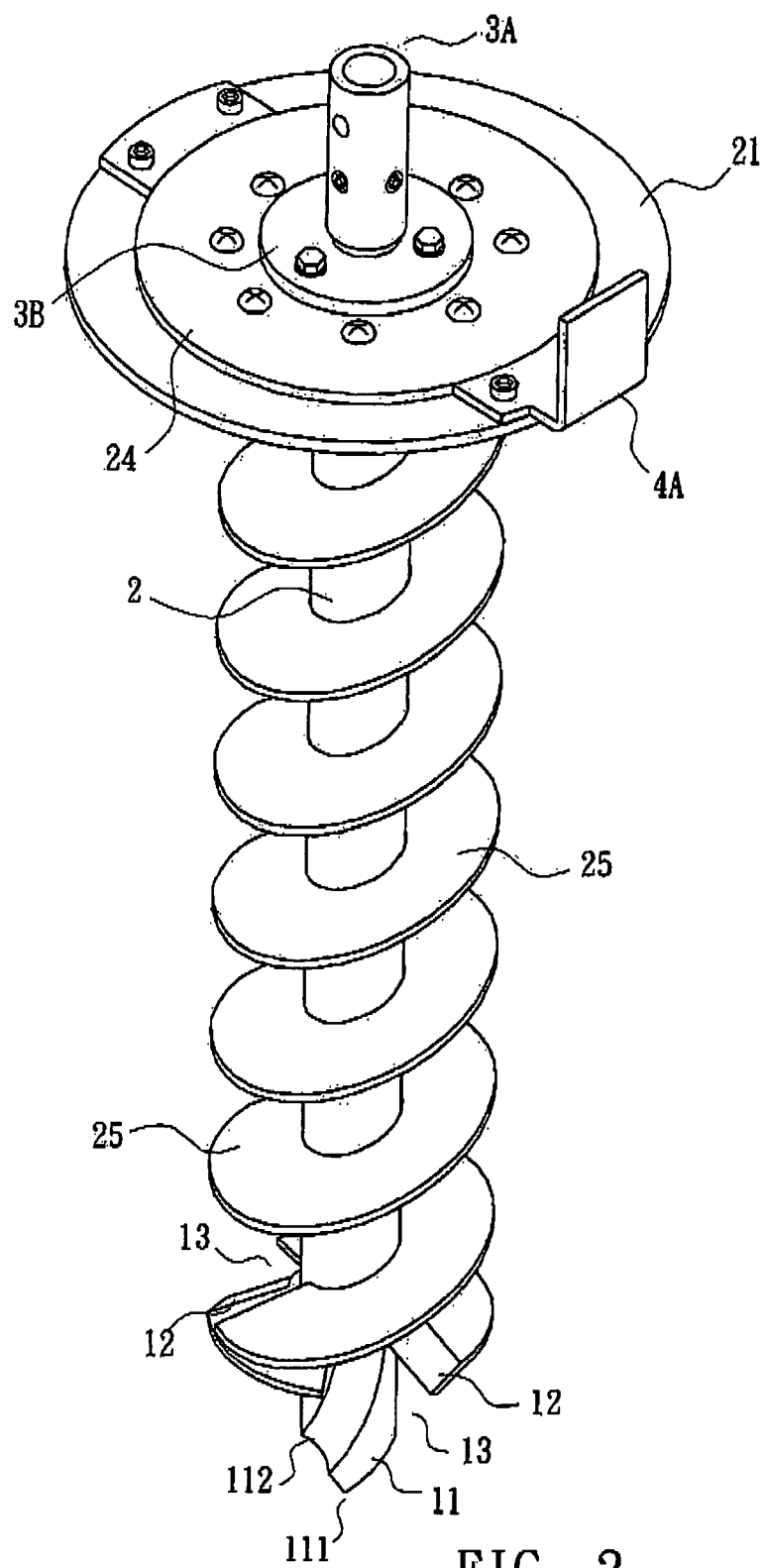


FIG. 1



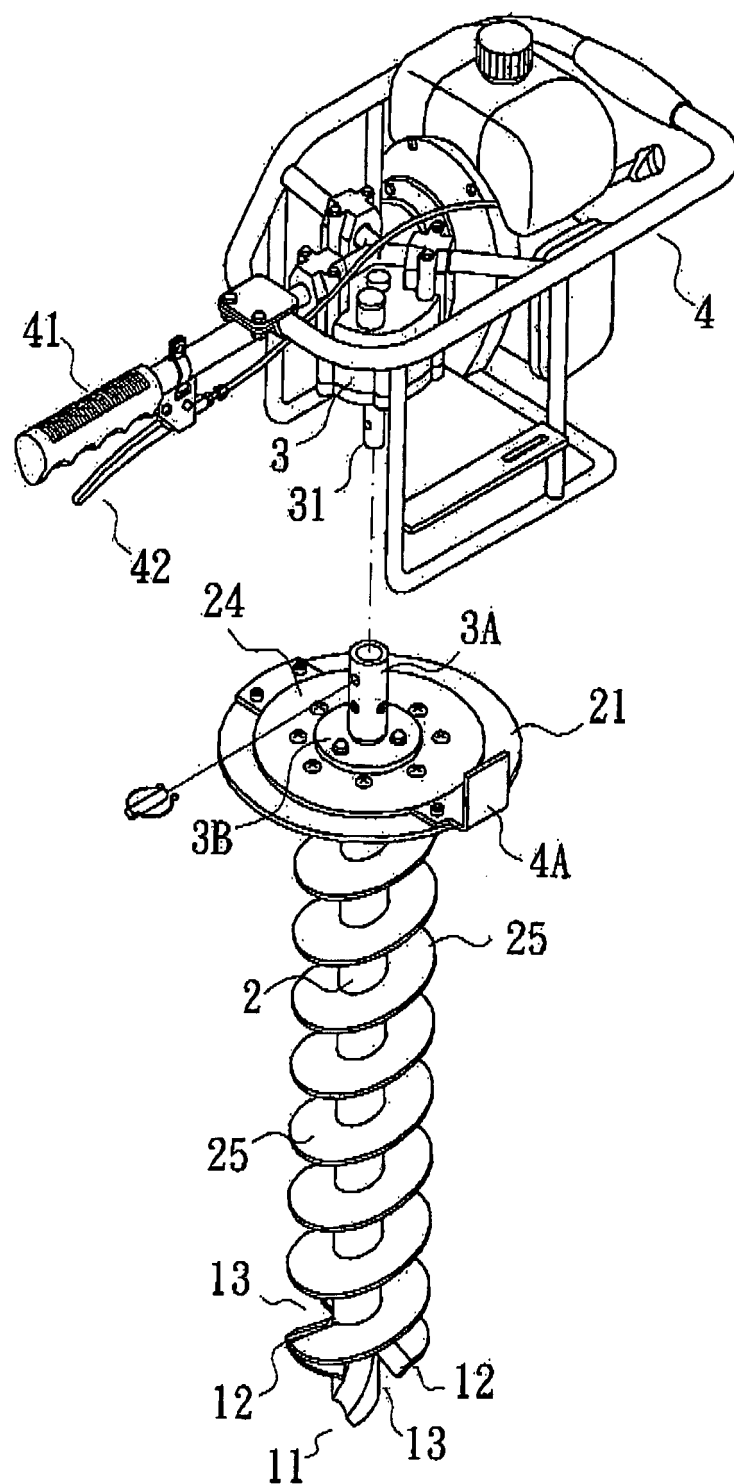


FIG. 3-A

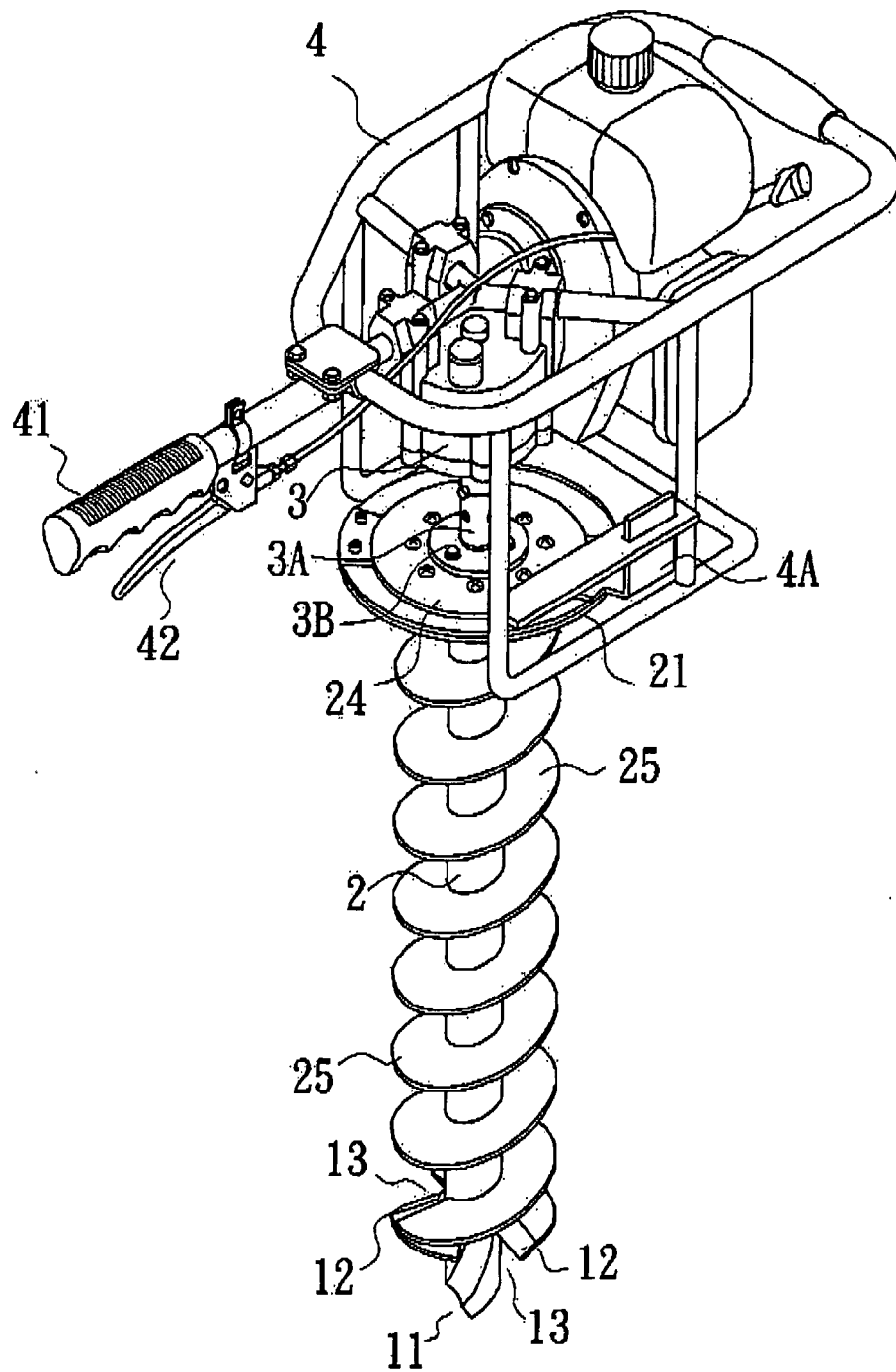


FIG. 3-B

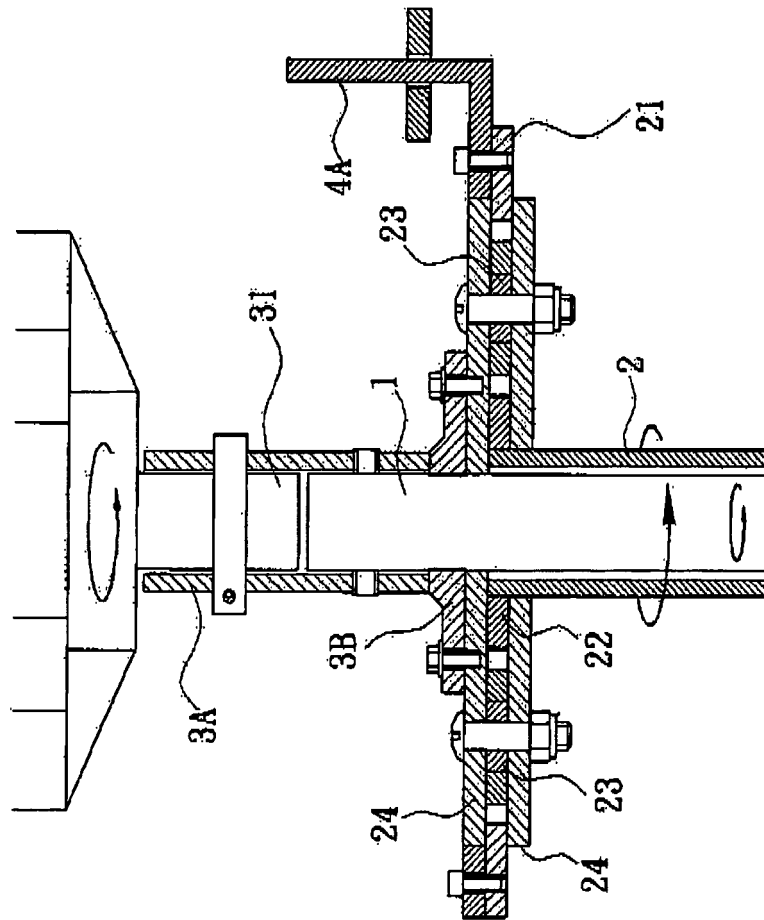


FIG. 4-A

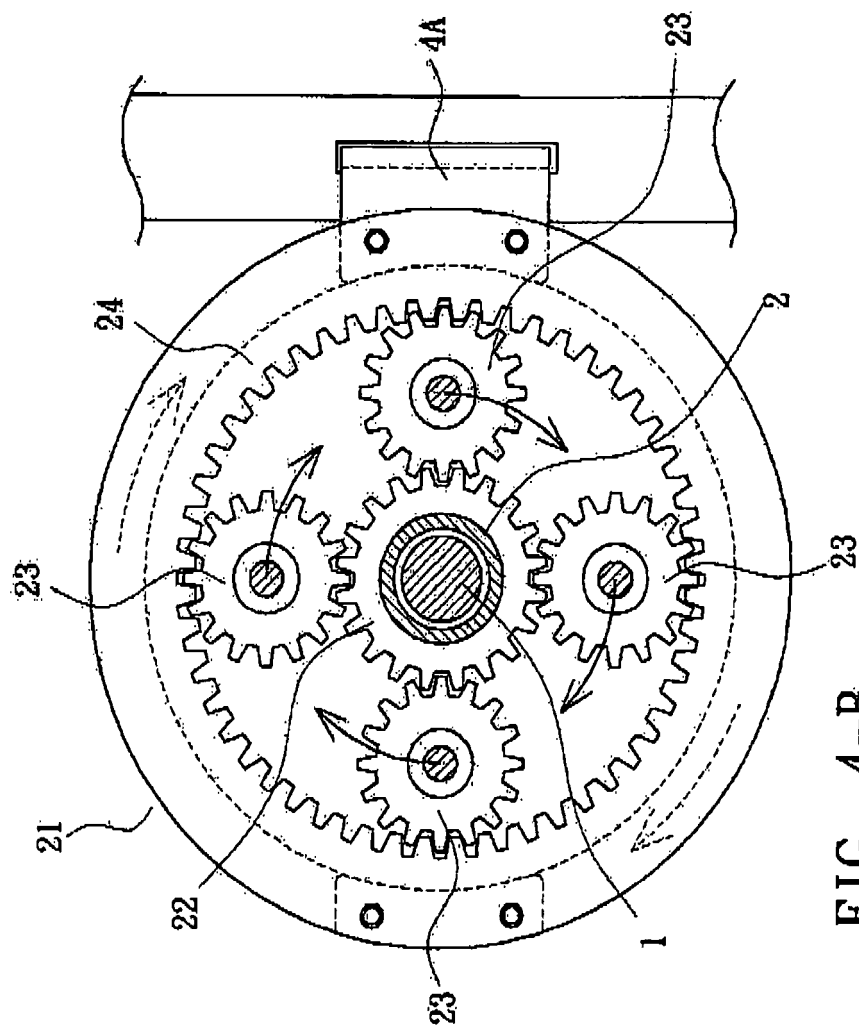


FIG. 4-B

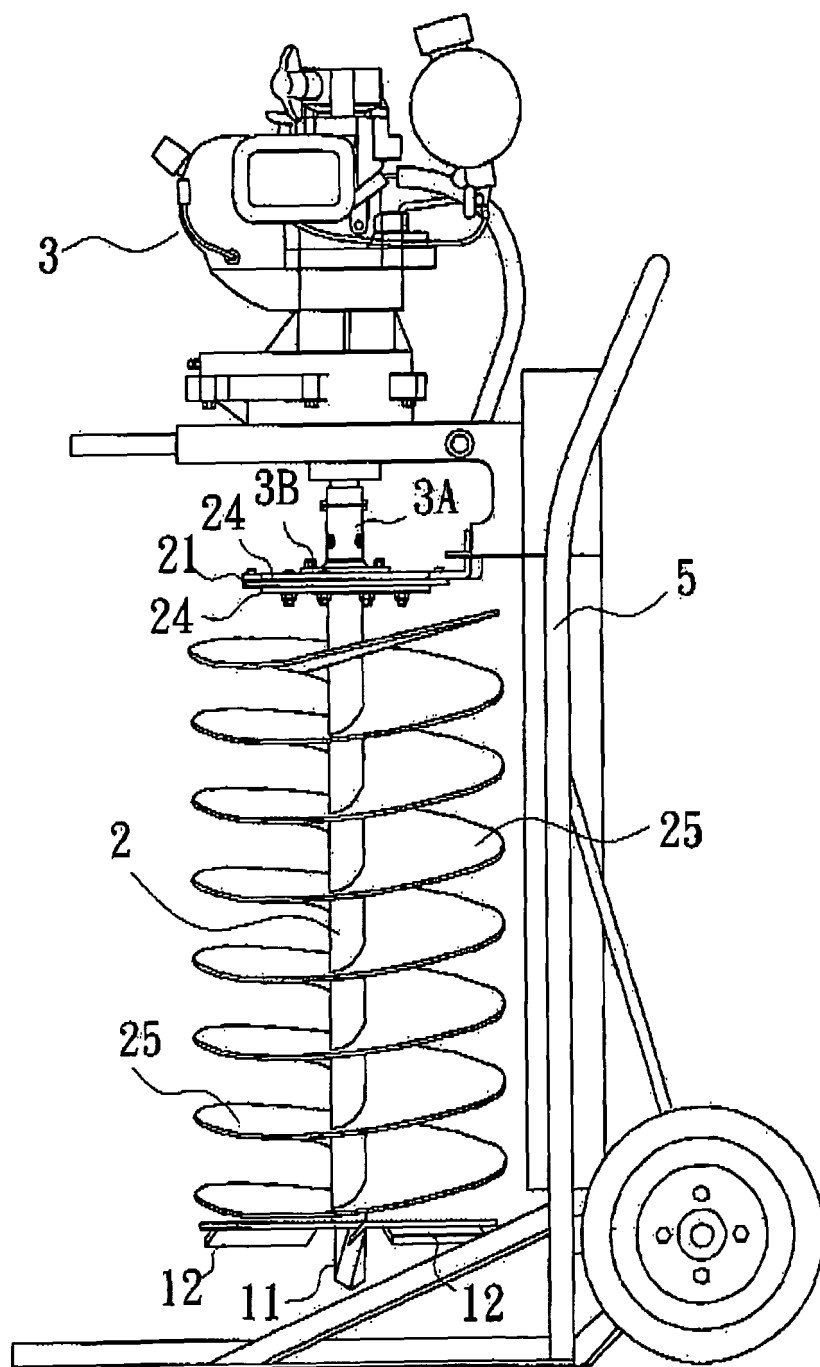


FIG. 5-A

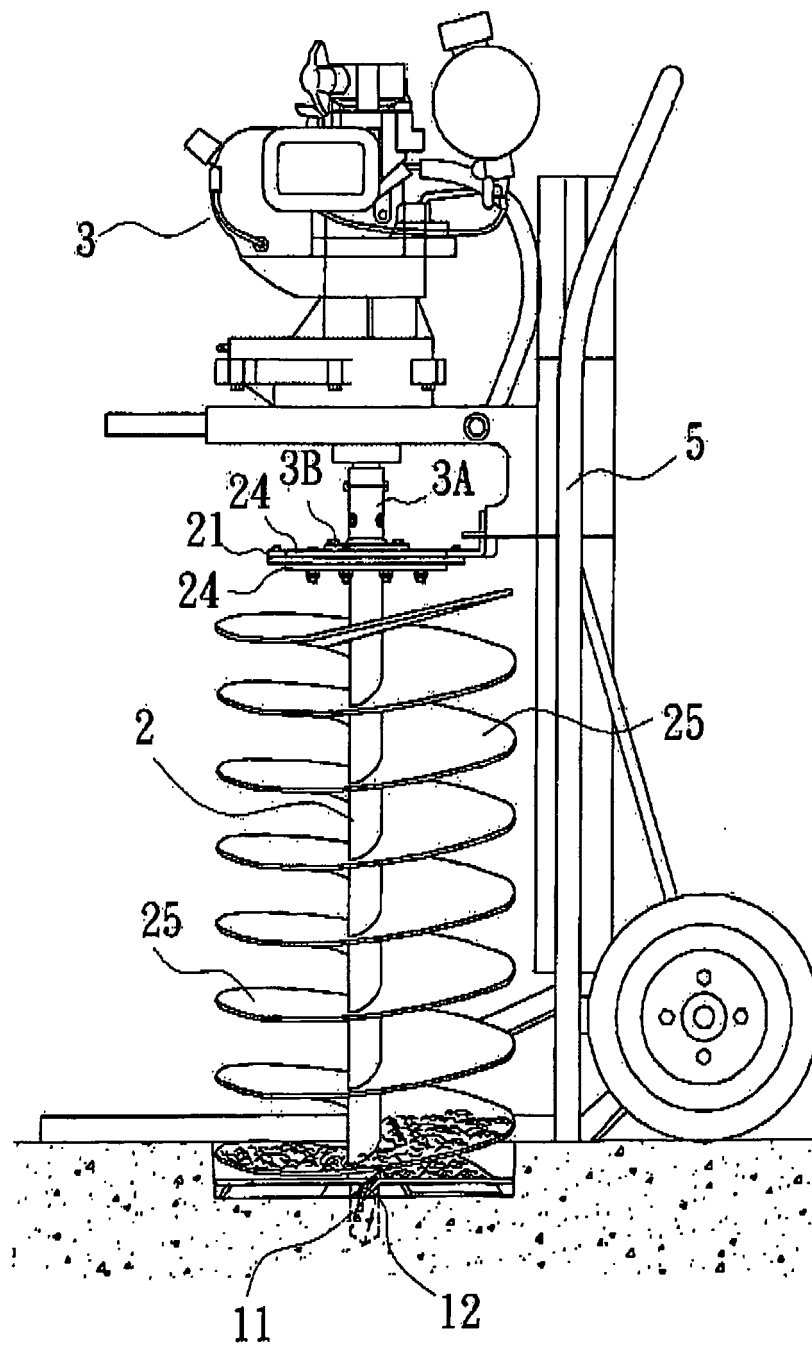


FIG. 5-B

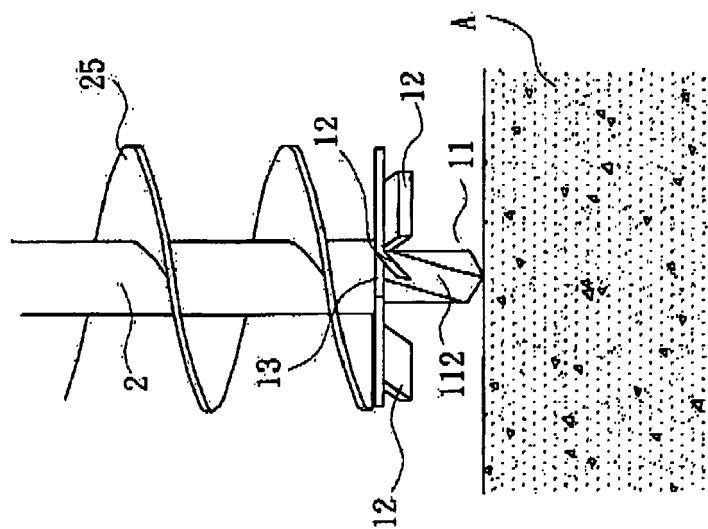


FIG. 6-A

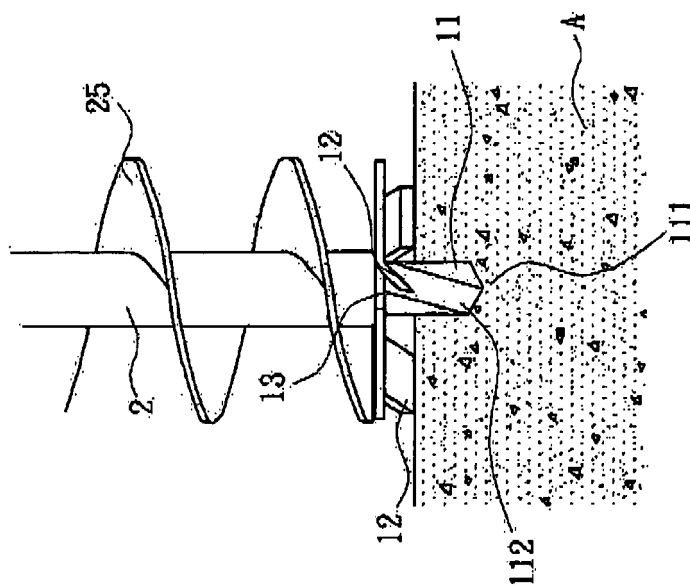


FIG. 6-B

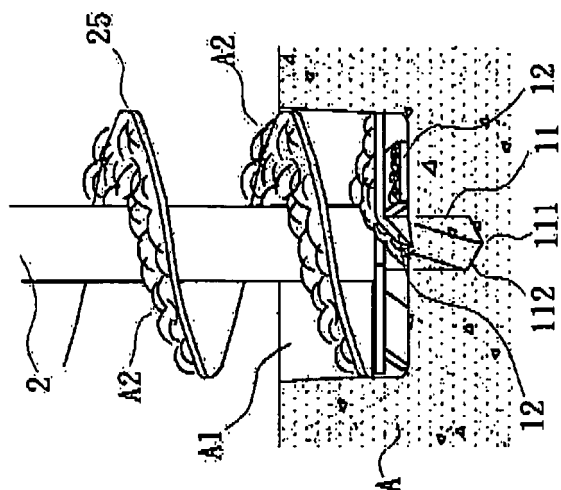


FIG. 6-C

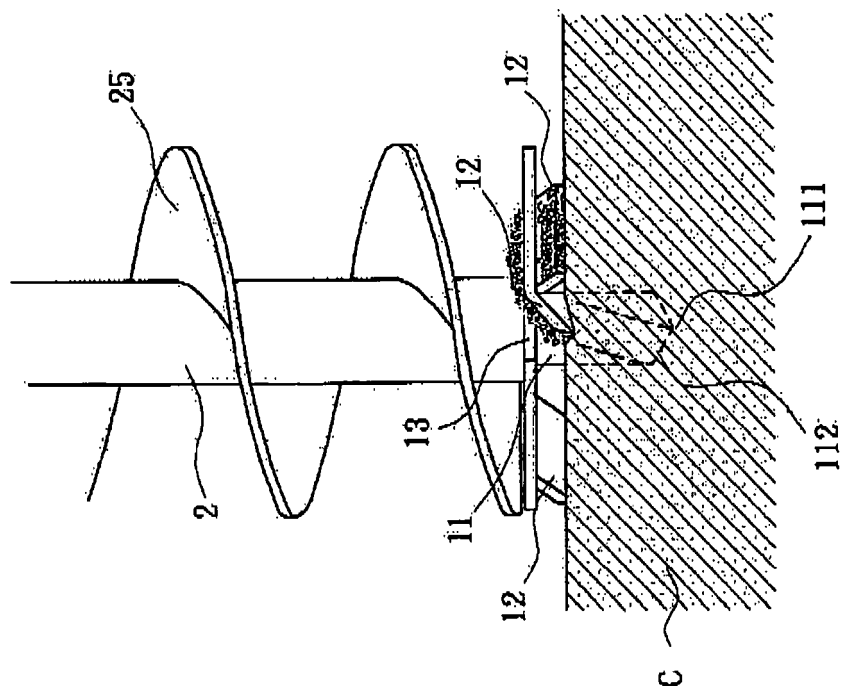


FIG. 8

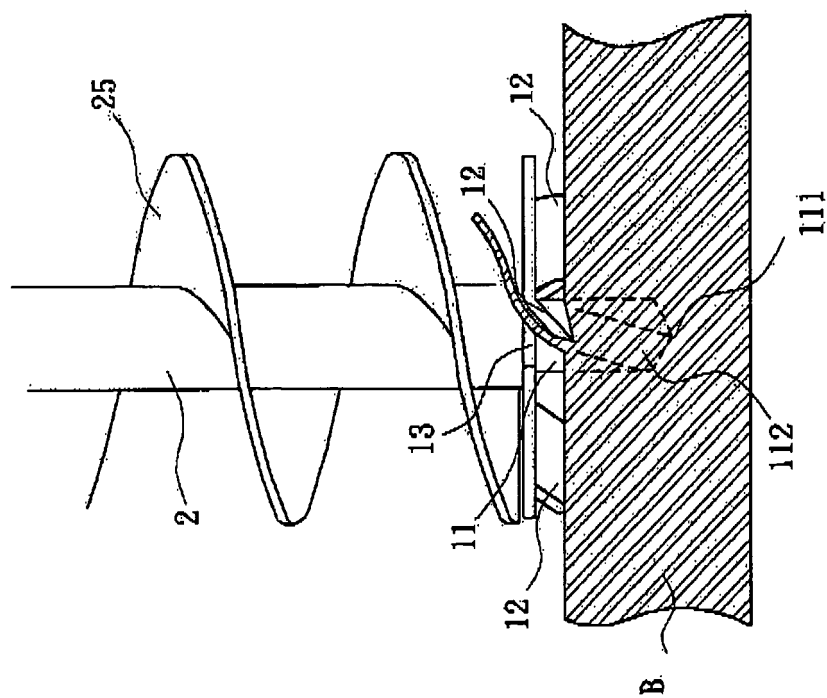


FIG. 7

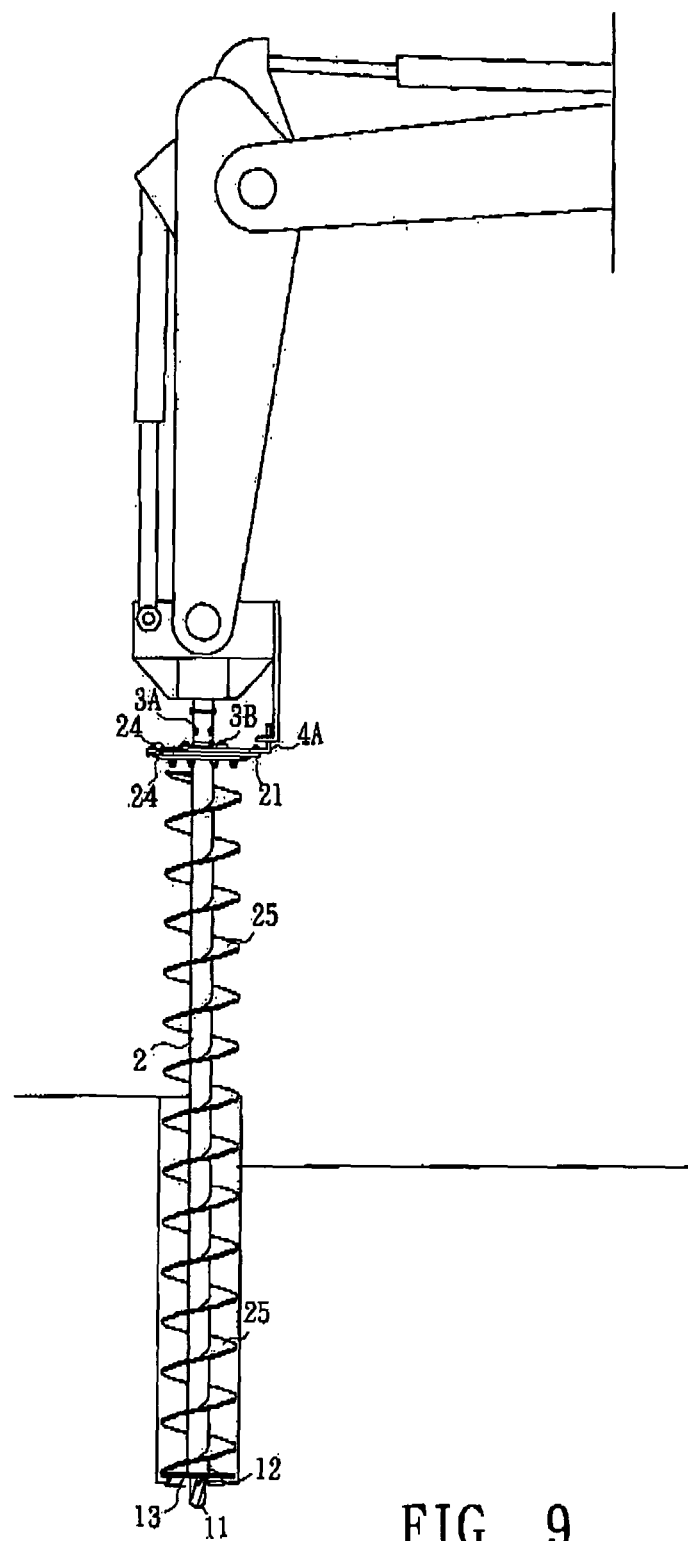


FIG. 9