

[Document Name] Description

[Title] Spinning Reel for Fishing

[Technical Field]

[0001]

The present invention relates to a spinning reel for fishing, and particularly to a spinning reel for fishing assembled with a one-way clutch to prevent reverse rotation of a rotor.

[Background]

[0002]

A spinning reel for fishing includes a rotor and a spool that respectively rotate and move back and forth in coordination with the reeling-in operation of a handle. In general, a spinning reel for fishing is assembled with a reverse-rotation prevention mechanism that allows rotation of the rotor in the reel-in direction by means of the rotating operation of the handle and prevents the reverse rotation of the rotor when an attempt is made to rotate the handle in the opposite direction.

[0003]

As disclosed in Patent Literature 1, the reverse-rotation prevention mechanism is configured with, for example: a one-way clutch including an inner ring that is fitted, in a detented manner, to a pinion gear which is integrally rotated by the rotating operation of a handle; a retainer that is disposed radially outwardly of the inner ring and retains a plurality of rolling members; and an outer ring disposed radially outwardly of the retainer. The outer ring is formed with an engagement portion disposed on its outer circumference at intervals in the circumferential direction, and with the engagement portion fitted into an engagement notch formed in an inner surface of a cylinder portion integrally formed on the reel body, the outer ring is fixed to the reel body in a detented manner.

[Prior Art]

[Patent Literatures]

[0004]

[Patent Literature 1] Japanese Unexamined Patent
Application Publication No. 2012-23965

[Summary]

[Technical Problems]

[0005]

The one-way clutch described above is housed in the cylinder portion formed on the reel body. That is, the entire outer ring is housed in the cylinder portion, and a projection and a recess formed on the outer circumference surface of the outer ring and the inner circumference surface of the cylinder portion engage with each other and fix the outer ring in a detented manner, limiting reduction in the size and weight of the reel and leaving room for improvement.

[0006]

The present invention was made in view of the above-mentioned problems, and an object thereof is to provide a spinning reel for fishing assembled with a one-way clutch, with a structure that enables reduction in the size and weight of a reel body.

[Solution to Problems]

[0007]

In order to achieve the above-described object, a spinning reel for fishing according to the present invention comprises: a reel body; a handle that is rotatably supported on the reel body; a drive shaft that is rotated by rotating operation of the handle; a one-way clutch that is disposed on the drive shaft and includes an inner ring, an outer ring and a retainer retaining a plurality of rolling members; a cylinder portion that is formed on the reel body and houses the one-way clutch; the outer ring is provided with a detent protruding radially outwardly; the cylinder portion is provided with a notch that radially penetrates its circumferential wall; and the detent of the outer ring is disposed in the notch in such a

manner that it is radially exposed in order to fix the outer ring in a detented manner.

[0008]

In the spinning reel for fishing of the configuration described above, the notch radially penetrates the circumferential wall of the cylinder portion provided on the reel body, and the outer ring is fixed in a detented manner with the detent of the outer ring disposed in the notch to be radially exposed. In this manner, the outer ring of the one-way clutch is not detented with the inner circumference surface of the cylinder portion of the reel body, which allows to reduce the diameter of the cylinder portion to the greatest extent, thereby enabling reduction in the size and weight of the reel body.

[0009]

Also, a spinning reel for fishing according to the present invention comprises: a reel body; a handle that is rotatably supported on the reel body; a drive shaft that is rotated by rotating operation of the handle; and a one-way clutch that is disposed on the drive shaft and includes an inner ring, an outer ring and a retainer retaining a plurality of rolling members; the outer ring is provided with a detent protruding radially outwardly; and the reel body is provided with a contact portion that restricts rotation of the outer ring by making contact with the detent at two spots of both sides thereof.

[0010]

In the above-described spinning reel for fishing, the outer ring of the one-way clutch is provided with a detent protruding radially outwardly, and the reel body is provided with a contact portion that restricts rotation of the outer ring by making contact with the detent at two spots of both sides of the detent, so as to simplify the structure of the portion that fixes the outer ring in a detented manner, thereby enabling reduction in the size and weight of the reel body.

[Advantageous Effects]

[0011]

The present invention provides a spinning reel for fishing assembled with a one-way clutch, with a structure that enables reduction in the size and weight of a reel body.

[Brief Description of Drawings]

[0012]

[Fig. 1] Fig. 1 is an exploded perspective view of a first embodiment of a spinning reel for fishing according to the present invention.

[Fig. 2] Fig. 2 is a sectional view along the axial direction of the main part of the spinning reel for fishing shown in Fig. 1.

[Fig. 3] Fig. 3A is a sectional view along line A-A of Fig. 2.

[Fig. 4] Fig. 4 is a perspective view showing a one-way clutch in a fixed state.

[Fig. 5] Fig. 5 is a perspective view showing the one-way clutch shown in Fig. 4, with a cover member of a retainer disposed therein.

[Fig. 6] Fig. 6 is an exploded perspective view of a second embodiment of a spinning reel for fishing according to the present invention.

[Fig. 7] Fig. 7 is a perspective view showing a one-way clutch in a fixed state.

[Description of Embodiments]

[0013]

Figs. 1 and 2 show a first embodiment of a spinning reel for fishing according to the present invention. First, an outline of the overall configuration of the spinning reel for fishing will be described. In the following description, front and rear mean the directions shown in Fig. 2.

[0014]

A spinning reel for fishing (hereinafter referred to as "reel") 1 according to the present embodiment comprises a reel body 2, and a reel foot 2A to be mounted on a fishing rod is integrally formed on the reel body 2. In the front of the reel body 2, a rotor 3 is rotatably supported and a spool (not shown) is supported in such a manner that it moves back and forth, synchronized with the rotational motion of the rotor 3.

[0015]

The rotor 3 includes a pair of arms 3a that rotate around the spool, and at front ends of the arms 3a, bail support members 3b are supported in such a manner that they are rotatable between a fishing-line reel-in position and a fishing-line casting position, with base ends of a bail 5 mounted on the bail support member 3b. In this case, one base end of the bail 5 is mounted on a fishing-line guide portion (line roller) 6 integrally provided on the bail support member 3b.

[0016]

A handle shaft is rotatably supported in the reel body 2 by means of a bearing, and a handle is mounted on a protruding end of the handle shaft. A driving-force transmission mechanism 10 is provided on the handle shaft and when the handle is rotated, transmits the driving force to the rotor 3 to rotate the rotor.

[0017]

As is known, the driving-force transmission mechanism 10 includes a drive gear that is mounted on the handle shaft in such a manner that it integrally rotates with the handle shaft, and a pinion 11 that has pinion teeth meshing with the drive gear. The pinion 11 extends in the front-rear direction perpendicular to the handle shaft and serves as a rotary portion (drive shaft) formed with a cavity 11a extending in the axial direction inside. In this case, a spool shaft is inserted into the cavity 11a and engages with a known oscillating mechanism that moves the spool

back and forth when the handle is rotated, and the spool is mounted on a tip end of the spool shaft.

[0018]

The pinion 11 is rotatably supported on the reel body 2. The pinion 11 extends toward the spool side, and the rotor 3 is integrally-rotatably mounted on a tip end of the pinion 11. The rotor 3 has a boss portion 3A with a through hole formed in the center, which is fitted externally onto a tip end of the pinion 11, and tightening a nut (not shown) fixes the rotor 3. On the pinion 11, a one-way clutch 20 is disposed and constitutes a reverse-rotation prevention device.

[0019]

With the above configuration, when the handle is operated to reel in, the rotor 3 is rotated by means of the driving-force transmission mechanism 10 and the spool reciprocates in the front-rear direction by means of the oscillating mechanism and the spool shaft. Thus, the fishing line is evenly wound around the spool by means of the fishing-line guide portion 6 of the rotor 3 that is rotated.

[0020]

Now, the one-way clutch 20 of the present embodiment will be described with reference to Figs. 1 to 4. As shown in Fig. 1, on the spool side of the reel body 2, a base 2B substantially in a disc shape is disposed, and a cylinder portion 2C is formed on the surface of the base 2B toward the axial direction. The pinion 11 penetrates the center of the cylinder portion 2C and is rotatably supported, and the one-way clutch 20 is disposed in the middle thereof.

[0021]

The pinion 11 is rotated by means of the drive gear by the rotating operation of the handle, and the one-way clutch 20 is disposed in the middle of the pinion 11 to allow the rotation of the pinion 11 in the reel-in direction and to prevent its reverse rotation.

The one-way clutch 20 includes an inner ring 21, an outer ring 27 and a retainer 23 retaining a plurality of rolling members 25, and further includes a cover member 23A (see Fig. 5) which is integrated with the retainer 23. These elements (or some of the elements) may be pre-unitized.

[0022]

The inner ring 21 is detented against the pinion 11 and serves as a drive shaft that rotates integrally with the pinion 11. Specifically, the pinion 11 has a cross section in a shape partially formed with a non-circular portion, and with a non-circular portion of the inner ring 21 fitted to this portion, the inner ring 21 rotates integrally with the pinion 11.

The retainer 23 is disposed radially outwardly of the inner ring 21 and has retaining portions 23a disposed at intervals in the circumferential direction. Each retaining portion 23a is provided with a biasing spring 24, which biases a rolling member 25 disposed between the retaining portions in the circumferential direction (in Fig. 3, counterclockwise direction; reverse-rotational direction).

[0023]

The outer ring 27 is disposed radially outwardly of the retainer 23 and is formed substantially in a ring shape. The inner circumference surface of the outer ring 27 has a wedge region 27a that prevents the rotation of the respective rolling members 25 and a free region 27b that allows the rolling members 25 to rotate freely. The rolling members 25 retained in the retainer 23 are always biased toward the wedge region by the biasing spring 24. The outer circumference surface 27d of the outer ring 27 is formed in a circular shape except for the portion at which a detent 27c described below is formed.

[0024]

At a portion of the outer ring 27, a protruding piece 27c is provided to radially outwardly protrude. This

protruding piece serves as a detent (hereinafter referred to as "detent 27c") to restrict rotation of the outer ring 27. The detent 27c is integrally formed to radially outwardly protrude from the outer circumference surface 27d of the outer ring 27, on one spot or more. In this case, it is preferable to form two or more pieces at equal intervals because if it is provided only on one spot, when a large torque is applied to the outer ring, the stress is concentrated and biasing, etc. may occur. In the present embodiment, two pieces are provided at 180° intervals so that they face each other across the central axis X. The detent 27c has a width in the circumferential direction and its sides 27e, 27f in the circumferential direction perform a detenting function.

[0025]

The cylinder portion 2C protruding on the reel body 2 has a circumferential wall 2a formed with a notch 2c that radially penetrates the circumferential wall 2a. This notch 2c is formed to the extent that the detent 27c of the outer ring 27 is fitted into it, and the outer ring 27 is fixed in a detented manner (its rotation is restricted) with the detent 27c fitted into the notch 2c and an exposed surface 27g disposed to be radially exposed.

[0026]

The notch 2c only needs to be formed on one spot or more on the circumferential wall 2a, and in the present embodiment, two are formed at equal intervals in the circumferential direction (on two spots at 180° intervals to be symmetrical about the central axis X). In other words, the notches only need to be provided in the same number as that of the detents of the outer ring 27.

[0027]

The outer surface of the detent 27c is radially exposed at the notch 2c of the cylinder portion 2C, and can be touched and picked with fingers. The detent makes it

easier to pick the outer ring 27 and improves the ease of attachment and detachment of the one-way clutch 20.

[0028]

In the configuration described above, the diameter of the circumferential wall 2a of the cylinder portion 2C (diameter of the outer circumference surface of the circumferential wall) is the same as the outermost diameter of the outer ring 27 (diameter of the exposed surface 27g of the detent 27c). In this case, the outer ring 27 is configured to fit within the circumferential wall 2a with a gap therebetween, to prevent rattling while ensuring good rotational performance and to reduce the size in the radial direction. Providing some gap also allows for easy attachment and detachment.

[0029]

The one-way clutch 20 constructed as described above is unitized and assembled with into the cylinder portion 2C. In this case, as shown in Fig. 5, the lid (cover member) 23A that covers the retainer 23 and the outer ring 27 is mounted on the surface of the outer ring 27 shown in Fig. 4, and the outer ring 27 is held between the retainer 23 and the cover member 23A. On the cover member 23A, an electric-corrosion-resistant plate (corrosion-resistant plate) or the like may be mounted. Further, a restriction plate may be disposed adjacent to the one-way clutch so as to restrict movement of the one-way clutch 20 in the axial direction. Alternatively, as shown in Figs. 1 and 2, a magnetic seal mechanism 50 may be disposed to enhance the waterproofing and dustproofing effect on the one-way clutch 20.

[0030]

As is known, the magnetic seal mechanism 50 includes: ring-shaped magnetic plates (pole plates) 51, 52 disposed with a minute gap between them and the outer circumference surface of the drive shaft (inner ring 21), and a ring-shaped magnet 53 held between the magnetic plates, with a

ferrofluid filled in the gap between the drive shaft and the magnetic plates (see Figs. 1 and 2).

[0031]

In this embodiment, the reel body is provided with a waterproof cap 60 so as to enclose the cylinder portion 2C and the one-way clutch 20. This waterproof cap 60 has a shape including a cylinder portion 61 that surrounds the one-way clutch 20 and a cover portion 62 that seals the opening on the spool side, and the magnetic plate 51 of the magnetic seal mechanism 50 is stuck to the inner surface of the cover portion 62.

[0032]

The one-way clutch 20 of the above-described configuration prevents rotation (reverse rotation) of the handle (rotor 3) in the casting direction.

Specifically, when the pinion 11 is rotated (in the clockwise direction in Fig. 3) in response to rotation of the handle in the reel-in direction, the inner ring 21 also rotates in the same direction together with the pinion 11. At this time, the rolling member 25 retained in the retainer 23 moves to the free region 27b of the outer ring 27, and thus the rotational force of the inner ring 21 is not transmitted to the outer ring 27 and the rotor 3 rotates with the pinion 11 with no problem.

[0033]

In contrast, when the inner ring 21 together with the pinion 11 is about to rotate in the reverse direction (with the rotor 3 rotating in the casting direction), the rolling member 25 retained in the retainer 23 rolls in the counterclockwise direction and comes to be located in the wedge region 27a of the outer ring 27 by means of the biasing spring 24, and thus the rotational force of the inner ring 21 is transmitted to the outer ring 27. Since rotation of the outer ring 27 is restricted by the detent 27c, this serves as a stopper and prevents the reverse rotation of the pinion 11 and the rotor 3.

[0034]

In the configuration described above, the notch 2c radially penetrates the circumferential wall 2a of the cylinder portion 2C on the reel body, and with the detent 27c that is formed on the outer ring 27 of the one-way clutch 20 and disposed to be radially exposed, the outer ring 27 is fixed in a detented manner.

In other words, unlike a conventional configuration, the outer ring 27 is not detented with a notch, a protrusion or the like formed on the inner circumference surface of the cylinder portion, which allows to reduce the diameter and thickness of the cylinder portion 2C as much as possible, and thus the size and weight of the reel body is reduced.

[0035]

Further, in this embodiment, since the magnetic seal mechanism 50 is disposed on the spool side of the one-way clutch 20 and the waterproof cap 60 is provided to enclose the cylinder portion 2C and the one-way clutch 20, foreign matter such as moisture and dust is kept from entering, and the durability is increased.

[0036]

Figs. 6 and 7 show a second embodiment of a spinning reel for fishing according to the present invention.

The one-way clutch 20 of this embodiment has a configuration similar to that of the first embodiment and includes the detents 27c formed at 180° intervals on the outer ring 27. Likewise the configuration shown in Fig. 5, the one-way clutch of this embodiment may also be configured with the cover member 23A of the retainer 23 and the electric-corrosion-resistant plate.

[0037]

In the present embodiment, the reel body 2 includes a contact portion 2E, and a side surface of the detent 27c of the outer ring 27 makes contact with the contact portion 2E to restrict rotation of the outer ring. Unlike the first

embodiment, the contact portion 2E is not required to be cylindrical, and only needs to protrude in the axial direction and make contact with a side surface of the detent 27c to restrict rotation. For this reason, in the case that one detent is provided on the outer ring, it only needs to be provided to make contact with the detent at two points of both sides in the circumferential direction, in order to restrict rotation in both directions.

[0038]

In the present embodiment, two detents 27c are formed at 180° intervals on the outer ring 27, and thus the contact portions 2E are provided on both sides of each detent in the circumferential direction, so that they make contact with each detent at two points (side surfaces 2E' of the contact portions 2E) of both sides in the circumferential direction.

[0039]

According to this configuration, unlike the first embodiment described above, the one-way clutch is fixed in a detented manner without a cylinder portion having a notch, and thus the weight and size of components are further reduced. In addition, in this configuration, a space is formed around the contact portion, and the one-way clutch 20 is readily attached and detached.

[0040]

Furthermore, preferably, the contact portions 2E is formed to contact the detents 27c of the outer ring 27 at two points on the side that is radially inwardly of the position of the outermost diameter of the detents 27c.

In this configuration, the contact portion 2E is thinner and thus its weight is even more reduced.

[0041]

Although the embodiments of the present invention are described above, the present invention is not limited to those embodiments and may be modified in various ways.

The shape of the detent 27c of the configuration above-described may be modified as desired. For example, in the notch 2c of the cylinder portion 2C, the exposed surface 27g of the detent may or may not radially protrude from the cylinder portion 2C. In the configuration shown in Fig. 7, the detent is configured to make contact with the contact portions 2E on both sides thereof in the circumferential direction, but the detent may be provided with a recess formed in its center along the axial direction, so that the contact portion fits into the recess. Alternatively, the reel body may be provided with a contact portion that extends in the axial direction in a U-shaped cross section so that it makes contact with both sides of the detent 27c.

[0042]

Further, although the retainer 23 is fixed to prevent the reverse rotation of the rotor in the embodiments described above, the reel body may include an operation member that protrudes out from the reel body so that the reverse rotation of the rotor is allowed by rotating the retainer by operation of the operation member to position the rolling member in the free region.

[Refence Signs List]

[0043]

1 spinning reel for fishing

2 reel body

2C cylinder portion

2c notch

3 rotor

20 one-way clutch

27 outer ring

27c detent

[Document Name] Claims

[Claim 1]

A spinning reel for fishing, comprising:
a reel body;
a handle that is rotatably supported on the reel body;
a drive shaft that is rotated by rotating operation of the handle;

a one-way clutch that is disposed on the drive shaft and includes an inner ring, an outer ring and a retainer retaining a plurality of rolling members;

a cylinder portion that is formed on the reel body and houses the one-way clutch; wherein

the outer ring is provided with a detent protruding radially outwardly;

the cylinder portion is provided with a notch that radially penetrates its circumferential wall; and

the detent of the outer ring is disposed in the notch in such a manner that it is radially exposed in order to fix the outer ring in a detented manner.

[Claim 2]

The spinning reel for fishing according to claim 1, wherein the circumferential wall is provided with two or more of the notches that are formed at equal intervals in the circumferential direction, and the detents are provided in the same number of as that of the notches.

[Claim 3]

The spinning reel for fishing according to claim 1 or 2, wherein the diameter of the outer circumference surface of the circumferential wall is the same as the outermost diameter of the outer ring.

[Claim 4]

The spinning reel for fishing according to any one of claims 1 to 3, further comprising a waterproof cap that encloses the cylinder portion and the one-way clutch.

[Claim 5]

A spinning reel for fishing, comprising:

a reel body;
a handle that is rotatably supported on the reel body;
a drive shaft that is rotated by rotating operation of the handle; and

a one-way clutch that is disposed on the drive shaft and includes an inner ring, an outer ring and a retainer retaining a plurality of rolling members; wherein

the outer ring is provided with a detent protruding radially outwardly; and

the reel body is provided with a contact portion that restricts rotation of the outer ring by making contact with the detent at two spots of both sides thereof.

[Claim 6]

The spinning reel for fishing according to claim 5, wherein the contact portion is provided radially inwardly of the position of the outermost diameter of the detent.