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(54) **MARKER ANCHOR FOR INSTALLATION IN SNOW**

(57) Provided is a marker anchor for installation in snow (10) that can be rotationally press-fitted into a hole (HL), the anchor being able to be easily embedded in the snow while being rotated even when the hole has a relatively small diameter, and having an increased fixing force in a withdrawal direction. A marker anchor for installation in snow (10) includes a main body shaft portion (20), a brush shaft portion (30), and a leading end entry portion (31a) having a protruding portion (30), a helical rib (23) is provided on main body shaft portion (20) and bristle groups (36, BR) are provided on the brush shaft portion (30), the bristle groups extending outward in a radial direction, wherein the bristle groups (36, BR) are arranged in a plurality of columns (38) along an axial direction, and the bristle groups (36, BR) in each column (38) are arranged in a plurality of lines (37a, 37b) along the axial direction and formed such that leading end (36a) of a bristle group (36), in one of the plurality of lines (37a), abut against leading end (36a) of the bristle groups (36, BR) in another one of the plurality of lines (37b) belonging to the same column (38), and vice versa.

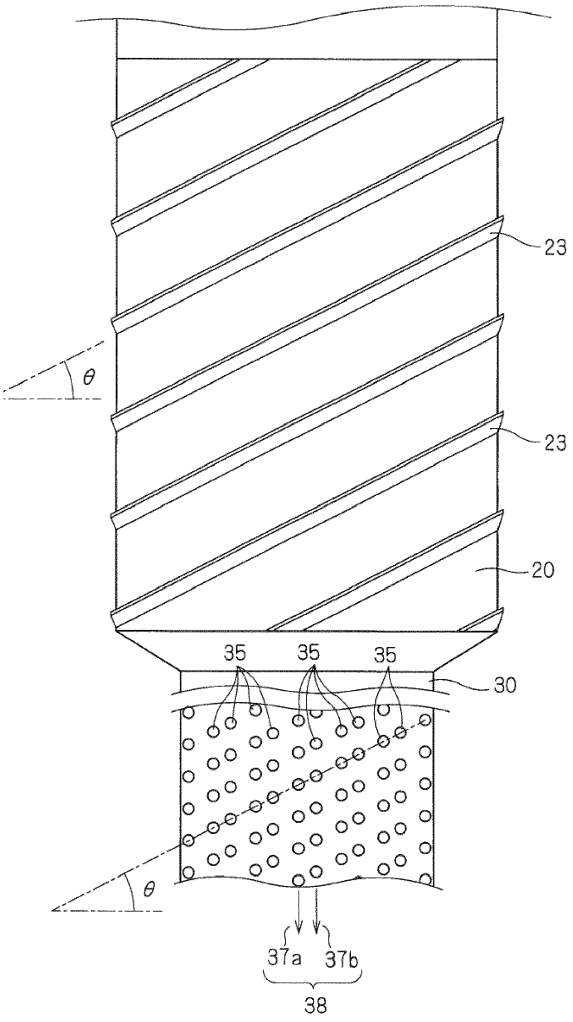

Fig. 4

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Description

TECHNICAL FIELD

[0001] The present invention relates to a marker anchor for installation in snow for supporting a marker used in ski races such as slalom or a marker used in a snow-covered state, and an installation method therefor.

BACKGROUND ART

[0002] A marker anchor disclosed in JP H10-20821A, for example, is known as a conventional marker anchor for installation in snow for supporting a marker used in ski races such as slalom.

[0003] In order to provide a pole supporting device that can be installed in snow in a simple and quick manner and that can be reliably kept in the snow in light of safety and the smooth advancement of ski races, the marker anchor for installation in snow disclosed in JP H10-20821A mentioned above is a pole supporting device used in a ski race, the pole supporting device supporting a pole used in a ski race embedded in the snow and set upright in the snow, and has the feature of having a tube portion that supports a base portion of the pole and a discontinuously extending helical thread portion that is provided on an outer circumference of the tube portion.

[0004] Also, a marker anchor disclosed in US Patent No. 7,992,900, for example, is known as a marker anchor for installation in snow provided with a brush portion at a leading end portion thereof.

[0005] The marker anchor for installation in snow disclosed in US Patent No. 7,992,900 mentioned above is used as a base for a slalom pole or a ski pole and is constituted by a leading end portion and a base end portion that are integrally molded, the leading end portion having brush portions implanted therein such that the brush portions standing up toward a base end side protrude in three outward directions, and the base end portion being formed to have a larger diameter than the leading end portion and having a hexagonal columnar shape. The marker anchor for installation in snow is installed by driving the marker anchor for installation in snow into the snow. When the marker anchor for installation in snow has been installed, the brush portions standing up toward the base end side provide resistance in a withdrawal direction, and thus, the marker anchor for installation in snow is fixed in the withdrawal direction.

[0006] JP H10-20821A and US Patent No. 7,992,900 are examples of related art.

[0007] However, the marker anchor for installation in snow disclosed in JP H10-20821A mentioned above is screwed and fixed using the helical thread portion, and the resistance in the withdrawal direction is only provided by the depth of the helical thread. Therefore, the marker anchor for installation in snow cannot necessarily be said to be sufficiently fixed.

[0008] On the other hand, the marker anchor for installation in snow disclosed in US Patent No. 7,992,900 mentioned above is fixed in the withdrawal direction by the brush portions standing up toward the base end side providing resistance in the withdrawal direction. The marker anchor for installation in snow is installed by forming a hole with a drill or the like in advance, the hole having a smaller diameter than the diameter of the base end portion, and press-fitting the marker anchor for installation in snow into the hole. Therefore, the smaller the diameter of the hole, the higher the fixing force, but the more difficult it is to press-fit the marker anchor for installation in snow into the hole. On the other hand, when the diameter of the hole is increased in order to make it easier to press-fit the marker anchor for installation in snow into the hole, the fixing force decreases.

[0009] Moreover, if the number of brush portions of the marker anchor for installation in snow disclosed in US Patent No. 7,992,900 is increased, the fixing force in the withdrawal direction increases even more, but it is difficult to press-fit the marker anchor for installation in snow into the hole. On the other hand, if the number of brush portions is reduced so as to make it easy to press-fit the marker anchor for installation in snow into the hole, the fixing force in the withdrawal direction decreases. Thus, there is a trade-off relationship.

SUMMARY OF THE INVENTION

[0010] The present invention was made in view of these issues, and it is an object thereof to provide a marker anchor for installation in snow that can be rotationally press-fitted into a hole, the marker anchor for installation in snow being able to be easily embedded in the snow while being rotated even when the hole has a relatively small diameter, and also having an increased fixing force in the withdrawal direction.

[0011] It is another object of the present invention to provide a mounting and demounting tool that can make it easy to demount the marker anchor for
installation in snow during removal of the marker anchor.

[0012] It is still another object of the present invention to provide a method for installing the marker anchor for installation in snow, the method making it possible to further increase the fixing force in the withdrawal direction during installation of the marker anchor for installation in snow.

[0013] A marker anchor for installation in snow according to claim 1 is a marker anchor for installation in snow including a helical rib portion provided on a shaft main body and brush portions extending outward in a radial direction at a shaft leading end, wherein the brush portions are arranged in a plurality of columns along an axial direction in such a manner as to be inclined toward a shaft base end, and the brush portions in each column are arranged in a plurality of lines along the axial direction and formed such that leading end portions of the brush portions in one of the plurality of lines abut against leading

end portions of the brush portions in another one of the plurality of lines, and vice versa.

[0014] The marker anchor for installation in snow according claim 1 has the helical rib portion, which is provided on the shaft main body, and the brush portions, which extend outward in a radial direction, at the shaft leading end, wherein the brush portions are arranged in a plurality of columns along the axial direction in such a manner as to be inclined toward the shaft base end, and the brush portions in each column are arranged in a plurality of lines along the axial direction and formed such that the leading end portions of the brush portions in one of the plurality of lines abut against the leading end portions of the brush portions in another one of the plurality of lines, and vice versa. Thus, each of the above-described columns has a shape that is tapered toward its leading end in plan view. Therefore, the resistance is small during rotational press-fitting, and the marker anchor for installation in snow easily enters the snow. Also, the brush portions are implanted such that leading ends of the brush portions in one of the plurality of lines abut against leading ends of the brush portions in another one of the plurality of lines, and vice versa. Therefore, the leading end portions of the brush portions in the plurality of lines overlap, and accordingly the withdrawal resistance can be increased.

[0015] A marker anchor for installation in snow according to claim 2 is the marker anchor for installation in snow according to claim 1, wherein the brush portions are arranged at an angle similar to a helical angle of the helical rib
portion.

[0016] In the marker anchor for installation in snow according to claim 2, the brush portions are arranged at an angle similar to the helical angle of the helical rib portion. Thus, the marker anchor for installation in snow easily enters the snow when rotationally press-fitted and is also easily rotationally withdrawn during removal.

[0017] A marker anchor for installation in snow according to claim 3 is the marker anchor for installation in snow according to claim 1 or 2, wherein a plurality of protrusions are formed on a circumferential surface of the shaft main body.

[0018] In the marker anchor for installation in snow according to claim 3, the plurality of protrusions are formed on the circumferential surface of the shaft main body of the marker anchor for installation in snow according to claim 1 or 2. Thus, in a state in which the marker anchor for installation in snow has been installed, the fixing force can be increased even more.

[0019] A marker according to claim 4 includes the marker anchor for installation in snow according to any one of claims 1 to 3.

[0020] In the marker according to claim 4, the same effects as those of the marker anchor for installation in snow according to any one of claims 1 to 3 are provided.

[0021] A mounting and demounting tool according to claim 5 is a mounting and demounting tool configured to mount or/and demount the marker according to claim 4, the mounting and demounting tool including a fit-in portion configured to be externally attached to the marker and an engagement portion configured to be engaged with a base end portion of the marker anchor for installation in snow and to enable the marker anchor for installation in snow to be withdrawn while being rotated.

[0022] The mounting and demounting tool according to claim 5 makes it possible to easily install and remove the marker according to claim 4.

[0023] A method for installing a marker according to claim 6 is a method for installing the marker according to claim 4, the method including the steps of forming a hole in snow, the hole having a smaller diameter than the shaft main body; driving and fixing a portion of an overall length of the marker anchor for installation in snow into the hole; externally attaching a mounting or/and demounting tool to the marker and engaging the mounting and demounting tool according to claim 5 with the marker anchor for installation in snow; press-fitting the marker anchor for installation in snow while rotating the mounting or/and demounting tool in an insertion direction; and expanding a diameter of the brush portions by further horizontally rotating the marker anchor for installation in snow in a state in which the marker anchor for installation in snow has been embedded in a predetermined position.

[0024] In the method for installing a marker according to claim 6, the marker is screwed into the hole to such an extent that the marker anchor for installation in snow is embedded in the snow, and at that position, the marker is further rotated to rotate the brush portions, thereby scraping away the surrounding snow, and thus expanding the diameter of the brush portions. This makes it possible to increase the fixing force and the withdrawal strength of the marker.

[0025] The marker anchor for installation in snow according to claim 1 has the helical rib portion, which is provided on the shaft main body, and the brush portions, which extend outward in a radial direction, at the shaft leading end, wherein the brush portions are arranged in a plurality of columns along the axial direction in such a manner as to be inclined toward the shaft base end, and the brush portions in each column are arranged in a plurality of lines along the axial direction and formed such that the leading end portions of the brush portions in one of the plurality of lines abut against the leading end portions of the brush portions in another one of the plurality of lines, and vice versa. Thus, each of the above-described columns has a shape that is tapered toward its leading end in plan view. Therefore, the resistance is small during rotational press-fitting, and the marker anchor for installation in snow easily enters the snow. Also, the brush portions are implanted such that the leading ends of the brush portions in one of the plurality of lines abut against the leading ends of the brush portions in another one of the plurality of lines, and vice versa. Therefore, the leading end portions of the brush portions in the plurality of lines overlap, and accordingly the withdrawal

resistance can be increased.

[0026] With the marker anchor for installation in snow according to claim 2, in the marker anchor for installation in snow according to claim 1, the brush portions are arranged at an angle similar to the helical angle of the helical rib portion. Thus, when compared with the marker anchor for installation in snow according to claim 1, the marker anchor for installation in snow according to claim 2 more easily enters the snow when rotationally press-fitted and also is more easily rotationally withdrawn during removal.

[0027] With the marker anchor for installation in snow according to claim 3, the plurality of protrusions are formed on the circumferential surface of the shaft main body of the marker anchor for installation in snow according to claim 1 or 2. Thus, in a state in which the marker anchor for installation in snow has been installed, the fixing force can be increased even more.

[0028] The marker according to claim 4 includes the marker anchor for installation in snow according to any one of claims 1 to 3. Thus, the same effects as those of the marker anchor for installation in snow according to any one of claims 1 to 3 are provided.

[0029] The mounting and demounting tool according to claim 5 is configured to mount or/and demount the marker according to claim 4, and includes the fit-in portion configured to be externally attached to the marker and the engagement portion configured to be engaged with the base end portion of the marker anchor for installation in snow and to enable the marker anchor for installation in snow to be withdrawn while being rotated. Thus, the marker can be easily installed and removed.

[0030] The method for installing a marker according to claim 6 is a method for installing the marker according to claim 4, and includes the steps of forming a hole in snow, the hole having a smaller diameter than the shaft main body; driving and fixing a portion of the overall length of the marker anchor for installation in snow into the hole; externally attaching the mounting or/and demounting tool to the marker and engaging the mounting and demounting tool according to claim 5 with the marker anchor for installation in snow; press-fitting the marker anchor for installation in snow while rotating the mounting or/and demounting tool in an insertion direction; and expanding the diameter of the brush portions by further horizontally rotating the marker anchor for installation in snow in a state in which the marker anchor for installation in snow has been embedded in a predetermined position. Thus, the marker is screwed into the hole to such an extent that the marker anchor for installation in snow is embedded in the snow, and at that position, the marker anchor for installation in snow is further rotated to rotate the brush portions, thereby scraping away the surrounding snow, and thus expanding the diameter of the brush portions. Therefore, the fixing force and the withdrawal strength of the marker can be increased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031]

FIG. 1 is a front view of a marker anchor for installation in snow according to the present invention.

FIG. 2 is a bottom view of the marker anchor for installation in snow.

FIG. 3 is a plan view of the marker anchor for installation in snow.

FIG. 4 is an enlarged front view of a relevant portion of a shaft main body of the marker anchor for installation in snow.

FIG. 5 is a cross-sectional view of a relevant portion of a brush shaft portion of the marker anchor for installation in snow.

FIGS. 6A and 6B show a mounting and demounting tool for the marker anchor for installation in snow; FIG. 6A is a substantially front view, and FIG. 6B is an enlarged perspective view of engagement portions.

FIG. 7 schematically illustrates a procedure (first step) of a method for installing the marker anchor for installation in snow.

FIG. 8 schematically illustrates a procedure (second step) of the method for installing the marker anchor for installation in snow.

FIG. 9 schematically illustrates a procedure (third step) of the method for installing the marker anchor for installation in snow.

FIG. 10 schematically illustrates a procedure (fourth step) of the method for installing the marker anchor for installation in snow.

FIG. 11 schematically illustrates a procedure (fifth step) of the method for installing the marker anchor for installation in snow.

EMBODIMENTS OF THE INVENTION

[0032] Hereinafter, embodiments for implementing a marker anchor for installation in snow, which may be referred to as "anchor" below, a mounting and demounting tool for the marker anchor for installation in snow, and a method for installing the marker anchor for installation in snow according to the present invention will be described with reference to the drawings.

[0033] FIG. 1 is a front view of a marker anchor for installation in snow according to the present invention. FIG. 2 is a bottom view of the marker anchor for installation in snow. FIG. 3 is a plan view of the marker anchor for installation in snow.

[0034] In FIGS. 1 to 3, reference numeral 10 indicates a marker anchor for installation in snow according to the present invention. The marker anchor for installation in snow 10 is constituted by a main body shaft portion 20, a brush shaft portion 30, and a leading end entry portion 31 that are integrally molded from a synthetic resin, the main body shaft portion 20 having a cylindrical shape,

the brush shaft portion 30 having a smaller diameter than the main body shaft portion 20 and having brushes BR implanted therein, and the leading end entry portion 31 being formed at a leading end portion of the brush shaft portion 30 and having a substantially conical shape.

[0035] The main body shaft portion 20 is formed into a hollow shape. A fitting hole 21 into which a connection spring 50 (see FIGS. 8 to 11), which will be described later, is forcefully fitted is formed in the main body shaft portion 20 so as to open in a base end portion thereof, and engagement protruding portions 22 are formed on an outer perimeter of the fitting hole 21, protruding outward in four different radial directions. Moreover, axially extending helical ribs 23 in the form of a double-start screw thread are provided on a circumferential surface of the main body shaft portion 20, and hemispherical small protrusions 24 are formed protruding from the entire outer circumferential surface of the main body shaft portion 20.

[0036] The brush shaft portion 30 is molded into a solid shape so as to have an increased strength. Six columns 38 of brush bristles are implanted in the brush shaft portion 30 so as to extend in radial directions from the shaft at equal intervals in a circumferential direction, each column 38 consisting of two lines of brush bristles that are lined up in a length direction of the shaft. Moreover, the brushes BR are formed so as to be inclined toward a base end of the brush shaft portion 30 and also to have a brush diameter that is larger than the diameter of the main body shaft portion 20 and that fits within the range of the diameter of the main body shaft portion 20 when the brushes BR are made narrower.

[0037] The leading end entry portion 31 is formed to have a larger diameter than the brush shaft portion 30 so that its outer diameter is substantially equal to the outer diameter of the main body shaft portion 20. Also, escape grooves 31a for allowing lumps of snow to escape during entry into the snow are formed in the leading end entry portion 31, the escape grooves 31a extending along an inclined portion of the leading end entry portion 31 and being located at respective positions corresponding to spaces between the six columns of brush bristles of the brushes BR that have been implanted as described above. Moreover, protruding portions 31b that are formed in such a manner as to be left between the escape grooves 31a are located directly under the roots of the brushes BR, and thus have the effect of protecting the roots of the brushes BR during entry of the leading end entry portion 31 into the snow.

[0038] FIG. 4 is an enlarged front view of a relevant portion with respect to the main body shaft portion and the brush shaft portion of the marker anchor for installation in snow. FIG. 5 is a cross-sectional view of a relevant portion showing a state in which bristle groups are implanted in the brush shaft portion of the marker anchor for installation in snow.

[0039] As shown in FIGS. 4 and 1, in each of the brushes BR, lines 37 (37a and 37b) are formed in each of which thirteen bristle groups 36 are lined up at equal intervals in a longitudinal direction of the shaft of the brush shaft portion 30, the bristle groups 36 each being constituted by a large number of brush bristles implanted in a single implantation hole 35. The bristle groups 36 in the line 37b adjacent to the line 37a are formed at respective positions that are arranged between the bristle groups 36 in the line 37a in the longitudinal direction. Also, the bristle groups 36 in the line 37a are inclined toward the bristle groups 36 in the opposing line 37b, and vice versa. The brushes BR are formed of the total of six columns 38, each column 38 consisting of two lines 37.

[0040] Also, as shown in FIG. 4 in detail, the bristle groups 36 are formed such that an angle θ of arrangement of the bristle groups 36 in each of the lines 37a and the bristle groups 36 in the corresponding opposing line 37b is equal to an angle θ of inclination of the helical ribs 23, which are formed in the main body shaft portion 20, and such that the bristle groups 36 in the adjacent columns 38 are arranged at the same angle θ.

[0041] Furthermore, as shown in FIG. 5, in each brush BR, which is constituted by a single column 38 consisting of two lines (37a and 37b) as described above, the bristle groups 36 are implanted such that the bristle groups 36 in the line 37a are inclined toward the bristle groups 36 in the other line 37b in the circumferential direction, and vice versa, so that leading ends 36a of the bristle groups 36 in the line 37a are inserted between the bristle groups 36 in the other line 37b. In other words, the bristle groups 36 are implanted such that the bristle groups 36 in the line 37a lean against the bristle groups 36 in the other line 37b, and vice versa, so that the leading ends 36a of the bristle groups 36 in the line 37a are inserted between the leading ends 36a of the bristle groups 36 in the other line 37b. That is to say, the bristle groups 36 are implanted such that the leading ends 36a of the bristle groups 36 in one of the two lines abut against the leading ends 36a of the bristle groups 36 in the other line, and vice versa.

[0042] FIG. 6A is a substantially front view of a mounting and demounting tool for the marker anchor for installation in snow, and FIG. 6B is an enlarged cross-sectional view of engagement portions of the mounting and demounting tool.

[0043] In FIGS. 6A and 6B, reference numeral 40 indicates a mounting and demounting tool. The mounting and demounting tool 40 is constituted by a tool main body 41 that can be externally fitted to a pole 60 (see FIG. 8) of a marker and the marker anchor for installation in snow 10 as well as handles 42 that are orthogonally attached to the tool main body 41, and has an overall substantially T-shape.

[0044] The tool main body 41 is formed into an approximately cylindrical tubular shape by die-casting aluminum. A pole fit-in portion 41a in which the pole 60 can be held is formed in the tool main body 41 such that the tool main body 41 has been cut away over half the circumference thereof over substantially the entire length in the longitudinal direction. Also, an externally pole-hold-

ing portion 41b having a semi-circular ring shape is formed at an upper end of the tool main body 41, the externally pole-holding portion 41b being located in a position that is symmetrical to the pole fit-in portion 41a in plan view and being configured to hold the pole 60 at an upper end thereof when the pole 60 has been fitted into the externally pole-holding portion 41b. A pole insertion hole 41d into which the pole 60 is to be fitted from a side surface of the pole is provided directly under the externally pole-holding portion 41b. Moreover, externally pole-holding transverse portions 41c are provided in a lower portion of the tool main body 41, the transverse portions 41c being located at respective positions that are symmetrical to the externally pole-holding portion 41b in plan view.

[0045] Hook-shaped fitting portions 43 are formed by cutting a lower end of the tool main body 41, the hook-shaped fitting portions 43 being configured to be fitted to the engagement protruding portions 22 provided at the upper end of the marker anchor for installation in snow 10 and used to rotationally press-fit or rotationally withdraw the marker anchor for installation in snow 10. The hook- shaped fitting portions 43 each include a vertical fitting hole 43a into which the corresponding engagement protruding portion 22 is to be fitted from above and a horizontal fitting hole 43b which is in communication with the vertical fitting hole 43a and into which the pole is to be laterally fitted.

[0046] FIGS. 7 to 11 schematically illustrate procedures (first to fifth steps) of a method for installing the marker anchor for installation in snow.

[0047] Installation of the marker anchor for installation in snow 10 having the above-described configuration into the snow using the mounting and demounting tool 40 is preferably performed using the following installation method.

[0048] First, as illustrated in FIG. 7, a hole HL having a diameter that is substantially equal to or slightly smaller than the diameter of the main body shaft portion 20 of the marker anchor for installation in snow 10 is formed with a drill or the like at a desired position of a snow-covered surface SGR.

[0049] Next, as illustrated in FIG. 8, the marker anchor for installation in snow 10 is driven into the hole HL in a state in which the connection spring 50 and the pole 60 have been fitted into the marker anchor for installation in snow 10. At this time, leading end portions of the brushes BR of the marker anchor for installation in snow 10 enter the hole HL in a state in which those portions are made narrower by the hole HL. If the hole HL has a large hole diameter at this time, the marker anchor for installation in snow 10 easily enters the hole HL and is thus easily installed; however, the withdrawal resistance is poor.

[0050] Next, as illustrated in FIG. 9, the mounting and demounting tool 40 is attached to the pole 60 by externally fitting the mounting and demounting tool 40 to the pole 60 from a side portion thereof, and the hook-shaped fitting portions 43 of the mounting and demounting tool 40 are fixed in such a manner as to be engaged with the engagement protruding portions 22 of the marker anchor for installation in snow 10.

[0051] Next, as illustrated in FIG. 10, the handles 42 of the mounting and demounting tool 40 are gripped, and the marker anchor for installation in snow 10 is press-fitted into the hole HL while being rotated. At this time, the brushes BR enter the hole HL in a state in which the brushes BR are made narrower as a whole. Since each column 38 of brush bristles constituting the brushes BR has a shape that is tapered toward its leading end in plan view, and the diameter of the brushes BR becomes narrower so as to fit within the range of the diameter of the main body shaft portion 20, resistance is small during rotational press-fitting, and the brushes BR easily enter the snow. Furthermore, the bristle groups 36 constituting the brushes BR are implanted at the same angle of inclination as the helical ribs 23, which are formed in the main body shaft portion 20. This facilitates the entry into the snow during rotational press-fitting. In addition, the helical ribs 23 are formed in the main body shaft portion 20. This facilitates the entry into the snow even more during rotational press-fitting.

[0052] Then, as illustrated in FIG. 11, when the marker anchor for installation in snow 10 has been screwed into the hole HL to such an extent that the marker anchor for installation in snow 10 is embedded in the snow, the mounting and demounting tool 40 is further rotated at that position (the mounting and demounting tool 40 is omitted from FIG. 11) to rotate the brushes BR at that position, thereby scraping away the surrounding snow, and further expanding the diameter of the brushes BR from the narrowed state. This step makes it possible to further increase the fixing force and the withdrawal strength of the marker anchor for installation in snow 10.

[0053] Moreover, in the installed state, since the bristle groups 36 of each brush BR are implanted such that the leading ends 36a of the bristle groups 36 in one of the two lines abut against the leading ends 36a of the bristle groups 36 in the other line, and vice versa, the leading end portions of the bristle groups 36 in the two lines overlap, and therefore, the withdrawal resistance can be increased.

[0054] On the other hand, to remove the pole 60, the mounting and demounting tool 40 is attached to the pole 60 by externally fitting the mounting and demounting tool 40 to the pole 60 from a side portion thereof, the hook-shaped fitting portions 43 of the mounting and demounting tool 40 are fixed in such a manner as to be engaged with the engagement protruding portions 22 of the marker anchor for installation in snow 10, and the marker anchor for installation in snow 10 is withdrawn while being rotated. At this time, the marker anchor for installation in snow 10 is withdrawn in a state in which the hook-shaped fitting portions 43 of the mounting and demounting tool 40 are engaged with the engagement protruding portions 22 of the marker anchor for installation in snow 10, and thus the pole 60 can be easily withdrawn. Moreover, in rota-

tional withdrawal during the removal as well, the helical ribs 23, which are formed in the main body shaft portion 20, and the bristle groups 36, which are implanted at the same angle of inclination as the helical ribs 23, facilitate the rotation.

[0055] Note that although the brushes BR of the marker anchor for installation in snow 10 according to the present embodiment are formed of six columns of brush bristles, the number of columns may be changed depending on the configuration of the bristle groups 36. Moreover, although each column 38 of brush bristles consists of two lines, the number of lines is not limited to two, and may be three, for example, or may be another number of lines. Moreover, although each column 38 of brush bristles is configured such that two lines of brush bristles are implanted inclined toward each other so that the leading end portions of the brush bristles in one of the two lines abut against the leading end portions of the brush bristles in the other line, and vice versa, the present invention is not limited to this configuration. A configuration may also be adopted in which the brush bristles in one of the two lines are implanted upright, and the brush bristles in the other line are implanted in an inclined state so that their leading end portions abut against the leading end portions of the upright brush bristles in the one line.

List of Reference Numerals

[0056]

10 Anchor
20 Main body shaft portion
21 Fitting hole
22 Engagement protruding portion
23 Helical rib
24 Small protrusion

30 Brush shaft portion
31a Leading end entry portion
31a Escape groove
31 Protruding portion
35 Implantation hole
36 Bristle group
37 Line of brush bristles
37a Single line of brush bristles
37 Opposing line of brush bristles
38 Single column of brush bristles (consisting of two lines of brush bristles)

40 Mounting and demounting tool
41 Tool main body
41a Pole fit-in portion
41b Externally pole-holding portion
41c Externally pole-holding transverse portion
41 Pole insertion hole
42 Handle
43 Hook-shaped fitting portion
43a Vertical fitting hole 43b
43b Horizontal fitting hole

50 Connection spring
60 Pole (marker)

BR Brush
SGR Snow-covered surface
HL Hole

Claims

1. A marker anchor for installation in snow, comprising a helical rib portion provided on a shaft main body and brush portions extending outward in a radial direction at a shaft leading end,
wherein the brush portions are arranged in a plurality of columns along an axial direction in such a manner as to be inclined toward a shaft base end, and the brush portions in each column are arranged in a plurality of lines along the axial direction and formed such that leading end portions of the brush portions in one of the plurality of lines abut against leading end portions of the brush portions in another one of the plurality of lines, and vice versa.

2. The marker anchor for installation in snow according to claim 1, wherein the brush portions are arranged at an angle similar to a helical angle of the helical rib portion.

3. The marker anchor for installation in snow according to claim 1 or 2, wherein a plurality of protrusions are formed on a circumferential surface of the shaft main body.

4. A marker comprising the marker anchor for installation in snow according to any one of claims 1 to 3.

5. A mounting and demounting tool configured to mount or/and demount the marker according to claim 4, the mounting and demounting tool comprising:

a fit-in portion configured to be externally attached to the marker; and
an engagement portion configured to be engaged with a base end portion of the marker anchor for installation in snow and to enable the marker anchor for installation in snow to be withdrawn while being rotated.

6. A method for installing the marker including the marker anchor for installation in snow according to claim 4, the method comprising the steps of:

forming a hole in snow, the hole having a smaller diameter than the shaft main body;
driving and fixing a portion of an overall length

of the marker anchor for installation in snow into the hole;

externally attaching a mounting or/and demounting tool to the marker and engaging the mounting and demounting tool according to claim 5 with the marker anchor for installation in snow;

press-fitting the marker anchor for installation in snow while rotating the mounting or/and demounting tool in an insertion direction; and

expanding a diameter of the brush portions by further horizontally rotating the marker anchor for installation in snow in a state in which the marker anchor for installation in snow has been embedded in a predetermined position.

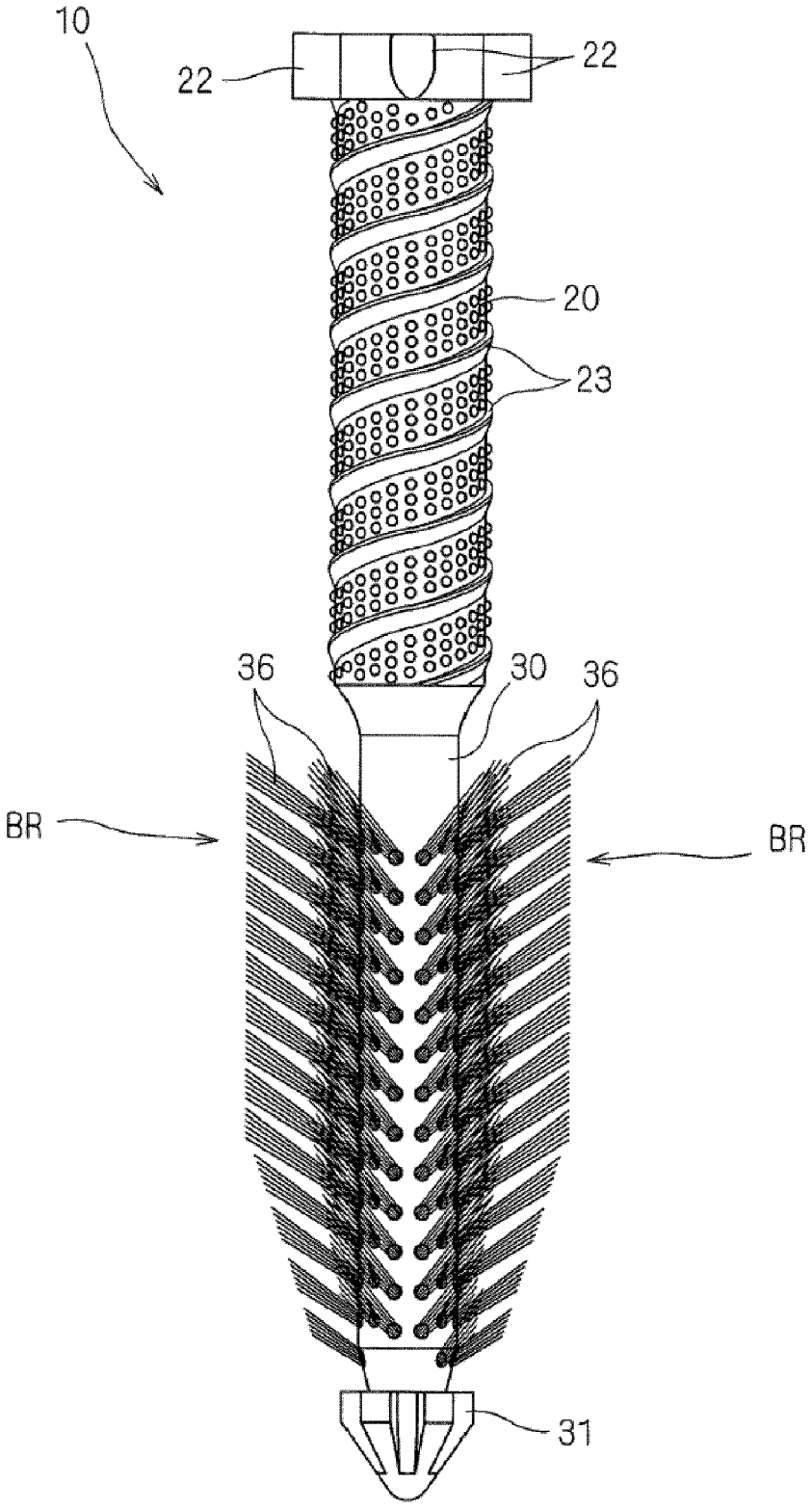
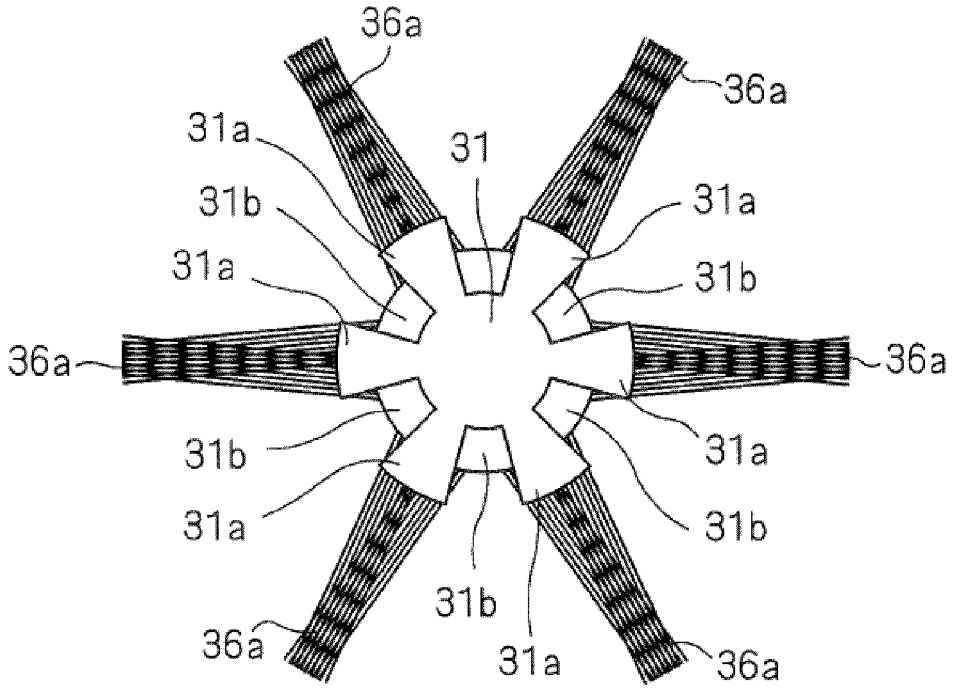


Fig. 1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31a
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31b
31a
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31b
36a
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31a
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31b
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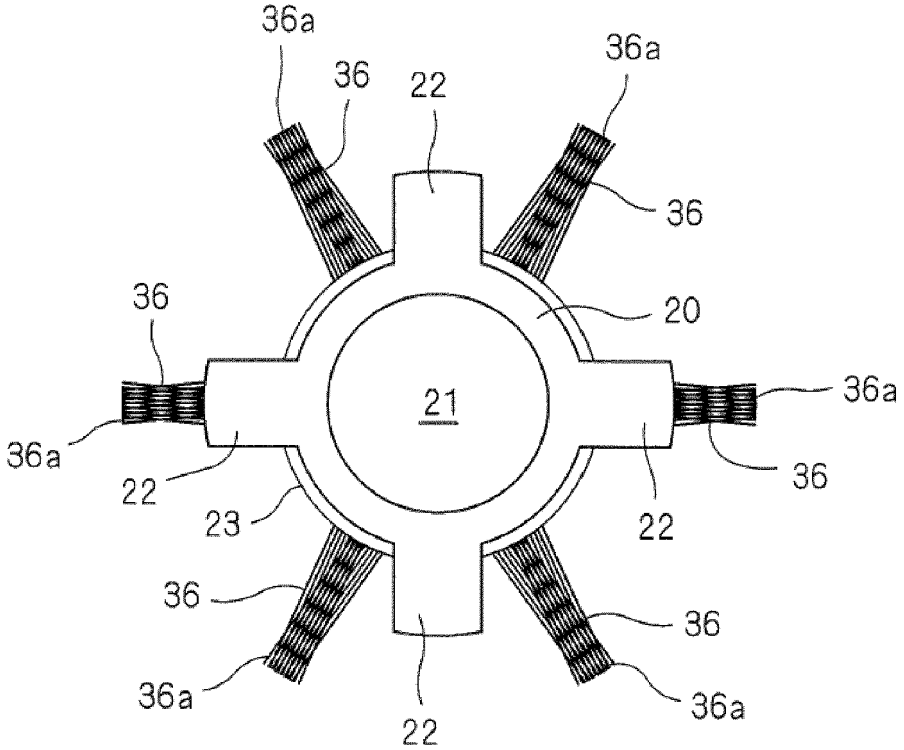
36a
31a
36a

Fig. 2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36a
22

Fig. 3

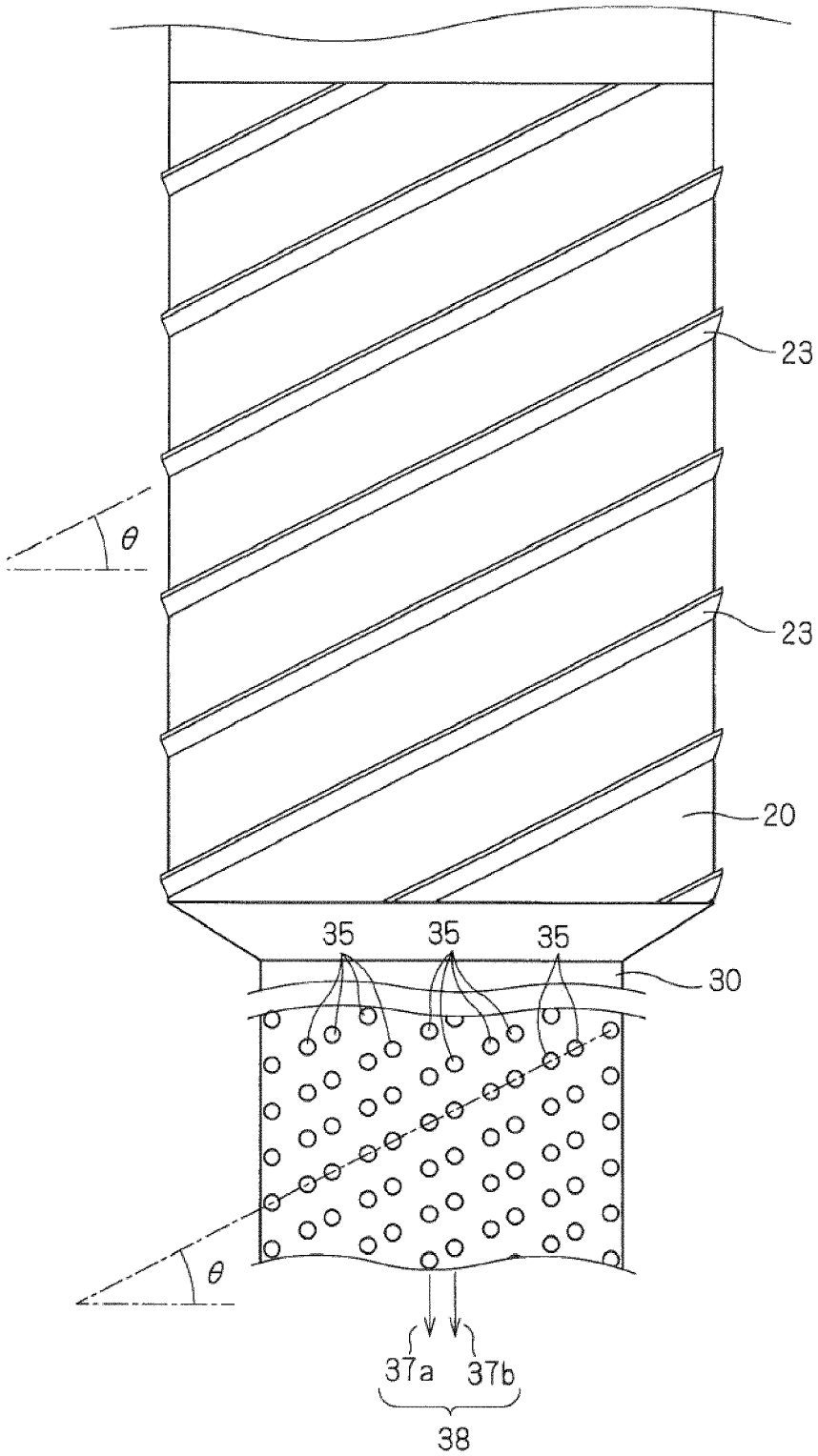


Fig. 4

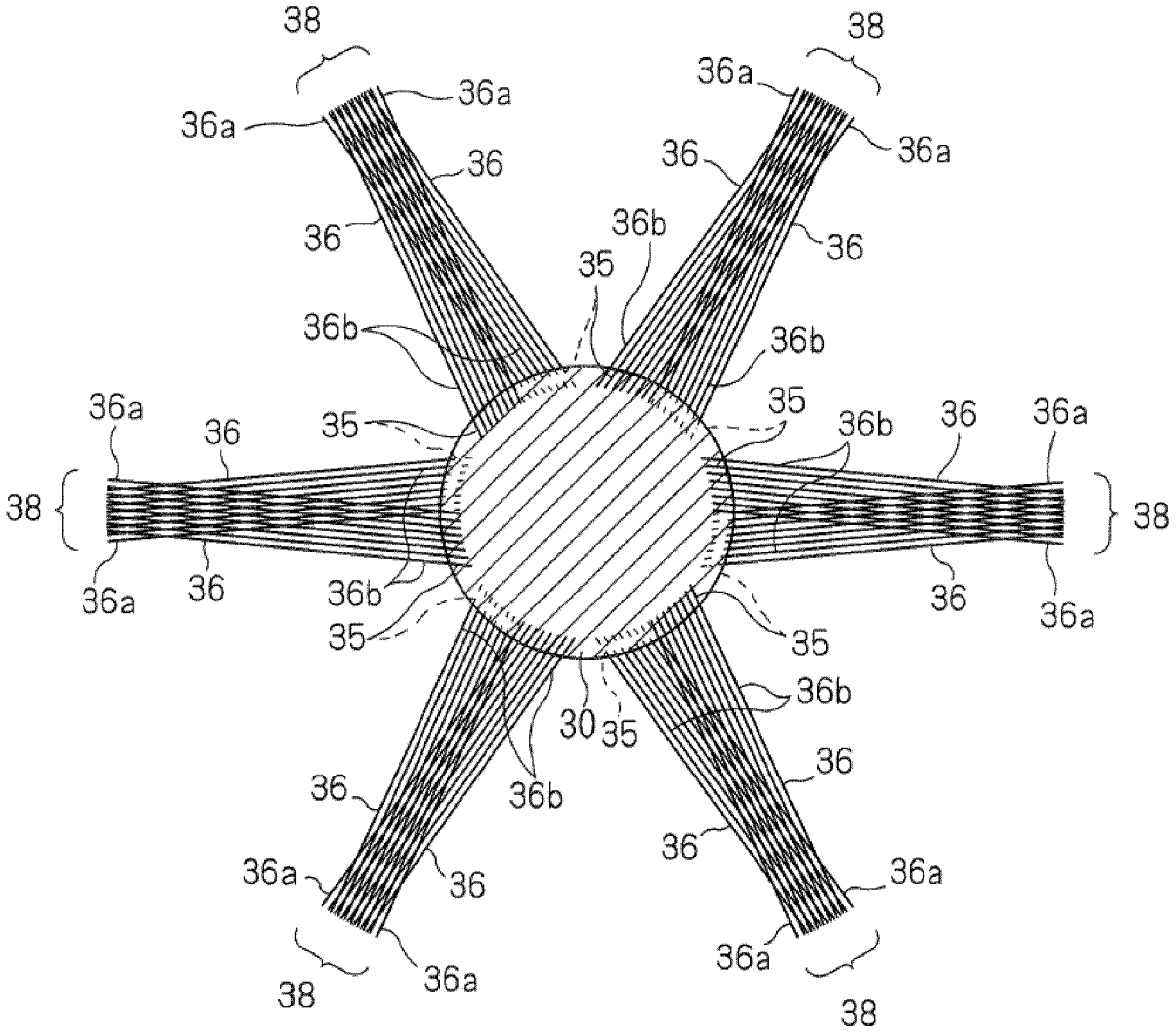
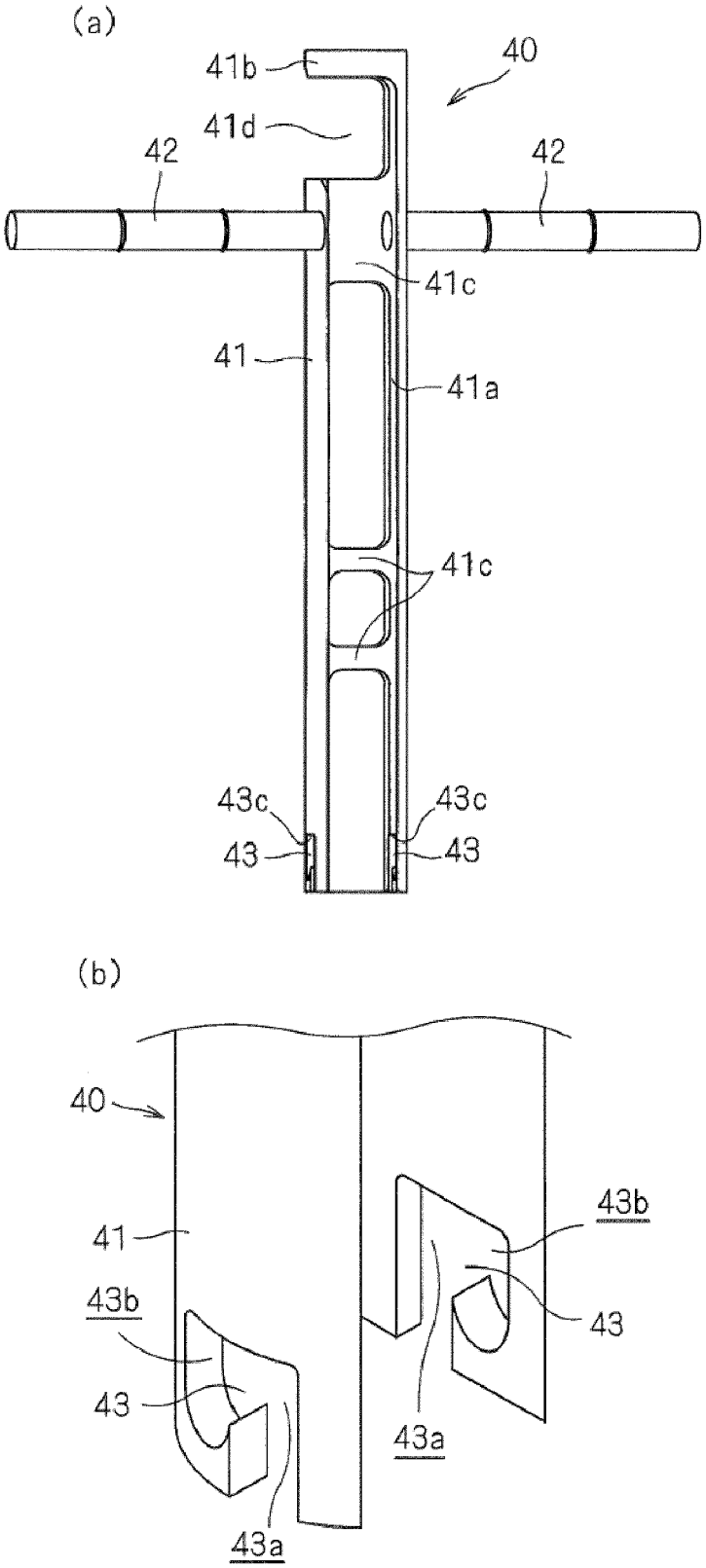


Fig. 5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41d
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42
41c
41
41a
41c
43c
43c
43
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(b)
40
41
43b
43b
43
43
43a
43a

Fig. 6

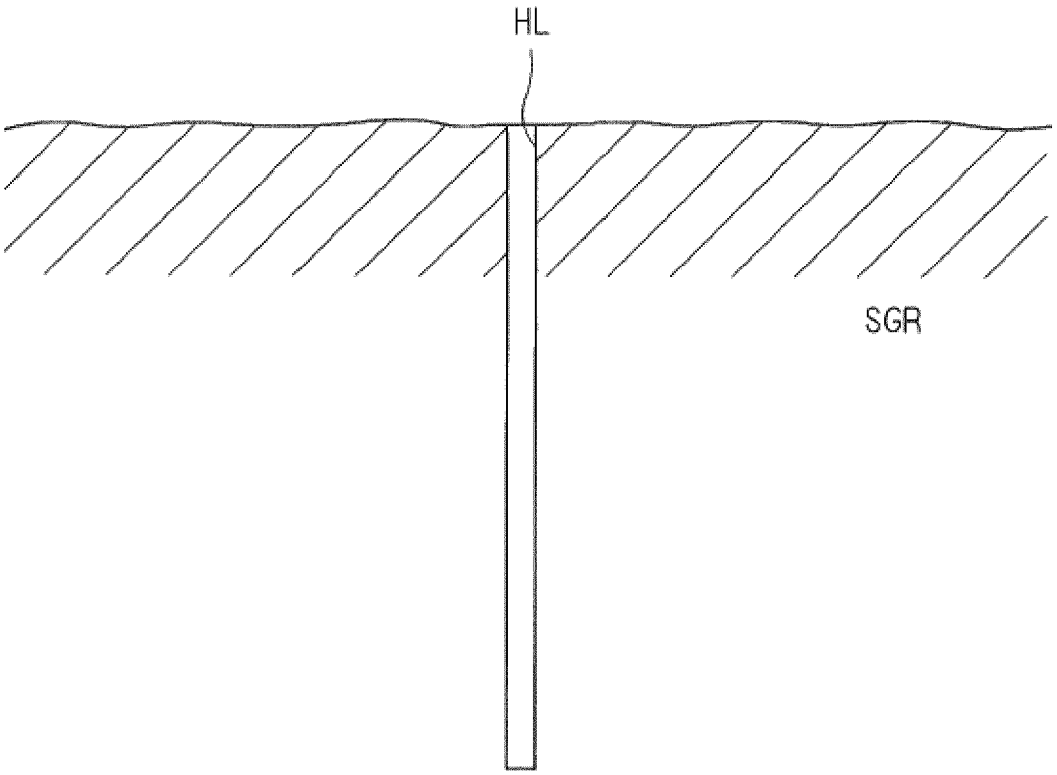

Fig. 7

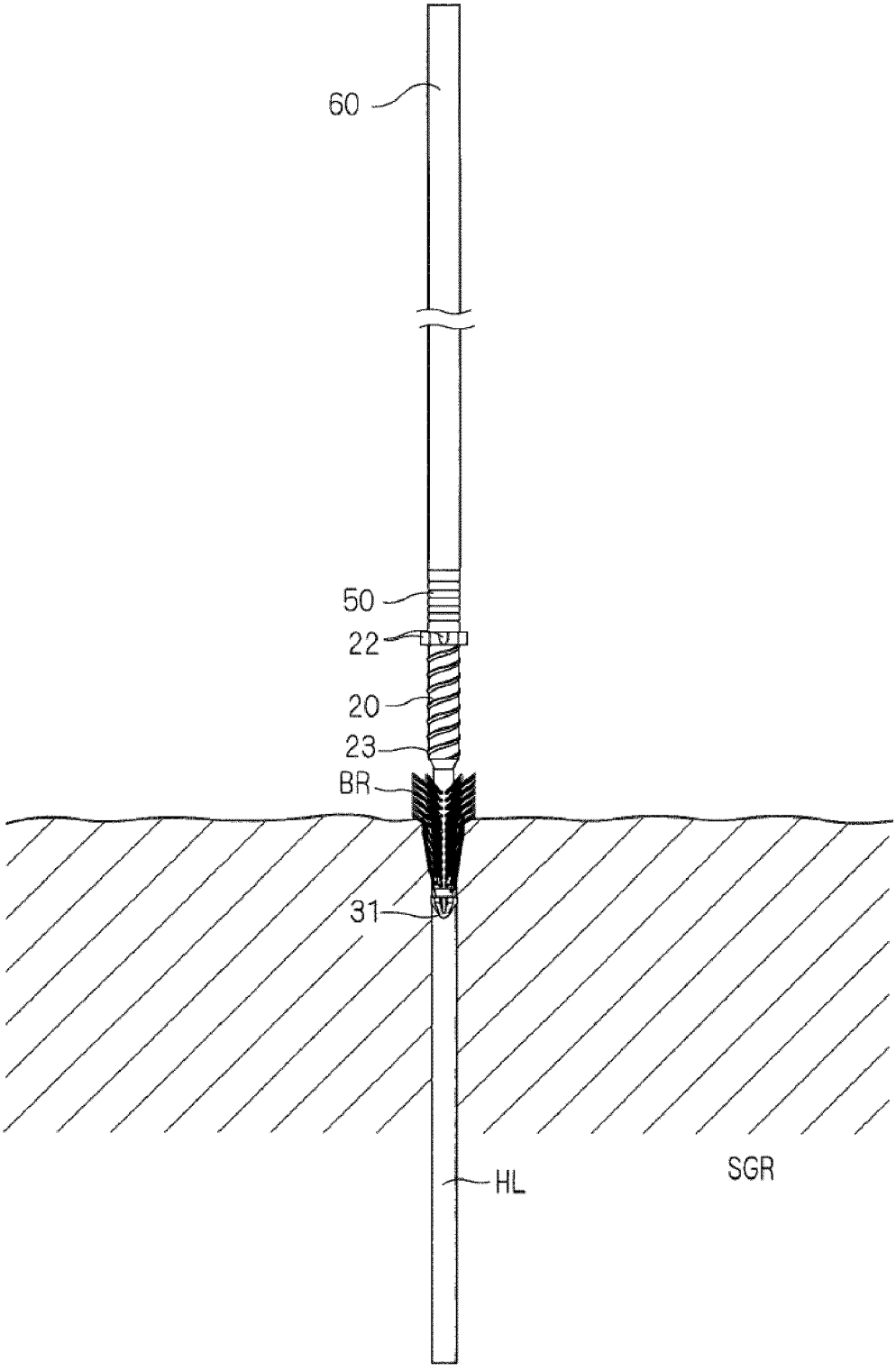

Fig. 8

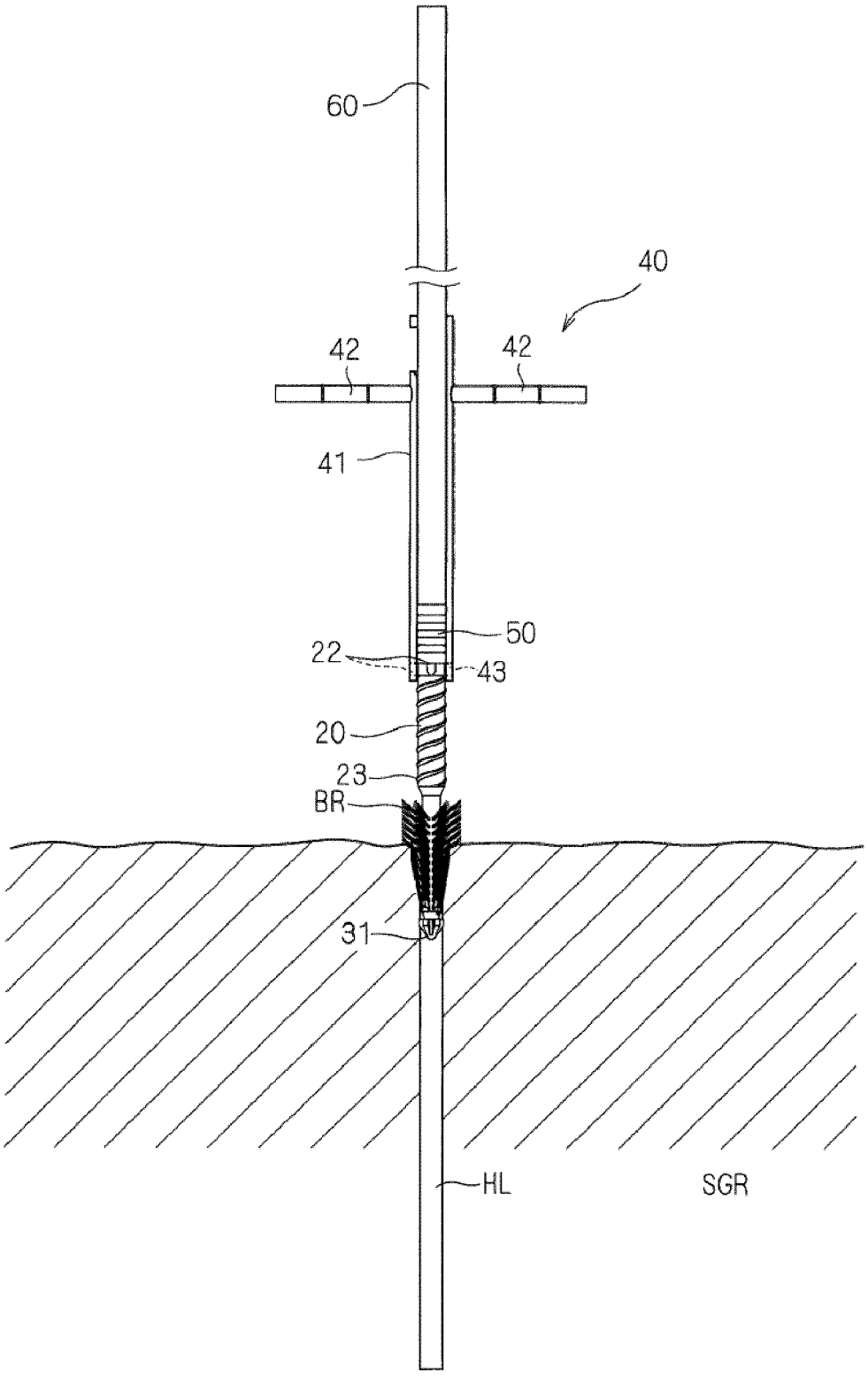

Fig. 9

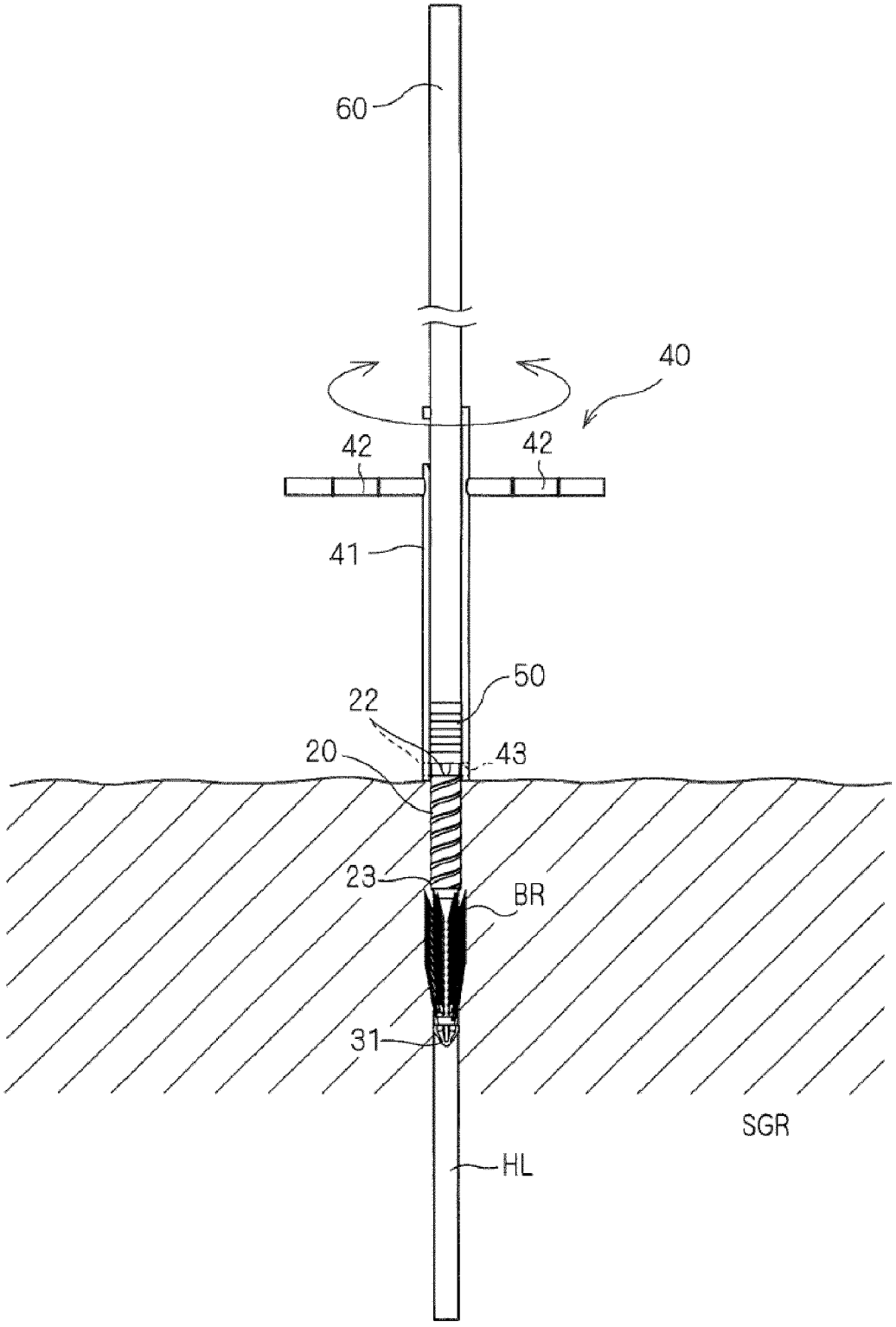

Fig. 10

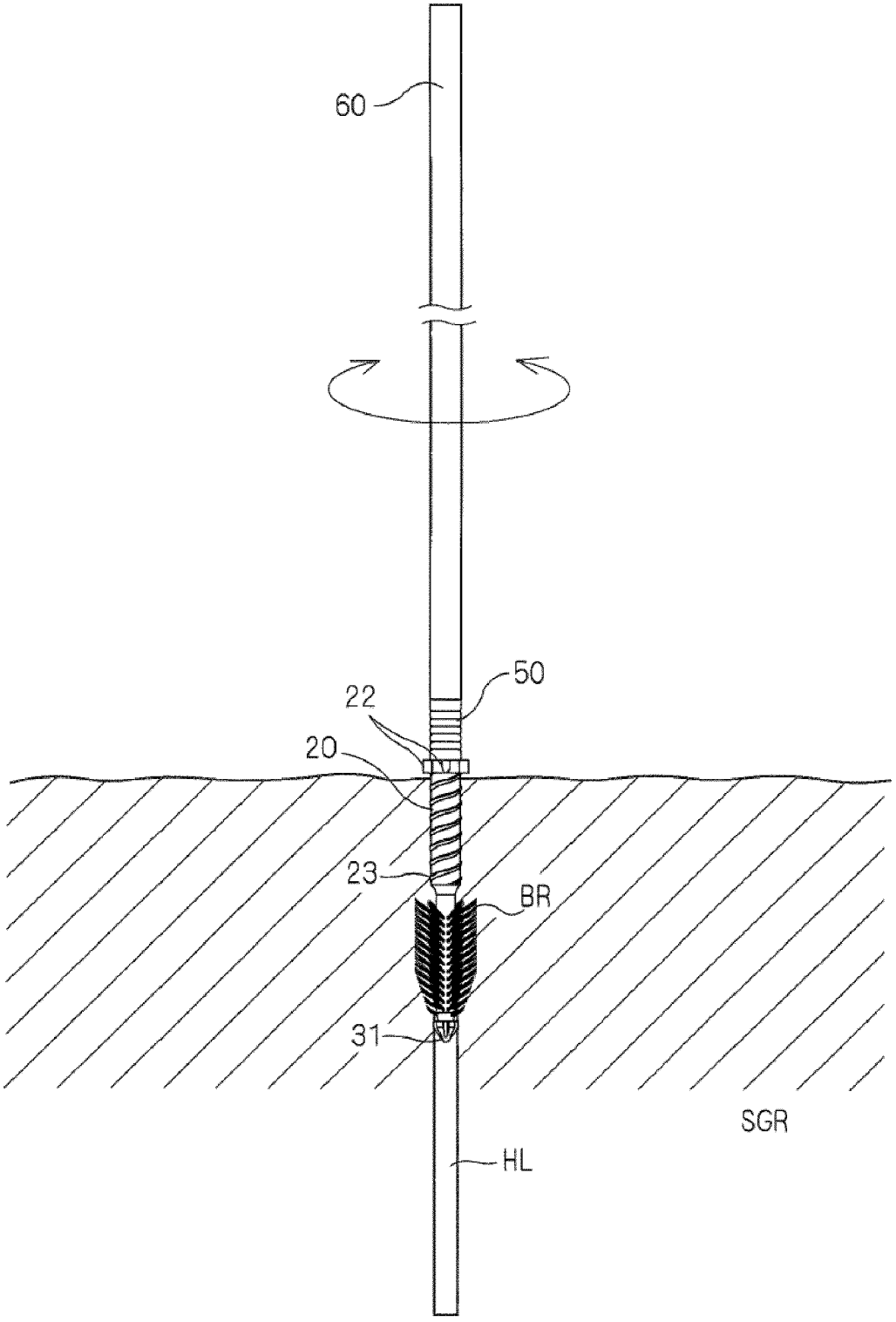

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 1955

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y A	US 2003/082026 A1 (BRLETICH MICHAEL F [US] ET AL) 1 May 2003 (2003-05-01) * paragraph [0046] - paragraph [0054]; figures 6-9 *	1,2,4,6 3	
X	JP H11 57114 A (K & K KOGYO KK) 2 March 1999 (1999-03-02) * paragraph [0012] - paragraph [0012]; figure 3 *	5	

TECHNICAL FIELDS SEARCHED (IPC)

A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 February 2017	Murer, Michael

CATEGORY OF CITED DOCUMENTS

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03-02-2017

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- US 7992900 B **[0004] [0005] [0006] [0008] [0009]**