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(54) **A TOOL FOR A PORTABLE SCREW GUN OR DRILL GUN FOR MAKING HOLES IN GRANULAR SOILS**

(57) A tool (1) for making a hole in a granular soil, in particular a sandy soil, comprising an elongated central portion (10) having a longitudinal axis (15) and provided with a first end portion (11) configured in such a way to removably engage with a chuck (110) of a portable screw gun, or drill gun (100), and a second end portion (12) provided with an actuation head (20). This has a predetermined diameter and configured in such a way to make a hole (70) having a corresponding diameter in a determined granular soil when an electric motor (105) of the portable screw gun, or drill gun (100) is actuated for causing the rotation of the chuck (110) and of the tool (1) to it engaged about the rotation axis (15) [Fig. 1].

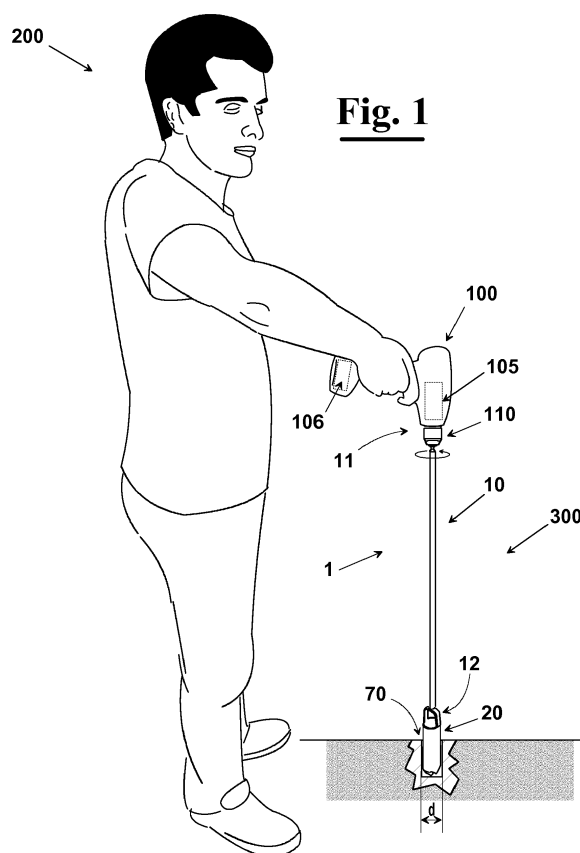


Fig. 1

Description

Field of the invention

[0001] The present invention relates to the technical field of equipment for making holes in a granular soil, in particular a sandy soil, and in particular it relates to a tool for portable drill gun, or screw gun.

[0002] The invention also relates to a system for making a hole in a granular soil, in particular a sandy soil, and a method for anchoring a pole, in particular a pole of a beach umbrella, in a granular soil.

Description of the prior art

[0003] As it is well known, many different equipment exist that are use for making holes in soil that has to house a pole, or a rod, for anchoring this to the soil.

[0004] In particular, in the field of bathing, in particular in the bathing establishments, for anchoring the poles of the beach umbrellas to the soil, manual tools are used that are called drills. These usually provided a handle, where the user seizes the tool. The handle is fixed, generally welded, to a bar which ends with an actuation head that can be a cylindrical, or helical, shaped actuation head. More precisely, at the moment of making a hole in the soil, the worker acts on the drill handle causing its rotation in a direction of rotation. In this way, the actuation head excavates in the ground a hole having a diameter which corresponds to the diameter of the actuation head.

[0005] However, the above disclosed tool, as well as other similar tools, has many drawbacks.

[0006] Firstly, in fact, in particular when many holes have to be made in the ground, as in the case of anchoring the beach umbrellas of a bathing establishment, or in the case of anchoring the poles of a fence, the worker repeats many times the effort, generally with adverse environmental conditions, owing to the atmospheric conditions, that can go from the sultry heat to the intense rain. Therefore, with the above disclosed equipments a long time and a great effort are needed for the worker for carrying out the whole work.

[0007] Another drawback is that the worker, since he/she has to acts on the drill handle for causing its rotation, is not always able to accurately control the effort that is exerted, and the position of the tool with respect to the ground. Therefore, the hole is not vertical, and therefore, when it is positioned into the hole, the pole appears to be inclined. Therefore, it is necessary to cover the hole and make another one, with further waste of time and energy.

[0008] Another equipment that is used for the same aim, i.e. to make holes in the granular grounds, in particular in open fields, or beaches, provides a tool similar to the one above disclosed, but provided with a petrol engine that causes the rotation of a working bar, which is provided with a helical, or cylindrical, head, about a rotation axis.

[0009] However, this kind of tools are very heavy and, therefore, very difficult to handle and to transport by a worker. Therefore, also this kind of equipment has the drawback that it is difficult to make vertical holes, partly owing to their weight, and partly owing to the difficulty to control the position of the working bar by the worker.

Summary of the invention

[0010] It is, therefore, an object of the present invention to provide a tool for making holes in a granular soil, in particular a sandy soil, that is able to overcome the above disclosed drawbacks of analogous devices of prior art.

[0011] It is, in particular, an object of the present invention to provide a tool for making holes in a granular soil, in particular a sandy soil, that is able to ensure that the hole is arranged vertically and, therefore, that the pole anchored to the soil at the hole is perfectly vertical.

[0012] It is also an object of the present invention to provide a tool for making holes in a granular soil, in particular a sandy soil, that is able to speed up and to help the worker who makes the holes in the granular soil, in particular in the case that many holes has to be made in the soil in order to complete a determined work.

[0013] It is a further object of the present invention to provide a tool for making holes in a granular soil, in particular a sandy soil, that is able to avoid that the worker can be subjected to injury, as for example, strains, or sprains.

[0014] These and other objects are achieved by a tool for making a hole in a granular soil, in particular a sandy soil, whose main characteristic is to comprise an elongated central portion having a longitudinal axis and provided with a first end portion configured in such a way to removably engage with a chuck of a portable screw gun, or drill, and with a second end portion provided with an actuation head, said actuation head having a predetermined diameter (d) and being configured in such a way to make a hole having a corresponding diameter, in the granular soil that comes into contact with it, when an electric motor of portable said screw gun or drill gun is actuated for causing a rotation of said chuck and of said tool that is engaged to it, about said rotation axis.

[0015] In particular, the first end portion has a plurality of engagement faces arranged to carry out a positive coupling with respective engagement faces which laterally delimit a seat of the chuck.

[0016] Advantageously, the central portion comprises a first part and at least a second part that can slide with respect to the first part, in such a way to obtain a telescopic engagement. More in particular, a blocking element is provided arranged to block the sliding of the second part in a determined position with respect to the first part whereby it is possible to adjust the length of the central portion, and therefore of the tool.

[0017] In particular, the central portion has a length set between 50 cm and 150 cm. In this way, the user can use the tool maintaining an erect position.

[0018] In an advantageous embodiment, the actuation head and the end portion have respective mutual engagement members arranged to carry out a disassemblable coupling.

[0019] For example, the mutual engagement members can be adapted to carry out a threaded coupling.

[0020] In an embodiment of the invention, the actuation head is substantially cylindrical shaped and is provided with a lower jagged surface, in particular provided with teeth.

[0021] In a possible alternative embodiment, the actuation head is helical shaped.

[0022] According to another aspect of the invention, a system for making a hole in a granular soil, in particular a sandy soil, said system being characterised in that it comprises:

- a portable screw gun, or drill gun provided with a chuck arranged to removably engage a tool and with an electric motor arranged to cause said chuck to rotate about a rotation axis;
- a tool comprising an elongated central portion having a first end portion configured in such a way to removably engage with said chuck, and a second end portion provided with an actuation head configured in such a way to make a hole in the granular soil, in particular a sandy soil, said electric motor of said portable screw gun, or drill gun being arranged to transmit to said tool, by means of said chuck, a rotational motion about a rotation axis for making the above described hole in said granular soil, said hole having a diameter which corresponds to the diameter of said actuation head.

[0023] According to another aspect of the invention, a method for anchoring a pole, in particular a beach umbrella pole, in a granular soil, in particular a sandy soil, comprises the steps of:

- disposing of a portable screw gun, or drill gun provided with a chuck and of an electric motor arranged to transmit a rotational motion to said chuck;
- engaging of said chuck of a tool comprising an elongated central portion having a longitudinal axis and provided with a first end portion, configured in such a way to removably engage with said chuck, and of a second end portion provided with an actuation head;
- actuating said portable screw gun, or drill gun causing said chuck to rotate about a rotation axis, said actuating step causing said tool to rotate about said longitudinal axis;
- making a hole in said granular soil, said hole having a diameter corresponding to the diameter of said actuation head;
- pulling said actuation head out of said hole;
- positioning said pole at said hole.

[0024] According to a further aspect of the invention, a method for transplanting of a plant, or a tree, in a pre-determined granular soil comprises the steps of:

- disposing of a portable screw gun, or drill gun provided with a chuck and an electric motor arranged to transmit a rotational motion to said chuck;
- engaging in said chuck a tool comprising an elongated central portion having a longitudinal axis and provided with a first end portion, configured in such a way to removably engage with said chuck, and a second end portion provided with an actuation head;
- actuating said portable screw gun, or drill gun causing said chuck to rotate about a rotation axis, said actuating causing said tool to rotate about said longitudinal axis;
- making a hole in said granular soil, said hole having a diameter which corresponds to the diameter of said actuation head;
- pulling said actuation head out of said hole;
- positioning of the root system of a plant, or a tree, at said hole.

[0025] Preferably, at the end of the above disclosed positioning step, a further step is provided of introducing soil between the pole, or the rod of the umbrella, or the plant, and the hole and, advantageously, a successive step for compacting the soil that is introduced, in such a way to steadily anchoring the pole, or the rod of the beach umbrella, or the plant, to the granular soil.

Brief description of the drawings

[0026] The invention will be now shown with the following description of an exemplary embodiment thereof, exemplifying but not limitative, with reference to the attached drawings in which:

- Fig. 1 diagrammatically shows in a side elevational perspective view, a first embodiment of a tool, according to the invention, for making holes in granular soils, in particular sandy soils;
- Fig. 2 diagrammatically shows in a perspective view, the tool of figure 1 in working conditions;
- Fig. 3A diagrammatically shows, in a side elevational perspective view, the tool of figure 1 disengaged from the portable screw gun, or drill gun to highlight some characteristics;
- Fig. 3B shows in a side elevational perspective view, an enlargement of the end portion of tool of figure 1 that has to be engaged with the chuck of portable screw gun, or drill gun;
- Fig. 4A diagrammatically shows in a side elevational view a portable screw gun, or drill gun that can be used for causing the tool, according to the invention, to rotate about a rotation axis;
- Fig. 4B diagrammatically shows in a front view the front part of portable screw gun, or drill gun of figure

4A at which the engagement portion of tool, according to the invention, engages;

- Figs. 5 to 7 show a side elevational perspective views of some possible alternative embodiments provided for the tool of figure 4A;
- Figs. 8 and 9 show in side elevational perspective views a further alternative embodiment of tool of figure 4A in 2 different working configurations;
- Fig. 10 shows in a side elevational perspective view, still another possible alternative embodiment of tool of figure 4A in a disassembled configuration;
- Figs. 11 and 12 show in a side elevational perspective view, 2 successive steps of a further possible use of the tool, according to the invention.

Detailed description of some exemplary embodiments

[0027] As it is diagrammatically shown in figure 1, a tool 1, according to the invention, for making a hole 70 in a granular soil, in particular a sandy soil, or ground, comprises an elongated central portion 10 having a longitudinal axis 15 and provided with a first end portion 11 and with a second end portion 12 opposite to the first.

[0028] More precisely, the first end portion 11 is configured in such a way to removably engage with a chuck 110 of a portable screw gun, or drill gun 100. This is provided with an electric motor 105 that is actuated by a worker 200, in particular by acting on a button 101. As it is shown, the electric motor 105 is operatively connected to chuck 110 whereby, when the worker 200 acts on the button 101 for actuating the electric motor 105, the latter causes chuck 110 to rotate about a rotation axis. In an advantageous embodiment of the present invention, the portable screw gun, or drill gun 100, provides at least one battery 106, for example of rechargeable type. In this way, it is more easy to transport and to use the tool in areas that are not easy to reach by electric system, as for example beaches, agricultural soils, etc. The second end portion 12 of tool 1 provides an actuation head 20 having a predetermined diameter. More precisely, the actuation head 20 is configured in such a way to make a hole 70, which has a corresponding diameter, in the granular soil with which it comes into contact, when the electric motor 105 is turned on.

[0029] According to the invention, the actuation head 20 can be cylindrical shaped (figures 1, 2 and 5), or helical shaped, and have different diameter and shapes (figures 6 and 7). Advantageously, in case of a cylindrical shaped, or hole saw, actuation head 20, the surface 21 that, in use, faces towards the soil in which the hole 70 has to be made, is jagged, in particular provided with a series of teeth 23, in such a way to make the perforating action into the granular soil more effective.

[0030] As it is shown in detail in figure 3B, the first end portion 11 of tool 1 has a plurality of polygonal faces 13 adapted to carry out a coupling, in particular a force coupling, or positive coupling, with respective polygonal faces 113 which laterally delimit a seat 115 of chuck 110

(see figure 4B). In this way, when the chuck 110, for example a self-centring chuck, rotates, the above disclosed coupling of faces 13 of tool 1 with the faces 113 of seat 115, causes also the end portion 11 of tool 1 to rotate. In practice, tool 1 rotates integrally with chuck 110.

[0031] In the example that is shown in the figures from 1 to 9, the end portion 11 has an hexagonal cross section. It is however also provided the possibility that the end portion 11 of tool 1, and, therefore, also the seat 115 of chuck 110, has a different number of polygonal faces 13. However, preferably, the cross section of the end portion 11 of tool 1 is polygonal shaped.

[0032] In the embodiment that is shown in the figures 8 and 9, central portion 10 provides a first part 10a and at least a second part 10b slidably mounted on the first part 10a. In particular, the 2 parts 10a and 10b are telescopically coupled and it is therefore possible to adjust, as desired, the length of tool 1. In particular, in order to block the 2 parts 10a and 10b of the central portion 10 in a determined position a blocking element 16 is provided arranged to block the sliding of said second part 10b in a determined position with respect to the first part 10a, whereby it is possible to adjust the length of the central portion 10. In the example of figure 9, the blocking element 16 provides a pin 19 provided with a catching head 18, which assists a user to grasp it, and that is arranged to be introduced in a hole 17 of a plurality of holes 17 made on part 10a of the elongated portion 10. In particular the pin 19 and the hole 17 can be provided with threads, whereby they carry out a threaded coupling that maintains the pin 19 in position during the use of tool 1. In this way, the end of pin 19 opposite to the catching head 18 exerts a blocking action on the external wall of part 10b impeding it to slide with respect to part 10a.

[0033] Other systems for blocking the relative sliding between the parts 10a and 10b can be however also provided, for example, also the part 10b can be provided with at least one hole, that is not shown in the figures for reasons of simplicity. In this case the pin 18 engages the 2 holes, i.e. the one of part 10a and the one of part 10b, thus impeding the relative sliding.

[0034] In this way, tool 1 can be adjusted according to the stature of user 200 who uses it. This allows the worker 200 to use tool 1 in erect position, and, therefore, in a comfortable position, apart from his/her stature. In this position, furthermore, user 200 can exert a force on the portable screw gun, or drill gun 100, and control the correct position of tool 1 with respect to the granular soil, that means that the tool is in a vertical position.

[0035] For example, the length of the main elongated portion 10 can be set between 50 cm and 150 cm.

[0036] In the further alternative embodiment of figure 10 tool 1 provides that the actuation head 20 and the end portion 11 can be mutually coupled, or disassembled. In this way, it is possible to replace an actuation head 20 with another one having a same shape, but different dimensions, in particular different diameter, or with an actuation head 20 of another type, for example replace a

helical shaped actuation head 20 with another hole saw shaped, as above described. This allows to adjust tool 1 to the different needs, and therefore making it highly versatile. In particular, this technical characteristic allows to tool 1 to make holes 70 in soils that are very different from each other from a morphological point of view, or that have different properties, for example a different level of moisture.

[0037] The actuation head 20 and the second end portion 12 can be provided, for example, with respective mutual engagement members, for example respective threaded surfaces 24 and 14, in such a way to allow a quick connection between the 2 components. Other similar systems are, however, provided still to make a disassemblable coupling between the actuation head 20 and the end portion 12 of tool 1, for example a positive coupling.

[0038] The assembly of the portable screw gun, or drill gun 100 and of the tool 1 above described with reference to figures 1 to 10, produces a system 300 for making a hole in a granular soil, in particular a sandy soil.

[0039] In particular, the system 300 allows to simply anchor the poles, in particular the poles 80 of beach umbrellas 90 (see the example of figure 2), or a series of the poles of a fence, or a series of poles in an agricultural soil, for example for keeping in vertical position the stem of determined vegetable, or plants of various kind, and anyway in a granular soil, as for example a sandy soil. In fact, once the hole 70 is made in the granular soil of interest, it is sufficient to pull the actuation head 20 of tool 1 out of the hole 70 and positioning into it the pole 80. This will have a diameter that is more, or less, the one of the hole that is made and will be, then, definitely fixed to the soil by pressing in order to cause a compacting of the granular soil at the hole 70 around the portion of the pole 80 and, therefore, a steady anchorage of it.

[0040] According to another aspect of the invention, the present invention can be also used for making a hole 70 in a granular soil for housing a plant, or a tree, 400 at the end of a transplanting operation, in particular from a pot 410 to a predetermined cultivation soil (see figures 11 and 12). In this case, diameter d2 of the actuation head 20 can be selected, for example in a range set between 5 cm and 100 cm, advantageously between 20 cm and 80 cm. In particular, if it is used for this specific use, the present invention allows to avoid the use of cumbersome and expensive agricultural machineries, and above all, to transplant a plant 410 in an uneven area that is difficult to reach by an agricultural vehicle, e.g. a farm tractor, for transporting and installing the machine that makes the hole into the soil.

[0041] The foregoing description of specific exemplary embodiments will so fully reveal the invention according to the conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt in various applications the specific exemplary embodiments without further research and without parting from the invention, and, accordingly, it is meant that such ad-

aptations and modifications will have to be considered as equivalent to the specific embodiments. The means and the materials to realize the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology that is employed herein is for the purpose of description and not of limitation.

Claims

1. A tool (1) for making a hole (70) in a granular soil, in particular a sandy soil, **characterised in that** it comprises an elongated central portion (10) having a longitudinal axis (15) and provided with a first end portion (11) configured to removably engage in a chuck (110) of a portable screw gun, or drill gun, and of a second end portion (12) opposite to the first, and provided with an actuation head (20), said actuation head (20) having a predetermined diameter (d) and being configured in such a way to make a hole (70), having a corresponding diameter, in the granular soil which comes into contact with it, when an electric motor (105) of said portable screw gun, or drill gun (100) is operated to cause said chuck (110), and said tool (1) that is engaged to it, to rotate about said rotation axis (15).
2. Tool (1) for making a hole (70) in a granular soil, according to claim 1, wherein said first end portion (11) has a plurality of polygonal faces (13) arranged to carry out a coupling with respective polygonal faces (113) which laterally delimit a seat (115) of said chuck (110).
3. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said central portion (10) comprising a first part (10a) and at least a second part (10b) that can slide with respect to said first part (10a), and a blocking element (16) being provided that is configured to block the sliding of said second part (10b) in a determined position with respect to said first part (10a) whereby it is possible to adjust the length of said central portion (10).
4. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said central portion (10) has a length set between 50 cm and 150 cm, such that the user (200) can use the tool in erect position.
5. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said actuation head (20) and said first end portion (11) have respective mutual engagement members (14,24) arranged to carry out a disassemblable coupling.

6. Tool (1) for making a hole (70) in a granular soil, according to claim 5, wherein said mutual engagement members (14,24) are arranged to carry out a threaded coupling.
7. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said actuation head (20) is substantially cylindrical shaped and is provided with a lower surface (21) provided with teeth.
8. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said actuation head (20) is helical shaped.
9. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said first end portion (11) has an hexagonal cross section.
10. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said portable screw gun, or drill gun (100) is equipped with at least a battery (106) of rechargeable type.
11. Tool (1) for making a hole (70) in a granular soil, according to any previous claim wherein said chuck (110) is a self-centring chuck.
12. System (300) for making a hole (70) in a granular soil, in particular a sandy soil, said system being **characterised in that** it comprises:
- a portable screw gun, or drill gun (100) provided with a chuck (110) configured to removably engage a tool (1), and with an electric motor (105) arranged to cause said chuck (110) to rotate about a rotation axis;
 - a tool (1), according to any claim from 1 to 11..
13. Method for anchoring a pole in a granular soil, said method **characterised in that** it comprises the steps of:
- disposing of a portable screw gun, or drill gun (100) provided with a chuck (110) and with an electric motor arranged to transmit a rotational motion to said chuck (110);
 - engaging to said chuck (110) a tool (1) comprising an elongated central portion (10) having a longitudinal axis (15) and provided with a first end portion (11), configured in such a way to removably engage with said chuck (110), and with a second end portion (12) provided with an actuation head (20);
 - actuating said portable screw gun, or drill gun (100) causing said chuck (110) to rotate about a rotation axis, said actuating step causing said tool (1) to rotate about said longitudinal axis (15);
 - making a hole (70) in said granular soil, said hole (70) having a diameter which corresponds to the diameter of said actuation head (20);
 - pulling said actuation head (20) out of said hole (70);
 - positioning said pole (80) into said hole (70);
 - introducing soil between said pole (80) and said hole (70) for steadily anchoring said pole to said granular soil.
14. Method for anchoring the pole of a beach umbrella in a granular soil, said method being **characterised in that** it comprises the steps of:
- disposing of a portable screw gun or drill gun (100) provided with a chuck (110) and with an electric motor arranged to transmit a rotational motion a said chuck (110);
 - engaging in said chuck (110) a tool (1) comprising an elongated central portion (10) having a longitudinal axis (15) and provided with a first end portion (11), configured in such a way to removably engage with said chuck (110), and a second end portion (12) provided with an actuation head (20);
 - actuating said portable screw gun or drill gun (100) causing said chuck (110) to rotate about a rotation axis, said actuating step causing said tool (1) to rotate about said longitudinal axis (15);
 - making a hole (70) in said granular soil, said hole (70) having a diameter which corresponds to the diameter of said actuation head (20);
 - pulling said actuation head (20) out of said hole (70);
 - positioning a pole of a beach umbrella (80) into said hole (70);
 - introducing soil between said pole of said beach umbrella and said hole (70) for steadily anchoring said pole of said beach umbrella to said granular soil.
15. Method for transplanting a plant, or a tree, in a pre-determined granular soil **characterised in that** it comprises the steps of:
- disposing of a portable screw gun or drill gun (100) provided with a chuck (110) and of an electric motor arranged to transmit a rotational motion a said chuck (110);
 - engaging in said chuck (110) a tool (1) comprising an elongated central portion (10) having a longitudinal axis (15) and provided with a first end portion (11), configured in such a way that removably engage with a said chuck (110), and with a second end portion (12) provided with an actuation head (20);
 - actuating said portable screw gun, or drill gun (100) causing said chuck (110) to rotate about

a rotation axis, said actuating step causing said tool (1) to rotate about said longitudinal axis (15);
- making a hole (70) in said granular soil, said hole (70) having a diameter which corresponds to the diameter of said actuation head (20); 5
- pulling said actuation head (20) out of said hole (70);
- positioning the root system of a plant, or a tree, (400) into said hole (70);
- introducing soil between said root system of 10
plant and said hole (70) for steadily anchoring said plant to said granular soil.

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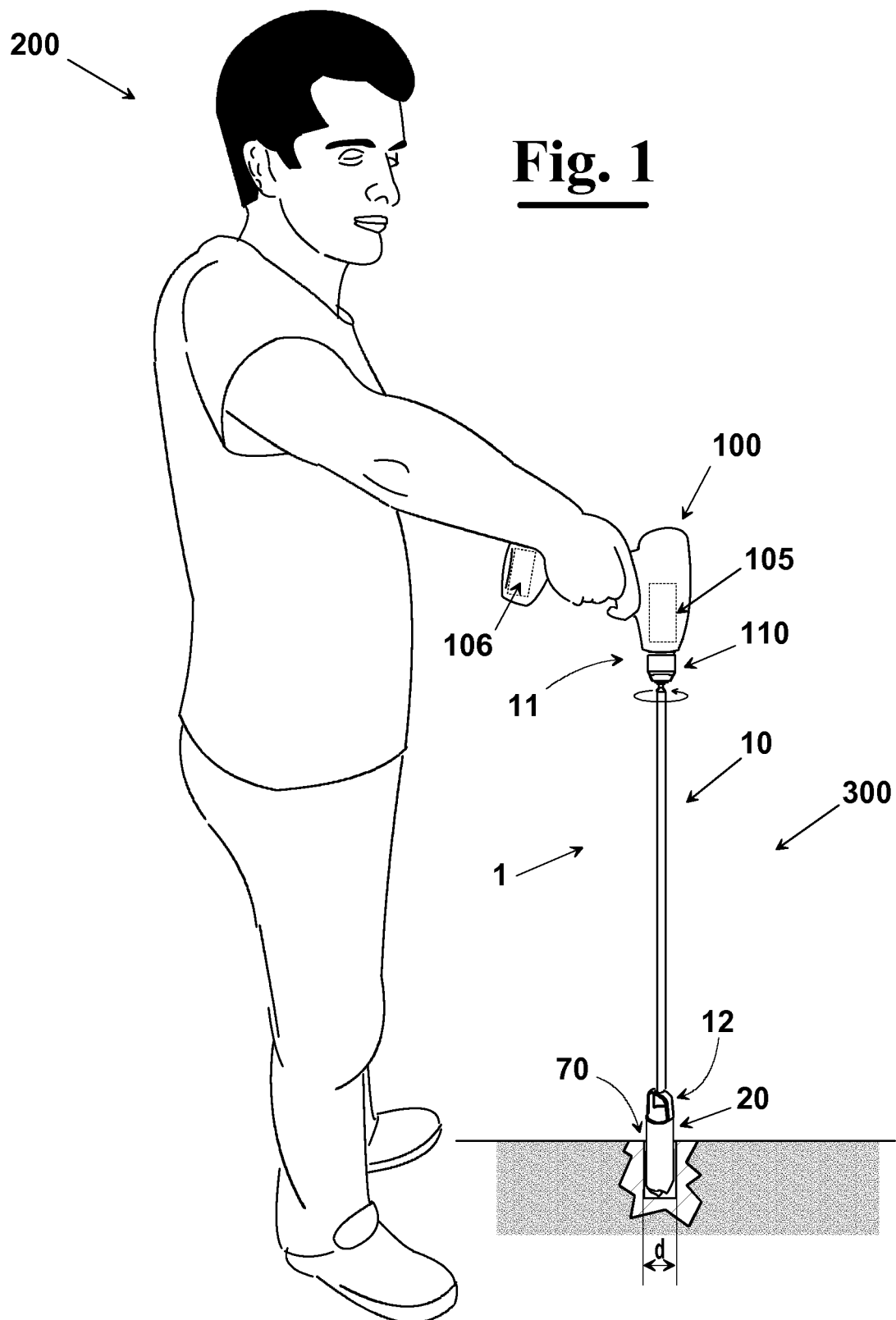
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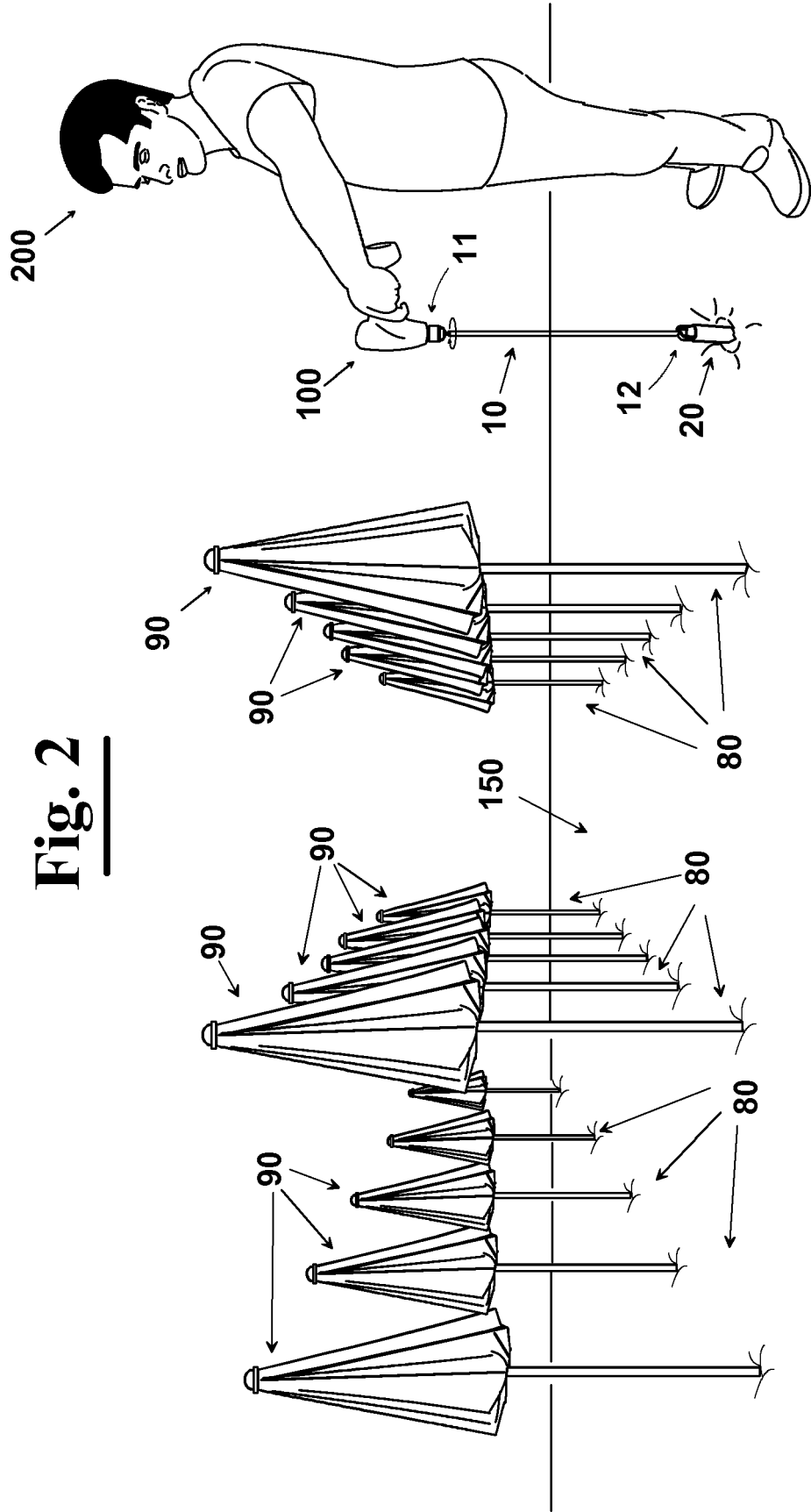


Fig. 3B

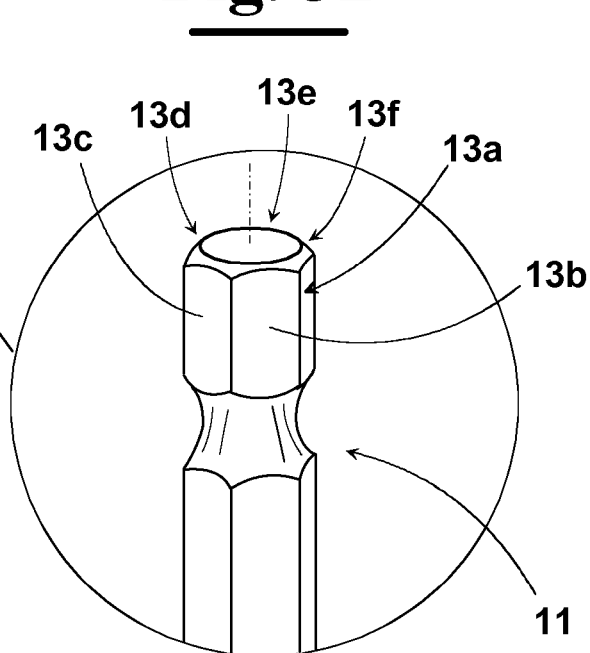


Fig. 3A

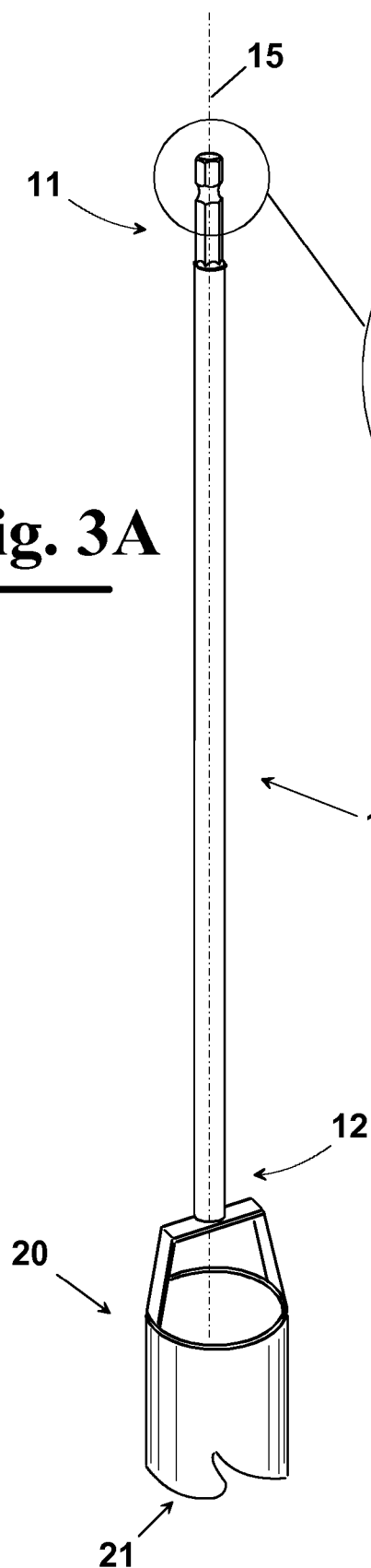


Fig. 4A

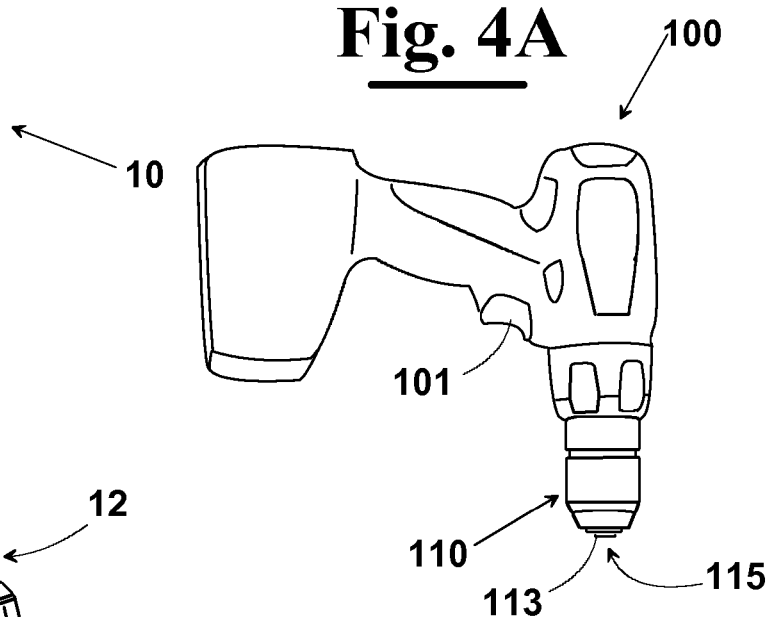


Fig. 4B

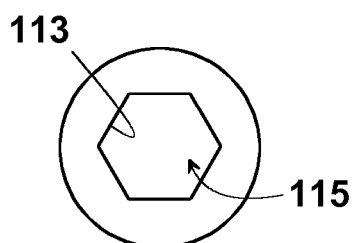


Fig. 5

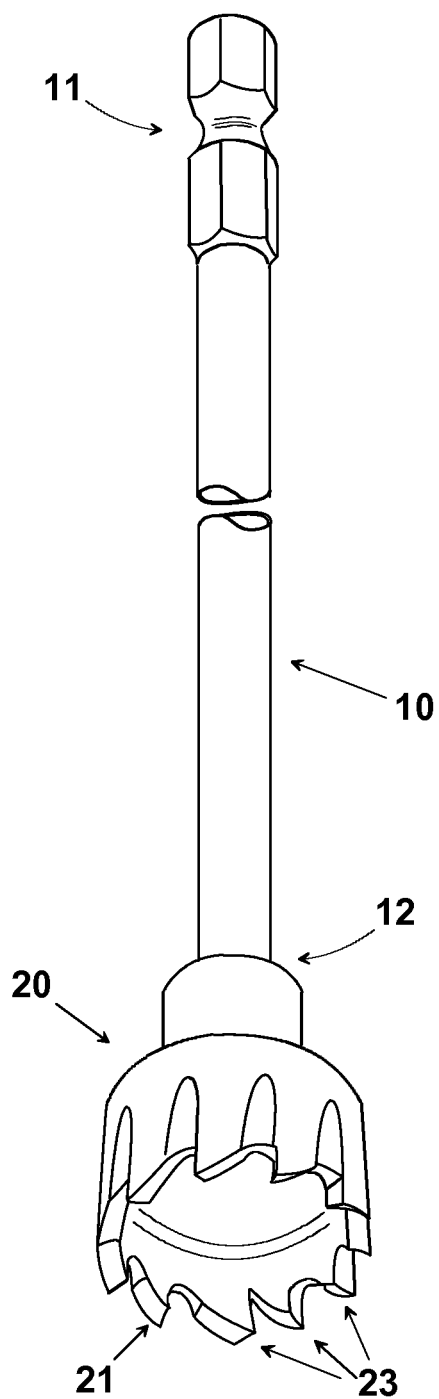


Fig. 6

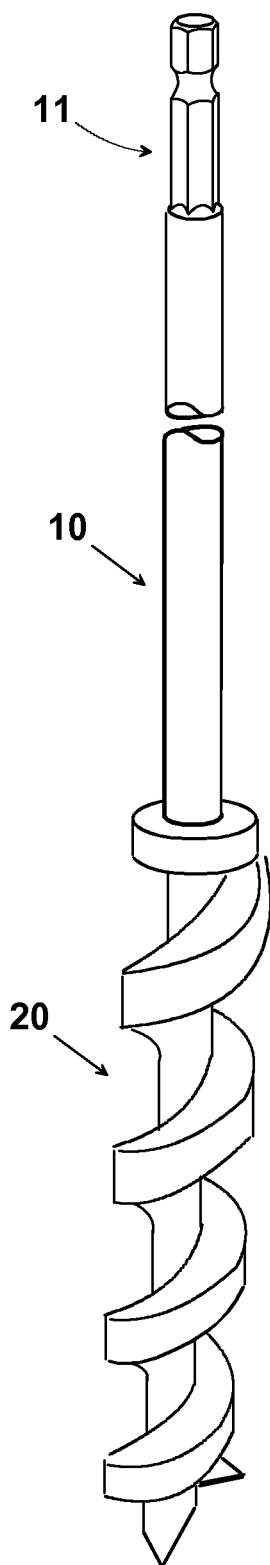
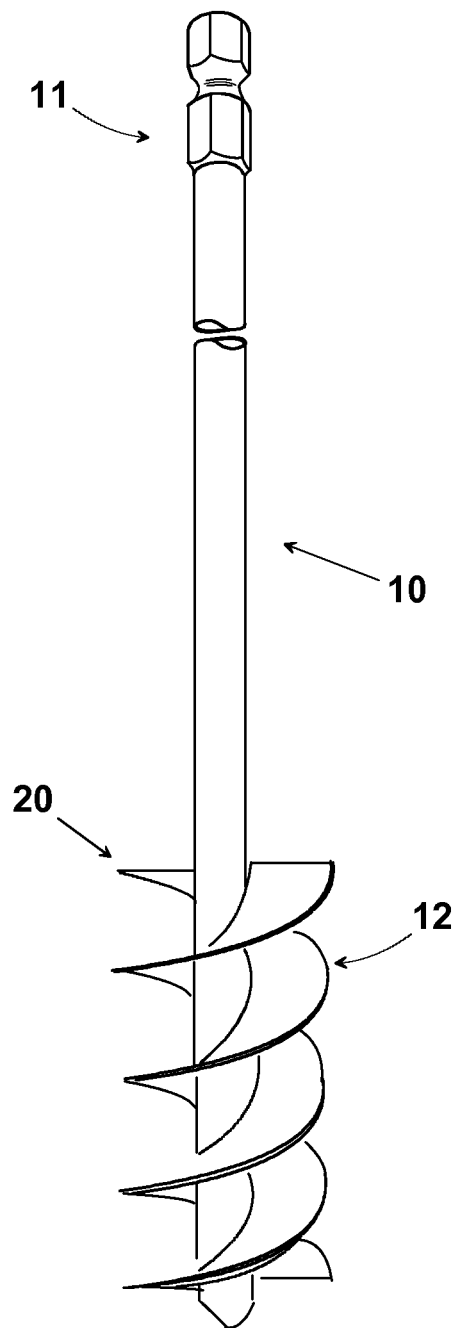
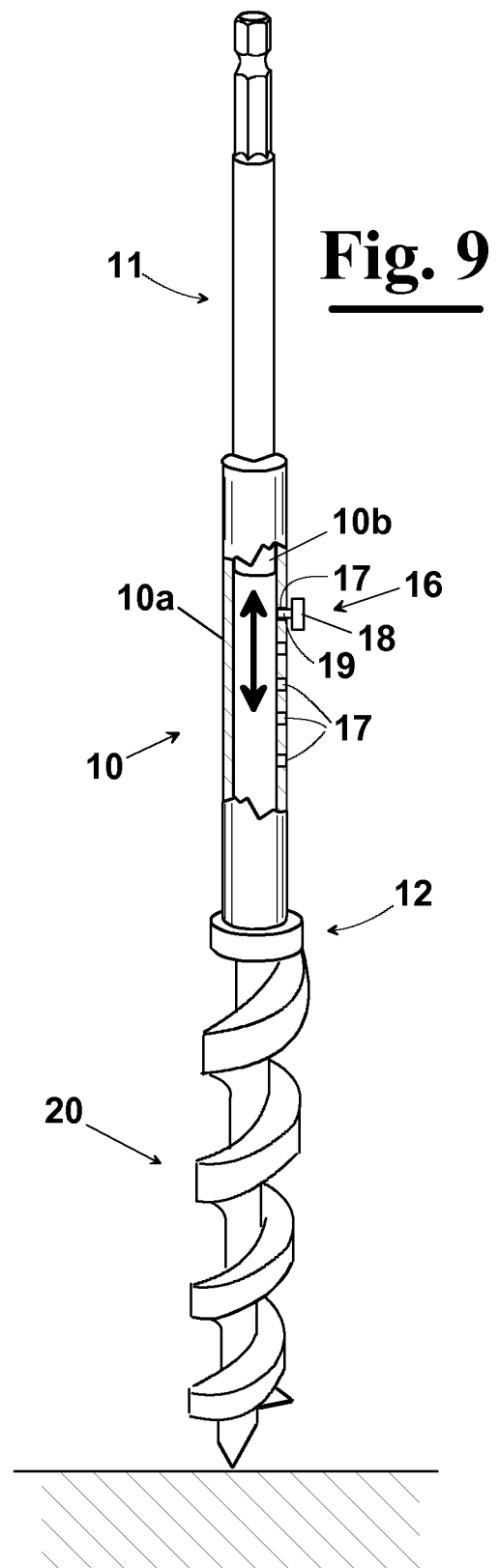
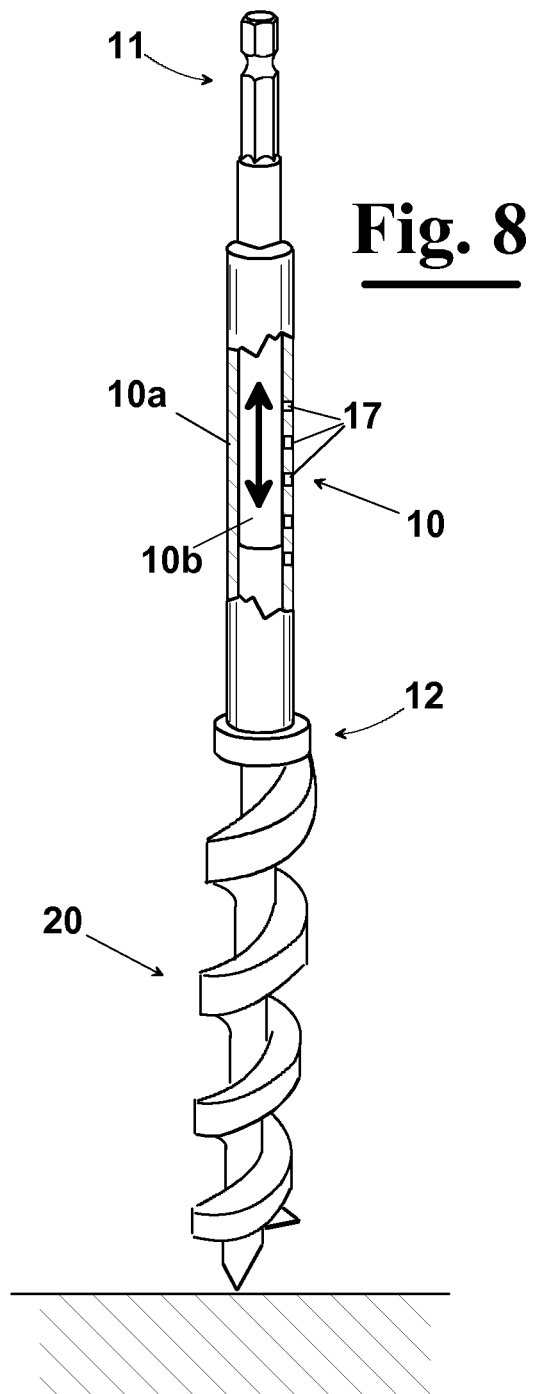


Fig. 7





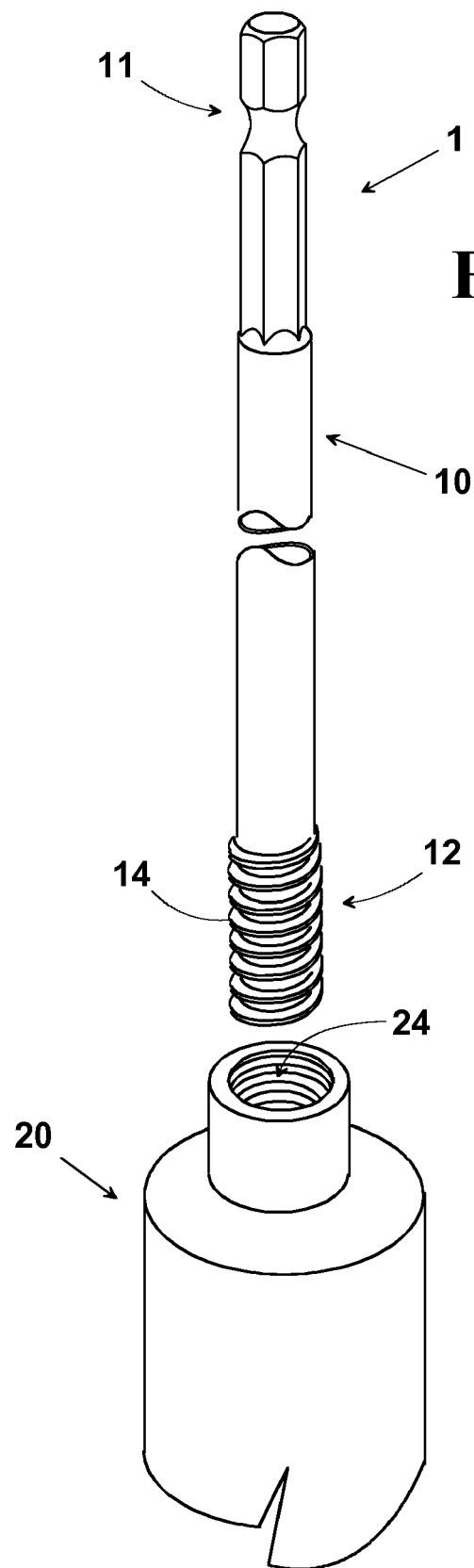


Fig. 10

Fig. 11

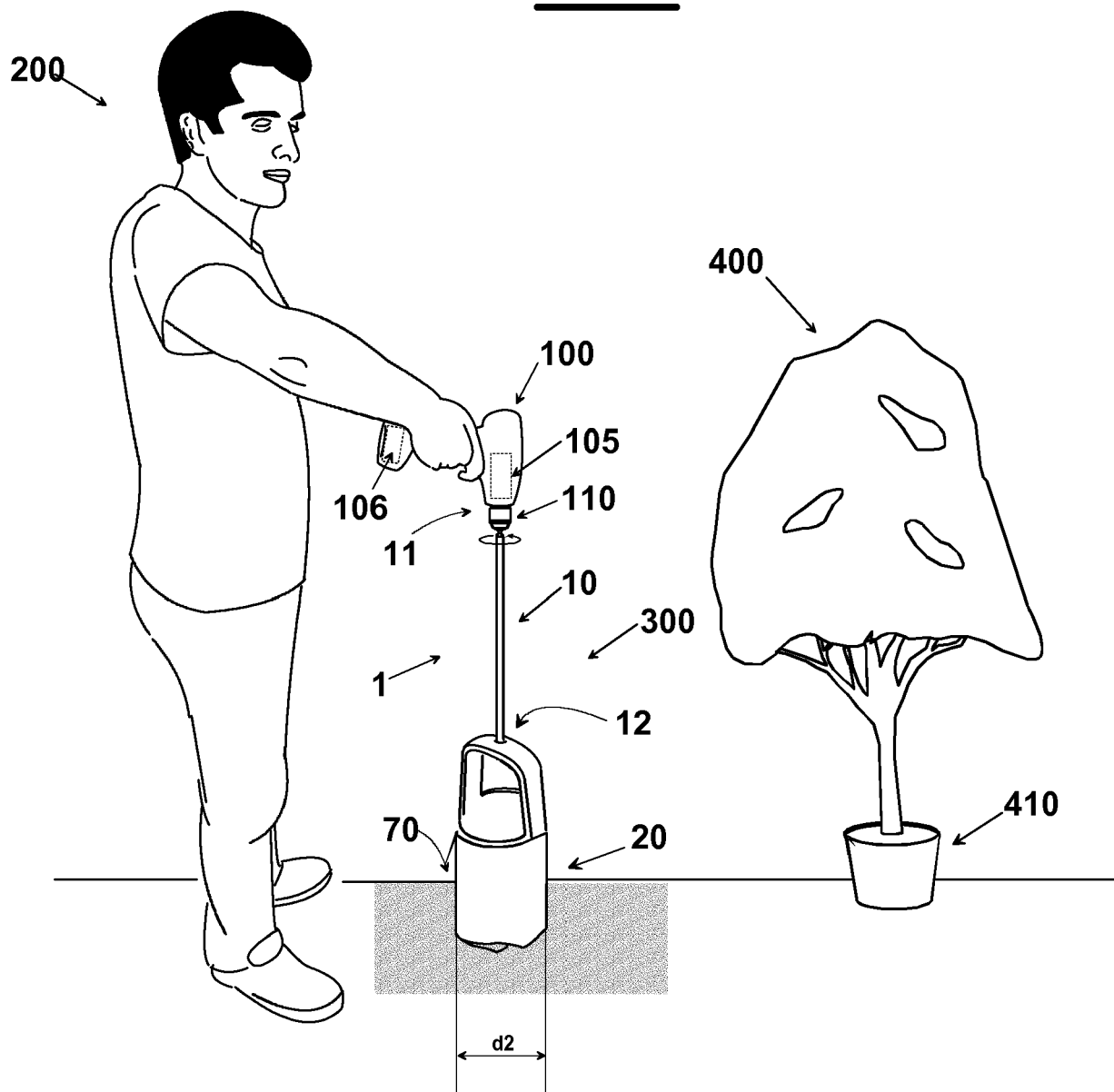
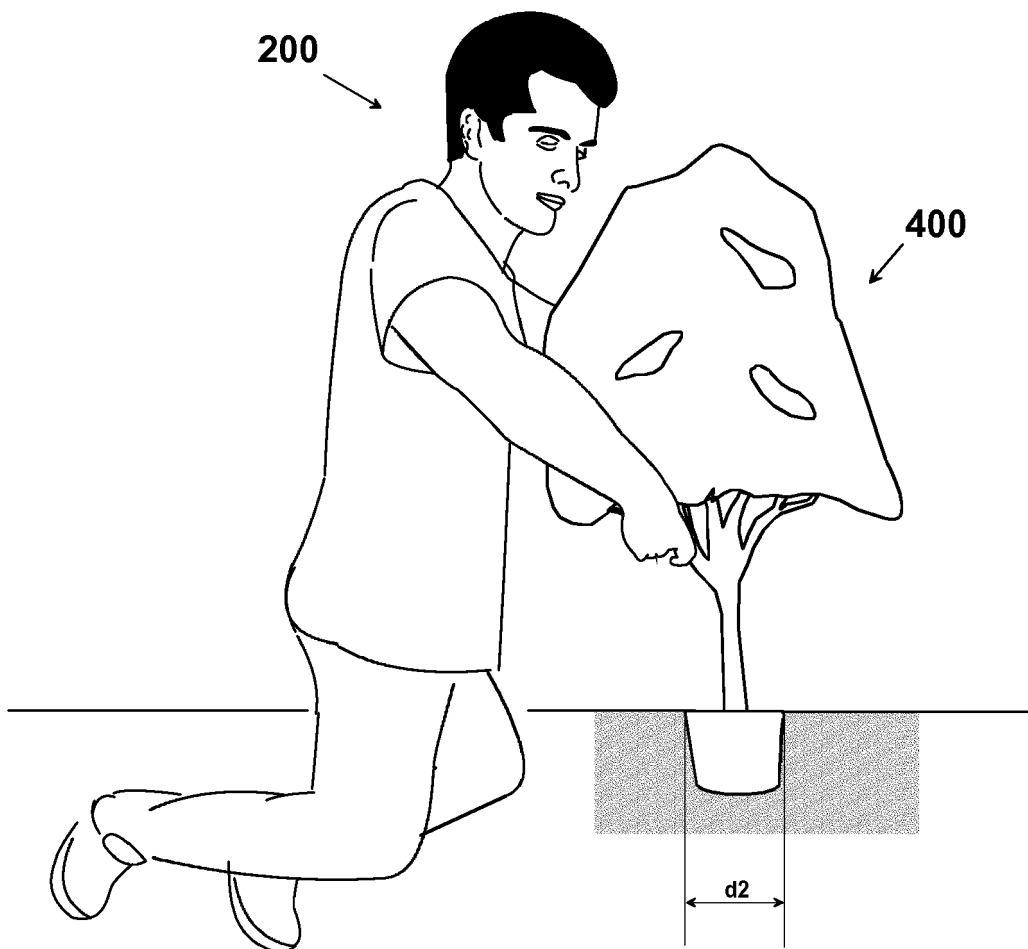


Fig. 12





EUROPEAN SEARCH REPORT

Application Number
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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