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(54) **METHOD, APPARATUS AND ARRANGEMENT FOR REPAIRING ICE OF ICE FIELD**

(57) A method for repairing an ice of an ice field comprising drilling, by an ice repairing apparatus, at least one hole to the ice of the ice field to remove, at least partly, a damaged ice, providing a solid ice insert having substantially the same size as the at least one hole, and inserting the ice insert into the at least hole such that a top surface of the ice insert is substantially on the same level with a surface of the ice of the ice field. An ice repairing apparatus comprising a rotating blade configured to drill a hole to an ice of an ice field, a rotating shaft configured to rotate the blade, wherein the shaft comprises a first end coupled with the blade, and a second end configured to be coupled with a power source for rotating the shaft; and a limiter coupled with the shaft configured to set against a surface of the ice and to prevent drilling of the blade into the ice when a desired depth of the hole is achieved. An ice repairing arrangement comprising an ice repairing apparatus, a mould for producing at least one ice insert, and freezer configured to freeze and/or to keep frozen at least one ice insert.

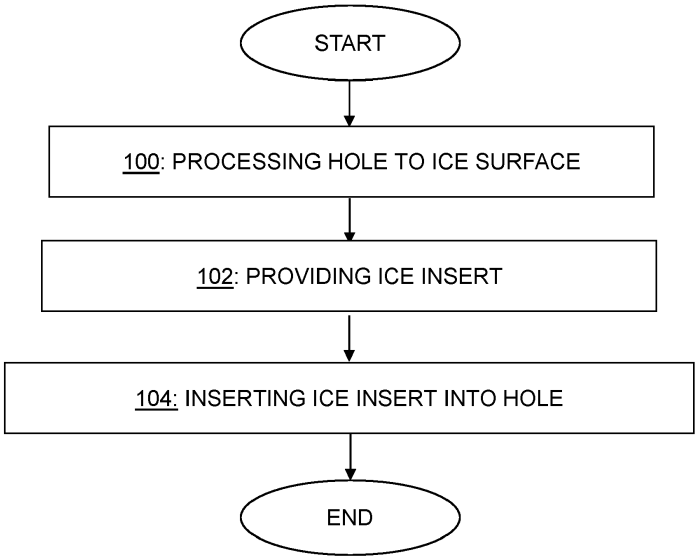

FIG. 1A

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Description

Field

[0001] The invention relates to a field of an ice repairing, especially an ice surface of an ice field used in an ice sport.

Background

[0002] A many kinds of ice sports are performed in an ice field. A quality of an ice of the ice field is very essential in the ice sports. A surface of the ice can be damaged during the ice sports which may cause many issues. For example, skates used in the ice sport may cause cracks on the surface of the ice field which may affect the ice sport. The crack on the ice surface may cause dangerous situations for athletes and therefore damages like the cracks shall be repaired. Normally the surface of the ice is repaired by drivable ice resurfacing machines. Use of the machines is very time-consuming process and hence, the machines are not used during the sport. For example, in ice hockey, the machine is normally used during intermissions not during periods. The damages on the ice surface are normally tried to repair manually during the periods. Currently there are no proper solution available in the market for manual repairing of the ice.

[0003] Hence, there is a need for the manual ice repairing solution which is quick and easy to use.

Brief description

[0004] The present invention is defined by the subject matter of the independent claims.

[0005] Embodiments are defined in the dependent claims.

[0006] The embodiments and features, if any, described in this specification that do not fall under the scope of the independent claim are to be interpreted as examples useful for understanding various embodiments of the invention.

List of drawings

[0007] Example embodiments of the present invention are described below, by way of example only, with reference to the accompanying drawings, in which

Figure 1A illustrates a flow chart of a method for repairing an ice of the ice field according to an embodiment of the invention;

Figures 1B, 1C, 1D and 1E illustrate the method for repairing an ice of the ice field according to an embodiment of the invention;

Figures 2A, 2B, 2C, 2D and 2E illustrate an ice repairing apparatus according to an embodiment of the invention; and

Figure 3 illustrates ice repairing arrangement according to an embodiment of the invention.

Description of embodiments

[0008] The following embodiments are only examples. Although the specification may refer to "an" embodiment in several locations, this does not necessarily mean that each such reference is to the same embodiment(s), or that the feature only applies to a single embodiment. Single features of different embodiments may also be combined to provide other embodiments. Furthermore, words "comprising" and "including" should be understood as not limiting the described embodiments to consist of only those features that have been mentioned and such embodiments may contain also features/structures that have not been specifically mentioned. All combinations of the embodiments are considered possible if their combination does not lead to structural or logical contradiction.

[0009] A quality of an ice, or an ice surface, is very essential in ice sports. The ice can easily damage during the sport, and typical damages are cracks caused by skates, for example. Repairing of the damages should be performed also during the sport and therefore a fast and reliable repairing is essential since the repairing process should cause as less delays to the sport as possible. Often the damages like cracks on the ice surface are tried to repair manually just by inserting/compressing slush and/or water into the crack. Repairing like this does not last long. Hence, the aim of the invention is to provide the fast and reliable manual solution for repairing the ice used in the ice sport.

[0010] According to a first aspect of the invention, illustrated in Figure 1A, there is provided a method for repairing an ice of an ice field comprising following step: processing [100], by an ice repairing apparatus, at least one hole to the ice of the ice field to remove, at least partly, a damaged ice; providing [102] an ice insert configured to fit into the at least one hole; and inserting [104] the ice insert into the at least hole such that a top surface of the ice insert is substantially on the same level with a surface of the ice of the ice field.

[0011] The ice field in this context must be understanded broadly. It refers all places having the ice (ice surface) for performing some ice sport. The ice field is called with different names in the different sports. Anyway, the common feature is the ice on which the sport is performed. The ice field may be placed in an indoor or outdoor. The ice field may be artificial or natural. The ice sport may be ice hockey, ringette, curling, bandy, figure skating or speed skating, for example. The term "ice surface" refers to the ice of the ice field, or a top surface of the ice of the ice field. One example of the ice sport in which the invention may be applied is ice-hockey which is usually played in the indoor ice rink (ice stadium). The ice-hockey is very fast game in which a lot of players are on the ice at same time. This causes a lot of stress to the ice surface and very often also damages to the ice which should be

repaired quickly and permanently during the game.

[0012] Referring now to Figure 1B which illustrates the ice surface 208 of the ice field having the crack C which is typical damage on the ice. The crack is often caused by a sharp skate, for example. The crack is often elongated cavity/hole on the surface of the ice which may disturb the ice sport or even cause dangerous situations for the athletes. The term "damaged ice" may refer, for example, to the crack on the ice surface. It is good to understand that the damage may be other than the crack(s) as well. The damage is normally limited to relatively small area such that a manual repairing is possible/reasonable to do. It is also possible that there are several damages on the ice in different locations and each of them may be repaired separately.

[0013] As illustrated in Figure 1A, the first step is in the repairing method is removing of the damaged ice spot by the ice repairing apparatus. The removal of the ice is performed by processing a hole H to the ice such that the damaged ice spot is, at least partly, removed. The processing of the hole comprises drilling. The ice repairing apparatus is configured to produce the hole to the ice surface such that a depth of the hole is predetermined. The apparatus is a part of the invention and is presented later in this application in detail. A diameter D1 of the drilled hole H may be 100 - 150mm, for example. Thus, if the damage on the ice surface 208 is smaller than the diameter of the hole, the whole damaged part of the ice may be removed by one drilling. The depth of the hole D2 may be 20 - 40mm. for example. The dept refers how far inside the ice the hole extends. In some case, as illustrated in Figure 1B, the size of the damage (damaged part of the ice) is bigger that the diameter of the hole, then two holes H_1, H_2 may be drilled side by side covering the whole damage. For example, if the damage is the crack having length of 200mm, two holes may be required to cover the whole damaged area of the ice. So, by drilling several holes in different directions side by side, also larger damaged areas may be covered.

[0014] In an embodiment, the ice repairing apparatus comprises a heated element. The heated element may be an iron, for example. When the iron is hot, it can progress into the ice and produce the hole.

[0015] Figure 1C is the same as Figure 1B but from a side view. The holes H_1, H_2 go deeper into the ice 208 than the crack C but this may also be the other way around such that the crack C goes deeper into the ice than the holes H_1, H_2.

[0016] Figure 1D illustrates a situation in which the crack is removed and there is two holes H_1, H_2 on the surface of the ice 208. As described, the number of the drilled holes depends on the size of the damage going to be repaired. In the example case of Figures 1B - 1D there is two holes.

[0017] In the second step of the method the ice insert(s) is provided. The ice insert II is a piece of ice configured to fit into the drilled hole. The ice insert may be one uniform piece of ice. In other words, the ice insert is a solid (hard) insert configured to be inserted into the hole such that it substantially fulfils the drilled hole. One or more inserts may be inserted into the hole. As described above, slush is traditionally used to repair the holes in the ice. The slush is soft which is very problematic from the repairing point of view. It may take for a long time before the slush is frozen (solidified), and even after that the repaired spot may not be as hard as the ice around it. Hence, the hole filled by the slush is prone to break again easily. The solid ice insert is immediately hard providing much more robust repairing of the ice. The ice insert may be frozen in the freezer and therefore it is as hard as the ice around the hole to which the insert is inserted.

[0018] In an embodiment, the ice insert may have substantially the same shape as the hole. For example, the drilled hole may be cylindrical, and the insert may have the same cylindrical shape. The ice insert may be produced by freezing water in a mould. A cavity of the mould determines the size of the ice insert. There may be a plurality of the cavities in the one mould. The ice insert(s) may be stored in the mould until it is used for repairing. The mould with the inserts may be stored in the freezer. A diameter of the ice insert may be a little bit smaller than the diameter of the hole such that the insert fits into the hole properly. A difference between the diameter of the hole and the insert may be some millimetres, for example. Height of the insert may be substantially the same as the depth of the hole, and then a top surface of the insert II_TS is on the same level than the surface of the ice 208. Then there is not any remarkable step between the top surface of the insert II_TS and the ice surface 208.

[0019] In the third step of the method the ice insert(s) is inserted into the hole(s) such that top surface of the insert is on the same level than the surface of the ice when the insert is in the hole forming a uniform and even ice surface. As described above, the insert is configured to fill the hole completely nevertheless there may be minor gap between side walls (surfaces) of the insert and the hole.

[0020] In an embodiment, the method further comprises smoothening [106], by a smoothening tool, the surface of the ice of the field in an area of the hole after inserting the ice insert into the hole. The smoothening tool may be a scraper, for example. The scraping ensures that the surface of the ice in the repaired area is uniform and even enough. For example, a small gap between the insert and hole can be filled by scraping. The scraping removes some slush from the surface of the ice which goes into the gap and fills it.

[0021] In another embodiment, the smoothening tool is a (hot) iron. The iron may be used for smoothening the repaired are of the ice by pressing and moving the iron in the repairing area. Steps between the ice surface and the top surface of the ice insert are melt forming even and uniform entity. The water (from melt ice) flows to the gap between the insert and the ice fields which enhance freezing of the insert with the ice field. In addition, after using the iron, the scraper may also be used.

[0022] In an embodiment, illustrated in Figure 1E, the ice insert II is dimensioned such that an outer surface of the insert II_OS is configured to freeze to an inner surface of the hole H_IS when the ice insert II is inserted into the hole H. In other words, the outer surface of the insert comes so close to the inner surface of the hole that the surfaces freeze (merge) together. When the insert is frozen with the ice of the ice field, they form the uniform ice surface. For example, the diameter of the hole may be 120mm and the diameter of the insert may be 118mm. This ensures that the insert fits inside the hole without problems, and the gap is so small that the insert freezes together with the inner surfaces of the hole. It is also possible to put some water and/or slush to the gap to enhance the freezing. The outer surface may refer to a bottom and/or a side surface of the insert and hole. The top surface of the insert may not be in direct contact with the inner surfaces of the hole.

[0023] In an embodiment, a temperature of the ice insert is substantially the same as a temperature of the ice of the ice field. This also enhances freezing of the insert together with the ice of the ice field. For example, the temperature of the ice in the ice field may be between 3-15 minus degrees, and the same temperature is also used with the ice insert. The temperature may vary in the different ice sports.

[0024] The above-mentioned method provides very simple but efficient way to repair the surface of the ice. Inserting the ready-made ice insert into the drilled hole as described above enables very fast and reliable way to repair damages of the ice surface. The ice insert merges with the ice of the ice field such that after repairing it is even difficult to see that the ice is repaired. The repairing is very durable and can be made manually by one person. The manually in this application refers to the repairing which can be performed by hand with the handheld device(s).

[0025] According to a second aspect of the invention there is provided the ice repairing apparatus comprising a rotating blade configured to drill the hole to the ice of an ice field, a rotating shaft configured to rotate the blade, wherein the shaft comprises a first end coupled with the blade, and a second end configured to be coupled with a power source for rotating the shaft; and a limiter coupled with the shaft configured to set against the surface of the ice and to prevent drilling of the blade into the ice when a desired depth of the hole is achieved.

[0026] Referring to Figures 2A - 2C, the ice drilling apparatus 200 comprises the rotating blade 202 configured to drill into the ice and to provide the hole for the ice insert. The blade drills into the ice when the set against the surface of the ice and pressed towards the ice. The blade is configured to drill the round hole. The blade is configured to cut the ice by chipping, and it comprises one or more cutting edges 212. A length of the blade L1 determine the diameter of the hole. As illustrated in Figure 1C, a shape of the blade may be substantially rectangle having cutting edges on the other longer side. This longer side is set against the ice when using the apparatus for drilling the hole

[0027] Still referring to Figures 2A - 2C, the ice drilling apparatus further comprises the shaft 204 configured to be rotatable around its central axis (longitudinal axis) CA. The shaft may have cylindrical shape and comprises the first end E1 and the second end E2. The first end is coupled with the blade such that the rotational movement of the shaft is transferred to the blade. The second end is configured to be coupled with the power source. The power source may be a hand-held drill machine, for example. Hence, the apparatus can be coupled and used with the standard drilling machines.

[0028] Still referring to Figures 2A - 2C, the ice drilling apparatus further comprises the limiter 206 configured to limit a drilling depth of the apparatus 200. The drilling dept refers to the depth of the hole to be drilled. The limiter is coupled with the shaft in the vicinity of the blade. The limiter is configured to set against the ice surface such that it allows drilling of the blade into the ice, and when the desired depth of the hole is achieved, the limiter prevents drilling of the blade deeper into the ice. In one embodiment, the limiter may set against the ice surface when the desired depth of the hole is achieved. The size of the limiter is larger than the size (diameter) of the hole so the limiter does not fit inside the hole and hence, it can prevent progress of the blade into the ice. The limiter further ensures that the hole is processed perpendicularly into the ice in relation to the surface of the ice field.

[0029] In an embodiment, the limiter comprises a first and a second position and is configured to move between them. Referring now to Figure 2D and 2E, the limiter 206 is configured to move between the first and the second position P1, P2 along the central axis CA of the shaft 204. Let's now look at Figure 2D which illustrates the first position P1 of the limiter 206. In the first position P1 the limiter 206 is set against the ice surface 208, but the blade 202 is not drilled into the ice 208 yet. This is a start position of the drilling process. Figure 2E illustrates the second position P2 of the limiter 206 in which the blade 202 is drilled into the ice and has achieved the desired depth of the hole D2. As can be seen in Figures 2E and 2D, the limiter 204 is configured to move along the central axis CA of the shaft 204 when moving from between the positions P1 and P2.

[0030] It is important to realize that moving of the limiter means that the limiter moves in relation to the shaft and the blade. It can also be understood the other way around, such that the shaft and blade move in relation to the limiter. Anyway, the main thing is that the position of the limiter is changed in relation to the shaft and the blade.

[0031] In an embodiment, the limiter moves from the first position to the second position when the apparatus is pressed against the ice such that the blade starts to drill inside the ice. Still referring to Figure 2E, the first position P1 is the start position of the drilling process in which the blade is not started to cut the ice yet. When the apparatus 200 and blade 202 is pressed slightly

against the ice 208 (downwards), the rotating blade 202 starts to intrude into the ice 208 such that the surface of the ice 208 forces the limiter 206 to move along the central axis of the shaft towards the second position. Referring now to Figure 2D, in the second position the rotating blade 202 is drilled into the ice 208 such that the hole H with the desired depth D2 is produced. When the second position P2 is achieved, the limiter cannot move any longer upwards in the direction of the central axis of the shaft. Then the limiter, which is larger than the diameter of the hole, prevents the progress of the blade any deeper into the ice.

[0032] In an embodiment, the limiter is configured to cover substantially the hole when the limiter is set against the surface of the ice. The limiter may be round shaped as illustrated in Figure 2B and its diameter is larger than the diameter of the hole. Hence, when the limiter is set against the ice, it covers the hole drilled by the blade. In other words, the hole is not, at least completely, visible under the limiter. This improves safety at work since the rotating blade is inside the hole which is covered by the limiter.

[0033] In an embodiment, the limiter 206 may comprise a hole 222 in the middle of the round shape as illustrated in Figure 2C, for example. The shaft may be coupled to the hole. The hole may comprise a flange (collar) around the hole used for coupling the shaft. The limiter and the shaft may be coupled together by a locking pin 220 through the flange, for example.

[0034] The movement of the limiter between the first and the second positions P1, P2 may be implemented such that the shaft 204 comprises a groove 218 configured to receive the locking pin 220 of the limiter 206. The groove 218 extends in the direction of the longitudinal axis CA of the shaft 204 and extends through the shaft 204. This enables movement of the locking pin in the groove. The limiter comprises the hole 222 for receiving the shaft 204 such that the shaft can move in the hole in the direction of the central axis CA of the shaft. In other words, the shaft can go through the hole. Hence, when the limiter is coupled with the shaft by the locking pin, the limiter can move with the pin when the pin is moving in the groove. This enables movement of the limiter between the first and the second positions.

[0035] Referring now to Figure 2A, in an embodiment, the limiter 206 further comprises at least one opening 210 for removing the drilled ice from the hole H when the limiter 206 is against the surface of the ice 208. Hence, the drilled ice can progress out of the hole and under the limiter. This enables better progress of the blade into the ice. There may also be a plurality of openings in the limiter.

[0036] In an embodiment, illustrated in Figure 2A and 2C the limiter 206 further comprises an elastic member 212 configured to resist the movement of the limiter 206 from the first position P1 to the second position P2. The elastic member is further configured to return the limiter 206 to the first position (P1) when the blade 202 is removed from the hole H. In an embodiment, the elastic member is a coil spring placed around the shaft such that the shaft is substantially inside the coil spring to resist the movement of the limiter along the central line of the shaft. The spring is compressed (loaded), at least partly, in the second position of the limiter, and uncompressed (unloaded) in the first position. The spring tends to recover from the compressed state to uncompressed state which means that spring tends to push the limiter from the second position to the first position. So, when the blade is removed from the hole and the surface of the ice does not force the limiter anymore to or towards the second position, the spring returns the limiter back to the first position.

[0037] In an embodiment, a location of the spring in the shaft may be adjusted. The spring may be coupled with a threaded portion having an inner thread. The treaded portion may be a nut, for example. The shaft may further comprise a portion having an outer thread. The threaded portion of the spring may be coupled with the threaded portion of the shaft making possible to adjust the location of the spring in the shaft. This makes possible to adjust the second position of the limiter, in other words, it makes possible to adjust the depth of the hole processed by the apparatus.

[0038] Referring to Figure 2A - 2E, in an embodiment, the limiter 206 comprises an inner space IS configured to receive the blade 202 in the first position P1 such that the limiter 206 covers, at least, partly the blade 202. Figure 2A and 2D illustrate the limiter 206 in the first position P1 from the side view. In the first position the blade is not visible from the side since it is inside the limiter. In other words, a shape of the limiter is a cup, and the blade is inside the cup in the first position. This protects the blade and also the operator of the apparatus from the sharp blade.

[0039] In an embodiment, illustrated in Figure 2C, the shaft 204 is coupled with the blade 202 from a middle such that the blade 202 extends perpendicularly from the shaft 204 to two opposite directions. As described above, the shape of the blade may be substantially rectangular, and the shaft, in the first end, may comprise a slot 214 configured to receive the blade. The slot 214 is substantially in the middle of the blade when the blade and the haft are coupled together. The blade may be fixed with the shaft by a screw(s), for example. Since the blade is in the middle of the shaft, the blade extends perpendicularly from the shaft to two opposite directions. The direction is perpendicular to the central axis of the shaft. The blade rotates around the central axis of the shaft.

[0040] In an embodiment, the blade is configured to drill the hole having a flat bottom. The cutting edge(s) of the blade may be substantially straight, and perpendicular in relation to the central line as illustrated in Figure 2C, for example. Therefore, the hole drilled by the blade has the flat bottom illustrated in Figure 1C, for example. If the bottom surface of the ice insert is flat, it is important that the bottom of the hole is flat to avoid air pockets in

the ice field.

[0041] Referring now to Figure 2A, in an embodiment, the apparatus 200 further comprises a guiding member 216 for guiding the blade 202 into the ice 208. The blade, described above, can easily move when rotating and is set against the ice. This may cause issues for positioning of the hole in the ice surface. The guiding member alleviates this issue. The guiding member may be a standard drill bit with tapered tip (taper shank). In other words, the drill bit has a sharp tip. The drill bit may be a twisted drill, for example. The tapered/sharp tip enables easy and accurate positioning of the guiding member and the blade.

[0042] According to a third aspect, illustrated in Figure 3, there is provided an ice repairing arrangement 300 comprising an ice repairing apparatus 200, a mould 302 for producing at least one ice insert II and a freezer 304 configured to freeze and/or to keep frozen at least one ice insert II.

[0043] The mould may be made of plastic like silicone, for example. It may comprise one or more cavities having the shape of ice insert and configured to be filled, at least partly, by water. The mould with water in the cavities is set into the freezer wherein water freezes and forms the ice insert. The ice inserts may be stored in the mould and the mould in the freezer until the ice inserts are used. The arrangement may further comprise a trolley having the freezer, the mould with the ice inserts and the ice repairing apparatus. Trolley is easy to move to the ice of the ice field when the repairing is needed, and away from the ice after repairing. The trolley may further comprise the drill for using the ice repairing apparatus, and the smoothening tool for smoothening the repaired area of the ice.

[0044] The method, apparatus and arrangement for repairing the ice of the ice ring provides very compact and efficient solution for repairing the ice surface used in the ice sports. The solution is easy to move to the ice when needed and its use is fast and effortless. When the repairing is performed properly, the ice insert melts together with the ice of the ice field forming the uniform and strong ice surface. The simple and fast use of the solution is a huge benefit since the repairing can be done also during the ice sport without causing any remarkable delays for the sport. This makes possible to repair the ice during the periods of the ice hockey without delaying the game, for example.

[0045] It will be obvious to a person skilled in the art that, as technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the example embodiments described above but may vary within the scope of the claims.

Claims

1. A method for repairing an ice of an ice field comprising:

   processing [100], by an ice repairing apparatus, at least one hole to the ice of the ice field to remove, at least partly, a damaged ice;
   providing [102] a solid ice insert configured to fit into the at least one hole; and
   inserting [104] the ice insert into the at least one hole such that a top surface of the ice insert is substantially on the same level with a surface of the ice of the ice field.

2. The method of claim 1, wherein the method further comprises:
   smoothening [106], by a smoothening tool, the surface of the ice of the field in an area of the at least one hole after inserting the ice insert.

3. The method of any preceding claim, wherein the ice insert is dimensioned such that an outer surface of the insert is configured to freeze to an inner surface of the hole after the ice insert is inserted into the hole.

4. The method of any preceding claim, wherein a temperature of the ice insert is substantially the same as a temperature of the ice of the ice field.

5. An ice repairing apparatus (200) comprising:

   a rotating blade (202) configured to drill a hole (H) to an ice of an ice field (208);
   a rotating shaft (204) configured to rotate the blade (202), wherein the shaft (204) comprises a first end (E1) coupled with the blade (202), and a second end (E2) configured to be coupled with a power source for rotating the shaft (204); and
   a limiter (206) coupled with the shaft (204) configured to set against a surface of the ice (208) and to prevent drilling of the blade (202) into the ice (208) when a desired depth of the hole (H) is achieved, and wherein the limiter (206) is configured to move between a first and a second position (P1, P2) along a central axis (CA) of the shaft (204) .

6. The ice repairing apparatus (200) of claim 5, wherein the limiter (206) is configured to be against the surface of the ice (208) during the drilling such that the surface of the ice (208) forces the limiter (206) from the first position (P1) to the second position (P2) when the blade (202) drills into the ice (208) and in the second position (P2) the limiter (206) is configured to prevent drilling of the blade (202) deeper into the ice (208).

7. The ice repairing apparatus (200) of claim 6, wherein limiter (206) is configured to substantially cover the hole (H) when the limiter (206) is against the surface of the ice (208).

8. The ice repairing apparatus (200) of any of claims 5-7, wherein the limiter (206) further comprises at least one opening (210) for removing the drilled ice from the hole (H) when the limiter (206) is against the surface of the ice (208).

9. The ice repairing apparatus (200) of any of claims 5 - 8, wherein the limiter (206) further comprises an elastic member (212) configured to resist the movement of the limiter (206) from the first position (P1) to the second position (P2), and to return the limiter (206) to the first position (P1) when the blade (202) is removed from the hole (H).

10. The ice repairing apparatus (200) of any of claims 5-9, wherein the limiter (206) comprises an inner space (IS) configured to receive the blade (202) in the first position (P1) such that the limiter (206) covers, at least partly, the blade (202).

11. The ice repairing apparatus (200) of any of claims 5 - 10, wherein the shaft (204) is coupled with the blade (202) from the middle of the blade such that the blade (202) extends perpendicularly from the shaft (204) to two opposite directions.

12. The ice repairing apparatus (200) of any of claims 5 - 11, wherein the blade (202) is configured to drill the hole (H) having a flat bottom.

13. The ice repairing apparatus (200) of any of claims 5 - 12, wherein the apparatus (200) further comprises a guiding member (216) configured to guide the blade (202) into the ice (208).

14. An ice repairing arrangement (300) comprising:

an ice repairing apparatus (200) of any of claims 5 - 13;
a mould (302) for producing at least one solid ice insert (II); and
freezer (304) configured to freeze and/or to keep frozen the at least one ice insert (II).

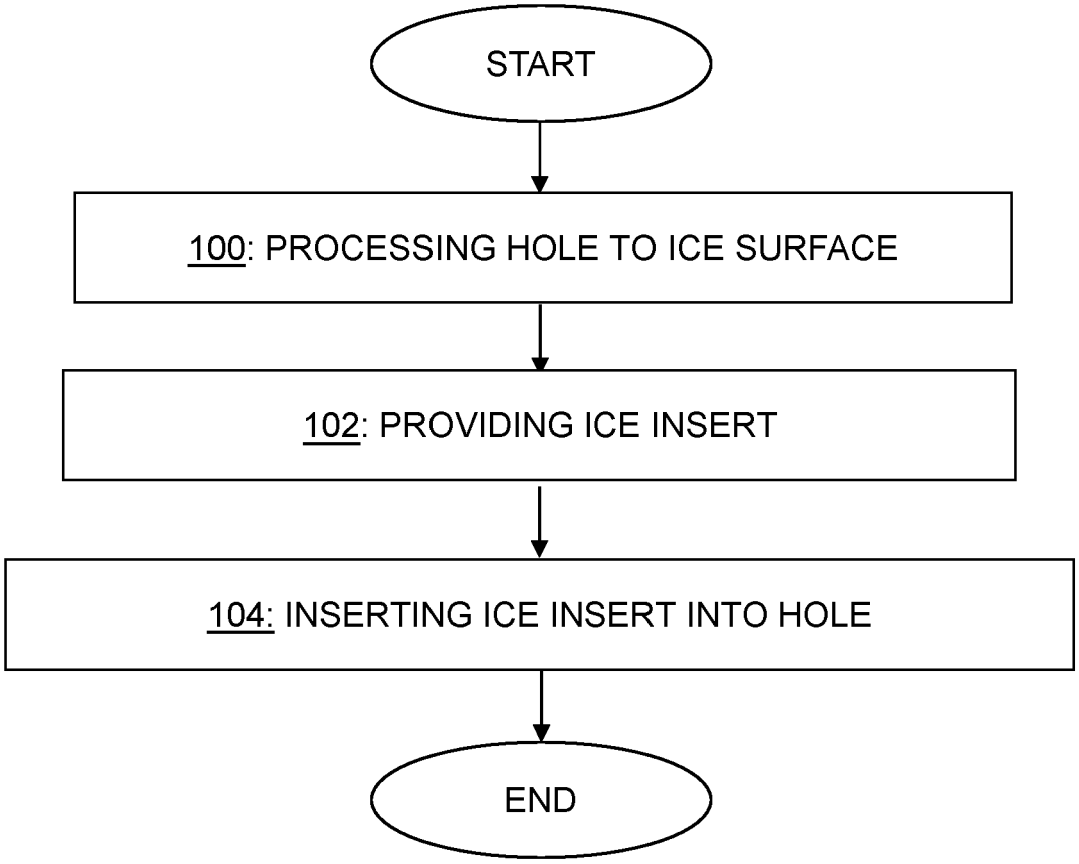
START
100: PROCESSING HOLE TO ICE SURFACE
102: PROVIDING ICE INSERT
104: INSERTING ICE INSERT INTO HOLE
END

FIG. 1A

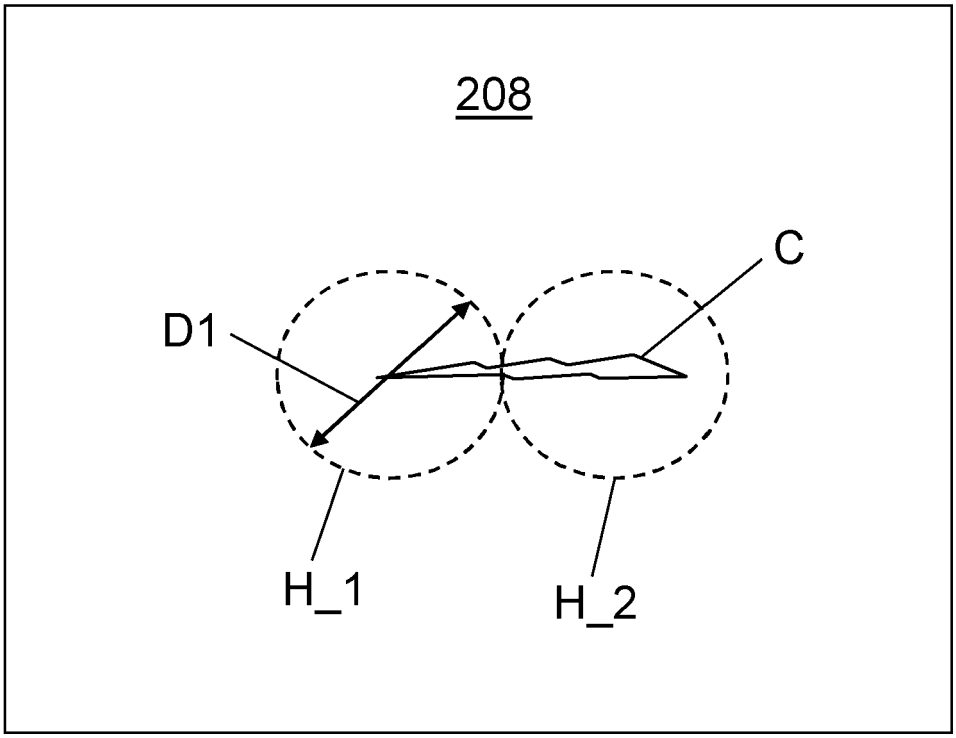

FIG. 1B

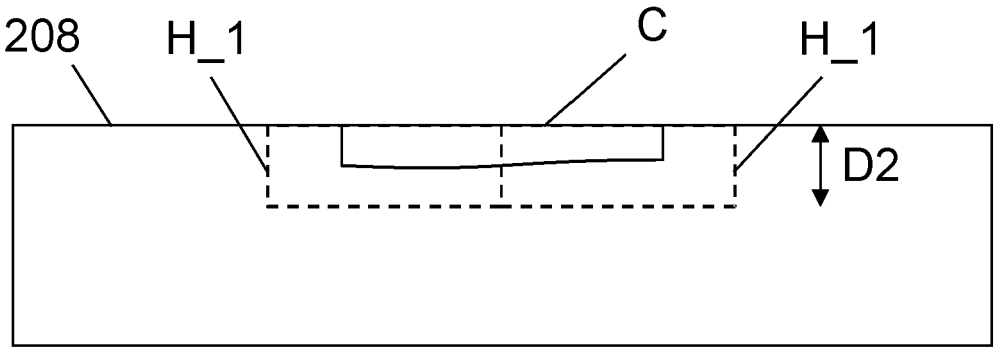

FIG. 1C

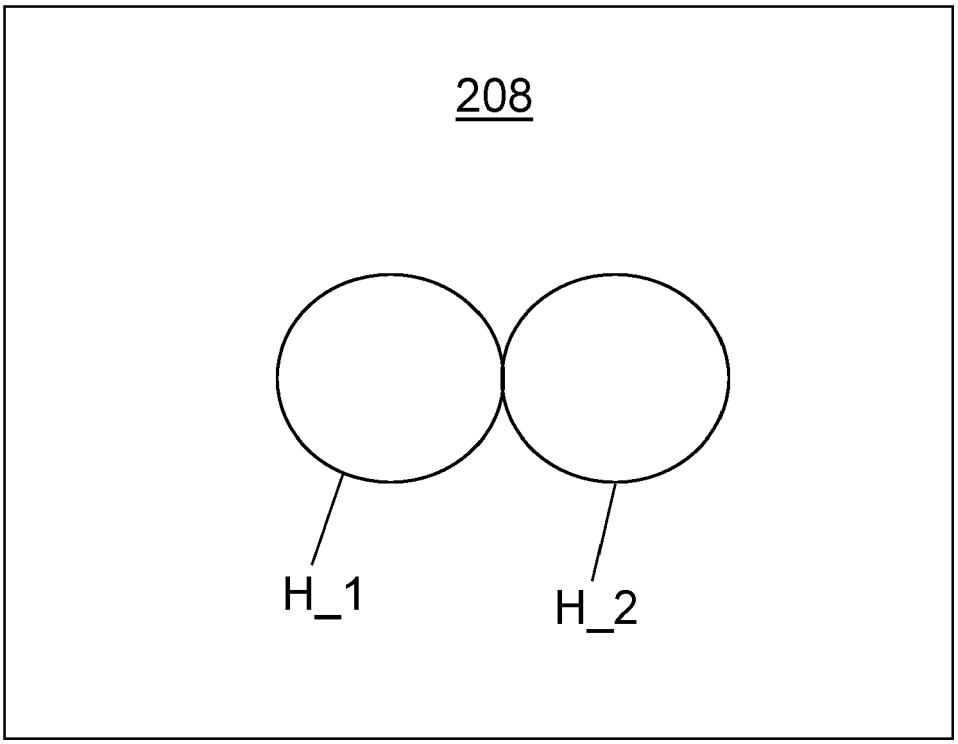

FIG. 1D

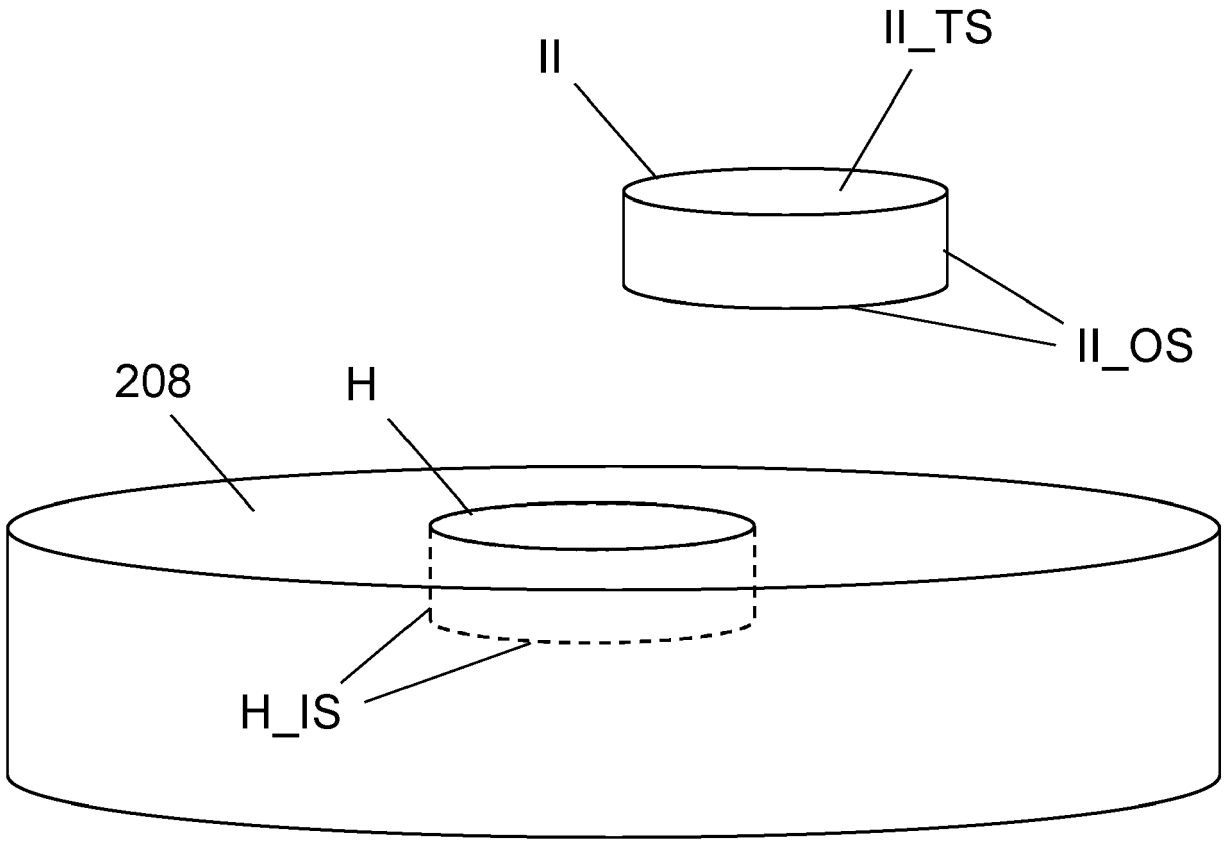

FIG. 1E

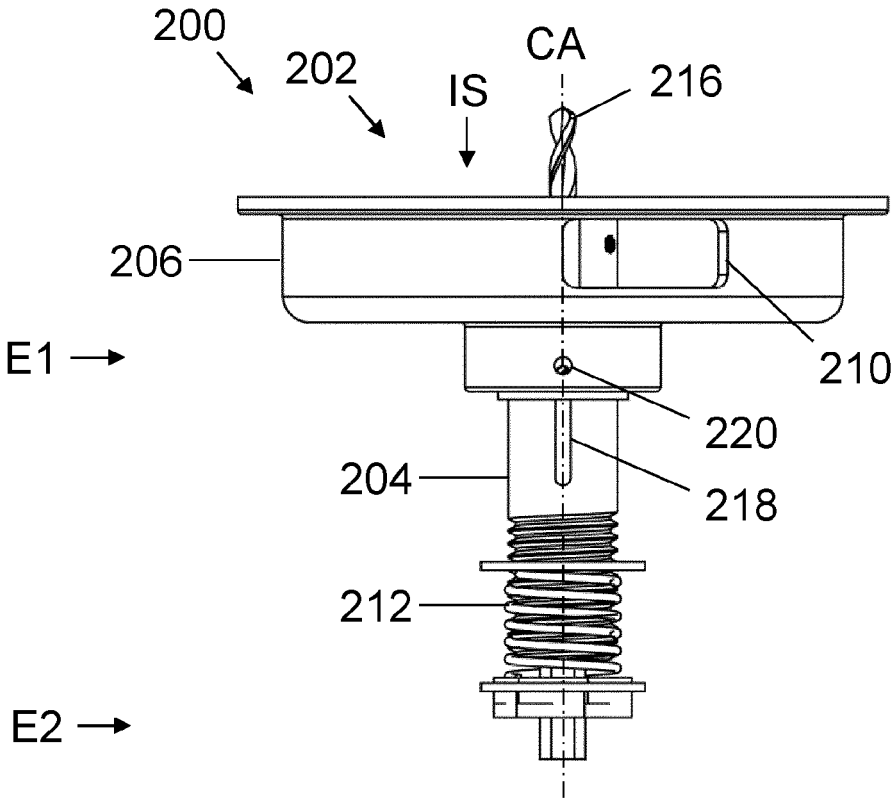

FIG. 2A

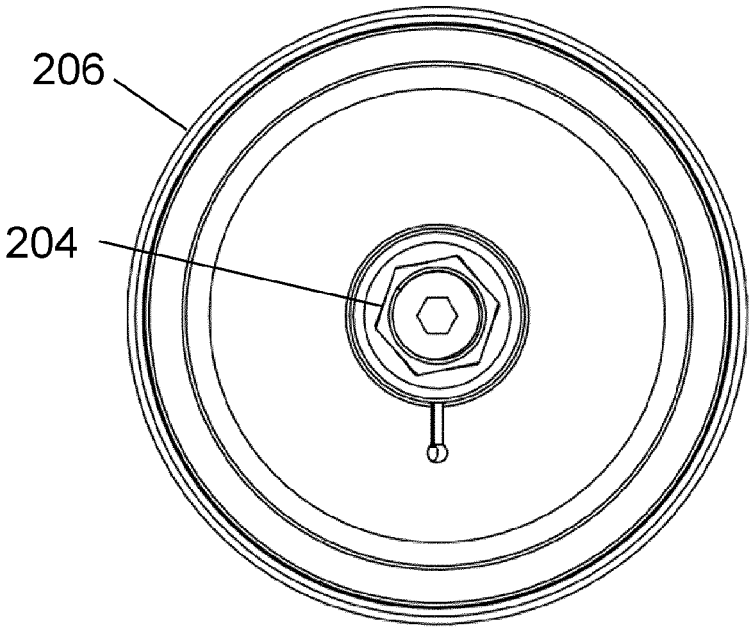

FIG. 2B

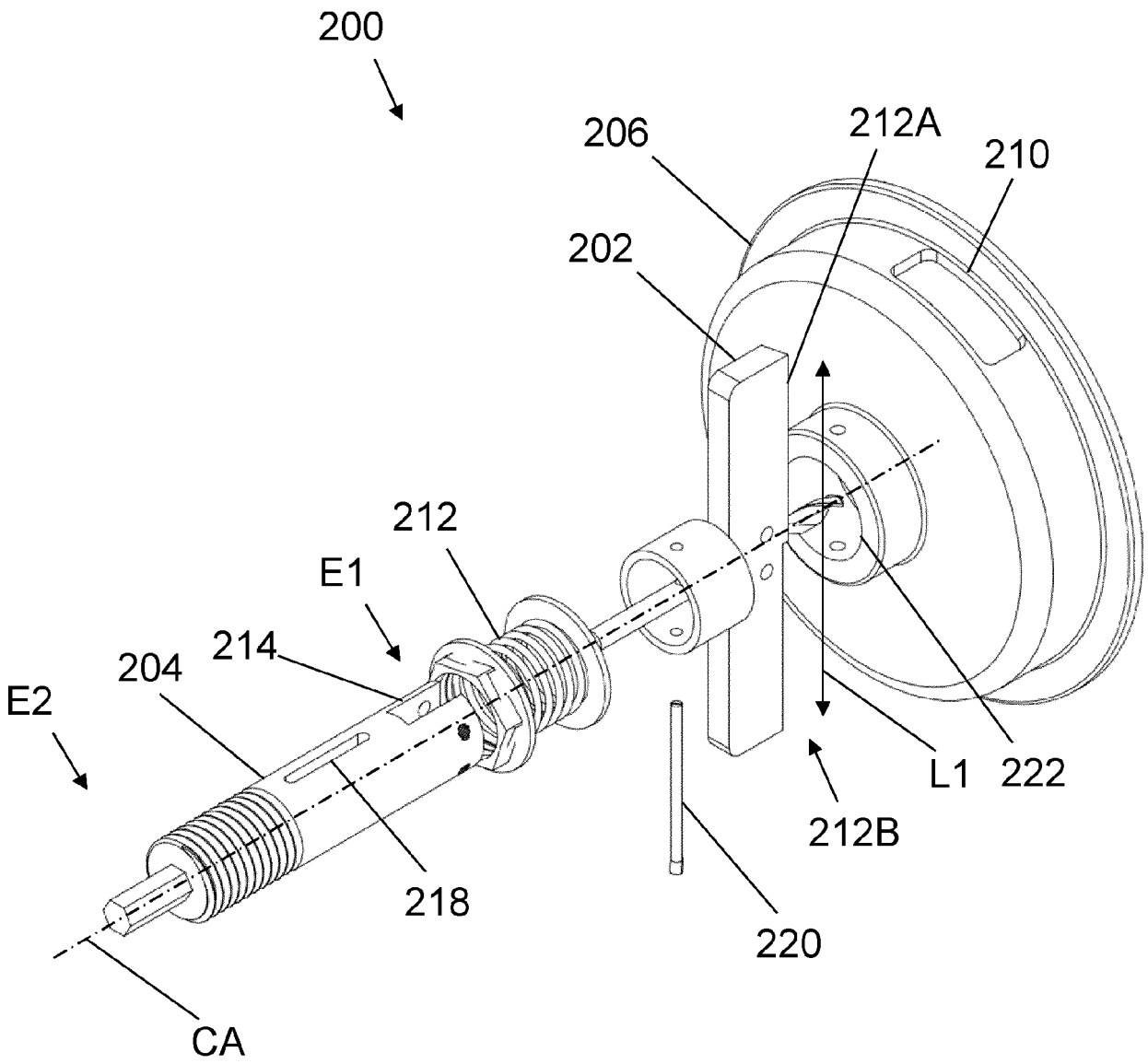

FIG. 2C

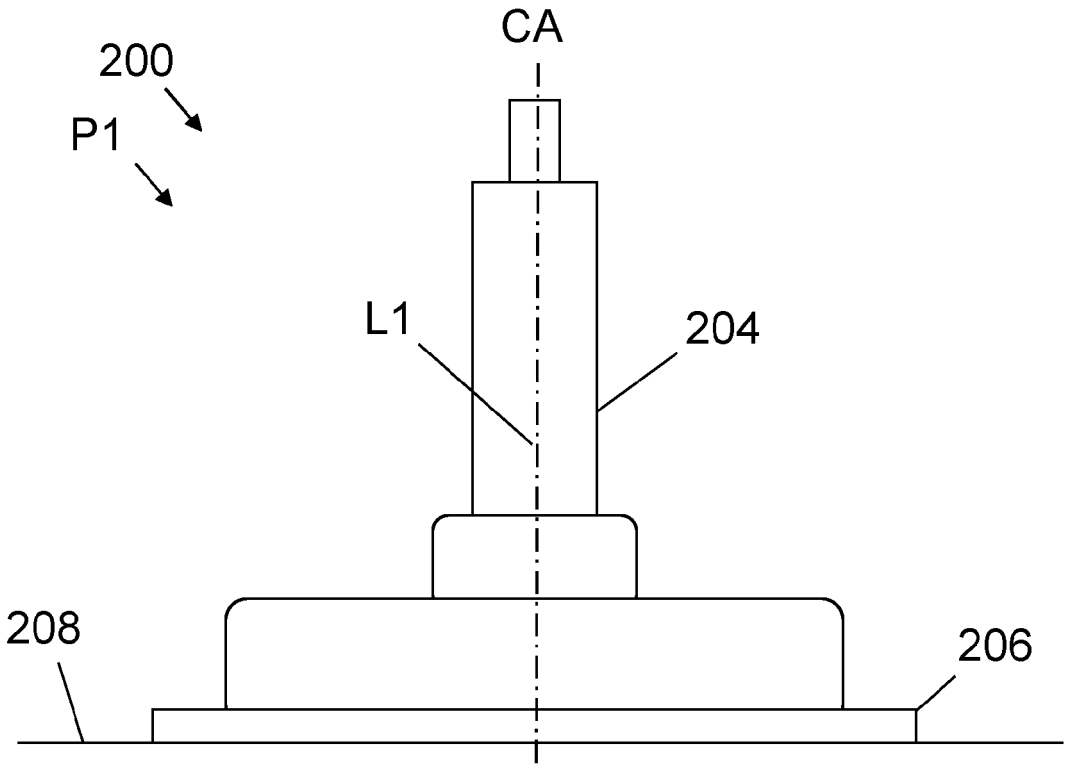

FIG. 2D

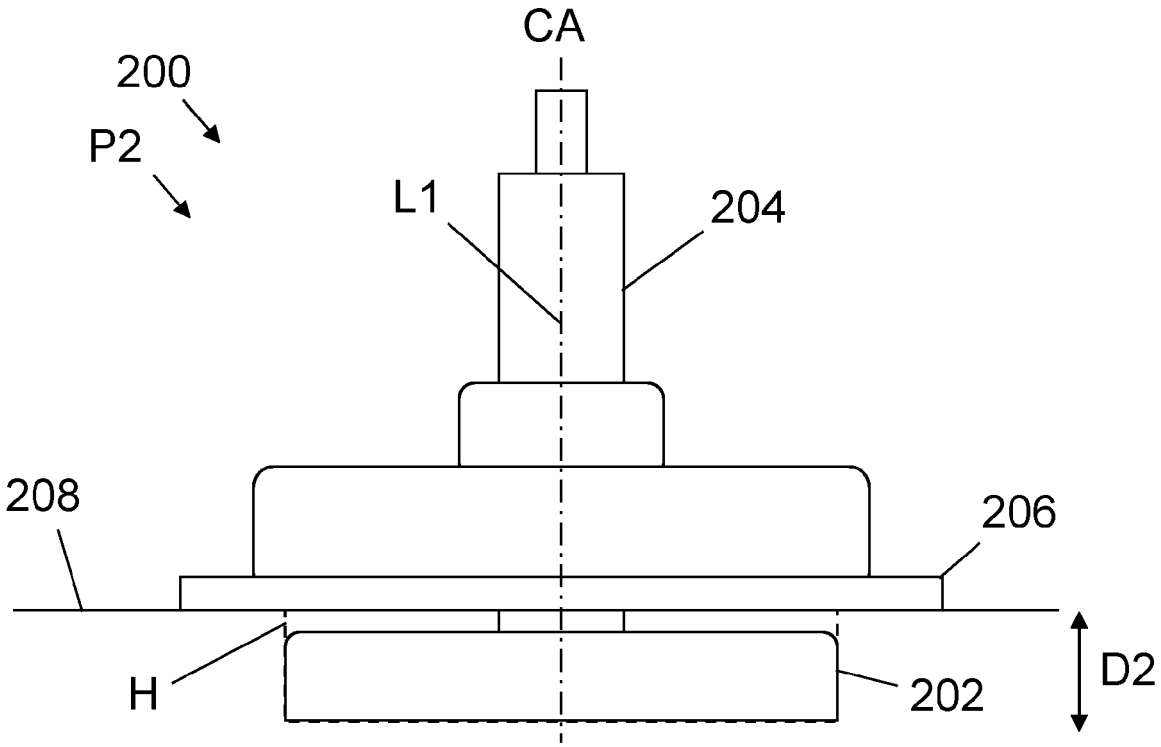

FIG. 2E

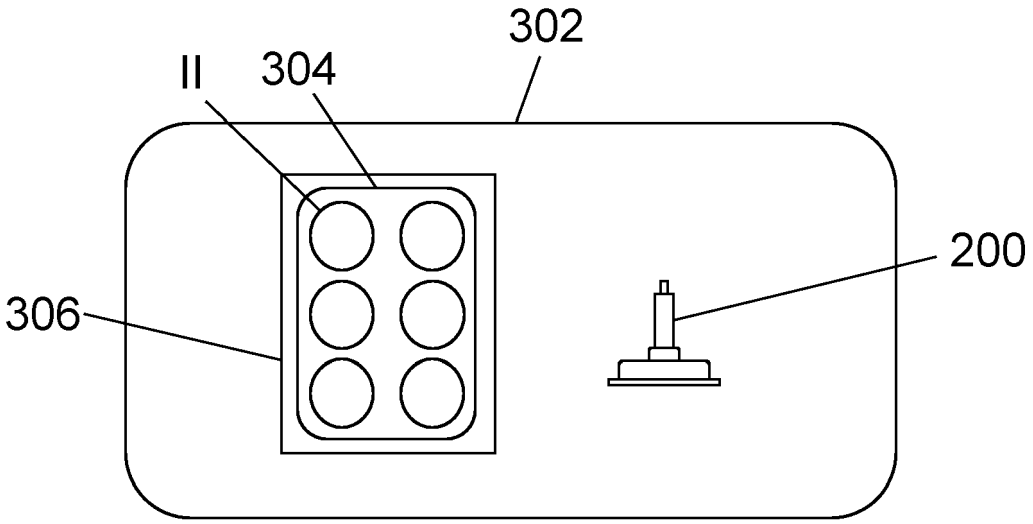

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 23 18 9934

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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A	* column 2, line 33 - column 3, line 27; figures 2-8 *	5-14	
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A	* column 2, line 33 - column 3, line 27; claim 1; figures 1-4 *	6-11	
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A63C
E01H
E21B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 January 2024	Murer, Michael

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