MEANS AND APPARATUS FOR
ERGONOMIC WATER PADDLE WITH
DYNAMIC ROTATING GRIP

Inventors: Fred P. Lane, Mosinee, WI (US);
Jeffrey D. Lane, Mosinee, WI (US)

Correspondence Address:
Fred P. Lane
1809 Townline Road
Mosinee, WI 54455

Assignees: Fred P. Lane, Marathon, WI (US);
EXPRESSLANE LLC, Marathon, WI (US)

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ABSTRACT
An improved paddle apparatus for kayaks, canoes, or like water craft having a plurality of hand grips mounted to allow dynamic rotation relative to the paddle shaft to allow the wrist to remain in a natural position while paddling and still allow full power to be transferred from the blade into the water. Also a means of paddling whereby the operator can paddle with greater power and control on either side of the watercraft without breaking either handgrip. A further improvement includes using the handgrip in the position perpendicular to the paddle shaft to determine the blade position by feel and steer with greater torque. An alternative embodiment includes rotation of the grip itself, further reducing the twisting of the wrists and other joints.
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PRIOR ART REFERENCES

[0001] U.S. Pat. No. 4,673,361 June 1987 Harvey
[0005] U.S. Pat. No. 6,514,109 February 2003 Carlow
[0006] U.S. Pat. No. 6,328,617 December 2001 Gunnell

BACKGROUND OF THE INVENTION

[0007] 1. Field of the Invention

[0008] The present invention relates to human powered propulsion through water using paddles or oars, particularly the sport of recreational or competitive canoeing or kayaking. More specifically the present invention relates to an improved system of paddling on either side of a watercraft with correct form for maximum power without breaking the hand grip.

[0009] 2. Description of the Related Art

[0010] Since ancient times man has used hand powered paddles for propelling floating craft through water. There are two main classes of paddles, single bladed and double bladed. Typically, a single bladed paddle, used primarily in canoeing, is designed to be held by the paddler with one hand on a ‘t’ grip handle located at the top of the paddle and the other on the throat of the paddle near the blade. The single bladed paddle is preferred for power and control because the grip at the top of the paddle allows the top hand to be orthogonal to the shaft, which drops the associated elbow to a more natural position. This allows the paddle to be stroked more closely to the body, which has several advantages.

[0011] One advantage is that blade of the paddle enters the water directly next to the watercraft. From this more natural position the power of the stroke is greatly increased while reducing the angular torque, which tends to send the watercraft off course.

[0012] Another is that the torso does not have to twist as much to insert the blade into the water as with a double bladed paddle. This unnatural twisting not only reduces efficiency, but also leads to fatigue. Over extended periods of time it can lead to repetitive strain injury to the wrists, arms, and torso.

[0013] Injuries common to prolonged double bladed paddle use include: carpal tunnel syndrome, wrist tendinitis, rotator cuff muscle tears and back strains and injuries.

[0014] There are, however, several problems with the single bladed paddle. Typically, if the paddle were used on one side of the craft the top hand of the rower would be on the handle and the bottom hand on the throat. If the paddle were required for maneuvers on the other side of the craft, the rower would either need to pull the blade out of the water, across the body, and back into the water. This greatly reduces reaction time and creates an awkward position for the rower, which greatly reduces the power of the stroke and increases fatigue.

[0015] The other alternative is to break the hands grip, and move the throat hand to the handle, and the handle hand to the throat. This creates inefficiency and hazard of dropping the paddle, especially in white water conditions, where actions need to be immediate and decisive. This is particularly hard to do in a kayak as the body of the watercraft is close to the torso of the user. This means the user must raise the paddle high above the head to accommodate movement across the body of the watercraft.

[0016] Another disadvantage of the single bladed paddle design is that the shaft of the paddle extends directly from the bottom of the grip area. This creates a disadvantage in gripping the paddle as the middle fingers cannot complete the gripping action.

[0017] Double bladed paddles have been used for years, typically in smaller craft such as kayaks to reduce the need for breaking the grip, or crossing the body with the blades when maneuvers require. But the awkward position of the hands along the line of the shaft require extra bending of the torso, and inefficient angle of entry, leading to the problems discussed above. There have been several inventions aimed at relieving stress on the wrists.

[0018] Another restricting factor of the prior art has been limiting the size of the shaft to the requirements of the handgrips. Typically the shaft size is limited to approximately 1.25 inches or smaller to allow the user to grip directly onto the shaft. (See Larson et. al. U.S. Pat. No. 6,537,117) Yet, the strength of a shaft is in direct proportion to the diameter squared. This principle allows the successful use of large diameter hollow tubing, from materials such as aluminum, to create lightweight and strong members in structures such as sailing masts and bicycles. Using prior art, the large diameter tubing in the rest of the shaft while restricting the diameter in the grip portion only cancels out the benefits for strength improvement as the handgrip is the portion subjected to the highest stress during operation and, as the saying goes, the chain is only as strong as its weakest link.

[0019] The constant need to change and adjust the grips demonstrated in the prior art have hindered the use of a breakaway adhesive to better adhere the users hand to the paddle.

DESCRIPTION OF THIS INVENTION (ART)

[0020] Summary

[0021] The principle object of this invention is to provide an improved paddle device for kayaks, canoes, or like water craft, having a plurality of handgrip portions rotatably mounted relative to the paddle shaft.

[0022] Objects and Advantages

[0023] An objective of the invention is to introduce a rotatable handgrip to reduce stress and fatigue.

[0024] Another objective is to add stops to lock the grips in position roughly parallel to the shaft and perpendicular to the shaft.
Another objective is to provide the advantages of a single bladed "T" handle grip without the disadvantage of interference to the grip by the shaft.

It is a further objective to introduce a method of paddling incorporating advantages of both single and double bladed paddles by means of a dynamically rotating grip portion of the paddle.

In this method the operator can ergonomically paddle or maneuver using a double bladed paddle with the same motion as a "T" gripped single bladed paddle to propel the craft with greater power and accuracy than with the double bladed paddle.

The operator can use this double bladed handle on either side of the watercraft without breaking their hand grip by dynamically rotating the grip from one position to another. Further this method of paddling allows more free and natural movement of the arms and torso reducing stress to the joints and muscle groups.

In addition this method of paddling allows complex maneuvers on either side of the craft quickly without breaking the hand's grip. One unexpected advantage is that by rotating either grip to the orthogonal position the grip becomes a lever for the paddler to know the position of the blade, which is also in the same plane as the handle rotation, which allows the paddler to exert more force to steering or other maneuvers.

Another advantage, because the handgrip need not be broken to execute complex maneuvers, or switching sides, aids to improve the grip such as Velcro, or other chemical sticking agents, on gloves, can now be used to reduce fatigue by securing the hand to the paddle grip.

An alternative embodiment includes rotation of the grip itself allowing complex rotation and further reducing the twisting of the wrists and other joints.

A further embodiment of this invention includes a hollow diameter of shaft tubing larger than can easily be gripped by a person. This gives the advantage of improving the strength to weight ratio of the shaft similar to what is done with large diameter tube bicycles. This is because the handgrip and the shaft are no longer the same piece.

A further embodiment of the present invention includes multiple parallel shafts between the grips and/or between the grip and the paddle acting as a beam to further strengthen and stiffen the resulting structure.

With the embodiment of the parallel shafts, the grip portion may be moved up and down the beam to accommodate the needs of the paddler.

A further embodiment of this invention includes a rotating handle which can be mounted on an existing paddle shaft eliminating permanent modification to existing paddles. This embodiment also adds further protection of the knuckles of the hand by acting as a hand guard.

A further embodiment of this invention includes the use of ball bearings in the rotatable portion of the handle to make the dynamic rotation movement smoother.

A further embodiment of this invention allows a soft locking mechanism, such as a spring, to return the grip to a consistent position. This adds the advantage that the user can more easily anticipate the handle orientation when grabbing the handle.

A further embodiment of this invention allows an opening near the stop as a pressure release, which has several advantages: first it soft locks the paddle into the stop position; second this acts as a mechanism to remove sand or grit that might otherwise be trapped in the races.

The foregoing has outlined rather broadly the features and technical advantages of this invention so that those skilled in the art may better understand the detailed description that follows.

Those skilled in the art will appreciate that they may readily use the conception and the specific embodiment disclosed as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. Those skilled in the art will also realize that such equivalent constructions do not depart from the spirit and scope of the invention in its broadest form.

**DRAWING FIGURES**

**FIG. 1A** shows a perspective view of the ergonomic paddle with dynamic rotating grip according to a first embodiment of the present invention.

**FIG. 1B** shows a perspective view of the ergonomic paddle with dynamic rotating grip according to a second embodiment of the present invention.

**FIG. 2** shows a top through section and centerline cross section of the rotating grip handle showing many of the present features of an embodiment of this invention with the dynamic grip rotated to a position intermediate between parallel and perpendicular with the paddle shaft.

**FIG. 3a** shows a top down view of the ergonomic paddle with dynamic rotating grip according to a second and preferred embodiment of the present invention.

**FIG. 3b** shows a face on view of the ergonomic paddle with the hand grip rotated into the parallel position.

**FIG. 3c** shows a face on view of the ergonomic paddle with the hand grip rotated into roughly the perpendicular position.

**FIG. 4** shows a detailed top down view of **FIG. 3a** with a centerline cross section of the preferred embodiment of this invention showing details of the design.

**FIG. 5** shows yet another embodiment of the present invention which allows the paddle grip to remain inline with the paddle shaft.

**FIG. 5a** shows a top down view of this embodiment.

**FIG. 5b** shows a face on view of this embodiment with the hand grip in a position parallel with the direction of the paddle shaft.

**FIG. 5c** shows a face on view of this embodiment with the hand grip in a position roughly perpendicular with the direction of the paddle shaft.

**FIG. 6** (overall) shows the methodological advantages of paddling with the dynamic rotating grip paddles.
FIG. 6a shows the right (starboard) stroke
FIG. 6b shows the intermediate position
FIG. 6c shows the left (port) stroke
FIG. 6d shows returning to the intermediate position

REFERENCE NUMERALS IN DRAWINGS

10—overall perspective of ergonomic paddle with dynamic rotating grips
11—overall perspective of alternate embodiment of ergonomic paddle with dynamic rotating grips
12—dynamic rotating grip portion of the paddle
13—alternate embodiment of dynamic rotating grip portion of the paddle
14—paddle shaft
15—paddle grip attachment sleeve
16—paddle blade
20—grip handle
22—grip housing
24—screws
25—shaft mount inset
26—rotation guide
27—arrows depicting direction of dynamic rotation
28—top plate grip housing
29—bottom plate grip housing with race inset
30—mounting sleeve to attach the handle to the shaft
31—rotation block
32—handle yoke
34—sleeve mounting latch
36—sleeve mounting band
38—rotating grip handle
40—retaining screw or post
50—paddle shaft modified with inset

DESCRIPTION—FIGS. PREFERRED EMBODIMENT

Two overview embodiments of the present invention 10 and 11 are shown primarily in FIGS. 1a and 1b.

FIG. 1a shows an embodiment in which the paddler grips a dynamic rotating grip portion of the paddle 12 to execute paddling maneuvers.

FIG. 1b shows an alternative embodiment of the present invention 11 showing an alternate embodiment of the dynamic rotating grip portion of the paddle which can be added to an existing paddle consisting of a paddle shaft 14. The overall dimensions of

FIGS. 1a and 1b are similar to a standard two bladed waterpaddle. The location of the dynamic rotating grips 12 are in the same position where the operator would grip an ordinary paddle. This is typically 1 to 2 meters between the left and right hands.

FIG. 2 Shows a detailed view of the dynamic rotating grip 12. The grip housing 20 has an annular shaped opening sized to fit around the operator’s hand, about 12 to 14 cm inner diameter. The grip handle 20 is sized to be gripped comfortably about 2.5 to 3 cm diameter attached to an annular rotation guide 26, with a diameter to fit inside the grip housing 22. The rotation guide 26 is designed to fit into a race to guide the rotation of the handle. The rotation race is made by forming a bottom plate grip housing with race inset 29 to the top plate grip housing 28. The paddle shaft 14 is then cut and modified to fit into the grip housing 22 at the shaft mount inset 25. The resulting assembly is then free to rotate in a direction roughly planar with the plane of the paddle blade 16. This is indicated by the arrows depicting the direction of dynamic rotation 27.

FIG. 3 shows an alternative and preferred embodiment of this invention designed to be mounted to an unmodified paddle shaft 14.

FIG. 3a shows top down view of one side of the shaft. The mounting sleeve to attach the handle to the shaft 30 is held in place by the sleeve mounting bands 36 and the sleeve mounting latches 34. The rotating grip handle 38 is attached to a handle yoke 32 and mounted to the sleeve using a rotation block 31. The rotation block is designed to mount the yoke and handle and still allow rotation

FIG. 3b shows a face on view of the paddle shaft 14 with the handle yoke 32 and rotating grip paddle 38 rotated into a position parallel with the shaft.

FIG. 3c shows a face on view of the paddle shaft 14 with the handle yoke 32 and rotating grip paddle 38 rotated into a position roughly perpendicular with the shaft.

FIG. 4 shows a detailed view of the alternate embodiment of dynamic rotating grip portion of the paddle 13 including a face on view and a centerline cross-section of the assembly. A retaining screw or post 40 is inserted through the handle yoke 32 and secured into the rotation block 31 in such a way the yoke can rotate with the rotating grip handle 38. The rotation block is cylindrical and is mounted into the mounting sleeve 30 with adhesive or may even by part of the sleeve assembly through plastic injection molding.

FIG. 5 shows an alternate embodiment where the mounting sleeve is eliminated and the paddle shaft 14 is modified with inset 50 in such a way as to make the rotating grip paddle 38 level with the paddle shaft.

FIG. 6 shows how one could use the apparatus to propel themselves through the water.

FIG. 6A shows the initiation of a stroke on the right side of the boat depicting the top (left) wrist naturally perpendicular to the paddle shaft and the bottom (right) wrist naturally parallel.

FIG. 6B shows the position of the grips between strokes in the intermediate or resting position with both wrists naturally about 45 degrees from the paddle shaft.
FIG. 6C shows the initiation of a stroke on the left side of the boat depicting the top (right) wrist naturally perpendicular to the paddle shaft and the bottom (left) wrist naturally parallel.

FIG. 6D shows the paddles returning again to the intermediate position.

DESCRIPTION—FIGS. ADDITIONAL EMOITONS

Addition embodiments may include a locking stop to limit the degrees rotation or to allow the paddler to statically set the angle of the grip relative to the shaft. The primary function of the locking stop is to limit rotation of the grip any angle, but typically one stopping point being parallel to the shaft and the other between 45 and 90 degrees from parallel to the shaft along the plane of rotation defined by the rotation guide.

In general the plane of rotation of the dynamic grip will be co-planar to the plane of the blade. However, a common practice in paddle construction called “feathering” may create an offset of up to 75 degrees between the plane of the blade and the plane of handle rotation.

CONCLUSION, RAMIFICATIONS, AND SCOPE

Although the present invention has been described in detail, those skilled in the art will understand that various changes, substitutions, kiralgnvev and alterations herein may be made without departing from the spirit and scope of the invention in its broadest form.

What is claimed is:

1. A rotating grip propulsion apparatus for use in human propulsion of small water crafts such as kayaks and canoes which adjusts dynamically to a paddle’s motions providing a full complement of arm and wrist movements, said rotating grip propulsion device comprising:

   a shaft having a first end, a second end, and an intermediate region;
   said first end having a blade portion for executing a paddle stroke which comprises propulsion through the water by means of inserting a blade into water and pushing or pulling through said water in a motion which is perpendicular to the plane of the blade said second end having a blade portion for propulsion through water being substantially equal to said first end;
   said intermediate region of said device including a center point, a first grip housing, and a second grip housing;
   said first and said second grip housing being equidistant from said center point, said first and said second grip housings for manipulating said propulsion device through water, and said first and said second grip housings each including a circularly rotating grip handle of each first and second handle comprising: an upper race, a lower race, a grip member rotatable between said first race and second race, a plurality of fasteners securing said upper race to said lower race,

   (iii) whereby an ergonomic paddling device is made.

2. The device according to claim 1, wherein:

   said upper race combined with said lower race comprising a race well

   said grip handle having a first end and a second end and a gripping region:

   said first end and said second end containing a rotation guide to stabilize said grip handle into said race well.

3. The device according to claim 2, wherein:

   said race well contains a locking stop to limit the range of motion of said grip handle between approximately parallel and perpendicular to said shaft.

4. A rotating grip propulsion apparatus of use in human propulsion with said rotating grips comprising:

   a continuous shaft comprising a first end an intermediate region and a second end;

   said first end having a blade portion for executing a paddle stroke which comprises propulsion through the water by means of inserting a blade into water and pushing or pulling through said water in a motion which is perpendicular to the plane of the blade.

5. A device according to claim 4, wherein:

   said yoke is permanently attached to said continuous shaft.

6. A device according to claim 5 wherein:

   said intermediate region is recessed such that said grip handle is collinear with the continuation of said intermediate region.

7. A means of propulsion for kayaks, canoes, or like water craft by means of an improved paddle method comprising:

   an operator with a plurality of hands comprising a left hand and a right hand;

   said operator using said plurality of hands to grip said plurality of grip handles which are rotatably mounted relative to said paddle shaft.

   said operator executing a starboard (right) side paddle stroke which comprises said operator inserting said blade into water on said starboard side of said craft and executing said paddling motion to propel said craft.

   said left hand of said operator, which is farthest from water, having naturally rotated said grip handle to a position perpendicular to said shaft and said right hand of said operator, which is closest to water, having naturally rotated to a position parallel to said shaft.
said operator retrieving said blade from water and returning to a neutral position where said blade one and said blade two are equal distance from water
said operator executing a port (left) side paddle stroke which comprises
said operator inserting said blade into water on said port side of said craft and executing said paddling motion to propel said craft
said right hand of said operator, which is farthest from water, having naturally rotated said grip handle to a position perpendicular to said shaft and said left hand of said operator, which is closest to water, having naturally rotated to a position parallel to said shaft
said operator retrieving said blade from water and returning to said neutral position where said blade one and said blade two are equal distance from water
whereby said operator can paddle with the same power and control as a single bladed paddle from either side of said watercraft without breaking the paddler’s hand grip.

8. The method according to claim 7 wherein:
Other maneuvers such as righting the watercraft deploy said grip.

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