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(54) Title: A CORE DRILLING MACHINE AND A HANDLE ASSEMBLY FOR A CORE DRILLING MACHINE.

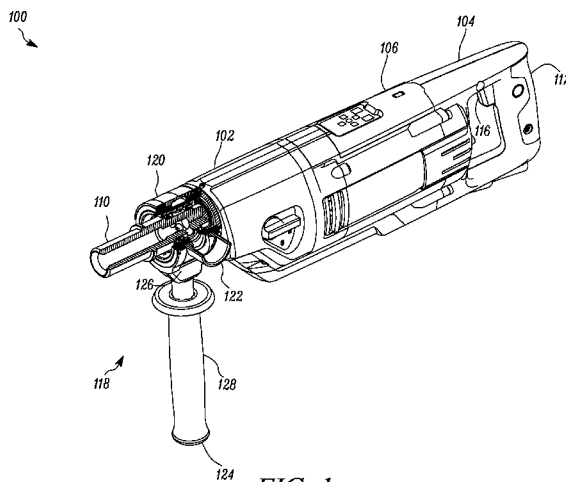


FIG. 1

(57) Abstract: The present invention relates to a core drilling machine (100). The core drilling machine (100) includes a front housing part (102) including a protruding nose. The drilling machine (100) includes a front handle assembly (118) and an output drive shaft (110) projecting outward from the protruding nose. A fluid attachment ring (120) is rotatably arranged around the protruding nose. Further, the front handle assembly (118) is arranged around the protruding nose.

A core drilling machine and a handle assembly for a core
drilling machine

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TECHNICAL FIELD

1. The present invention relates to a core drilling machine comprising:

a front housing part comprising a protruding nose;

a front handle assembly;

10 an output drive shaft projecting outward from the protruding nose;

a detachable drill bit tool fastened to the output drive shaft; and

a fluid attachment ring rotatably arranged around the protruding nose

BACKGROUND

15 Core drilling machines are widely used in order to make holes in bricks, concrete or the like. The core drilling machines may find applications in walls, roofs, floors and rocks also. The core drilling machine includes a drive shaft which is configured to hold a required drill bit tool based on applications. Further, a wet cooling arrangement can be provided to regularly lubricate the drill bit tool by water and/or

20 lubricant. The cooling arrangement can include a water tube connected to a fluid attachment ring which is provided around the drive shaft. DE 19647575 has this, and further a fixed front handle near the rear handle. This however provides an unfavourably short distance between the front and rear handle, a distinct disadvantage.

Normally, a core drilling machine without a water lubricating arrangement is

25 provided with handles at front and rear sections to aid manual gripping by an operator. The front handle assembly at the front section is provided to support the core drilling machine during operation. However, the front handle assembly is often fixed and may provide a hindrance to the operator to maneuver the core drilling machine, while operating. This may lead to other ergonomic problems such as inconveniency in work

30 while changing an inclination of the core drilling from one angle to another angle.

Thus, a fixed front handle assembly may pose problems for the operator to work with a core drilling machine.

Hence, there is a need for an improved front handle assembly for a core drilling machine, which provides a better handling of the core drilling machine without interfering with a cooling arrangement.

BRIEF DISCLOSURE OF THE INVENTION

In light of the aforementioned, it is an objective to solve or at least reduce the problem discussed above. In particular, the objective is to provide an improved front handle assembly for a core drilling machine.

The objective is achieved with a novel core drilling machine according to claim 1. The core drilling machine includes a front housing part. Further, the first housing part includes a protruding nose. The drilling device further includes a front handle assembly and an output drive shaft. The output drive shaft is projected outwards from the protruding nose of the front housing part. Further, the drilling device includes a detachable drill bit tool, which is fastened to the output drive shaft. The drilling device also includes a fluid attachment ring which is rotatably arranged around the protruding nose. In an aspect of the present invention, a front handle assembly is arranged around the protruding nose, and is preferably rotatably arranged. Therefore the front handle assembly may relatively rotate about the fluid attachment ring to allow easy maneuvering of the core drilling machine. The advantage of a fluid attachment is combined with a front handle placed far forward being rotably adjustable in relation to the fluid supply.

According to claim 2, the front handle assembly further includes a front handle and a front handle support. Further, according to claim 3, the front handle includes a hand grip and a handle screw. The handle screw protrudes from an inner end of the hand grip and is rotatably fixed to the hand grip. In an aspect of the present invention, the handle screw may be screwed into a thread provided in the front handle support. The front handle may be tightened in the thread to attach and may be loosened to detach the front handle from the front handle support.

According to claim 4, an inner end of the handle screw when screwed by the hand grip is arranged to come into contact with the fluid attachment ring via a multiple protective bodies. The front handle may be locked with the fluid attachment ring and the protruding nose.

5 According to claim 5, the front handle support also includes a front ring section. Further, the front ring section is located in front of the fluid attachment ring. Further, according to claim 6, the front handle support includes a rear ring section such that, the rear ring section is located behind the fluid attachment ring.

10 According to claim 7, the front handle support and the rear ring section are in contact to provide radial support for the front handle support. According to claim 8, the rear ring section also includes an aperture. According to claim 9, the front handle support includes a protruding section. Further, the protruding section may extend through the aperture of the rear ring section.

15 According to claim 10, the front housing part is connected to a rear housing part via an intermediate housing part.

According to claim 11, the detachable drill bit tool may include at least one cutting edge comprising diamonds.

According to claim 12, the core drilling machine is a concrete drilling machine.

20 Claim 13 describes a front handle assembly for the core drilling machine. The front handle assembly may include a front handle support and a front handle connected with the front handle support. The front handle assembly further includes a front ring section. The front ring section is radially holding a front end of the front handle support. The front handle assembly also includes a rear ring section. The rear ring section is provided in contact with a rear end of the front handle support. In an aspect
25 of the present invention, the front handle support and the rear ring section are in contact to create radial support for the front handle support.

According to claim 14, the rear ring section may include an aperture. Further, according to claim 15, the front handle support may include a protruding section. The protruding section may extend through the aperture of the rear ring section.

30 BRIEF DESCRIPTION OF THE DRAWINGS

The invention will in the following be described in more detail with reference to the enclosed drawings, wherein:

FIG. 1 illustrates a perspective view of a core drilling machine, in accordance with an embodiment of the present invention;

5 FIG. 2 illustrates an exploded view of a front handle assembly for the core drilling machine, in accordance with an embodiment of the present invention;

FIG. 3 illustrates a cross-sectional view of the front handle assembly for the core drilling machine, in accordance with an embodiment of the present invention; and

10 FIG. 4 illustrates another cross-sectional view of the front handle assembly for the core drilling machine, in accordance with an embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

15 The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which example embodiments of the invention incorporating one or more aspects of the present invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. For example, one or more aspects of the present invention can be utilized in other embodiments and even other types of devices. In the drawings, like numbers refer to like elements.

20 FIG. 1 shows a perspective view of an exemplary core drilling machine **100**, in accordance with an embodiment of the present invention. In an embodiment of the present invention, the core drilling machine **100** may be used in concrete drilling application. However, it should be understood that the present invention could be incorporated into any suitable type of hand-held machine, for example, but not limited to, rotary cutter, handheld drill hammers etc. and is not limited to use merely in concrete drilling. In addition, any suitable size, shape or type of elements or materials could be used.

30 The core drilling machine **100**, as shown in the FIG. 1, includes a housing which may be structured into multiple parts. In an embodiment of the present invention, the

housing may include a front housing part **102** and a rear housing part **104**. In another embodiment of the present invention, the front housing part **102** is connected to the rear housing part **104** via an intermediate housing part **106**. The intermediate housing part **106** may include an input means to set and control the torque and/or speed of the core drilling machine **100**. Further, it may be apparent to a person skilled in art, that the core drilling machine **100** may include a single integral housing.

In an embodiment of the present invention, the front housing part **102** may include a protruding nose **108** (shown in FIG. 2). The protruding nose **108** may extend in a forward direction of the front housing part **102**. The rear housing part **104** may include a prime mover (not shown) such as, but not limited to, an electric motor for driving the core drilling machine **100**. In an embodiment of the present invention, the electric motor may be drivably connected to an output drive shaft **110** via a suitable transmission assembly such as, but not limited to, gear, belts or a combination of these. The output drive shaft **110** may project outward from the protruding nose **108** and a detachable drill bit tool (not shown) may fasten to the output drive shaft **110**. In various embodiments of the present invention, the output drive shaft **110** may be made of spring steel so that it can be flexed while drilling without breaking. However, the output drive shaft **110** may be made of any other material, for example, but not limited to, hardened steel.

The rear housing part **104** may include a rear handle **112** to assist manual gripping of the core drilling machine **100** during operation. The front housing part **102** of the core drilling machine **100** may include a torque/speed regulator **114**. The rear handle **112** may also have a pulse trigger **116** to start and stop the operation of the core drilling machine **100**. Further, the core drilling machine **100** may include a front handle assembly **118** and a fluid attachment ring **120**. In an embodiment of the present invention, the front handle assembly **118** and the fluid attachment ring **120** may be both rotatably arranged around the protruding nose **108**.

In various embodiment of the present invention, the drill bit tool may include a diamond cutter and a cutting tool with a plurality of cutting edges. During operation, in order to cool the drill bit tool and the output drive shaft **110**, the fluid attachment ring **120** may be connected to a coolant tube (not shown) via a hose connector **122**. The

hose connector **122** may be integrally provided with the fluid attachment ring **120**. The coolant tube may supply water and/or lubricant to cool the output drive shaft **110** and the drill bit tool during operation. The connector **122** can alternatively connect an adaptor for a vacuum cleaner to suck away dust.

5 In an embodiment of the present invention, the front handle assembly **118** may include a front handle **124** and a front handle support **126**. Further, the front handle **124** may include a hand grip **128** to assist a tight gripping of the core drilling machine **100** in addition to the rear handle **112**. Further, a press fit arrangement of the front handle assembly **118** secured with the front housing part **102**.

10 FIG. 2 illustrates an exploded view of the front handle assembly **118** of the core drilling machine **100**. As shown in FIG. 2, the front handle **124** includes a handle screw **130** and a spacer **132**, such that the handle screw **130** is rotatably fixed to the hand grip **128** and protrudes from an inner end of the hand grip **128**. Corresponding to the handle screw **130**, a thread **134** is provided in the front handle support **126**. During assembly,
15 the thread **134** may receive the handle screw **130** by rotating the front handle **124** and may detach by loosening the handle screw **130**. Further, in an assembled state, the handle screw **130** comes in contact with the fluid attachment ring **120** preferably via multiple protective bodies **136** and **138**. A spring **162**, e.g., of steel or an elastomeric material, e.g., rubber, in the front handle **124** is compressed by the spacer **132** when the hand grip
20 **128** is screwed via handle screw **130** such that protective bodies **136** and **138** are pressed harder and harder towards the fluid attachment ring **120** when the handgrip is screwed more and more. This provides a very stiff attachment of the handgrip **128**. In an embodiment of the present invention, the protective bodies **136** and **138** may be made of an elastomeric material (e.g. rubber), steel or plastic. When screwing the
25 handgrip **128** both the front handle and the fluid attachment ring **120** are locked not to rotate around the protruding nose **108**. They are therefore also locked in relation to each other, and in a selected position. This is very favorable for the operator.

In an embodiment of the present invention, the front handle support **126** may include a front ring section **140**. The front ring section **140** may be located in front of
30 the fluid attachment ring **120**. The front ring section **140** may be an integral part of the front handle support **126** and in the assembled state, the front ring section **140** radially

holds the front handle support **126**. Further, the front ring section **140** may be configured to receive a lock ring **142** into the front ring section **140**. In an embodiment of the present invention, the lock ring **142** may also be made of some lighter material such as plastic.

5 In an embodiment of the present invention, the front handle support **126** may include a rear ring section **144**, such that the rear ring section **144** is located behind the fluid attachment ring **120**. Further, the front handle support **126** includes a protruding section **146** which is configured to be received in an aperture **148** provided in the rear ring section **144**.

10 FIG. 3 shows a cross-sectional view of the front handle assembly **118**, in accordance with an embodiment of the present invention. As shown in the FIG. 3, in an embodiment of the present invention, the output drive shaft **110** may be supported on a bearing **150**. During operation, the bearing **150** may reduce wear of the output drive shaft **110**. Further, a leak indicating passage **152** is provided to indicate a water leak in the sealing **154** during operation.

15 Moreover, multiple sealing members **154** are provided between the output drive shaft **110** and a sleeve **156**. The sealing members **154** may provide a leak proof passage for the coolant within the output drive shaft **110**. The sleeve **156** may also include a protruding part, such that the protruding part is received in a groove provided on the protruding nose **108**.

20 Additionally, a circular clip **158** also supports the sleeve **156**. Further an O-rings **160** is disposed between the fluid attachment ring **120** and the protruding nose **108**. The O-rings **160** may be a compressed seal, between the fluid attachment ring **120** and the protruding nose **108**. However, any other sealing means (e.g. face seal, lip seal etc.) may be utilized without departing from the essence of the present invention.

25 FIG. 4 shows another cross-sectional view of the front handle assembly **118**, in accordance to the present invention. The front handle **118** is rotatable around the fluid attachment ring **120** when required. In an embodiment of the present invention, the rotation of the front handle **118** may be provided with an orientation of about 256 degrees around the fluid attachment ring **120**. This limited orientation of front handle **118** may permit rotation of the front handle **124** around the fluid attachment ring **120**

without interfering with the cooling arrangement. Further, the present invention may advantageously facilitate an improved separate lock for the front handle **124** and the cooling tube (not shown) simultaneously. In addition to that, the present invention may permit a better handling of the core drilling machine **100** and may also allow the operator to improve the work efficiency.

In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

CLAIMS

1. A core drilling machine (100), the core drilling machine (100) comprising:

a front housing part (102) comprising a protruding nose (108);

5 a front handle assembly (118);

an output drive shaft (110) projecting outward from the protruding nose (108);

a detachable drill bit tool fastened to the output drive shaft (110); and

10 a fluid attachment ring (120) rotatably arranged around the protruding nose (108);

characterized in that the front handle assembly (118) is arranged around the protruding nose (108).

2. A core drilling machine (100) according to claim 1, wherein the front handle assembly (118) comprises:

15 a front handle (124); and

a front handle support (126).

3. A core drilling machine (100) according to claim 2, wherein the front handle (124) comprises a hand grip (128) and a handle screw (130) rotatably fixed to the hand grip (128) and protruding from an inner end of the hand grip (128), so that the front
- 20 handle (124) can be screwed into a thread (134) in the front handle support (126) for attachment and be unscrewed for detachment.

4. A core drilling machine (100) according to claim 3, wherein the front handle assembly (118) is rotatably arranged around the protruding nose (108), and an inner end of the handle screw (130) when screwed by the hand grip (128) is arranged to
- 25 come into contact, directly or preferably indirectly via protective bodies (136, 138), with the fluid attachment ring (120) for locking of the front handle (124) and of the fluid attachment ring (120) for rotation around the protruding nose (108).

5. A core drilling machine (100) according to any of claims 2 to 4, wherein the front handle support (126) comprises a front ring section (140), the front ring section (140) is located in front of the fluid attachment ring (120).
6. A core drilling machine (100) according to any of claims 2 to 5, wherein the front handle support (126) comprises a rear ring section (144), the rear ring section (144) is located behind the fluid attachment ring (120).
7. A core drilling machine (100) according to claim 6, wherein the front handle support (126) and the rear ring section (144) are in contact to provide radial support for the front handle support (126).
8. A core drilling machine (100) according to claim 7, wherein the rear ring section (144) comprises an aperture (148).
9. A core drilling machine (100) according to claim 8, wherein the front handle support (126) comprises a protruding section (146), the protruding section (146) extends through the aperture (148) of the rear ring section (144).
10. A core drilling machine (100) according to any of the preceding claims, wherein the front housing part (102) is connected to a rear housing part (104) directly or via an intermediate housing part (106), the machine having a rear handle (112).
11. A core drilling machine (100) according to any of the preceding claims, wherein the detachable drill bit tool comprises at least one cutting edge comprising diamonds.
12. A core drilling machine (100) according to any of the preceding claims, wherein the core drilling machine (100) is a concrete drilling machine.
13. A front handle assembly (118) for a core drilling machine (100), the front handle assembly (118) comprising :
 - a front handle support (126);
 - a front handle (124), the front handle (124) is connected with the front handle support (126);

a front ring section (140), the front ring section (140) is radially holding a front end of the front handle support (126); and

a rear ring section (144), the rear ring section (144) is provided in contact with a rear end of the front handle support (126),

5 **characterized in that** the front handle support (126) and the rear ring section (144) are in contact to create radial support for the front handle support (126).

14. A front handle assembly (118) according to claim 13, wherein the rear ring section (144) comprises an aperture (148).

10 15. A front handle assembly (118) according to claim 13, wherein the front handle support (126) comprises a protruding section (146), the protruding section (146) extends through the aperture (148) of the rear ring section (144).

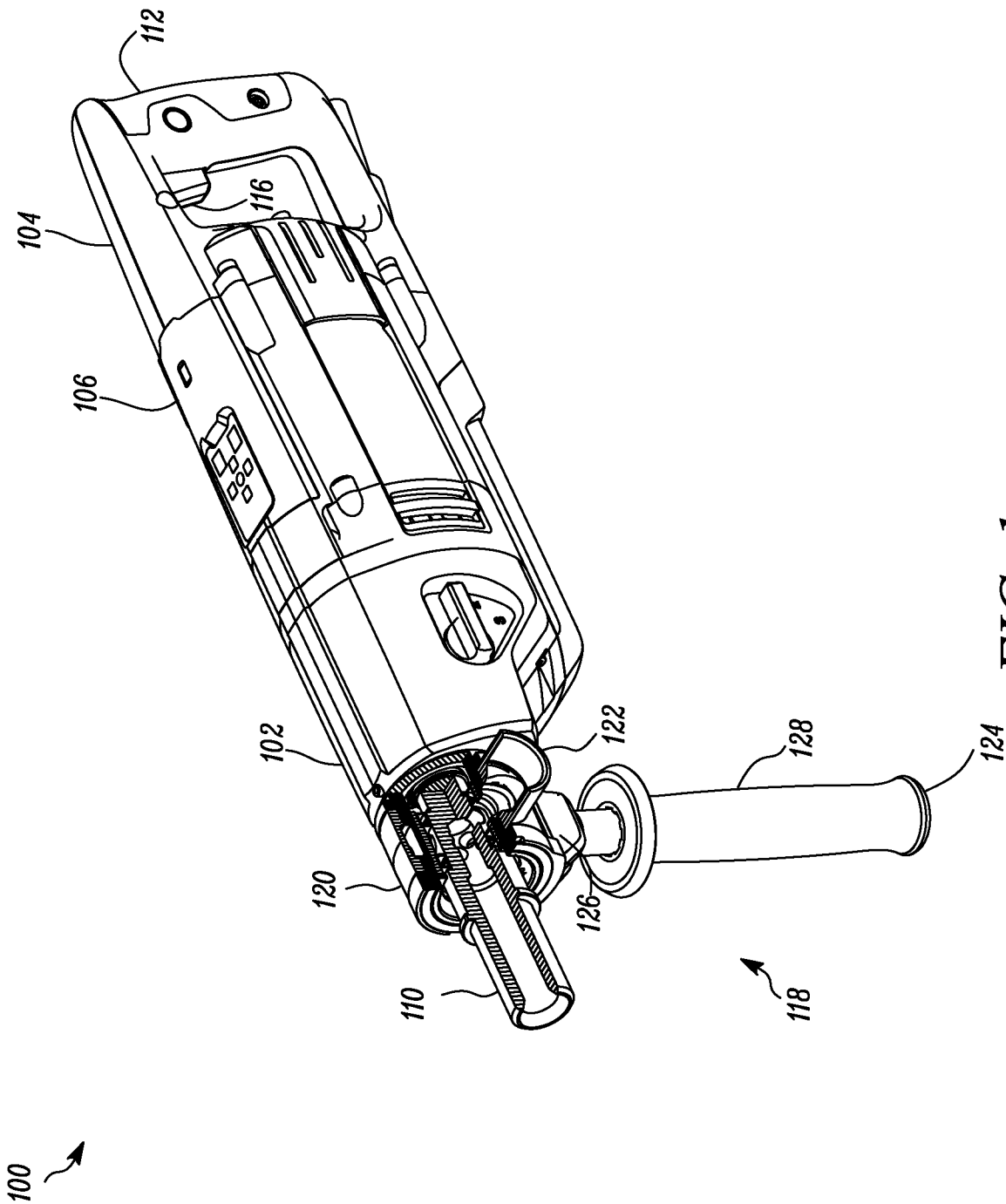


FIG. 1

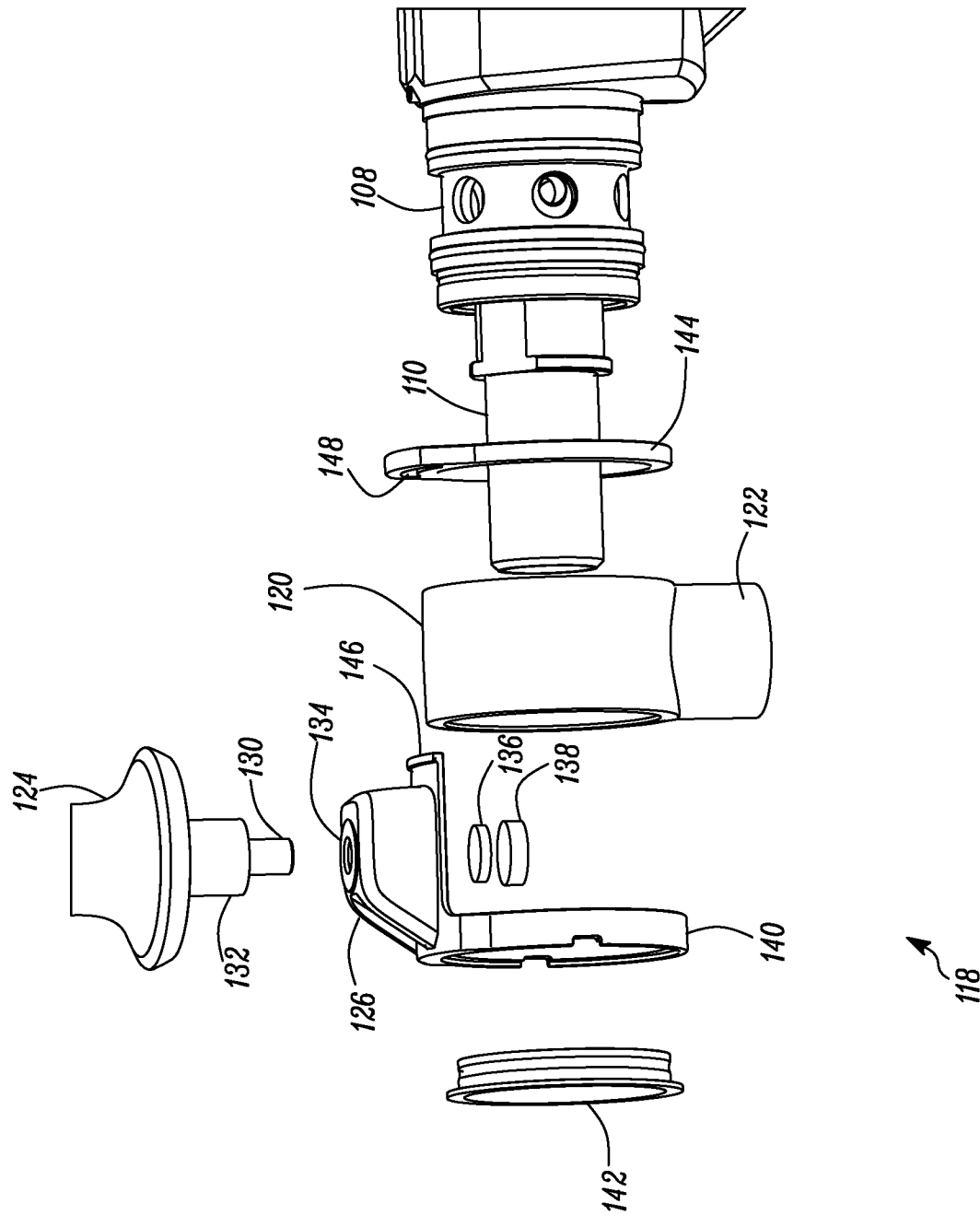


FIG. 2

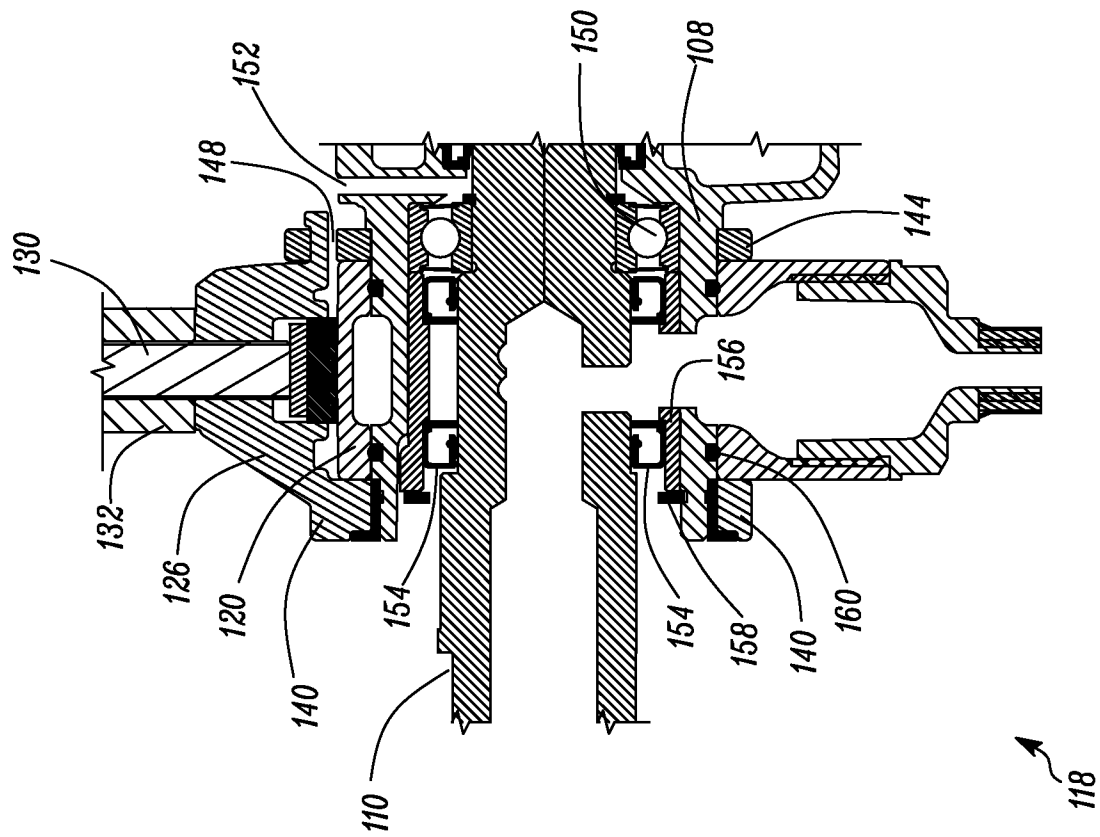


FIG. 3

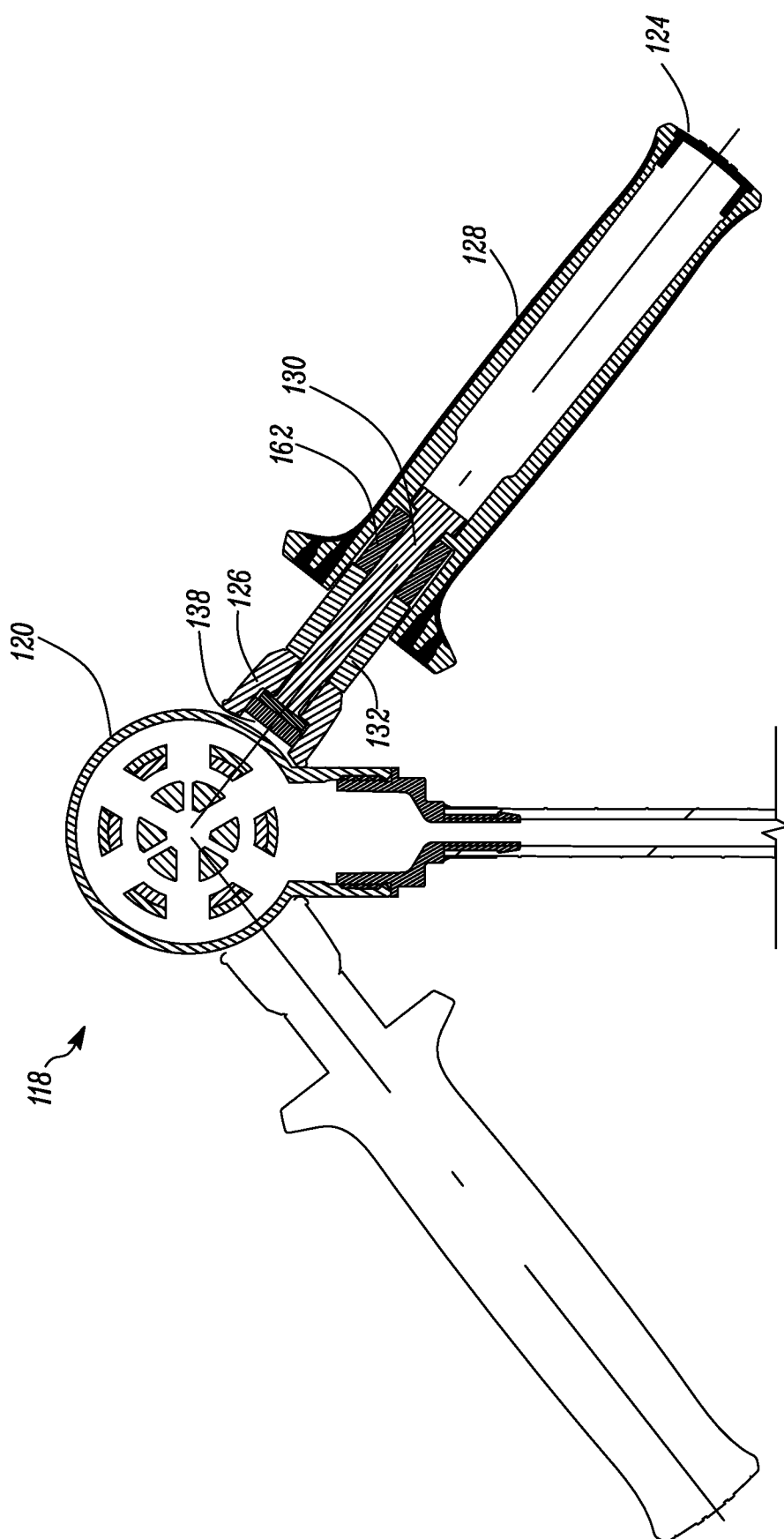


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050411

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B23B, B23Q, B25F, B28D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	--	1-12,14,15
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A	--	
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Date of the actual completion of the international search

17 December 2010

Date of mailing of the international search report

23-12-2010

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050411

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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International patent classification (IPC)**B23B 45/00** (2006.01)**B25F 5/02** (2006.01)**B28D 1/14** (2006.01)**B23Q 11/10** (2006.01)**Download your patent documents at www.prv.se**

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Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE2010/050411

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