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(54) **DUSTPROOF STRUCTURE OF GRINDING TOOL HOLDER**

(57) A dustproof structure of a grinding tool holder (20), which comprises a shaft portion (21) and a counterweight portion (22) connected to one end of the shaft portion (21). The counterweight portion (22) comprises an eccentric block (23) connected to the shaft portion (21), at least one bearing (24) mounted in the eccentric block (23), a dustproof ring (25), and a grinding member assembling head (26) assembled with the bearing (24). The eccentric block (23) is formed with an assembly port (233) for disposing the bearing (24) and the dustproof ring (25), the dustproof ring (25) is located on a side of the bearing (24) facing the grinding member assembling head (26), and formed with a first continuous concave-convex structure (251) on a side away from the bearing (24), the grinding member assembling head (26) is formed with a second continuous concave-convex structure (261) on a side facing the dustproof ring (25), the first and second continuous concave-convex structures (251 and 261) match with each other and define dust blocking dots (271).

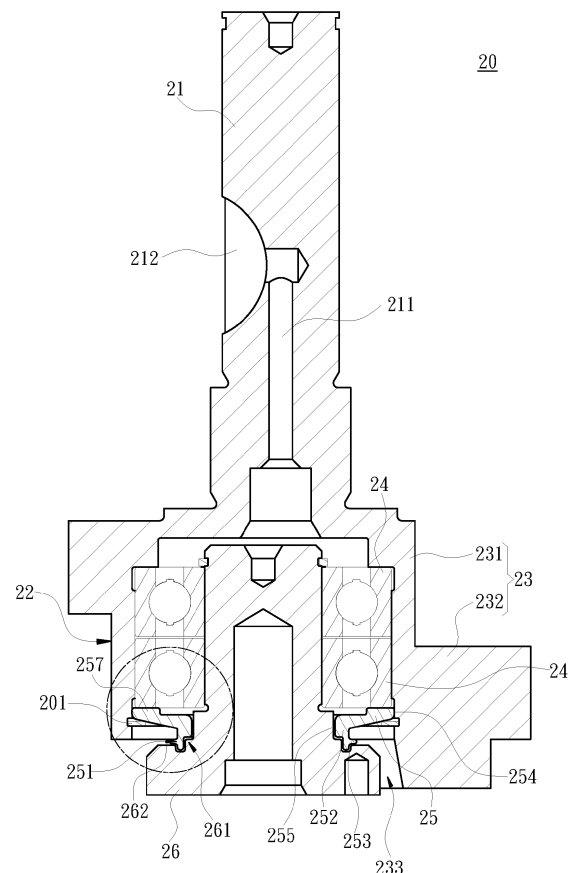


Fig. 2

Description

FIELD OF THE INVENTION

[0001] The invention relates to a grinding tool holder applied to tool grinding machines, and more particularly to a grinding tool holder with a dustproof structure.

BACKGROUND OF THE INVENTION

[0002] In order for the existing tool grinding machine to be capable of driving a grinding member to work by orbital motion or random orbital motion, the tool grinding machine is assembled with the grinding member via a grinding tool holder, such as the grinding tool holders disclosed in US Patent No. 6,878,049, KR Patent No. 10-2015-0000792, TW Patent No. 439616, US Patent No. 6,855,040.

[0003] The grinding tool holder is driven by a motor of the tool grinding machine, and the grinding tool holder is driven by at least one included bearing and an inertial force generated by the motor to make the grinding tool holder generate orbital motion or random orbital motion. However, since the grinding tool holder is assembled with the grinding member, the grinding tool holder is close to a surface to be ground, and dust generated during a grinding process may float toward the grinding tool holder. In this regard, although the above-mentioned patents are equipped with dustproof designs, most of them are mainly designed to block the path along which dust enters the bearing directly, but it is still easy for the fine dust to enter the bearing through the gaps between the blocking structures to affect the operation or service life of the bearing.

SUMMARY OF THE INVENTION

[0004] A main object of the invention is to solve the problem that shielding alone is incapable of preventing dust from entering the bearing through the gaps between the structures in the existing tool grinding machine.

[0005] In order to achieve the above object, the invention provides a dustproof structure of a grinding tool holder, the grinding tool holder is assembled with a motor, and the grinding tool holder is assembled with a grinding tool optionally. The grinding tool holder comprises a shaft portion assembled with the motor, and a counterweight portion connected to one end of the shaft portion. The counterweight portion comprises an eccentric block connected to the shaft portion, at least one bearing mounted in the eccentric block, a dustproof ring, and a grinding member assembling head assembled with the at least one bearing. The eccentric block is formed with an assembly port to provide the at least one bearing and the dustproof ring for disposal therein, the dustproof ring is located on a side of the at least one bearing facing the grinding member assembling head, the dustproof ring is formed with a first continuous concave-convex structure

on a side distant from the at least one bearing, the grinding member assembling head is formed with a second continuous concave-convex structure on a side facing the dustproof ring, and the first continuous concave-convex structure and the second continuous concave-convex structure coordinate with each other and jointly define a plurality of dust blocking dots.

[0006] In one embodiment, the first continuous concave-convex structure comprises a step portion and a branch portion extending from a side of the step portion, the branch portion is horizontal to a surface of the grinding member assembling head facing the dustproof ring.

[0007] In one embodiment, the dustproof ring comprises an outer ring edge and an inner ring edge, and the first continuous concave-convex structure is disposed close to the inner ring edge.

[0008] In one embodiment, the counterweight portion comprises a limiting ring mounted in the assembly port for limiting a position of the dustproof ring.

[0009] In one embodiment, an outer diameter of the limiting ring is larger than an outer diameter of the dustproof ring.

[0010] In one embodiment, the shaft portion is formed with an air guide channel communicating with the assembly port, and a mounting groove communicating with the air guide channel to provide for installing a motor paddle, and wherein an airflow is induced into the air guide channel by the mounting groove when the motor rotates.

[0011] In one embodiment, the dustproof ring comprises an inclined surface facing the grinding member assembling head.

[0012] In one embodiment, the dustproof ring comprises a pushing block disposed on a side facing the at least one bearing to contact with the at least one bearing.

[0013] In one embodiment, an outer diameter of the dustproof ring is larger than an outer diameter of the at least one bearing, and an outer diameter of the limiting ring is larger than an outer diameter of the dustproof ring.

[0014] Accordingly, compared with the prior art, the grinding tool holder of the invention has the following features: in addition to the dustproof ring, the first continuous concave-convex structure on the dustproof ring further coordinates with the second continuous concave-convex structure on the grinding member assembling head, the first continuous concave-convex structure and the second continuous concave-convex structure jointly define the plurality of dust blocking dots, so that a length of edge-wise distance for dust to enter the assembly port is increased, thereby greatly preventing the at least one bearing from operating abnormally due to dust.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a schematic structural diagram of a tool grinding machine.

FIG. 2 is a cross-sectional structural view of an em-

bodiment of a dustproof structure of a grinding tool holder of the invention.

FIG. 3 is a perspective structural exploded view of an embodiment of the dustproof structure of the grinding tool holder of the invention.

FIG. 4 is a cross-sectional structural exploded view of an embodiment of the dustproof structure of the grinding tool holder of the invention.

FIG. 5 is a cross-sectional view of a partially enlarged structure in FIG. 1 of the invention.

FIG. 6 is a cross-sectional structural view of another embodiment of the dustproof structure of the grinding tool holder of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The detailed description and technical content of the invention are described below with reference to the accompanying drawings.

[0017] Please refer to FIG. 1, the invention provides a dustproof structure of a grinding tool holder, a grinding tool holder 20 is a part of a tool grinding machine 30, the grinding tool holder 20 is assembled with a motor 31 of the tool grinding machine 30 to be regarded as an output shaft of the motor 31. The motor 31 can be electric or pneumatic. In addition, the grinding tool holder 20 can be assembled with a grinding tool 32 optionally, and the grinding tool 32 can be a grinding disc. When the grinding tool holder 20 is driven by the motor 31, the grinding disc assembled thereon generates orbital motion or random orbital motion.

[0018] Please refer to FIG. 1, FIG. 2, FIG. 3 and FIG. 4, the grinding tool holder 20 comprises a shaft portion 21 assembled with the motor 31, and a counterweight portion 22 connected to one end of the shaft portion 21. The counterweight portion 22 comprises an eccentric block 23 connected to the shaft portion 21, at least one bearing 24 mounted in the eccentric block 23, a dustproof ring 25, and a grinding member assembling head 26 assembled with the at least one bearing 24. More specifically, the eccentric block 23 comprises an upper eccentric portion 231 and a lower eccentric portion 232, wherein a center of the upper eccentric portion 231 and a center of the lower eccentric portion 232 are not on a same axis. The eccentric block 23 is further formed with an assembly port 233, and an opening of the assembly port 233 is located on a side of the eccentric block 23 distant from the shaft portion 21. The assembly port 233 provides the at least one bearing 24 and the dustproof ring 25 to be disposed therein. The dustproof ring 25 is located on a side of the at least one bearing 24 facing the grinding member assembling head 26. In other words, the dustproof ring 25 is installed after the at least one bearing 24 is inserted into the assembly port 233. The dustproof ring 25 is located close to the opening of the assembly port 233. That is to say, when observation on an inside of the assembly port 233, the dustproof ring 25 is first seen,

and the at least one bearing 24 is shielded by the dustproof ring 25. In addition, when a plurality of the at least one bearings 24 are implemented, the dustproof ring 25 is disposed on a side of one of the bearings 24 facing the grinding member assembling head 26, wherein the bearing 24 is closest to the opening of the assembly port 233.

[0019] Please refer to FIG. 2 and FIG. 5. In the invention, the dustproof ring 25 is formed with a first continuous concave-convex structure 251 on a side distant from the at least one bearing 24. The grinding member assembling head 26 is formed with a second continuous concave-convex structure 261 on a side facing the dustproof ring 25, and the first continuous concave-convex structure 251 is coordinated with the second continuous concave-convex structure 261. In addition, the first continuous concave-convex structure 251 and the second continuous concave-convex structure 261 jointly form a path 27 communicating from an external environment into the assembly port 233. The first continuous concave-convex structure 251 and the second continuous concave-convex structure 261 jointly define a plurality of dust blocking dots 271 located on the path 27, the plurality of dust blocking dots 271 are respectively a bend on the path 27, and the path 27 is no longer a simple straight line, or not only having a single bend due to the plurality of dust blocking dots 271; that is, the first continuous concave-convex structure 251 and the second continuous concave-convex structure 261 increase a length of edgewise distance. When the tool grinding machine 30 performs a grinding operation, although a small amount of dust generated by the grinding operation enters a gap (i.e., the path 27) between the first continuous concave-convex structure 251 and the second continuous concave-convex structure 261, the dust is incapable of entering the assembly port 233 due to the plurality of dust blocking dots 271, thereby preventing the at least one bearing 24 from operating abnormally due to the dust.

[0020] Accordingly, it is mainly the at least one bearing 24 that makes the grinding disc to generate orbital motion (or random orbital motion), although the grinding tool holder 20 is driven by the motor 31. Therefore, a main object of the dustproof structure of the grinding tool holder 20 of the invention is to prevent operation of the at least one bearing 24 from being affected by dust generated by grinding operation.

[0021] Please refer to FIG. 2 and FIG. 5. In one embodiment, the first continuous concave-convex structure 251 comprises a step portion 252 and a branch portion 253 extending from a side of the step portion 252. Further, in one embodiment, the branch portion 253 is horizontal to a surface 262 of the grinding member assembling head 26 facing the dustproof ring 25. In this embodiment, some of the dust blocking dots 271 are located at different heights, so the path 27 is presented high and low and consequently increases a dustproof effect. Furthermore, the dustproof ring 25 comprises an outer ring edge 254 and an inner ring edge 255, and the first continuous con-

cave-convex structure 251 is disposed adjacent to the inner ring edge 255. In addition, the branch portion 253 extends from the inner ring edge 255 toward the outer ring edge 254. In one embodiment, the dustproof ring 25 has an inclined surface 256 facing the grinding member assembling head 26, that is, when the grinding tool holder 20 is observed in a state where the grinding tool 32 is placed horizontally on a plane, a side of the inclined surface 256 adjacent to the outer ring edge 254 is higher than a side of the inclined surface 256 adjacent to the inner ring edge 255.

[0022] Please refer to FIG. 6, in one embodiment that the motor 31 is pneumatic, the shaft portion 21 is formed with an air guide channel 211, and a mounting groove 212 communicating with the air guide channel 211. The mounting groove 212 provides a motor paddle 28 to be disposed therein. A purpose of the motor paddle 28 is that when a rotor 311 of the motor 31 is pushed by high pressure gas, the rotor 311 will drive the motor paddle 28 to rotate, so as to drive the grinding tool holder 20 to rotate. In this embodiment, the mounting groove 212 is designed in a way such that after the motor paddle 28 is disposed, a small amount of gas is capable of entering the air guide channel 211 through a gap, and the gas entering the air guide channel 211, and then entering the assembly port 233 along the air guide channel 211, so that an airflow 29 flowing toward the grinding member assembling head 26 is generated inside the assembly port 233, and a pressure inside the assembly port 233 is turned into a positive pressure state due to the airflow 29 to prevent dust that enters the assembly port 233 from drifting toward the at least one bearing 24 to further ensure regular operation of the at least one bearing 24.

[0023] Please refer to FIG. 2, FIG. 3, FIG. 4 and FIG. 5. In one embodiment, the counterweight portion 22 comprises a limiting ring 201. The limiting ring 201 is installed in the assembly port 233 and is used to limit a position of the dustproof ring 25; that is, the dustproof ring 25 cannot be separated from the assembly port 233. In one embodiment, an outer diameter of the limiting ring 201 is larger than an outer diameter of the dustproof ring 25 in order to shield the outer ring edge 254 of the dustproof ring 25 to prevent dust from entering the assembly port 233 through a position where the dustproof ring 25 is assembled with an inner wall of the assembly port 233. In addition, in one embodiment, an outer diameter of the dustproof ring 25 is larger than an outer diameter of the at least one bearing 24.

[0024] Please refer to FIG. 2, FIG. 3, FIG. 4 and FIG. 5. In one embodiment, the dustproof ring 25 comprises a pushing block 257 disposed on a side facing the at least one bearing 24 to contact with the at least one bearing 24. The pushing block 257 is located at the side of the dustproof ring 25 facing the at least one bearing 24 where is not a simple plane, but in a stepped shape.

Claims

1. A dustproof structure of a grinding tool holder (20), the grinding tool holder (20) assembled with a motor (31) and provided for a grinding tool (32) to be assembled therewith optionally, the grinding tool holder (20) comprising:

a shaft portion (21), assembled with the motor (31); and
a counterweight portion (22), connected to one end of the shaft portion (21), the counterweight portion (22) comprising an eccentric block (23) connected to the shaft portion (21), at least one bearing (24) mounted in the eccentric block (23), a dustproof ring (25), and a grinding member assembling head (26) assembled with the at least one bearing (24), wherein the eccentric block (23) is formed with an assembly port (233) to provide the at least one bearing (24) and the dustproof ring (25) for disposal therein, the dustproof ring (25) is located on a side of the at least one bearing (24) facing the grinding member assembling head (26), the dustproof ring (25) is formed with a first continuous concave-convex structure (251) on a side distant from the at least one bearing (24), the grinding member assembling head (26) is formed with a second continuous concave-convex structure (261) on a side facing the dustproof ring (25), and the first continuous concave-convex structure (251) and the second continuous concave-convex structure (261) coordinate with each other and jointly defining a plurality of dust blocking dots (271).

2. The dustproof structure of the grinding tool holder (20) as claimed in claim 1, wherein the first continuous concave-convex structure (251) comprises a step portion (252) and a branch portion (253) extending from a side of the step portion (252), the branch portion (253) is horizontal to a surface (262) of the grinding member assembling head (26) facing the dustproof ring (25).
3. The dustproof structure of the grinding tool holder (20) as claimed in claims 1 or 2, wherein the dustproof ring (25) comprises an outer ring edge (254) and an inner ring edge (255), and the first continuous concave-convex structure (251) is disposed close to the inner ring edge (255).
4. The dustproof structure of the grinding tool holder (20) as claimed in claim 3, wherein the counterweight portion (22) comprises a limiting ring (201) mounted in the assembly port (233) for limiting a position of the dustproof ring (25).
5. The dustproof structure of the grinding tool holder

(20) as claimed in claim 4, wherein an outer diameter of the limiting ring (201) is larger than an outer diameter of the dustproof ring (25).

6. The dustproof structure of the grinding tool holder (20) as claimed in claim 4, wherein the shaft portion (21) is formed with an air guide channel (211) communicating with the assembly port (233), and a mounting groove (212) communicating with the air guide channel (211) to provide for installing a motor paddle (28), and wherein an airflow (29) is induced into the air guide channel (211) by the mounting groove (212) when the motor (31) rotates. 5
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7. The dustproof structure of the grinding tool holder (20) as claimed in claim 5, wherein the dustproof ring (25) comprises an inclined surface (256) facing the grinding member assembling head (26). 15
8. The dustproof structure of the grinding tool holder (20) as claimed in claim 6, wherein the dustproof ring (25) comprises a pushing block (257) disposed on a side facing the at least one bearing (24) to contact with the at least one bearing (24). 20
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9. The dustproof structure of the grinding tool holder (20) as claimed in claim 6, wherein an outer diameter of the dustproof ring (25) is larger than an outer diameter of the at least one bearing (24), and an outer diameter of the limiting ring (201) is larger than an outer diameter of the dustproof ring (25). 30
10. The dustproof structure of the grinding tool holder (20) as claimed in claims 1 or 2, wherein the dustproof ring (25) comprises an inclined surface (256) facing the grinding member assembling head (26). 35
11. The dustproof structure of the grinding tool holder (20) as claimed in claims 1 or 2, wherein the counterweight portion (22) comprises a limiting ring (201) mounted in the assembly port (233) to limit a position of the dustproof ring (25). 40
12. The dustproof structure of the grinding tool holder (20) as claimed in claims 1 or 2, wherein the shaft portion (21) is formed with an air guide channel (211) communicating with the assembly port (233), and a mounting groove (212) communicating with the air guide channel (211) and provided for installing a motor paddle (28), and wherein an airflow (29) is induced into the air guide channel (211) by the mounting groove (212) when the motor (31) rotates. 45
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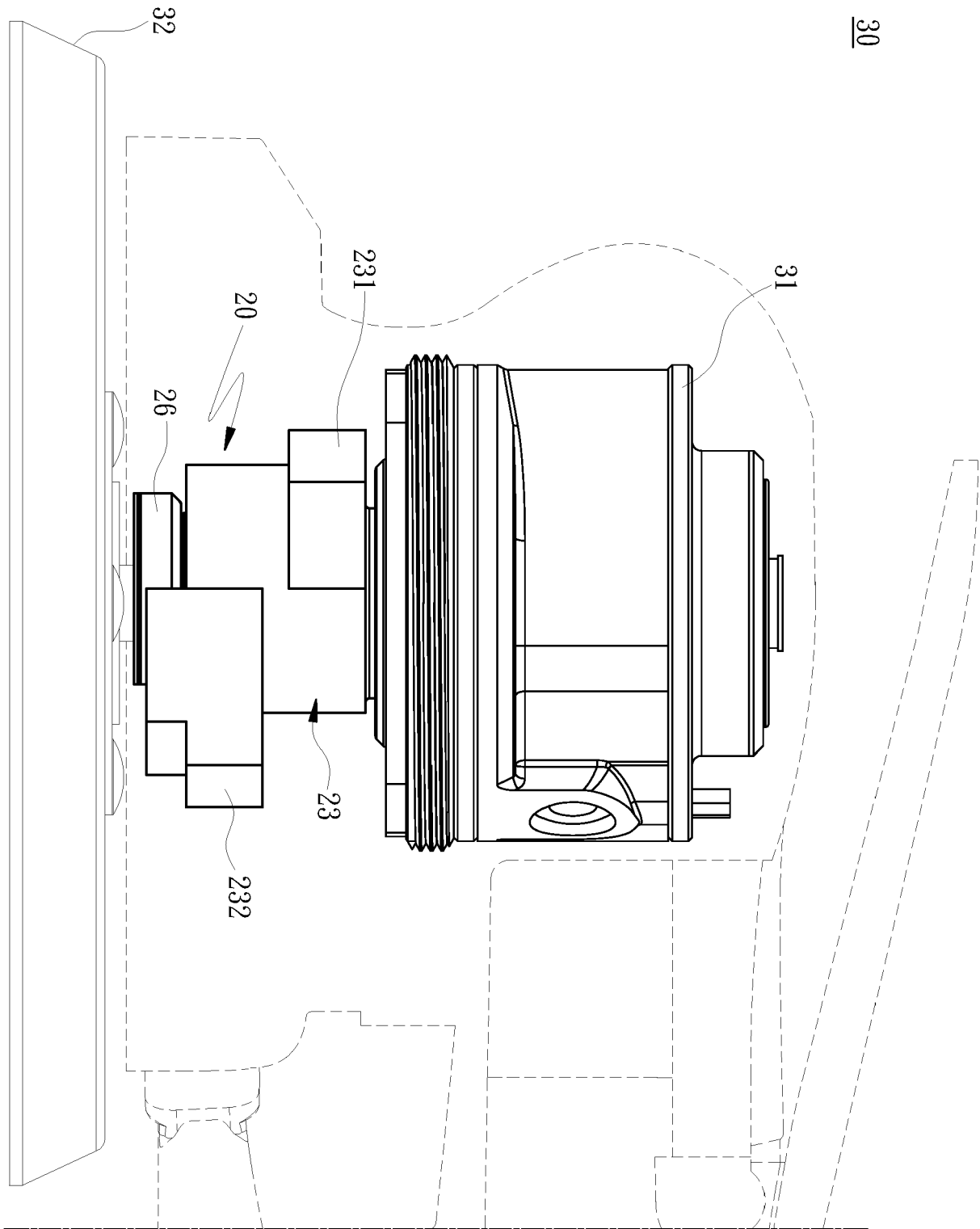


Fig. 1

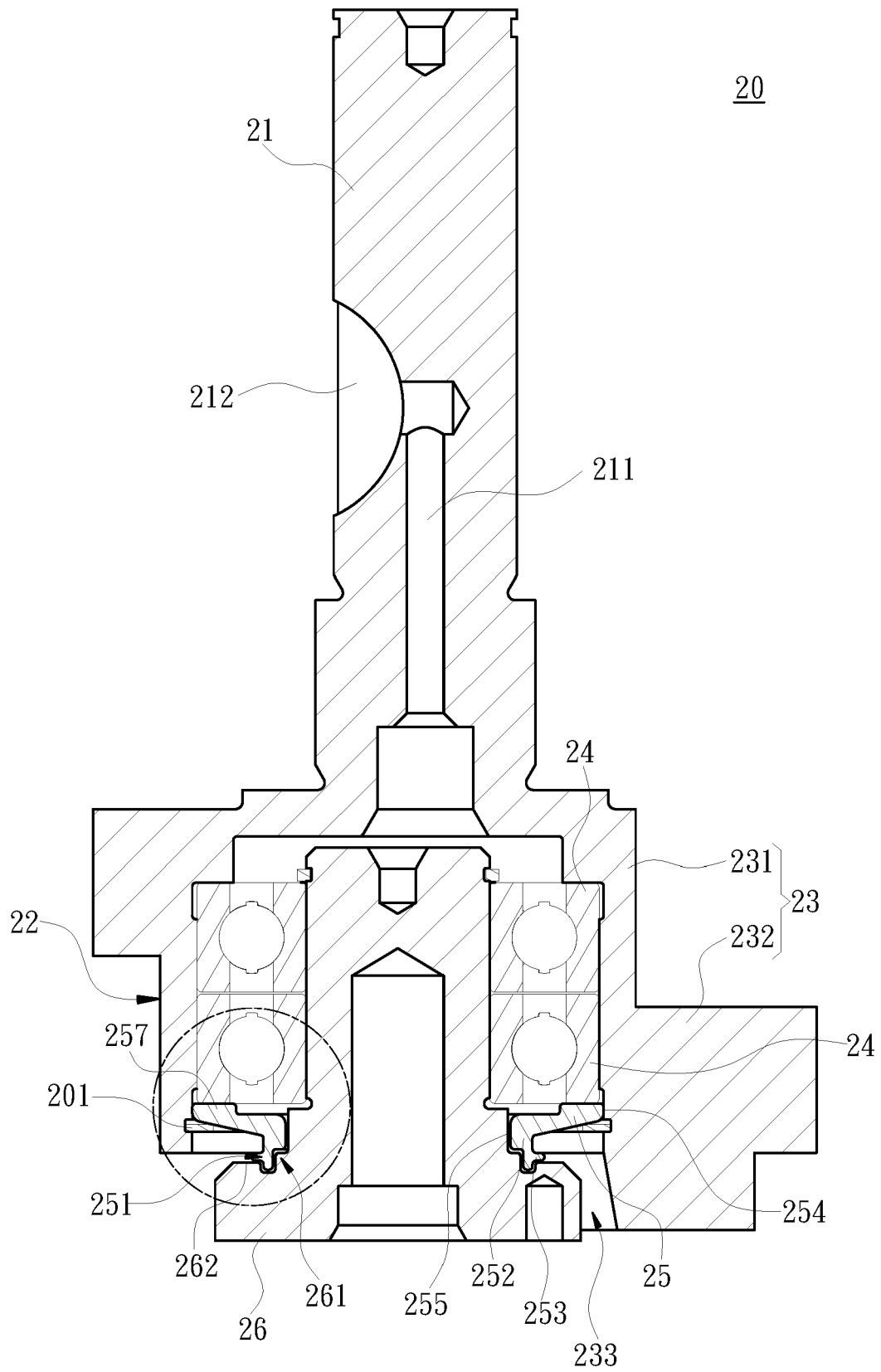


Fig. 2

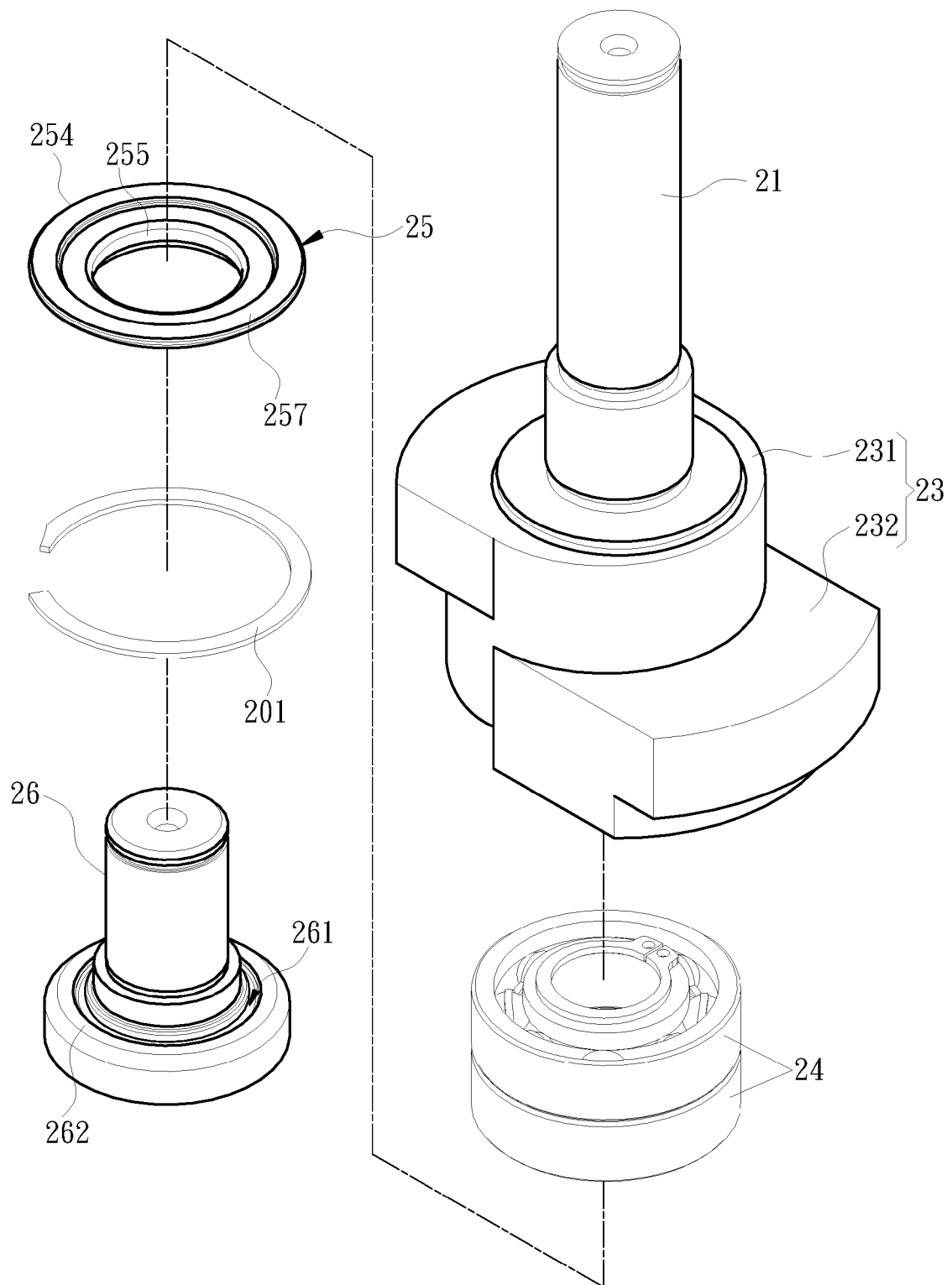


Fig. 3

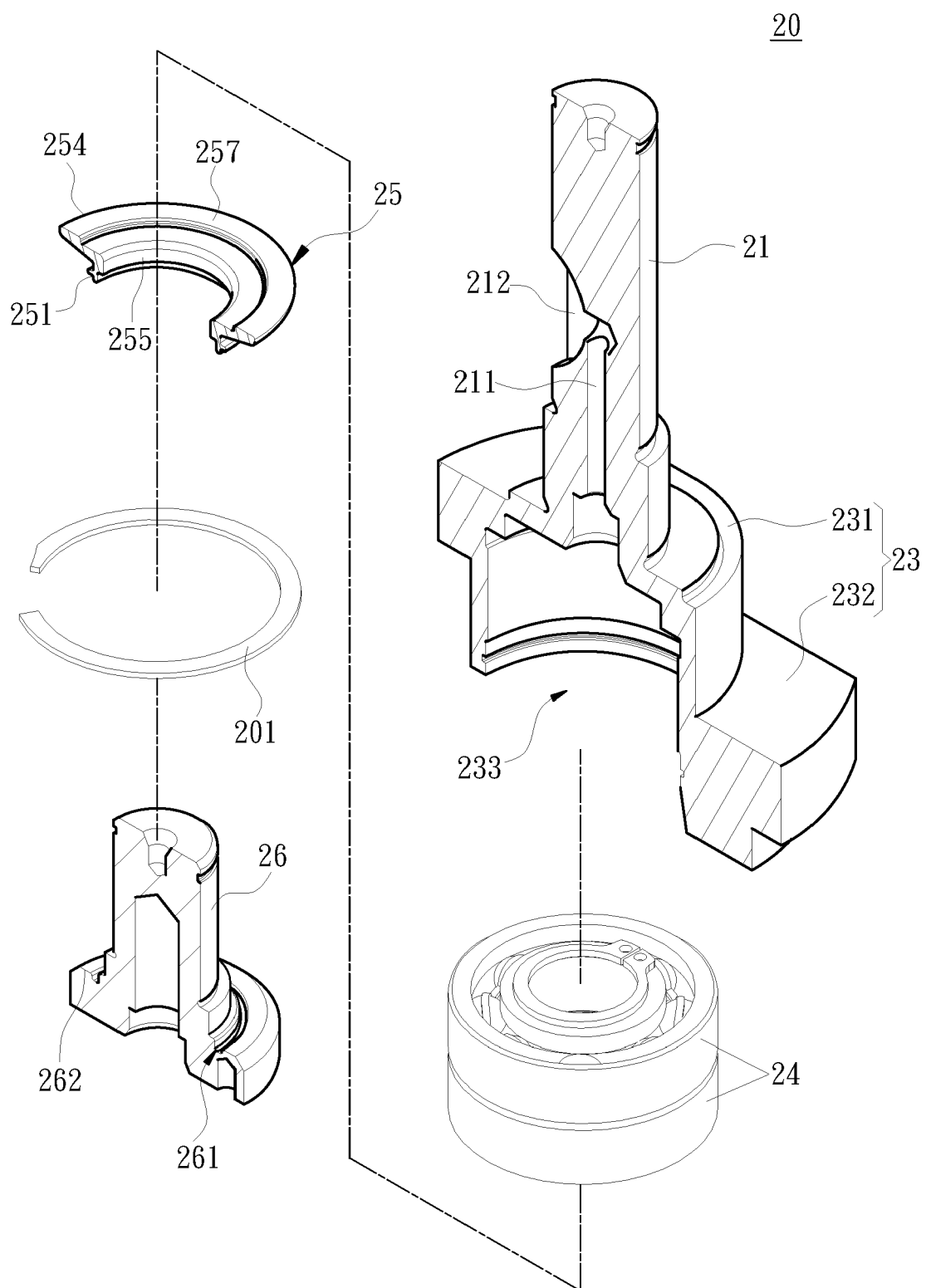


Fig. 4

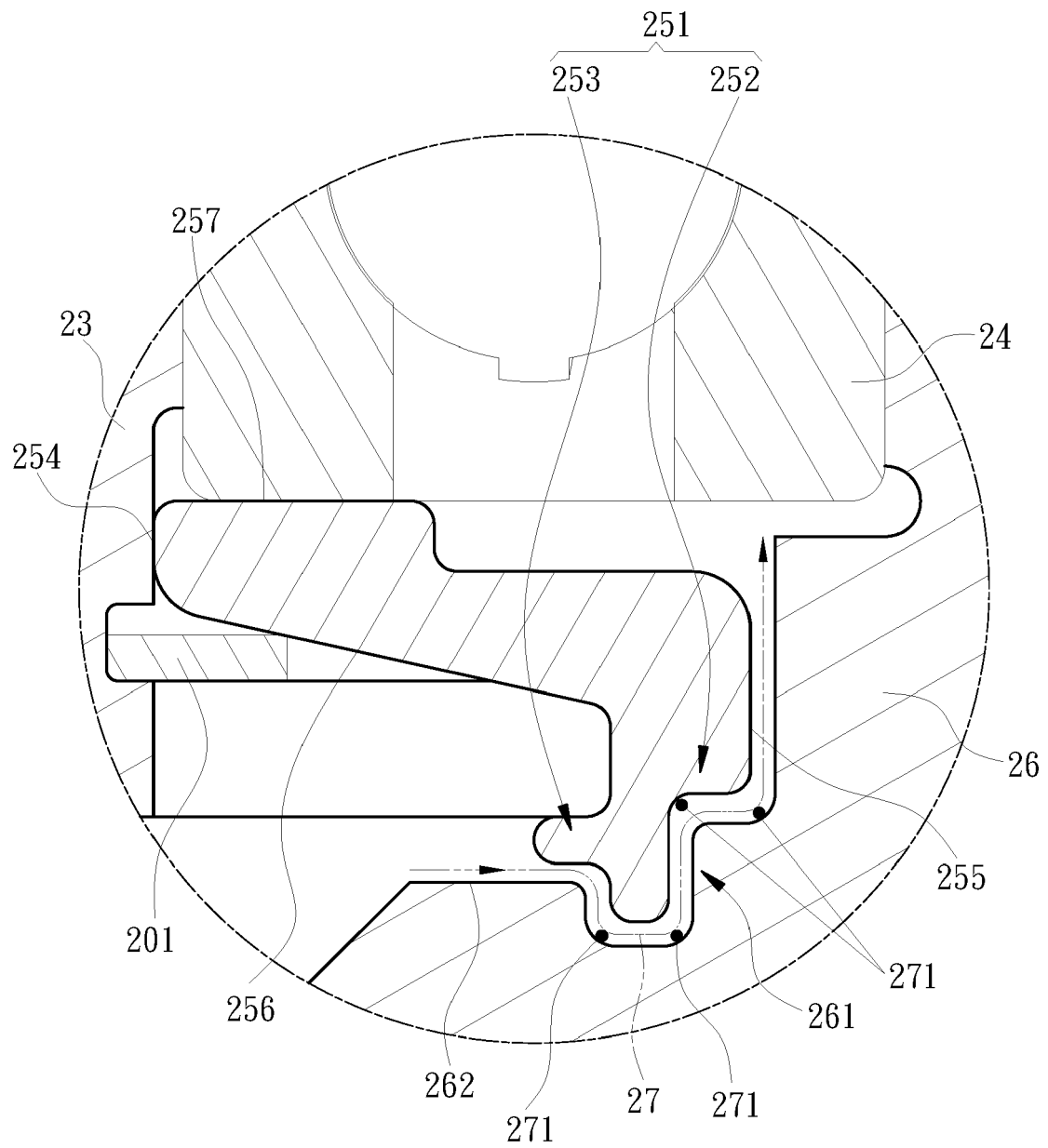


Fig. 5

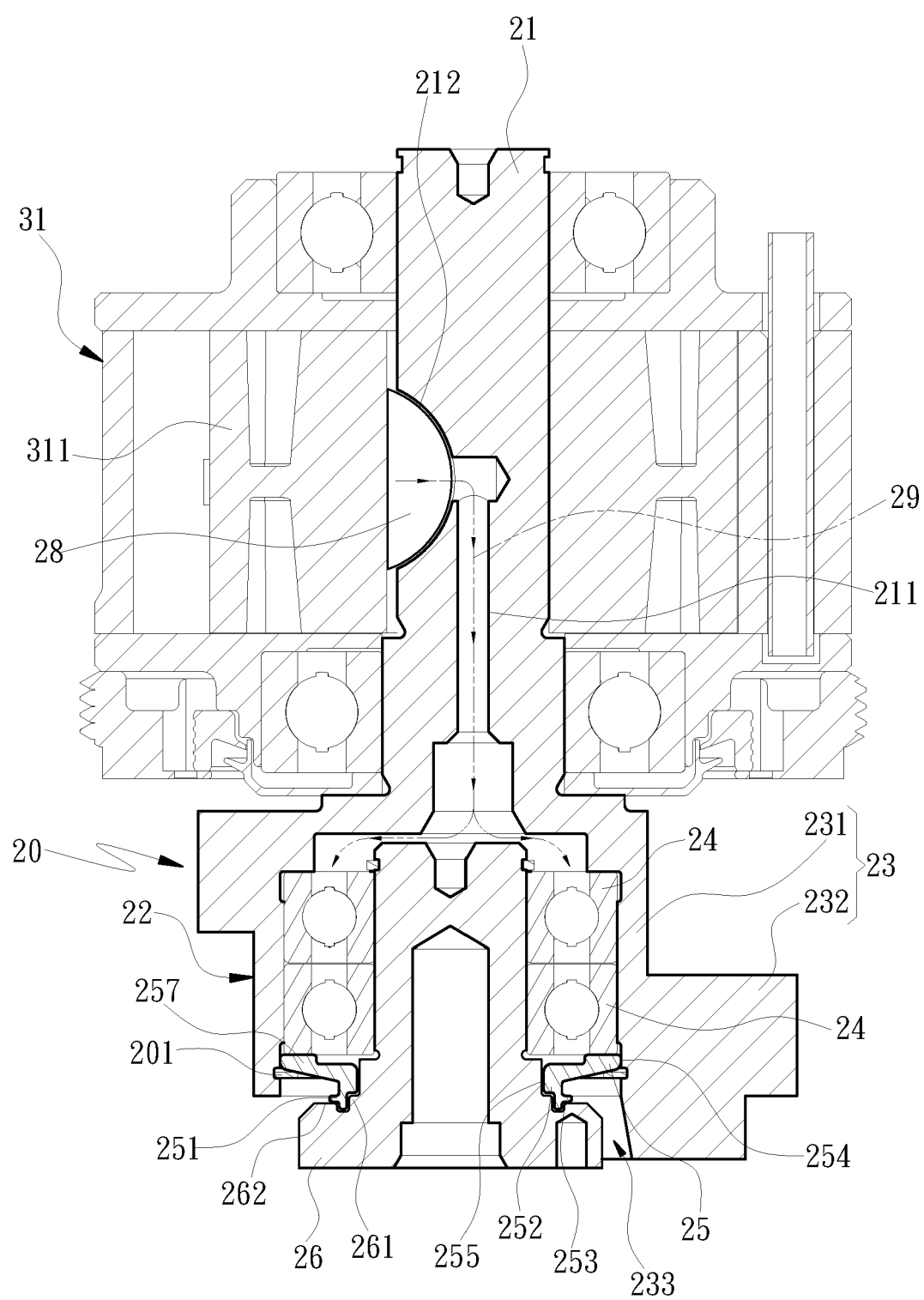


Fig. 6



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 1292

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EPO FORM 1503 03.82 (P04C01)

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Y	* figures 2,3,4 * -----	6, 12	
Y	US 2003/129934 A1 (HUBER PAUL W [US]) 10 July 2003 (2003-07-10) * paragraphs [0095], [0098]; figures 17,18 *	6, 12	
A	EP 1 424 164 A1 (DYNABRADE [US]) 2 June 2004 (2004-06-02) * figure 3 * -----	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B24B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 August 2022	Examiner Koller, Stefan
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 16 1292

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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18-08-2022

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