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EUROPEAN PATENT APPLICATION

- (43) Date of publication:
07.08.2024 Bulletin 2024/32
- (51) International Patent Classification (IPC):
D03D 45/00 (2006.01)
- (21) Application number: 24176641.9
- (22) Date of filing: 17.05.2024

<div>(84) Designated Contracting States: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR Designated Extension States: BA Designated Validation States: GE KH MA MD TN</div>	<div>(71) Applicant: Changchun Huibang Technology Co., Ltd Changchun City Jilin Province 130102 (CN)</div> <div>(72) Inventor: XIAO, Feng Changchun City, Jilin Province, 130102 (CN)</div> <div>(74) Representative: Ipside 7-9 Allée Haussmann 33300 Bordeaux Cedex (FR)</div>
<div>(30) Priority: 29.12.2023 CN 202323621594 U</div>	

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SHUTTLE AND ROTOR ASSEMBLY WITH A BALANCING DEVICE

- (57) The present invention discloses a shuttle and rotor assembly with a balancing device, comprising a rotor assembly. The rotor assembly comprises a housing and multiple eccentric sleeves symmetrically arranged on the housing. The eccentric sleeves are connected to an inner cylindrical cam and an outer cylindrical cam via an adjusting component, with the inner cylindrical cam and the outer cylindrical cam being of different sizes and opposite directions. This invention relates to the field of loom technology. The shuttle and rotor assembly with the balancing device, during the high-speed operation of the rotor shuttle, the spool is subjected to a centripetal pulling force, causing frictional conflict in the area of the cam disc at the other end of the spool. The adjustment slot is an annular groove, and the ball is placed on the surface of the adjustment slot. The ball, inner cylindrical cam, and outer cylindrical cam are all installed inside the eccentric sleeve. The ball can contact the inner wall of the eccentric sleeve and make fine distance adjustments. The inner cylindrical cam and outer cylindrical cam can rotate, thereby offsetting the impact of manufacturing errors and achieving the requirements for normal operation at low precision, thus reducing production costs.

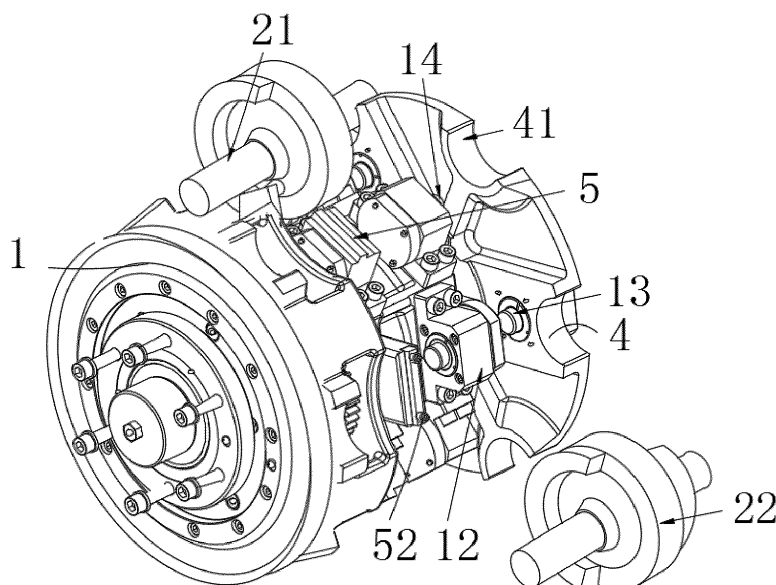


FIG. 1

Description

Technical Field

[0001] The present invention relates to the field of loom technology, specifically to a shuttle and rotor assembly with a balancing device.

Background Art

[0002] In the use of looms, the shuttle and rotor need to cooperate.

[0003] Reference to Chinese Patent: CN216107548U (A rotary pattern machine housing structure), the aforementioned patent proposes a solution to address the issue of unstable vibration units in existing technology by achieving dynamic balance through parallel driving by motors.

[0004] Although the aforementioned patent achieves dynamic balance through parallel driving by motors, in existing technology, the shuttle and rotor during operation can deviate from the axial center due to eccentric forces. If the machining errors of parts are not within the required range, it can lead to collisions between the shuttle assembly and the rotor, preventing normal rotational driving. Therefore, there is a high demand for part manufacturing, increasing manufacturing costs. To address this, the present invention provides a shuttle and rotor assembly with a balancing device.

Summary of the Invention

[0005] In view of the deficiencies of the existing technology, the present invention provides a shuttle and rotor assembly with a balancing device, solving the problem of high manufacturing error requirements for parts.

[0006] To achieve the above objectives, the present invention is implemented through the following technical solutions: A shuttle and rotor assembly with a balancing device, comprising a rotor assembly, the rotor assembly comprises a housing and multiple eccentric sleeves symmetrically arranged on the housing, and the eccentric sleeves are connected to the inner cylindrical cam and outer cylindrical cam through an adjusting component, with the inner cylindrical cam and outer cylindrical cam being of different sizes and opposite directions, and at least one set of the inner cylindrical cam and outer cylindrical cam symmetrically arranged, and the eccentric sleeves are set on the surface of the housing for error adjustment of the inner cylindrical cam and outer cylindrical cam, and the inner cylindrical cam and outer cylindrical cam are set inside the eccentric sleeves to accommodate the shuttle assembly on the adjacent rotor assembly;

a shuttle assembly, the shuttle assembly comprises a spool and a bobbin, and the surface of the spool is equipped with a cam disc, and at least one cam

disc is set in the axial direction of the spool, and the surface of the cam disc cooperates with at least one of the inner cylindrical cam and outer cylindrical cam; a mating unit, set at the tail of the housing for the cooperative rotation of the housing and the spool; a limiting unit, set on the surface of the housing to prevent displacement of the spool; a lubrication unit, set inside the housing for lubricating various components.

[0007] Preferably, the mating unit comprises an arcuate groove and a mating sleeve, the arcuate grooves are evenly distributed at the bottom of the housing and there are multiple arcuate grooves, the mating sleeve is mounted on the surface of the spool and the arcuate grooves and mating sleeve rotate in contact.

[0008] Preferably, the limiting unit comprises a solid block and an outer edge block, and the solid block and outer edge block are mounted on the side of the housing and at least one set is provided.

[0009] Preferably, the surface of the spool is provided with a limiting slot, the solid block and outer edge block both cooperate with the limiting slot to prevent displacement of the spool.

[0010] Preferably, the adjusting component comprises an adjustment slot and a ball, the adjustment slot is provided on the surfaces of the inner cylindrical cam and outer cylindrical cam, the ball is placed on the surface of the adjustment slot, and the ball has a certain gap with the inner wall of the eccentric sleeve for error adjustment.

[0011] Preferably, the lubrication unit comprises an inlet and an oil groove, the inlet is located on the front and rear sides of the housing, and the oil groove is provided inside the housing and interfaces with various components.

Beneficial Effects

[0012] The present invention provides a shuttle and rotor assembly with a balancing device. Compared with existing technology, it has the following beneficial effects:

(1) The shuttle and rotor assembly with a balancing device, during the high-speed operation of the rotor shuttle, the spool is subjected to centripetal traction, causing frictional resistance at the area of the cam disc at the other end of the spool. The adjustment slot is a circular slot, the ball is placed on the surface of the adjustment slot, the ball and both the inner cylindrical cam and outer cylindrical cam are installed inside the eccentric sleeve, the ball can contact the inner wall of the eccentric sleeve and make fine distance adjustments, the inner cylindrical cam and outer cylindrical cam can rotate, thereby offsetting the impact of machining errors, thus meeting the requirements for normal operation at low precision, reducing production costs.

(2) The shuttle and rotor assembly with a balancing

device, through the protruding ends of the solid block and outer edge block sliding into the limiting slot to prevent lateral movement of the spool thereby achieving displacement prevention of the spool, the arcuate grooves and mating sleeve can rotate and have a wear-resistant effect, the inlet is an external oil inlet, which can enhance the stability of the operation of the device.

Brief Description of the Drawings

[0013]

FIG. 1 is a schematic structural diagram of the present invention;

FIG. 2 is a bird's-eye view of the present invention;

FIG. 3 is a partial sectional view of the present invention.

[0014] List of reference numerals: 1-rotor assembly, 11-housing, 12-eccentric sleeve, 13-inner cylindrical cam, 14-outer cylindrical cam, 2-shuttle assembly, 21-spool, 22-cam disc, 3-adjusting component, 31-adjustment slot, 32-ball, 4-mating unit, 41-arcuate groove, 42-mating sleeve, 5-limiting unit, 51-solid block, 52-outer edge block, 6-lubrication unit, 61-inlet, 62-oil groove.

Detailed Description of Embodiments

[0015] The following will describe the technical solutions in the embodiments of the present invention clearly and completely with reference to the drawings in the embodiments of the present invention. Obviously, the described embodiments are only a part of the embodiments of the present invention, not all embodiments. Based on the embodiments in this invention, all other embodiments obtained by those skilled in the art without creative efforts fall within the protection scope of the present invention.

[0016] Please refer to FIGS. 1-3, the present invention provides two technical solutions:

Embodiment 1

[0017] A shuttle and rotor assembly with a balancing device, comprising a rotor assembly 1, the rotor assembly 1 comprises a housing 11 and multiple eccentric sleeves 12 symmetrically arranged on the housing 11, and the eccentric sleeves 12 are connected to the inner cylindrical cam 13 and outer cylindrical cam 14 through an adjusting component 3, one inner cylindrical cam and one outer cylindrical cam, each paired with a corresponding eccentric sleeve, this is one set, and at least one set is matched with the cam disc, and the number of axial inner cylindrical cams 13 and outer cylindrical cams 14 is set according to the number of cam discs, and the inner cylindrical cam 13 and outer cylindrical cam 14 are of

different sizes and opposite directions, and at least one set of the inner cylindrical cam 13 and outer cylindrical cam 14 is symmetrically arranged, and the eccentric sleeves 12 are set on the surface of the housing 11 for error adjustment of the inner cylindrical cam 13 and outer cylindrical cam 14, and the inner cylindrical cam 13 and outer cylindrical cam 14 are set inside the eccentric sleeves 12 to accommodate the shuttle assembly on the adjacent rotor assembly, assuming there are two cam discs, respectively the first cam disc and the second cam disc, the first inner cylindrical cam and the first outer cylindrical cam, the second inner cylindrical cam and the second outer cylindrical cam, the third inner cylindrical cam and the third outer cylindrical cam, the fourth inner cylindrical cam and the fourth outer cylindrical cam, the fifth inner cylindrical cam and the fifth outer cylindrical cam, the sixth inner cylindrical cam and the sixth outer cylindrical cam, the first inner cylindrical cam, the first outer cylindrical cam and the fourth inner cylindrical cam, the fourth outer cylindrical cam, the second inner cylindrical cam, the second outer cylindrical cam and the fifth inner cylindrical cam, the fifth outer cylindrical cam, the third inner cylindrical cam, the third outer cylindrical cam and the sixth inner cylindrical cam, the sixth outer cylindrical cam are respectively in the same plane;

Shuttle assembly 2, the shuttle assembly 2 comprises a spool 21 and a bobbin, during the high-speed operation of the rotor shuttle, the spool 21 is subjected to centripetal traction, causing frictional resistance at the area of the cam disc 22 at the other end of the spool, the adjustment slot 31 is a circular slot, the ball 32 is placed on the surface of the adjustment slot 31, the ball 32 and both the inner cylindrical cam 13 and outer cylindrical cam 14 are installed inside the eccentric sleeve 12, the ball 32 can contact the inner wall of the eccentric sleeve 12 and make fine distance adjustments, the inner cylindrical cam 13 and outer cylindrical cam 14 can rotate, thereby offsetting the impact of machining errors, thus meeting the requirements for normal operation at low precision, reducing production costs, the bobbin is mounted on one end of the spool 21 for winding external thread, and the surface of the spool 21 is equipped with a cam disc 22, if there are multiple cam discs 22, they are installed in parallel on the spool 21, and the spool 21 is symmetrically arranged relative to the housing 11, and at least one cam disc 22 is set in the axial direction of the spool 21, and the surface of the cam disc 22 cooperates with at least one of the inner cylindrical cam 13 and outer cylindrical cam 14;

Mating unit 4, set at the tail of the housing 11 for the cooperative rotation of the housing 11 and the spool 21;

Limiting unit 5, set on the surface of the housing 11

to prevent displacement of the spool 21;

Lubrication unit 6, set inside the housing 11 for lubricating various components.

Embodiment 2

[0018] The main difference from Embodiment 1 is:

A shuttle and rotor assembly with a balancing device, the mating unit 4 comprises an arcuate groove 41 and a mating sleeve 42, the arcuate groove 41 and mating sleeve 42 can rotate and have a wear-resistant effect, the arcuate grooves 41 are evenly distributed at the bottom of the housing 11 and there are multiple arcuate grooves 41, the mating sleeve 42 is mounted on the surface of the spool 21 and the arcuate grooves 41 and mating sleeve 42 rotate in contact, the limiting unit 5 comprises a solid block 51 and an outer edge block 52, through the protruding ends of the solid block 51 and outer edge block 52 sliding into the limiting slot to prevent lateral movement of the spool 21 thereby achieving displacement prevention of the spool 21, the arcuate grooves 41 and mating sleeve 42 can rotate and have a wear-resistant effect, the inlet 61 is an external oil inlet, which can enhance the stability of the operation of the device, the solid block 51 and outer edge block 52's protruding ends slide into the limiting slot to prevent lateral movement of the spool 21 thereby achieving displacement prevention of the spool 21, and the solid block 51 and outer edge block 52 are mounted on the side of the housing 11 and at least one set is provided, the solid block 51 and outer edge block 52 are symmetrically arranged, the surface of the spool 21 is provided with a limiting slot, the solid block 51 and outer edge block 52 both cooperate with the limiting slot to prevent displacement of the spool 21, the adjusting component 3 comprises an adjustment slot 31 and a ball 32, the adjustment slot 31 is a circular slot, the ball 32 is placed on the surface of the adjustment slot 31, the ball 32 and both the inner cylindrical cam 13 and outer cylindrical cam 14 are installed inside the eccentric sleeve 12, the ball 32 can contact the inner wall of the eccentric sleeve 12 and make fine distance adjustments, the adjustment slot 31 is provided on the surfaces of the inner cylindrical cam 13 and outer cylindrical cam 14, the ball 32 is placed on the surface of the adjustment slot 31, and the ball 32 has a certain gap with the inner wall of the eccentric sleeve 12 for error adjustment, the lubrication unit 6 comprises an inlet 61 and an oil groove 62, the inlet 61 is an external oil inlet, the inlet 61 is located on the front and rear sides of the housing 11, the oil groove 62 is provided inside the housing 11 and interfaces with various components.

[0019] At the same time, the contents not described in detail in this specification are known existing technologies to those skilled in the art.

[0020] In operation, during the high-speed operation of the rotor shuttle, the spool 21 is subjected to centripetal traction, causing frictional resistance at the area of the

cam disc 22 at the other end of the spool, the adjustment slot 31 is a circular slot, the ball 32 is placed on the surface of the adjustment slot 31, the ball 32 and both the inner cylindrical cam 13 and outer cylindrical cam 14 are installed inside the eccentric sleeve 12, the ball 32 can contact the inner wall of the eccentric sleeve 12 and make fine distance adjustments, the inner cylindrical cam 13 and outer cylindrical cam 14 can rotate, thereby offsetting the impact of machining errors, thus meeting the requirements for normal operation at low precision, reducing production costs, through the protruding ends of the solid block 51 and outer edge block 52 sliding into the limiting slot to prevent lateral movement of the spool 21 thereby achieving displacement prevention of the spool 21, the arcuate grooves 41 and mating sleeve 42 can rotate and have a wear-resistant effect, the inlet 61 is an external oil inlet, which can enhance the stability of the operation of the device.

[0021] It should be noted that in this document, relational terms such as first and second are used solely to distinguish one entity or operation from another entity or operation, without necessarily requiring or implying any such actual relationship or order between such entities or operations. Moreover, terms like "comprises," "comprises," or any other variation thereof are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not only comprise those elements but may also comprise other elements not expressly listed or inherent to such process, method, article, or apparatus.

[0022] Although embodiments of the invention have been shown and described, it will be apparent to those skilled in the art that many changes, modifications, substitutions, and variations can be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined by the appended claims and their equivalents.

Claims

1. A shuttle and rotor assembly with a balancing device, **characterized by** comprising:

a rotor assembly (1), said rotor assembly (1) comprises a housing (11) and multiple eccentric sleeves (12) symmetrically arranged on the housing (11), and the eccentric sleeves (12) are connected to an inner cylindrical cam (13) and an outer cylindrical cam (14) via an adjusting component (3), and the inner cylindrical cam (13) and the outer cylindrical cam (14) are of different sizes and opposite directions, and at least one set of the inner cylindrical cam (13) and the outer cylindrical cam (14) are symmetrically arranged, and the eccentric sleeves (12) are arranged on the surface of the housing (11) for error adjustment of the inner cylindrical cam

- (13) and the outer cylindrical cam (14), and the inner cylindrical cam (13) and the outer cylindrical cam (14) are arranged inside the eccentric sleeves (12) to accommodate the shuttle assembly from adjacent rotor assemblies; 5
- a shuttle assembly (2), said shuttle assembly (2) comprises a spool (21) and a bobbin, and the surface of the spool (21) is equipped with a cam disc (22), and at least one cam disc (22) is arranged in the axial direction of the spool (21), 10
- and the surface of the cam disc (22) mates with at least one of the inner cylindrical cam (13) and the outer cylindrical cam (14);
- a mating unit (4), arranged at the tail of the housing (11) for the cooperative rotation of the housing (11) with the spool (21); 15
- a limiting unit (5), arranged on the surface of the housing (11) to prevent displacement of the spool (21);
- a lubrication unit (6), arranged inside the housing (11) for lubricating various components. 20
2. The shuttle and rotor assembly with a balancing device according to claim 1, **characterized in that:** the mating unit (4) comprises an arcuate groove (41) 25
- and a mating sleeve (42), the arcuate grooves (41) are evenly distributed at the bottom of the housing (11) and there are multiple arcuate grooves (41), the mating sleeve (42) is mounted on the surface of the spool (21) and the arcuate grooves (41) and mating sleeve (42) rotate in contact. 30
3. The shuttle and rotor assembly with a balancing device according to claim 1, **characterized in that:** the limiting unit (5) comprises a solid block (51) and an 35
- outer edge block (52), and the solid block (51) and outer edge block (52) are mounted on the side of the housing (11) and at least one set is provided.
4. The shuttle and rotor assembly with a balancing device according to claim 3, **characterized in that:** the surface of the spool (21) is provided with a limiting slot, the solid block (51) and outer edge block (52) both cooperate with the limiting slot to prevent displacement of the spool (21). 40
5. The shuttle and rotor assembly with a balancing device according to claim 1, **characterized in that:** the adjusting component (3) comprises an adjustment slot (31) and a ball (32), the adjustment slot (31) is 50
- provided on the surfaces of the inner cylindrical cam (13) and outer cylindrical cam (14), the ball (32) is placed on the surface of the adjustment slot (31), and the ball (32) has a certain gap with the inner wall of the eccentric sleeve (12) for error adjustment. 55
6. The shuttle and rotor assembly with a balancing device according to claim 1, **characterized in that:** the

lubrication unit (6) comprises an inlet (61) and an oil groove (62), the inlet (61) is located on the front and rear sides of the housing (11), and the oil groove (62) is provided inside the housing (11) and interfaces with various components.

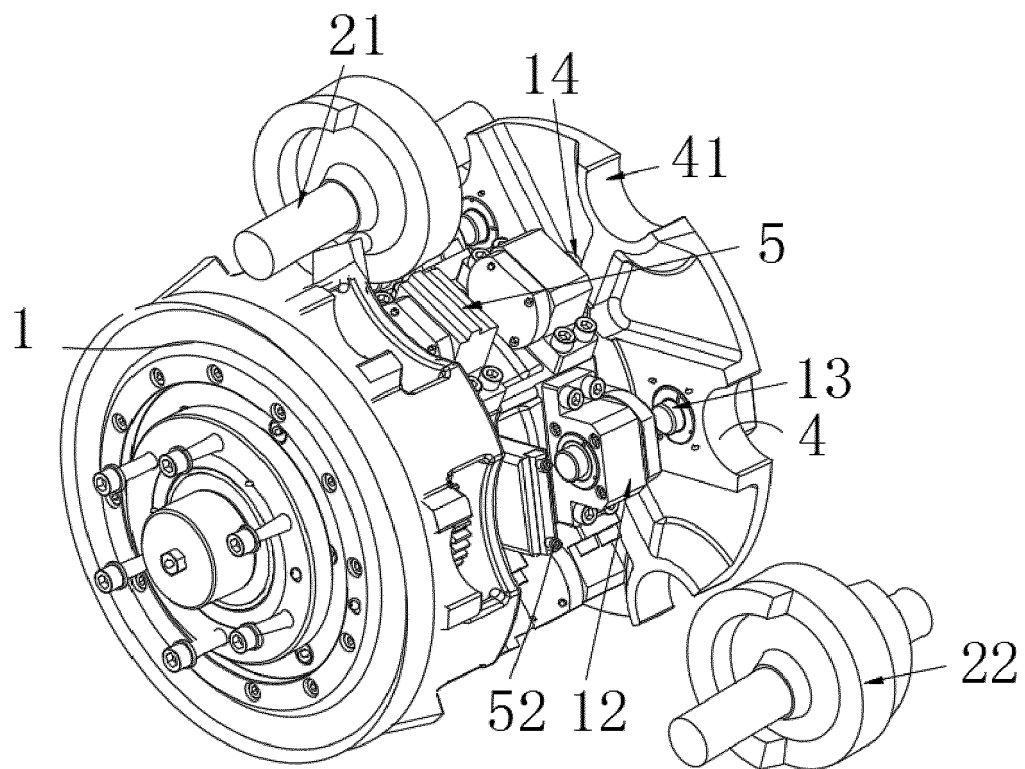


FIG. 1

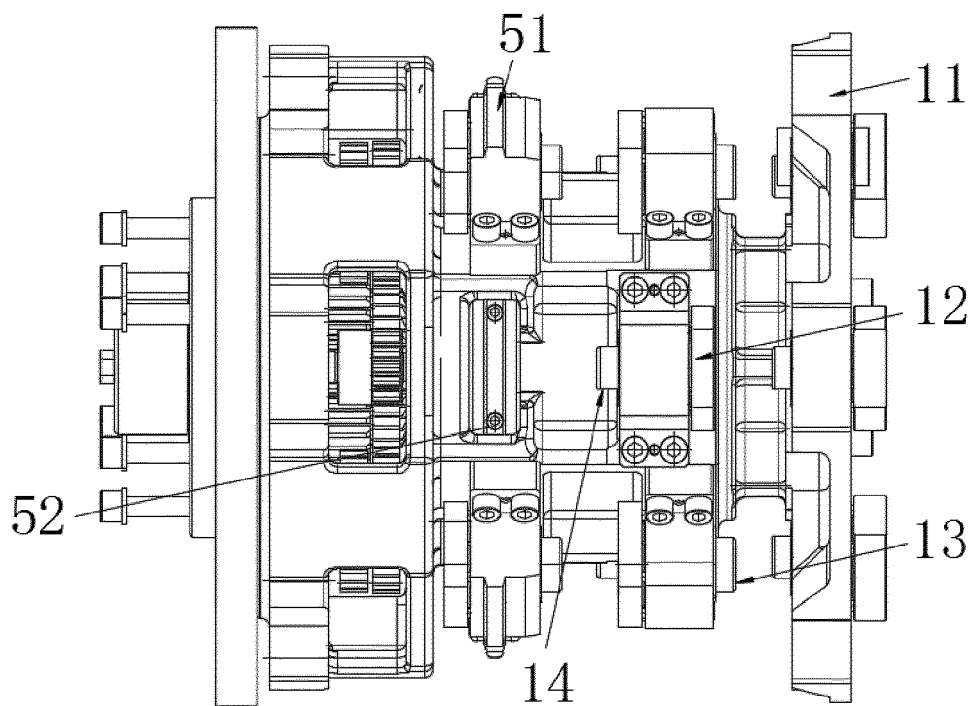
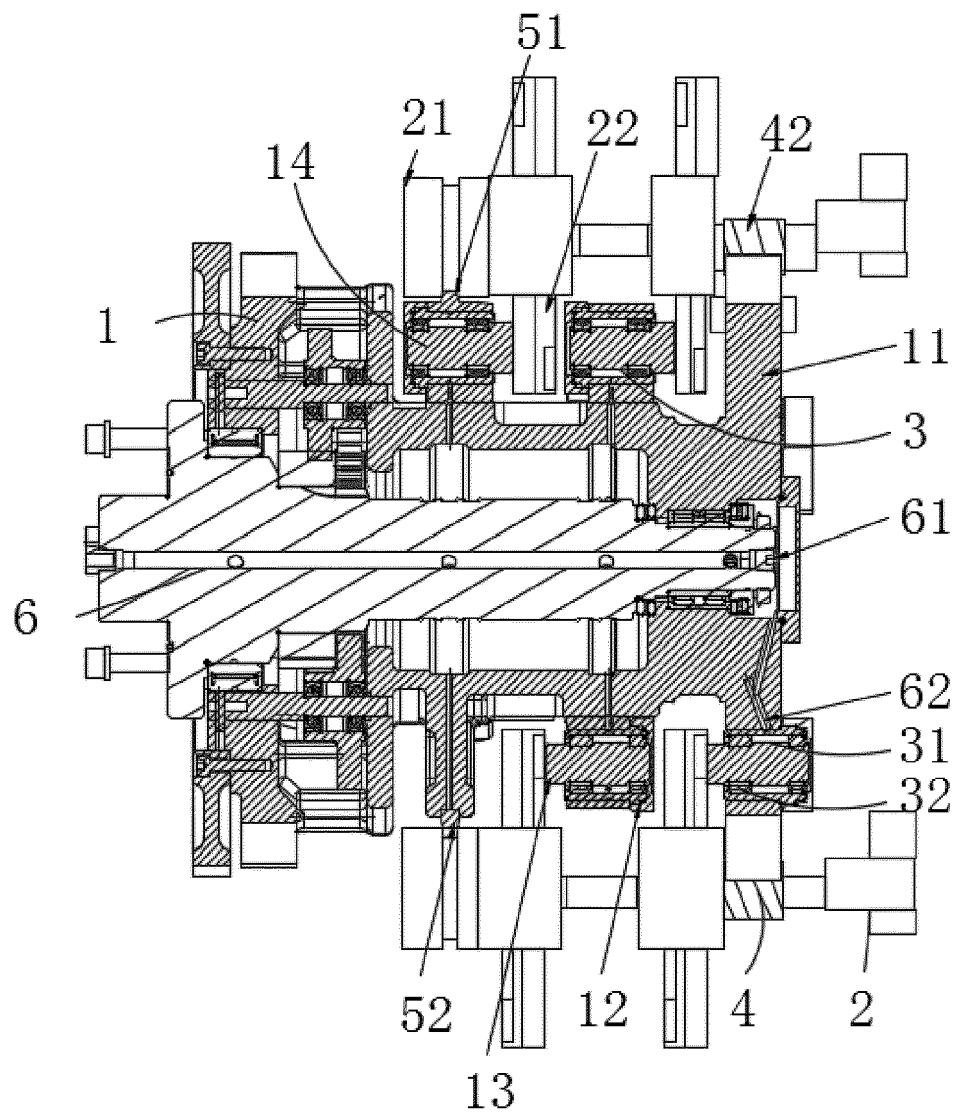


FIG. 2



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 216107548 U [0003]