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(54) **APPARATUS FOR ROCK DRILLING**

**STEINBOHRVORRICHTUNG**

**APPAREIL DE FORAGE DE ROCHES**

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## Description

### TECHNICAL FIELD

**[0001]** The present invention concerns a rinsing device for a drill for rock drilling, as well as a drilling device comprising a rinsing device. In particular, the invention concerns lubrication of sealing elements in the rinsing device.

### BACKGROUND OF THE INVENTION

**[0002]** A typical example of a rock drill comprises a number of drilling rods which are joined together and form a drill string. One end of the drill string culminates in a drill head which drills into the stone as it cuts and rotates. The other end of the drill rod is coupled to a drive apparatus via a neck adaptor. In use, the drill string cuts and rotates by means of the drive apparatus.

**[0003]** In order that drilling can be carried out effectively when drilling stone, it is necessary that the bottom of the drill hole is kept clean and that drill cuttings are carried away from the drill hole. This is done by a rinsing medium, e.g. water or air, being flushed from a rinse adaptor via a rinse head in through, through a central hole in the neck adaptor, and further through a central hole in the drill string and out through the drill head to the bottom of the drill hole. Drill cuttings mixed with the rinsing medium are then forced out of the drill hole between the drilling rod and the walls of the drill hole.

**[0004]** To prevent the rinsing medium from entering the drill, the neck adaptor is sealed against the rinse head by means of rinse seals. The neck adaptor has a rotating to-and-fro movement, while the rinse head is stationary relative to the drill.

**[0005]** These rinse seals are often doubled both forward and backward and have one or more so-called "spy-hole" so that the operator is given the chance to notice a leak and replace the primary seal before the secondary seal also fails. In this way, the rinsing medium is prevented from entering the drill, which prevents damage to the drill.

The current lifetime of rinse seals can be seen as a problem. Damaged rinse seals are a common reason why drills need to be serviced.

**[0006]** Mine environments with damp air, and occasionally saline rinse water are a particular problem. The surface of the neck adaptor quickly becomes corroded and the surface upon which the rinse seals must glide becomes highly wearing.

Additional problems are that the rinse seals become warm through contact friction, especially in high-frequency machines. The primary seals are effectively cooled by the rinse water, but the secondary seals are not always cooled, as the separate lubricating gas in the drill does not always reach the secondary seals.

**[0007]** The front bearing of the neck adaptor is stationary relative to the drill. Currently, to lubricate this contact

surface, an air-oil mixture is used, which has been the tradition since pneumatic drills. In such drills, oil was added to the pressurized gas which drove the striking apparatus and rinsed away drill cuttings. When production and use of hydraulic drills began, it was desirable to maintain lubrication, which is why a separate lubricating gas flow was introduced.

Lubricating gas in hydraulic drills comprises an entire system which branches to many places in the drill. This is partly due to the requirement for lubrication in many places, but also - by means of overpressure - to prevent drill cuttings from entering the drill.

As the lubricating gas system branches off to the entire machine, water and dirt, as well as drill cuttings and particles ground from drilling parts and the like, are effectively spread to the entire machine, should the lubricating gas system be polluted.

The risk of such pollution, especially water penetration, is large at the front of the drill. Here, water can penetrate both from the outside by, e.g. a worn nose bush, or from the inside, by rinse water passing through a worn rinse seal.

### SUMMARY OF THE INVENTION

**[0008]** One aim of the present invention is therefore to provide a rinsing device for a drilling device which improves the lifetime of the rinse seals in the rinsing device.

**[0009]** In accordance with the present invention, this aim is achieved by a rinsing device for a drilling device for rock drilling. The rinsing device comprises a cylindrical neck adaptor which comprises a mantle surface, two end surfaces, a central axial passage which opens at one end surface, and a radial connection between the central axial passage and an opening in the mantle surface. The rinsing device also comprises a rinse head with an axially-extending hole. The neck adaptor is slidably arranged in said hole. The said rinse head surrounds a part of the mantle surface of the neck adaptor and provides a first space which extends around the mantle surface of the neck adaptor in the region of the opening in the mantle surface of the neck adaptor. The first space is connected to the outside of the rinse head via a feed channel. The rinsing device comprises at least one primary sealing element arranged in the axial direction on each side of the first space in the rinse head to provide a seal between the neck adaptor and the first space. The rinsing device also comprises at least one second space which extends about the mantle surface of the neck adaptor. Each of the second spaces borders that side of each primary sealing element which faces away from the first space. The rinsing device comprises means for supplying lubricant to the second space.

**[0010]** The means for supplying lubricant to the second space comprises one or more outlets which extend from the second space to the outside of the rinse head.

**[0011]** As the rinsing device comprises means for supplying lubricant to the second space, lubricant will be able

to lubricate the contact between the neck adaptor and the sealing element. In this way, friction is lower and wear of the seal is reduced, which means that the lifetime of the sealing element is improved.

One advantage of the present invention is that corrosion of the mantle surface of the neck adaptor is reduced, as it is not subjected to the moist air which can reach the mantle surface through the spyhole, which also contributes to an improved lifetime.

Another advantage of the present invention is that water and dirt penetration into the drill via the lubricating gas system - and the damage resulting therefrom - is avoided. This also means that the drill is more available, as it does not have to be taken out of service for repair so often.

Another advantage with the present invention is that concurrent lubrication of the guide is possible.

Another advantage of the present invention is that - if simultaneous lubrication of the guide is carried out - power use is reduced in that a smaller amount of air is used in the lubrication system.

## BRIEF DESCRIPTION OF THE DRAWINGS

### [0012]

Figure 1 is a schematic side view of a drilling device for rock drilling.

Figure 2 is a schematic view which shows a longitudinal cross-section of a first embodiment of a rinsing device.

Figure 3 is a schematic view which shows a radial cross-section of the rinsing device along the line III-III in Figure 2.

Figure 4 is a schematic view which shows a longitudinal cross-section of a second embodiment of a rinsing device.

Figure 5 is a schematic view which shows a radial cross-section of the rinsing device along the line V-V in Figure 4.

Figure 6 is a schematic view which shows a radial cross-section of the rinsing device along the line VI-VI in Figure 4.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0013] A number of embodiments of the present invention will now be described with reference to the figures. The present invention is not limited to these embodiments. Different variations, equivalents and modifications can be used. These embodiments should not therefore be taken as limiting the scope of the invention, the scope of which is defined by appended claims.

[0014] Figure 1 shows a device for rock drilling 10. The rock drilling device 10 comprises a drill 20, a number of drilling rods 30 (only one is shown), which are joined together and form a drill string 40. One end of the drill string culminates in a drill head 50 which drills into the stone

52 as it cuts and rotates, thereby forming a drill hole 55. The other end of the drill rod is coupled to drill 20 via a neck adaptor 60. In use, the drill string 40 cuts and with to-and-fro movements, and rotates in use, driven by the drill 20.

To transport drill cuttings from the bottom of the drill hole 55, the drill comprises a rinsing device 70. A rinsing medium, e.g. water or air, is flushed by a device 80 for supply of rinsing medium in via rinsing device 70 in a central hole in the neck adaptor 60, and further through a central hole in the drill string 40 and out through the drill head 50 to the bottom of the drill hole 55. Drill cuttings mixed with the rinsing medium are then forced out of the drill hole 55 between the drill string 40 and the walls of the drill hole.

[0015] Figure 2 shows a side-view of a first example of the rinsing device 70 and Figure 3 shows a cross-section along the line III-III in Figure 2 of the first example of the rinsing device 70. The rinsing device 70 comprises a neck adaptor 60, said neck adaptor 60 being cylindrical and comprising a mantle surface 90, two end surfaces, a central axial passage 100 which opens at one end surface. The neck adaptor 60 also comprises a radial connection 110 between the central axial passage 100 and an opening 120 in the mantle surface 90.

[0016] The rinsing medium is intended to be flushed into the neck adaptor 60 through opening 120, further through the radial connection 110 and into the central axial passage 100 for further passage through the drill string 40 and drill head 50, and out through the drill head to the drill hole (as shown in Figure 1).

[0017] The rinsing device 70 comprises a rinse head 130. An aim of the rinse head 130 is that it provides a replaceable holder for the sealing element (said sealing element is described in more detail below). The rinse head 130 comprises an axially extending hole 140, in which hole the neck adaptor 60 is slidably arranged, so that - during drilling - the neck adaptor can rotate and move forwards and backwards in the rinse head which is stationary relative to the drill 20.

The rinse head 130 surrounds a part of the mantle surface 90 of the neck adaptor and provides a first space 150. The first space 150 extends around the mantle surface 90 of the neck adaptor in the region of the opening 120 in the mantle surface 90 of the neck adaptor. The first space 150 is connected to the outside of the rinse head 130 via a feed channel 160. This can for example be via a rinse adaptor 170. The first space 150 is preferably arranged so that the opening 120 of the neck adaptor is always located within the first space 150 upon rotating to-and-fro movement, which means that the rinsing medium always has free access to opening 120 in the mantle surface 90 of the neck adaptor.

[0018] The rinsing device 70 comprises at least one primary sealing element 180. The primary sealing element 180 is arranged in the axial direction on each side of the first space 150 in the rinse head 130 to provide a seal between the neck adaptor 60 and the first space

150, to prevent rinse medium leaking from the first space 150 along the gap between the mantle surface 90 of the neck adaptor 60 and the rinse head 130. Should such a leakage for instance reach the drill, damage can occur. Certain embodiments, such as the example in Figure 2, comprise two primary sealing elements 180, wherein one is arranged on one side of the opening 120 in the neck adaptor, and the other is arranged on the other side of the neck adaptor's opening 120.

**[0019]** In certain embodiments, the rinsing device 170 comprises at least one secondary sealing element 190 arranged in the axial direction on each side of the first space 150 in the rinse head 130 and on that side of each primary sealing element 180 which faces away from the first space 150, for a further seal between the neck adaptor 60 and the first space 150.

**[0020]** This means that, should any rinse medium leak past any of the primary sealing elements 180, the rinse medium is prevented from leaking further along the gap between the mantle surface 90 of the neck adaptor 60 and the rinse head 130. Certain embodiments, such as the example in Figure 2, comprise two secondary sealing elements 190, whereby one is arranged on that side of one primary sealing element 180 which faces away from the first space 150, and the other is arranged on that side of the other primary sealing element 180 which faces away from the first space 150.

The primary sealing elements 180 and the secondary sealing elements 190 can e.g. be unidirectional, such as e.g. so-called U-sleeves, i.e. in this case these should seal in the direction from the first space 150.

**[0021]** The rinsing device 70 also comprises at least one second space 200 which extends about the mantle surface 90 of the neck adaptor, which second space 200 borders that face of each primary sealing element 180 which faces away from the first space. In certain embodiments, such as e.g. that shown in Figure 2 (and also in Figure 4), the rinsing device comprises two second spaces 200, each of said two second spaces 200 being arranged on each side of the first space 150.

**[0022]** The rinsing device 70 comprises means for supplying lubricant to the second space 200. This is to lubricate the contact surfaces between the neck adaptor 60 (and in certain cases also the guide which is described in more detail below) and the primary sealing elements 180 and in certain cases, the secondary sealing elements 190, so that contact friction between the neck adaptor 60 and the primary and secondary sealing elements 180, 190 is reduced. This reduces wear on the primary and secondary sealing elements 180, 190. Preferably, grease or another lubricant with high viscosity can be used as lubricant. The lubricant should not comprise lubricating gas. Grease can be defined as a solid, semi-liquid or hard product, which is obtained by introducing a thickening agent to a liquid lubricant. To determine consistency, a special method is used according to EN-ISO 2137. The values measured are the depth in mm to which a special cone penetrates homogenized grease under 5

seconds at 25°C. The consistency is specified as penetration in 1/10mm. It is preferable for the present invention to use grease in class 00 - class 4, classified according to the National Lubrication Grease Institute (NLGI) in the USA, i.e. "hard" to "semi-liquid" grease with a penetration of 205-400, preferably a "normal" grease classed in class 2 with a penetration from 265 to 295 or a "relatively hard" grease classed in class 3 with a penetration from 220 to 250.

**[0023]** The means for supplying lubricant to the second space 200 comprises one or more inlets 210, said inlets 210 extending from the outside of the rinsing device 70 to the second space 200. The inlets 210 allow lubricant to be transferred from the outside of the rinsing device, e.g. via a grease nipple 215 to the second space 200. In certain embodiments, such as e.g. that shown in Figure 3, (and also in Figure 5), the inlet 210 extends radially to the mantle surface 90 of the neck adaptor in the second space 200. The inlet 210 can e.g. extend through the rinse head 130 from an opening 220 on a mantle surface 230 of the rinse head 130 to the second space 200, such as e.g. that shown in Figure 3. The inlet 210 can e.g. be formed as two or more channels 240, such as e.g. shown in Figure 3, in which the inlet 210 is formed as two channels 240. In certain embodiments, such as e.g. that shown in Figure 3, the opening 220 of the inlet in the rinse head 130 is comprised in a recess 250 in the mantle surface 230 of the rinse head. This has the advantage that lubricant can more easily be distributed in the inlet 210 or channels 240 where these pass through the rinse head 130. The recess prevents lubricant from taking short-cuts along the outer mantle surface of the rinse head from the inlet 210 to the outlet 260 (as described below), without passing the neck adapter 60 and the second space 200.

**[0024]** The means for supplying lubricant to the second space 200 comprises one or more outlets 260. The outlets extend from the second space 200 to the outside of the rinse head, and allow excess lubricant to pass out of the rinsing device 70, e.g. through so-called spyhole 265 in an outer cover 267 of the rinsing device 70. This also allows rinse medium to flow out if it has leaked past the primary and in certain cases secondary sealing elements 180, 190, which means that a user can see from the outside of the rinsing device 70 whether such a leak has occurred, so that the primary, and in certain cases, the secondary sealing elements 180, 190 can be replaced if they have worn out. The supply of lubricant increases the lifetime of the primary and in certain cases, secondary, sealing elements 180, 190. The lubricant does not prevent the passage of rinse medium through the spyhole 265, as the rinse medium has a certain pressure, and pushes out the lubricant. However, any lubricant present in the spyhole does prevent water and dirt entering from outside and penetrating the neck adaptor 60 and the primary and secondary sealing elements 180 and 190, where they would cause wear and corrosion.

**[0025]** In certain embodiments, such as e.g. that

shown in Figure 3 (and also in Figures 5 and 6 described below), the outlet 260 extends radially from the mantle surface 90 of the neck adaptor in the second space 200. The outlet 260 can e.g. extend from the second space 200, through the rinse head 130 and to a vent 270 on the mantle surface 230 of the rinse head, such as e.g. shown in Figures 3, 5 and 6. In certain embodiments, such as e.g. that shown in Figure 3, each outlet 260 through the rinse head 130 comprises two or more channels 280 through the rinse head 130. In certain embodiments, such as e.g. that shown in Figure 3, the vent 270 of the outlet in the rinse head is comprised in a recess 290 in the mantle surface 90 of the rinse head.

**[0026]** Figure 4 shows a side-view of an embodiment of the rinsing device 70. Figure 5 shows a cross-section along the line V-V of the embodiment of Figure 4, e.g. the cross-sections runs through a cylindrical guide 300. Figure 6 shows a cross-section along the line VI-VI of the embodiment of Figure 4.

**[0027]** In certain embodiments, such as e.g. that shown in Figures 4 and 5, the rinsing device comprises a guide 300, said guide 300 comprising an axially extending hole 310, the neck adaptor 60 being slidably arranged in said hole. The guide can e.g. be a so-called nose bush. The guide 300 surrounds a portion of the mantle surface 90 of the neck adaptor. The guide 300 borders the rinse head 130 and the second space 200. In certain embodiments, such as e.g. that shown in Figures 4 and 5, the inlet 210 extends through the guide 300 from an opening 320 on a mantle surface 330 of the guide 300 to the second space 200. The inlets 210 of certain embodiments can comprise two or more channels (not shown), to obtain an even better flow of lubricant to the second space 200. In one embodiment, the inlet 210 runs through the guide 300 and the outlet 260 through the rinse head 130, this is shown in Figures 4, 5 and 6.

**[0028]** The lubricant is squirted in via channels 240 through, e.g. the outer cover 267 of the rinsing device 70. The lubricant is carried further in through the inlet 210 to the second space 200, where it is allowed to spread. The second space 200 can e.g. be contained between the primary sealing elements 180 and the secondary sealing elements 190, as shown in Figure 2. In this way, the lubricant can be supplied between the primary sealing element 180 and the secondary sealing element 190 to the second space 200.

**[0029]** The second space 200 can also be contained on that face of each primary sealing element 180 which faces away from the first space 150, as shown in Figure 4. Lubricant can therefore be supplied to the second space 200, on that face of each second sealing element which faces away from the first space 150. This requires that, when the lubricant reaches the secondary sealing element 190, and the secondary sealing element 190 is unidirectional, such as e.g. so-called U-sleeves, the secondary sealing element 190 releases and allows lubricant to enter into the space between the primary 180 and secondary 190 sealing elements. In this embodiment, lubri-

cation of the guide 300 is also made possible; in this case, the second space extends along the mantle surface of the neck adaptor 60 both in the region where it is surrounded by the rinse head 130 and where the neck adaptor 60 is surrounded by the guide 300. (This requires that the lubricant spreads both to the left and right in Figure 4, when it is squirted in through the left grease nipple 215). This embodiment is very advantageous, as water and drill cuttings are prevented from entering via the lubricating gas pipes in the guide 300, as no lubricating gas pipes are required.

Alternatively, if only the primary sealing elements 180 are present (and no secondary sealing elements), lubricant is squirted in on that face of each primary sealing element 180 which faces away from the first space 150. The lubricant can e.g. be squirted in via inlet 210 in the rinse head 130 or via inlet 210 in the guide 300.

The lubricant is then carried further out through the outlet 260. When lubricant is seen e.g. in some of the spyholes 265 coupled to the outlet 206, filling with lubricant is complete. The variously described embodiments of the rinse head 130 and guide 300 are formed so that grease is forced all the way to the neck adaptor 60 before it can spread further out via the outlet 260 and the spyholes.

**[0030]** The lubricant lubricates the contact between the neck adaptor 60 and the sealing elements 180, 190 and in certain embodiments, also between the neck adaptor 60 and the guide 300. In this way, friction is lowered and wear and heat production is lowered. The lubricant also reduces corrosion by preventing air from making contact with the neck adaptor 60. External water which enters via the rear entrance through the spyholes 265 is also prevented from reaching the neck adaptor 60 and in certain cases, the guide 300.

**[0031]** The lubricant can e.g. be squirted in continuously or at close intervals, e.g. by manual injection through the grease nipple, by a central lubrication system from e.g. a drill rig in which the drill 20 is arranged, by a lubricant container on a sled on which the drill 20 is arranged, said lubricant container in turn may be pressurised by lubricating gas via a branched tube from a lubricating gas intake on the drill 20, or by an automated grease cartridge which is exchanged at regular intervals.

## Claims

1. A rinsing device (70) for a drill device for rock drilling, said rinsing device (70) comprising: a cylindrical neck adaptor (60) which comprises a mantle surface (90), two end surfaces, a central axial passage (100) which opens at one end surface, and a radial connection (110) between the central axial passage (100) and an opening (120) in the mantle surface (90), a rinse head (130) with a axially-extending hole (140), said neck adaptor (60) being slidably arranged in said hole and said rinse head (130) surrounding a part of the mantle surface (90) of the neck adaptor

- and providing a first space (150) which extends around the mantle surface (90) of the neck adaptor in the region of the opening (120) in the mantle surface (90) of the neck adaptor, said first space (150) being connected to the outside of the rinse head (130) via a feed channel (160), at least one primary sealing element (180) arranged in the axial direction on each side of the first space (150) in the rinse head (130) to provide a seal between the neck adaptor (60) and the first space (150), at least one second space (200) which extends about the mantle surface (90) of the neck adaptor, each of which second spaces (200) borders that side of each primary sealing element (180) which faces away from the first space (150), the rinsing device (70) comprises means for supplying lubricant to the second space, wherein the means for supplying lubricant to the second space (200) comprises one or more inlets (210), said inlet (210) extending from the outside of the rinsing device (70) to the second space (200) **characterized in that** the means for supplying lubricant to the second space (200) comprises one or more outlets (260) which extend from the second space (200) to the outside of the rinse head (70).
2. The rinsing device (70) according to claim 1, comprising at least one secondary sealing element (190) arranged in the axial direction on each side of the first space (150) in the rinse head (130) and on that side of each primary sealing element (180) which faces away from the first space (150).
  3. The rinsing device (70) according to claim 2, means for supplying lubricant is arranged to supply lubricant between the primary sealing element (180) and the secondary sealing element (190).
  4. The rinsing device (70) according to claim 2, wherein the means for supplying lubricant is arranged to supply lubricant on that side of each primary sealing element (180) which faces away from the first space (150).
  5. The rinsing device (70) according to claim 1, wherein the inlet (210) extends radially to the mantle surface (90) of the neck adaptor in the second space (200).
  6. The rinsing device (70) according to any of claims 1-5, wherein the inlet (210) extends through the rinse head from an opening (220) on a mantle surface (230) of the rinse head (130) to the second space (200).
  7. The rinsing device (70) according to claim 6, wherein the inlet (210) through the rinse head (130) comprises one or more channels (240).
  8. The rinsing device (70) according to claim 1, wherein the outlet (260) extends radially from the mantle surface (90) of the neck adaptor in the second space (200).
  9. The rinsing device (70) according to any of claims 1-8, wherein the outlet (260) extends through the rinse head from the second space (200) to a vent (270) on the mantle surface (230) of the rinse head.
  10. The rinsing device (70) according to any of claims 1-5, comprising a cylindrical guide (300) with an axially extending hole (310), the neck adaptor (60) being slidably arranged said hole, and said guide (300) surrounding a portion of the mantle surface (90) of the neck adaptor, said guide (300) bordering the rinse head and the second space (200), wherein the inlet (210) extends through the guide (300) from an opening (320) on a mantle surface (330) of the guide (300) to the second space (200).
  11. The rinsing device (70) according to any of claims 1-10, wherein at least one second space (200) is comprised of two second spaces, each one of said two second spaces (200) being arranged on each side of the first space (150).
  12. The rinsing device (70) according to any of claims 1-11, wherein the lubricant comprises a "hard" to "semi-liquid" grease with a penetration of 205-400, preferably a "normal" grease classed in class 2 with a penetration from 265 to 295 or a "relatively hard" grease classed in class 3 with a penetration from 220 to 250.
  13. A drilling device (10) for rock drilling, said drilling device (10) **characterised in that** it comprises a rinsing device (70) according to any of claims 1-12.
- ## Patentansprüche
1. Eine Spülvorrichtung (70) für eine Bohrvorrichtung zum Gesteinsbohren, welche Spülvorrichtung (70) aufweist:  
  
einen zylindrischen Halsadapter (60), der eine Manteloberfläche (90), zwei Endoberflächen, einen zentralen axialen Durchgang (100), der sich an einer Endoberfläche öffnet, und eine radiale Verbindung (110) zwischen dem zentralen axialen Durchgang (100) und einer Öffnung (120) in der Manteloberfläche (90) aufweist, einen Spülkopf (130) mit einem sich axial erstreckenden Loch (140), welcher Halsadapter (60) in dem genannten Loch verschiebbar angeordnet ist und welcher Spülkopf (130) einen Teil der Manteloberfläche (90) des Halsadapters umgibt und einen ersten

- Raum (150) bereitstellt, der sich im Bereich der Öffnung (120) in der Manteloberfläche (90) des Halsadapters um die Manteloberfläche (90) des Halsadapters erstreckt, welcher erste Raum (150) über einen Versorgungskanal (160) mit der Außenseite des Spülkopfes (130) verbunden ist, mindestens ein primäres Dichtungselement (180), das in axialer Richtung auf jeder Seite des ersten Raums (150) in dem Spülkopf (130) angeordnet ist, um eine Dichtung zwischen dem Halsadapter (60) und dem ersten Raum (150) bereitzustellen, mindestens einen zweiten Raum (200), der sich um die Manteloberfläche (90) des Halsadapters erstreckt, wobei jeder der zweiten Räume (200) an diejenige Seite eines jeden primären Dichtungselements (180) angrenzt, welche weg von dem ersten Raum (150) zeigt, wobei die Spülvorrichtung (70) Mittel zum Zuführen von Schmiermittel zu dem zweiten Raum aufweist, wobei das Mittel zum Zuführen von Schmiermittel zu dem zweiten Raum (200) einen oder mehrere Einlässe (210) aufweist, welcher Einlass (210) sich von der Außenseite der Spülvorrichtung (70) zu dem zweiten Raum (200) erstreckt, **dadurch gekennzeichnet, dass** das Mittel zum Zuführen von Schmiermittel zu dem zweiten Raum (200) einen oder mehrere Auslässe (260) aufweist, die sich von dem zweiten Raum (200) zu der Außenseite der Spülvorrichtung (70) erstrecken.
2. Die Spülvorrichtung (70) nach Anspruch 1, aufweisend mindestens ein sekundäres Dichtungselement (190) das in axialer Richtung auf jeder Seite des ersten Raums (150) in dem Spülkopf (130) und auf derjenigen Seite eines jeden primären Dichtungselements (180), welche weg von dem ersten Raum (150) zeigt, angeordnet ist.
  3. Die Spülvorrichtung (70) nach Anspruch 2, wobei das Mittel zum Zuführen von Schmiermittel angeordnet ist, um Schmiermittel zwischen das primäre Dichtungselement (180) und das sekundäre Dichtungselement (190) zuzuführen.
  4. Die Spülvorrichtung (70) nach Anspruch 2, wobei das Mittel zum Zuführen von Schmiermittel angeordnet ist, um Schmiermittel an diejenige Seite eines jeden primären Dichtungselements (180) zuzuführen, welche weg von dem ersten Raum (150) zeigt.
  5. Die Spülvorrichtung (70) nach Anspruch 1, wobei der Einlass (210) sich radial zu der Manteloberfläche (90) des Halsadapters in dem zweiten Raum (200) erstreckt.
  6. Die Spülvorrichtung (70) nach einem der Ansprüche 1-5, wobei der Einlass (210) sich durch den Spülkopf von einer Öffnung (220) auf der Manteloberfläche (230) des Spülkopfes (130) zu dem zweiten Raum (200) erstreckt.
  7. Die Spülvorrichtung (70) nach Anspruch 6, wobei der Einlass (210) durch den Spülkopf (130) einen oder mehrere Kanäle (240) aufweist.
  8. Die Spülvorrichtung (70) nach Anspruch 1, wobei der Auslass (260) sich radial von der Manteloberfläche (90) des Halsadapters in den zweiten Raum (200) erstreckt.
  9. Die Spülvorrichtung (70) nach einem der Ansprüche 1-8, wobei der Auslass (260) sich durch den Spülkopf von dem zweiten Raum (200) zu einer Lüftung (270) auf der Manteloberfläche (230) des Spülkopfes erstreckt.
  10. Die Spülvorrichtung (70) nach einem der Ansprüche 1-5, aufweisend eine zylindrische Führung (300) mit einem sich axial erstreckenden Loch (310), wobei der Halsadapter (60) verschiebbar in dem genannten Loch angeordnet ist, und die genannte Führung (300) einen Teil der Manteloberfläche (90) des Halsadapters umgibt, welche Führung (300) an den Spülkopf und den zweiten Raum (200) angrenzt, wobei der Einlass (210) sich durch die Führung (300) von einer Öffnung (320) auf einer Manteloberfläche (330) der Führung (300) zu dem zweiten Raum (200) erstreckt.
  11. Die Spülvorrichtung (70) nach einem der Ansprüche 1-10, wobei mindestens ein zweiter Raum (200) sich aus zwei zweiten Räumen zusammensetzt, wobei jeder der genannten zwei zweiten Räume (200) auf jeder Seite des ersten Raums (150) angeordnet ist.
  12. Die Spülvorrichtung (70) nach einem der Ansprüche 1-11, wobei das Schmiermittel ein "hartes" bis "halbflüssiges" Schmierfett mit einer Eindringtiefe von 205-400, vorzugsweise ein "normales" in der Klasse 2 eingestuftes Schmierfett mit einer Eindringtiefe von 265 bis 295 oder ein "vergleichsweise hartes" in der Klasse 3 eingestuftes Schmierfett mit einer Eindringtiefe von 220 bis 250 aufweist.
  13. Eine Bohrvorrichtung (10) zum Gesteinsbohren, welche Bohrvorrichtung (10) **dadurch gekennzeichnet ist, dass** sie eine Spülvorrichtung (70) nach einem der Ansprüche 1-12 aufweist.

#### Revendications

1. Dispositif de rinçage (70) pour un dispositif à forer

- pour forer la roche, ledit dispositif de rinçage (70) comprenant un adaptateur de col cylindrique (60) qui comprend une surface de chemisage (90), deux surfaces d'extrémité, un passage axial central (100) qui débouche sur une surface d'extrémité et une liaison radiale (110) entre le passage axial central (100) et une ouverture (120) de la surface de chemisage (90), une tête de rinçage (130) présentant un trou (140) qui s'étend axialement, ledit adaptateur de col (60) étant aménagé à coulissement dans ledit trou et ladite tête de rinçage (130) entourant une partie de la surface de chemisage (90) de l'adaptateur de col et fournissant un premier espace (150) qui s'étend autour de la surface de chemisage (90) de l'adaptateur de col dans la région de l'ouverture (120) de la surface de chemisage (90) de l'adaptateur de col, ledit premier espace (150) étant raccordé à l'extérieur de la tête de rinçage (130) via un canal d'alimentation (160), au moins un élément d'étanchéité primaire (180) aménagé dans la direction axiale sur chaque côté du premier espace (150) de la tête de rinçage (130) pour former un joint étanche entre l'adaptateur de col (60) et le premier espace (150), au moins un second espace (200) qui s'étend autour de la surface de chemisage (90) de l'adaptateur de col, chacun desquels seconds espaces (200) borde le côté de chaque élément d'étanchéité primaire (180) qui est opposé au premier espace (150), le dispositif de rinçage (70) comprenant des moyens pour fournir du lubrifiant au second espace, dans lequel les moyens de fourniture de lubrifiant au second espace (200) comprennent une ou plusieurs entrées (210), ladite entrée (210) s'étendant de l'extérieur du dispositif de rinçage (70) au second espace (200), **caractérisé en ce que** les moyens de fourniture de lubrifiant au second espace (200) comprennent une ou plusieurs sorties (260) qui s'étendent du second espace (200) à l'extérieur de la tête de rinçage (70).
2. Dispositif de rinçage (70) selon la revendication 1, comprenant au moins un élément d'étanchéité secondaire (190) aménagé dans la direction axiale sur chaque côté du premier espace (150) de la tête de rinçage (130) et sur le côté de chaque élément d'étanchéité primaire (180) qui est opposé au premier espace (150).
  3. Dispositif de rinçage (70) selon la revendication 2, dans lequel des moyens de fourniture de lubrifiant sont aménagés pour fournir du lubrifiant entre l'élément d'étanchéité primaire (180) et l'élément d'étanchéité secondaire (190).
  4. Dispositif de rinçage (70) selon la revendication 2, dans lequel les moyens de fourniture de lubrifiant sont aménagés pour fournir du lubrifiant sur le côté de chaque élément d'étanchéité primaire (180) qui est opposé au premier espace (150).
  5. Dispositif de rinçage (70) selon la revendication 1, dans lequel l'entrée (210) s'étend radialement vers la surface de chemisage (90) de l'adaptateur de col dans le second espace (200).
  6. Dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 5, dans lequel l'entrée (210) s'étend à travers la tête de rinçage d'une ouverture (220) sur une surface de chemisage (230) de la tête de rinçage (130) au second espace (200).
  7. Dispositif de rinçage (70) selon la revendication 6, dans lequel l'entrée (210) à travers la tête de rinçage (130) comprend un ou plusieurs canaux (240).
  8. Dispositif de rinçage (70) selon la revendication 1, dans lequel la sortie (260) s'étend radialement de la surface de chemisage (90) de l'adaptateur de col dans le second espace (200).
  9. Dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 8, dans lequel la sortie (260) s'étend à travers la tête de rinçage du second espace (200) à un orifice (270) de la surface de chemisage (230) de la tête de rinçage.
  10. Dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 5, comprenant un guide cylindrique (300) présentant un trou (310) s'étendant axialement, l'adaptateur de col (60) étant aménagé à coulissement dans ledit trou et ledit guide (300) entourant une partie de la surface de chemisage (90) de l'adaptateur de col, ledit guide (300) bordant la tête de rinçage et le second espace (200), dans lequel l'entrée (210) s'étend à travers le guide (300) d'une ouverture (320) sur une surface de chemisage (330) du guide (300) au second espace (200).
  11. Dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 10, dans lequel au moins un second espace (200) est constitué de deux seconds espaces, chaque desdits deux seconds espaces (200) étant aménagé sur chaque côté du premier espace (150).
  12. Dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 11, dans lequel le lubrifiant comprend une graisse « dure » à « semi-liquide » avec une pénétration de 205 à 400, de préférence une graisse « normale » classée en classe 2 avec une pénétration de 265 à 295 ou une graisse « relativement dure » classée en classe 3 avec une pénétration de 220 à 250.
  13. Dispositif de forage (10) pour forage de roches, ledit dispositif de forage (10) étant **caractérisé en ce qu'il**

comprend un dispositif de rinçage (70) selon l'une quelconque des revendications 1 à 12.

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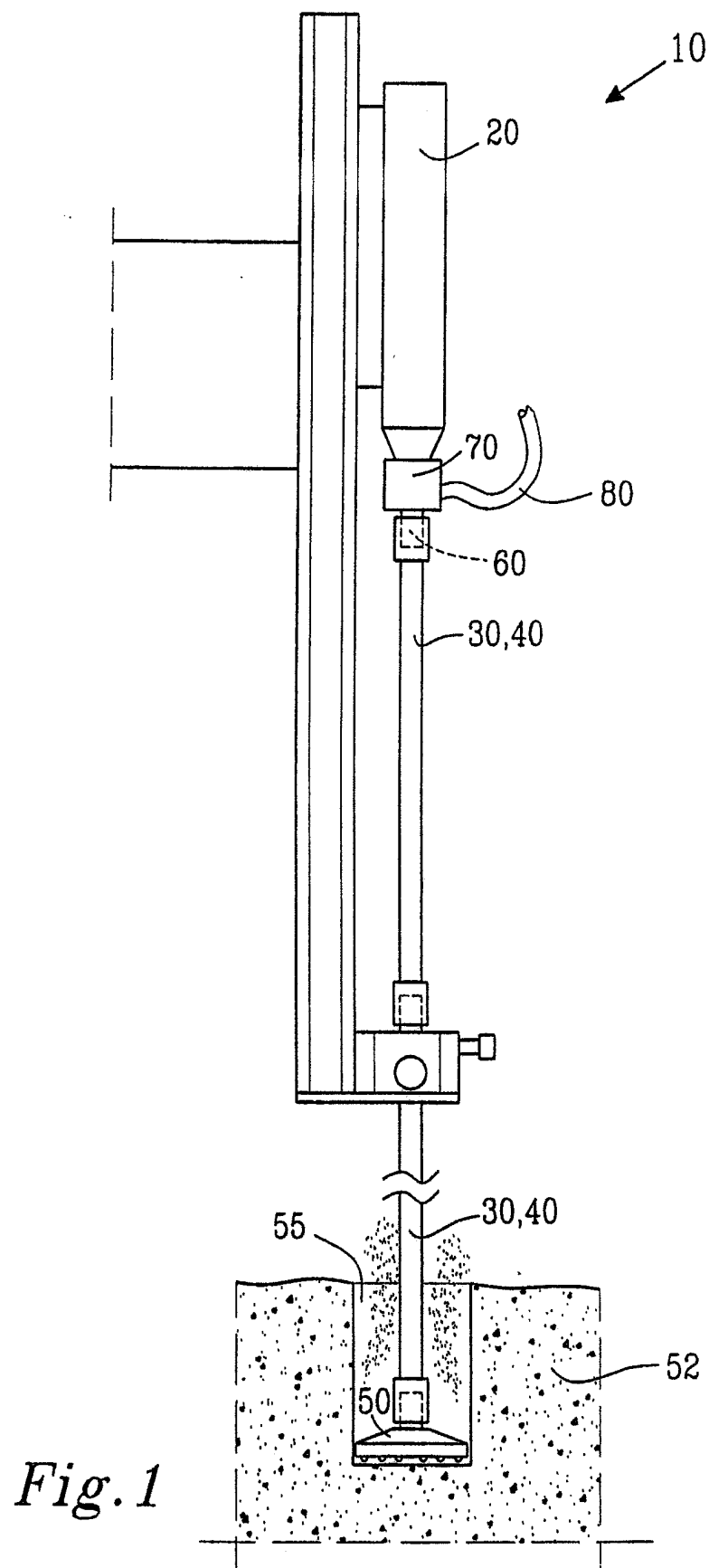
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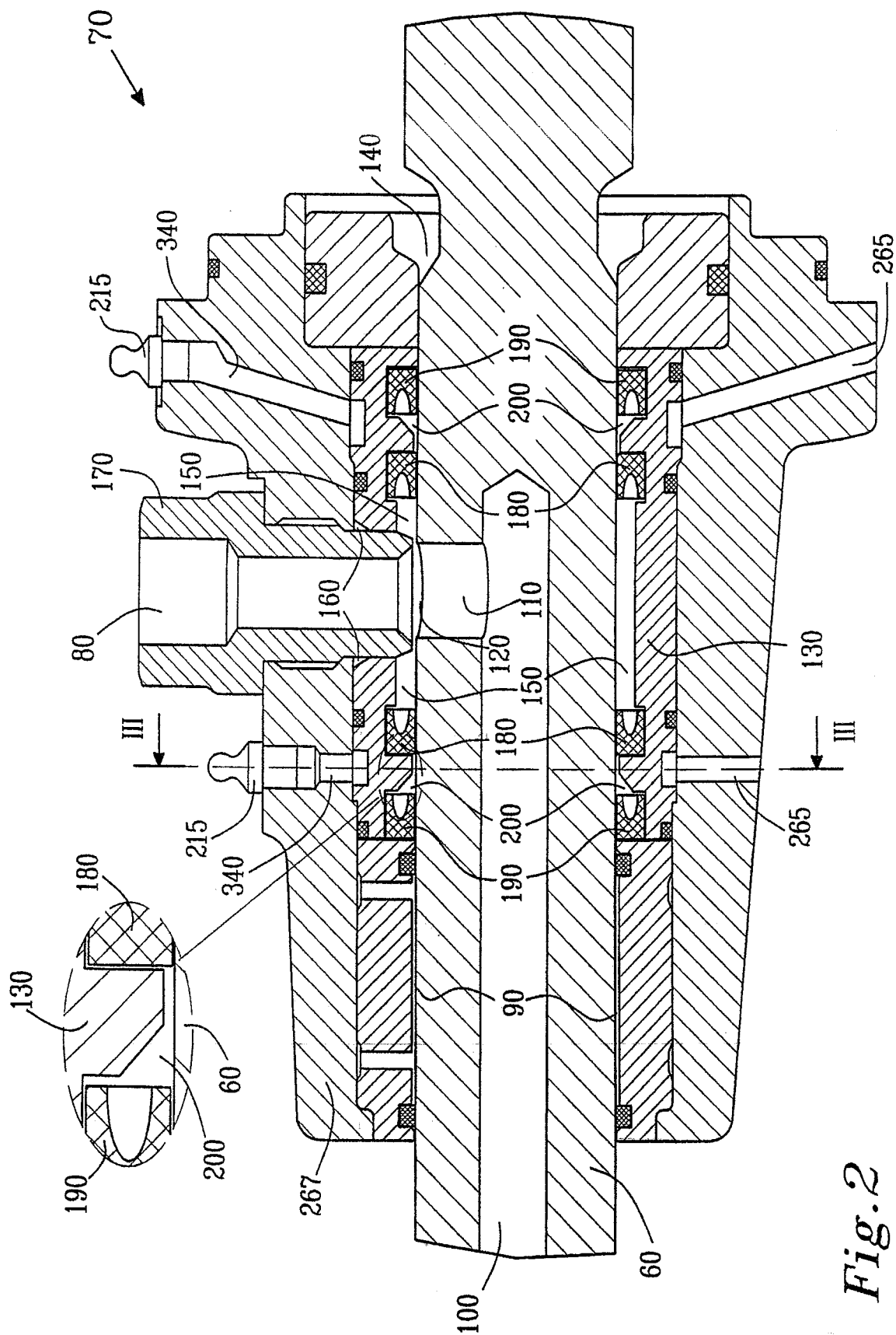
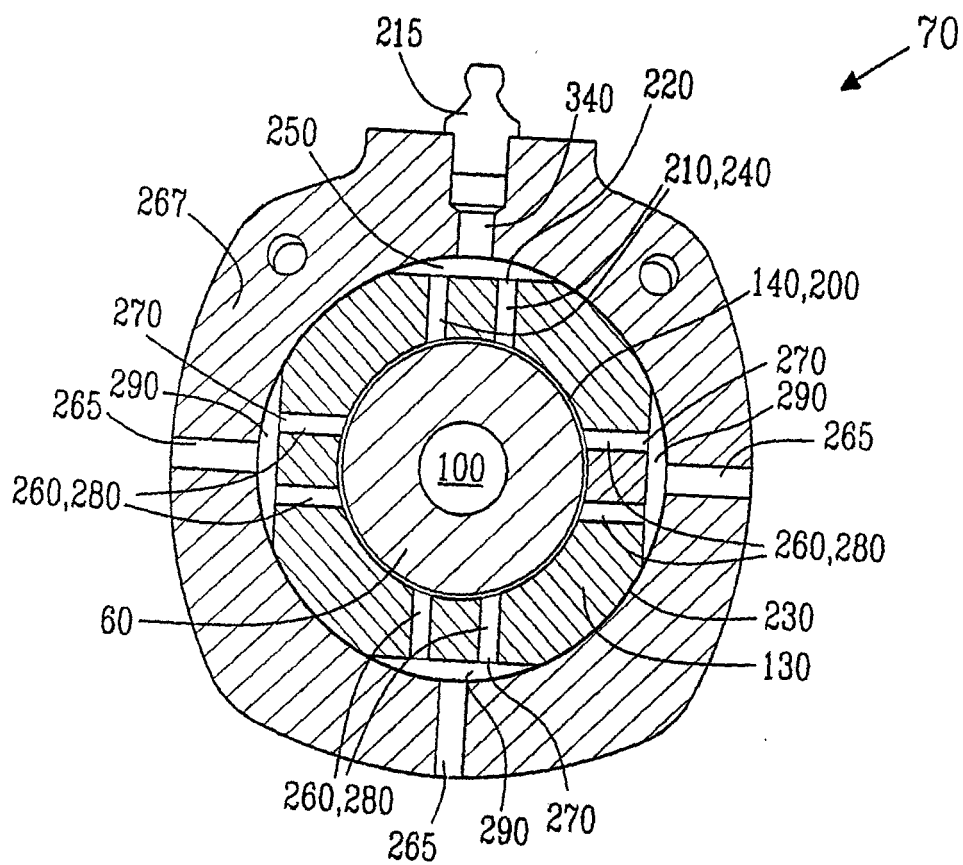
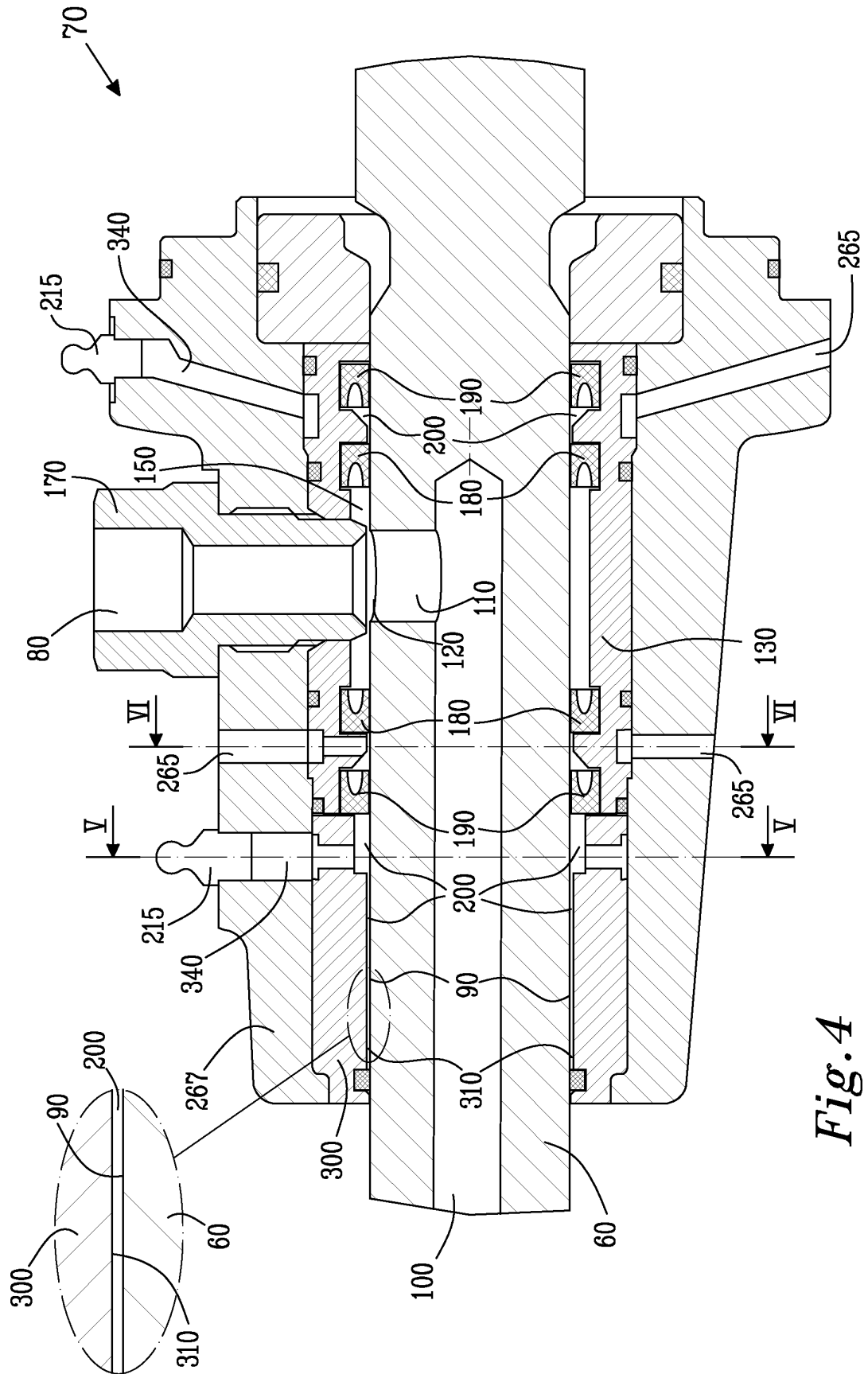
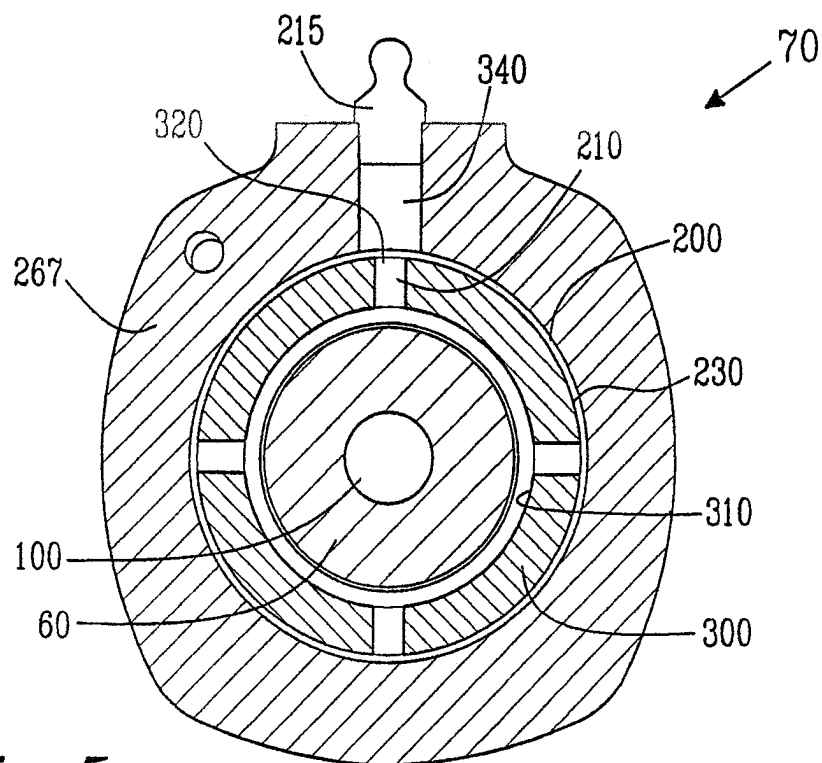


Fig. 2

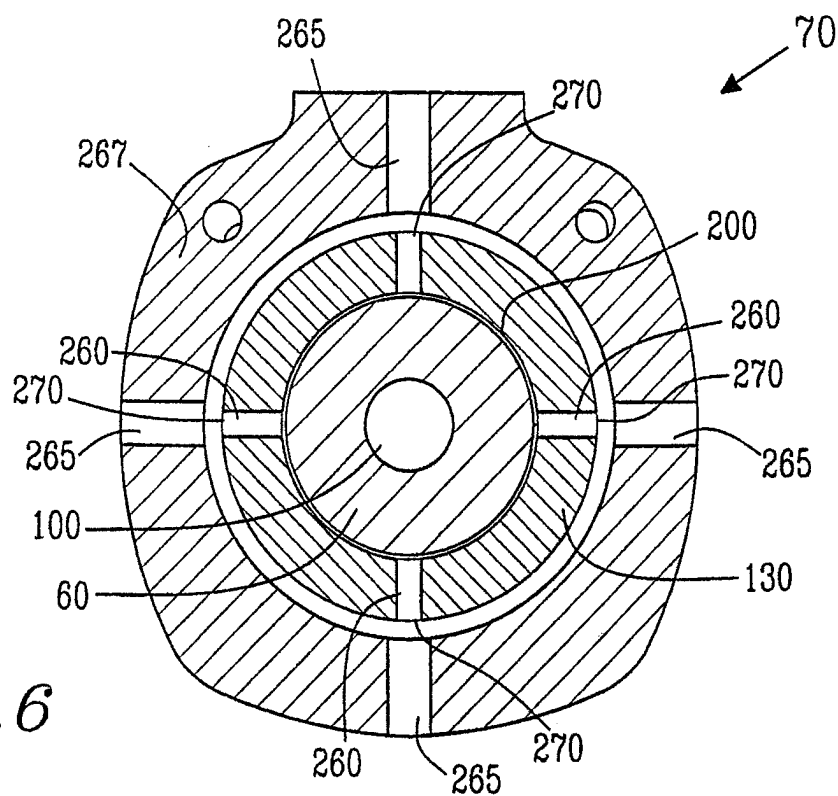


*Fig. 3*





*Fig.5*



*Fig.6*