

JOINT SYSTEM FOR A MULTI PIECE FISHING ROD

TECHNICAL FIELD

[0001] The present invention generally relates to fishing rods, and in particular to a joint system for a multi piece fishing rod.

BACKGROUND

[0002] The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the invention.

[0003] Commercially available multi piece fishing rods are designed to be separated into different sections to facilitate the storage and transportation of these fishing rods. The different sections can then be jointed back together so that the fishing rod can be used. The joints, also known as the 'ferrule', between the different sections typically comprises a male member formed from a blank having a tapered cylindrical shape with a circular cross-section, and a cooperating female member, providing a tapered passage for accommodating the male member therein. The tapered passage is shaped to closely conform to the shape of the male member so that the male member can have a friction fit and therefore be retained within the female member.

[0004] A multi piece fishing rod should ideally be relatively lightweight, and yet have the same strength as a corresponding one-piece fishing rod. The joints therefore need to be precisely designed and engineered to provide that strength, because the joints are most typically prone to failure when fishing under load. The joints can however add significant weight to the fishing rod which is undesirable for a multi piece fishing rod.

[0005] Furthermore, during assembly of a multi piece fishing rod, the rod sections need to be carefully aligned to ensure that the fishing line guides provided along the

fishing rod are properly aligned to allow the fishing line to freely pass through all of the guides. This alignment can be difficult to achieve, particularly when the light levels are low. This makes it difficult to see whether the guides are properly aligned. This is because with the typical circular cross-sectional shape of current ferrule designs, the male member of one rod section can be inserted and accommodated within the female member in any rotational position relative to the other rod section to which it is being joined making it necessary to rotate the rod section so that the guides are properly aligned during assembly. This problem is greater for fishing rods made from three or more sections.

[0006] An object of the invention is to ameliorate one or more of the above-mentioned difficulties.

SUMMARY

[0007] According to an aspect of the present disclosure, there is provided a joint system for a multi piece fishing rod having a plurality of rod sections, the joint system comprising a tapered male member having a non-circular cross-section, and a female member having a tapered passage with a non-circular cross-section shaped to accommodate the male member, wherein a friction fit is provided for the male member when the male member is inserted into and is in contact with the tapered passage.

[0008] In some embodiments, the male and female members may have an elliptical or oval cross-section.

[0009] In some embodiments, the male and female members may have an egg-shaped oval, hexagonal, diamond, triangular, square, rectangular cross-section.

[0010] In some embodiments, the joint system may comprise a spigot for interconnecting two said rod sections, wherein the male member is provided on an end of the spigot, and the female member is provided at an end of a said rod section.

[0011] In some embodiments, the male member may be provided at an end of a said rod section, and the female member may be provided on an end of another said rod section.

[0012] In some embodiments, the fishing rod has butt and tip sections, the male member may be provided on an end of the tip section, and the female member may be provided on the end of the butt section.

[0013] In some embodiments, the fishing rod has butt and tip sections, the male member may be provided on an end of the tip section, and the female member may be provided on the end of the butt section.

[0014] According to another aspect of the present disclosure, there is provided a multi piece fishing rod comprising at least one joint system as described above.

[0015] Other aspects and features will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] In the figures, which illustrate, by way of example only, embodiments of the present disclosure,

[0017] Figure 1 is respective side views of disassembled prior art multi piece fishing rods having a 3-piece joint system, 1/3 joint system, and a butt joint system;

[0018] Figure 2 is a diagram showing the elliptical or oval cross-sectional shape of the joint system according to the present disclosure;

[0019] Figure 3a and 3b are respectively schematic side views of a multi piece fishing rod in an disassembled and assembled condition, the fishing rod having a spigot joint system according to an embodiment of the present disclosure;

[0020] Figure 4a and 4b are respectively schematic side views of a multi piece fishing rod in an disassembled and assembled condition, the fishing rod having an overlapping joint system according to another embodiment of the present disclosure; and

[0021] Figure 5a and 5b respectively show partial isometric side cross-sectional views of the variations in the overlapping joint assembly for a multi piece fishing rod

according to Fig. 4a and 4b.

DETAILED DESCRIPTION

[0022] Throughout this document, unless otherwise indicated to the contrary, the terms “comprising”, “consisting of”, “having” and the like, are to be construed as non-exhaustive, or in other words, as meaning “including, but not limited to”.

[0023] Furthermore, throughout the specification, unless the context requires otherwise, the word “include” or variations such as “includes” or “including” will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

[0024] Referring initially to Fig. 1, there is shown three disassembled multi piece fishing rod designs 1a, 1b, 1c that are currently available on the market. The first fishing rod design 1a has three pieces 3a, 5a, 7a and require two joints (not shown) to join together the three pieces in what is known as a ‘3 Pieces Joint System’. The second fishing rod design 1b has two pieces 3b, 5b, with a joint (not shown) being provided at the lower third of the fishing rod 1b in what is known as a ‘1/3 Joint System’. The third fishing rod design 1c has a tip section 3c, and a butt section 5c which requires a joint (not shown) between the two sections in what is known as a ‘Butt Joint System’. Each of these systems currently utilise a joint system having a male member with a tapered cylindrical shape, and an accommodating female member as previously described. The joint system according to the present disclosure may be adapted for use in any of these multi piece fishing rod designs.

[0025] Fig. 2 schematically shows the elliptical or oval shape used in the joint system according to the present disclosure. The traditional joint system uses a cylindrical tapered member having a circular cross-section. This cross-section is schematically shown by the equivalent circle 11 shown as a dotted circle in Fig. 2. The joint system according to the present disclosure may use an elliptical or oval cross-section 15 as also shown in Fig. 2. The elliptical or oval cross-section has a major axis ‘a’, and a minor axis ‘b’, while the equivalent circle 11 has a radius of $(a + b)/2$. The a and b dimensions will progressively vary along the longitudinal length of the joint system. For example, the a and b dimensions will be at a minimum at a peripheral tip of a tapered male member and be at its maximum at the base of the

member. The a and b dimensions for the tapered passage of a cooperating female member according to the present disclosure may also similarly be at a maximum at the entrance to the tapered passage progressively reducing to the deepest part of that passage. It has been found that manufacturing a male member using an elliptical or oval cross-section 15 requires less material use to achieve the same strength as a conventional tapered male member having a circular cross-section corresponding to the equivalent circle 11. This results in weight savings in the joint system according to the present disclosure, when compared with traditional joint systems. Furthermore, the strength of the joint system can still be maintained, notwithstanding the weight savings.

[0026] Another advantage of the use of an elliptical or oval cross-section is that the male member can only be fitted into the female member in only one of two ways making it easier and quicker to properly align the fishing line guides thereby facilitating the correct assembly of the fishing rod using the joint system according to the present disclosure.

[0027] It is however to be appreciated that the present disclosure is not limited to elliptical or oval cross-sections, and that the use of other non-circular cross-sections are also envisaged. For example, cross-sectional shapes including egg shaped, hexagonal, diamond, triangular, square, rectangular could be used according to the present disclosure, and can also achieve similar advantages over traditional joint systems using circular cross-sections.

[0028] Fig. 3a and 3b respectively show a fishing rod 20 in both a disassembled and assembled condition having a first possible embodiment of a joint system 21 according to the present disclosure. The fishing rod 20 has a butt section 22, and tip section 24, with each section being formed from a tubular blank that can have an elliptical or oval cross-section along at least a substantial part of the length of the fishing rod 20. The butt section 22 has an elliptical or oval cross-section 28 as shown along cross-sectional line A-A. A joint area 23 is provided at one end of the butt section 22, with the butt section joint area 23 also having an elliptical or oval cross-section 30 as shown along cross-sectional line B-B. The tip section 24 has a joint area 27 at one end of the tip section 24, and a peripheral tip 25 provided at the opposing end of the tip section 24. The tip section joint area 27 also has an elliptical

or oval cross-section 28 as shown at cross-sectional; line A-A. Each of the joint areas 23, 27 may be provided with a passage 32,34 having a slight taper. The joint system 21 further includes a spigot 26 having an elliptical or oval cross-section that can be made from solid or hollow tubing. The spigot 26 is shown in Fig. 3a partially inserted into the butt section joint area passage 32, and cross-sectional line B-B shows that both the joint area passage 32 and spigot 26 have an elliptical or oval cross-section. Furthermore, there is minimal clearance between the spigot 26, and the accommodating passage 32 when the spigot is inserted in place. The spigot 26 may be permanently secured to the joint area passage 32 of the butt section 22. The exposed end of the spigot 26 may have a slight taper and can be inserted into the passage 34 provided within the opposing joint area 27. The tip section joint area 27 can be slid over the spigot 26 until the increasing taper of the spigot 26 provides a friction seal within the passage 34 therein. The fishing rod will then be in an assembled condition as shown in Fig. 3b. This thereby temporarily holds together the associated sections 22,24 while the fishing rod 20 is in use. The fishing rod 20 can then be disassembled for storage or travel by breaking the friction seal between the spigot 26 and the opposing joint area passage 34. It is also envisaged that the spigot 26 be alternatively secured to the tip section joint area passage 34, in which case the above described assembly process is reversed.

[0029] Fig. 4a and 4b shows another possible embodiment of a joint system 36 according to the present disclosure that eliminates the need for a separate spigot. The fishing rod may have a butt section 39, and a tip section 37 that can both be formed from tubular blanks. Both the butt section 39 and tip section 37 can have an elliptical or oval cross-section as shown by cross-sectional lines A-A in Fig 4a. The tip section 37 has a joint area 38 that may be provided with a slight taper and an elliptical or oval cross-section as shown in cross-sectional line B-B in Fig. 4b. The butt section 39 has a joint area 40 that is shaped to provide a cooperating passage 41 for accommodating the tip section end 38. The passage 41 may therefore also be provided with a slight taper and elliptical or oval cross-section. The joint system 36 can then operate by inserting the tip section joint area 38 (i.e. the male member of the joint system 36) into the passage 41 of the butt section 39 (i.e. the female member of the joint system 36) so that the butt section joint area 40 overlaps the tip section

joint area 38, and there is a good friction seal therebetween. This assembled condition is shown in Fig. 4b.

[0030] Fig. 5a provides a detailed view of the joint system 36 of the fishing rod shown in Figs. 4a and 4b. Fig. 5b shows a joint system 50 that operates in reverse to the joint system 36 shown in Fig. 5a. The fishing rod also has a tip section 51 having a joint area 52 that is provided with a passage 55 which may have an elliptical or oval cross-section and may be slightly tapered. The fishing rod also has a butt section 53 having a joint area 54 that is narrower than the tip section 51 that may have an elliptical or oval cross-section and may be slightly tapered. The butt section joint area 54 can therefore be the male member of the joint system 50, while the tip section 51 provides a cooperating passage 55 and can therefore be the female member of the joint system 50. The joint system 50 can then operate by inserting the butt section end 54 into the tip section passage 55 until there is a frictional seal between the butt section end 54 and the overlapping tip section joint area 52.

[0031] The male member and/or the female member of the joint system according to the present disclosure may be manufactured using different materials including, but not limited to:

- a. solid carbon fibre,
- b. tubular carbon fibre,
- c. solid fiberglass,
- d. tubular fibreglass,
- e. any kind and blend and variation of composites using carbon fibre, fiberglass, Aramids, Kevlar, boron or others
- f. aluminium
- g. stainless steel or any other metal

[0032] The joint system according to the present disclosure can be reinforced by the use of ferrules, whipping thread, epoxy or some other hard and strong coating to for example prevent the tubular ends forming the female members of the joint system from splitting or delaminating.

[0033] The male member of the joint system, when made from carbon fibre, fiberglass or composites thereof, may for example be manufactured using a fibre or composite reinforcing fabric pre-impregnated with resin, also known as 'prepreg', which may be placed over a mandrel that is shaped to provide the required tapered shape, the prepreg being subsequently cured within an autoclave. An alternative method can be used when metal such as stainless steel is used for the manufacture of the components of the joint system. CNC machinery can be used to machine one or more of the different components of the joint system. Alternatively, the sections of the fishing rod may be made from tubular blanks that can be shaped to provide the female members of the joint system as previously described.

[0034] The joint system according to the present disclosure can require less material but still provide a similar strength to traditional cylindrical tapered joint systems thereby leading to weight savings. Furthermore, the use of a joint system according to the present disclosure having an elliptical or oval or other non-circular cross-section can facilitate the assembly of the fishing rod by making it easier to properly align the fishing line guides of the fishing rod when assembled.

[0035] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by a skilled person to which the subject matter herein belongs.

[0036] It should be appreciated by the person skilled in the art that the above invention is not limited to the embodiment described. It is appreciable that modifications and improvements may be made without departing from the scope of the present invention.

[0037] It should be further appreciated by the person skilled in the art that one or more of the above modifications or improvements, not being mutually exclusive, may be further combined to form yet further embodiments of the present invention.

CLAIMS

1. A joint system for a multi piece fishing rod having a plurality of rod sections, the joint system comprising a tapered male member having a non-circular cross-section, and a female member having a tapered passage with a non-circular cross-section shaped to accommodate the male member, wherein a friction fit is provided for the male member when the male member is inserted into and is in contact with the tapered passage.
2. A joint system according to claim 1 wherein the male and female members have an elliptical or oval cross-section.
3. A joint system according to claim 1 wherein the male and female members have an egg-shaped oval, hexagonal, diamond, triangular, square, rectangular cross-section.
4. A joint system according to any one of the preceding claims, comprising a spigot for interconnecting two said rod sections, wherein the male member is provided on an end of the spigot, and the female member is provided at an end of a said rod section.
5. A joint system according to any one of claims 1 to 3, wherein the male member is provided at an end of a said rod section, and the female member is provided on an end of another said rod section.
6. A joint system according to any one of claims 1 to 3, wherein the fishing rod has butt and tip sections, the male member is provided on an end of the tip section, and the female member is provided on the end of the butt section.
7. A joint system according to any one of claims 1 to 3, wherein the fishing rod has butt and tip sections, the male member is provided on an end of the butt section, and the female member is provided on an end of the tip section.
8. A multi piece fishing rod comprising at least one joint system according to any one of the preceding claims.