



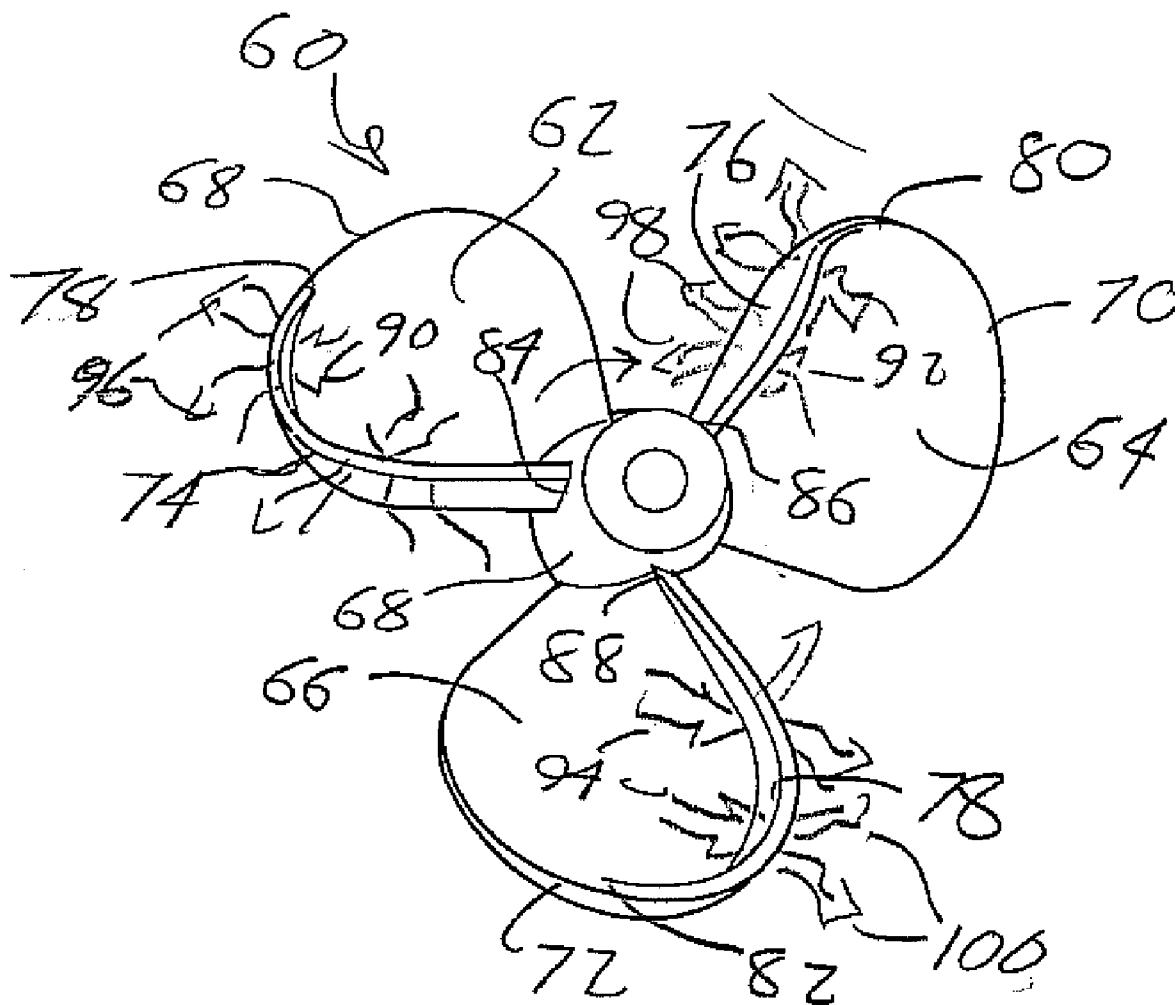
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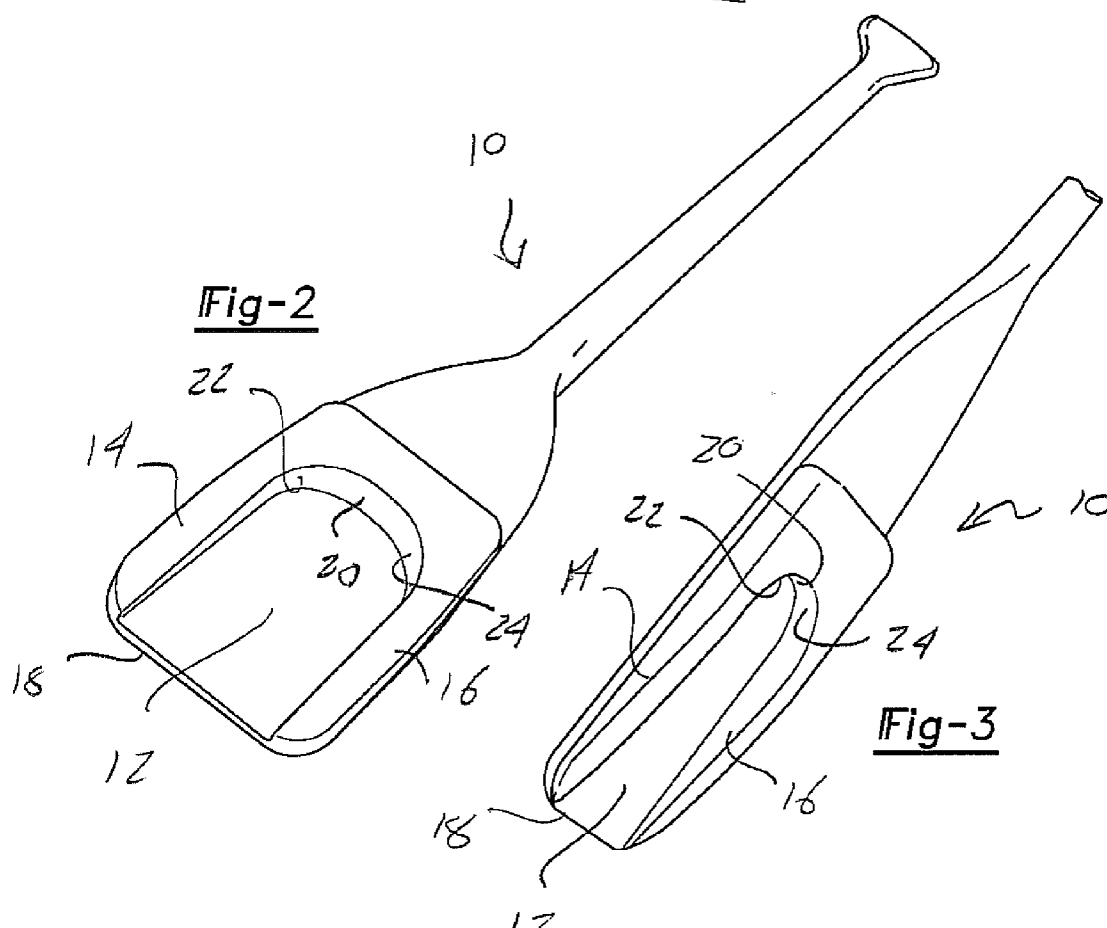
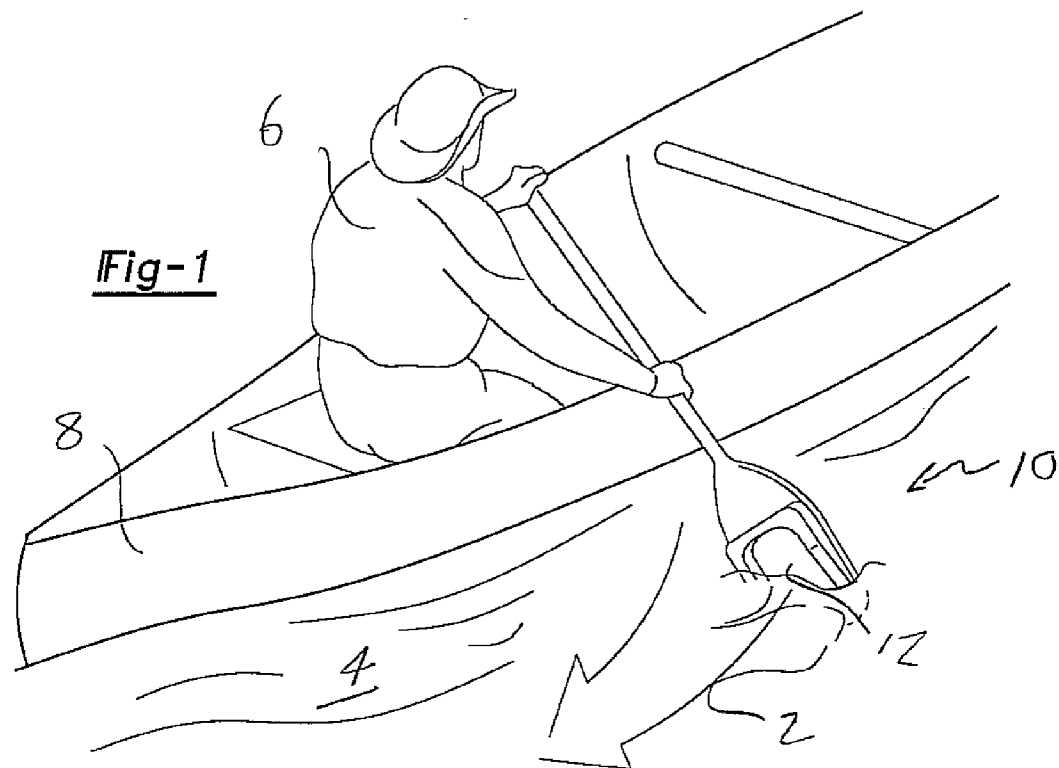
(19) **United States**(12) **Patent Application Publication**
Moore(10) **Pub. No.: US 2010/0104448 A1**(43) **Pub. Date: Apr. 29, 2010**(54) **FLOW RESTRICTIVE EDGE PROFILE
EXHIBITED UPON A SURFACE OF A FLUID
PROPELLED/PROPELLING IMPLEMENT****Publication Classification**(51) **Int. Cl.**
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(52) **U.S. Cl.** **416/235; 440/101**(76) **Inventor:** **John K. Moore**, Scottsdale, AZ
(US)(57) **ABSTRACT**

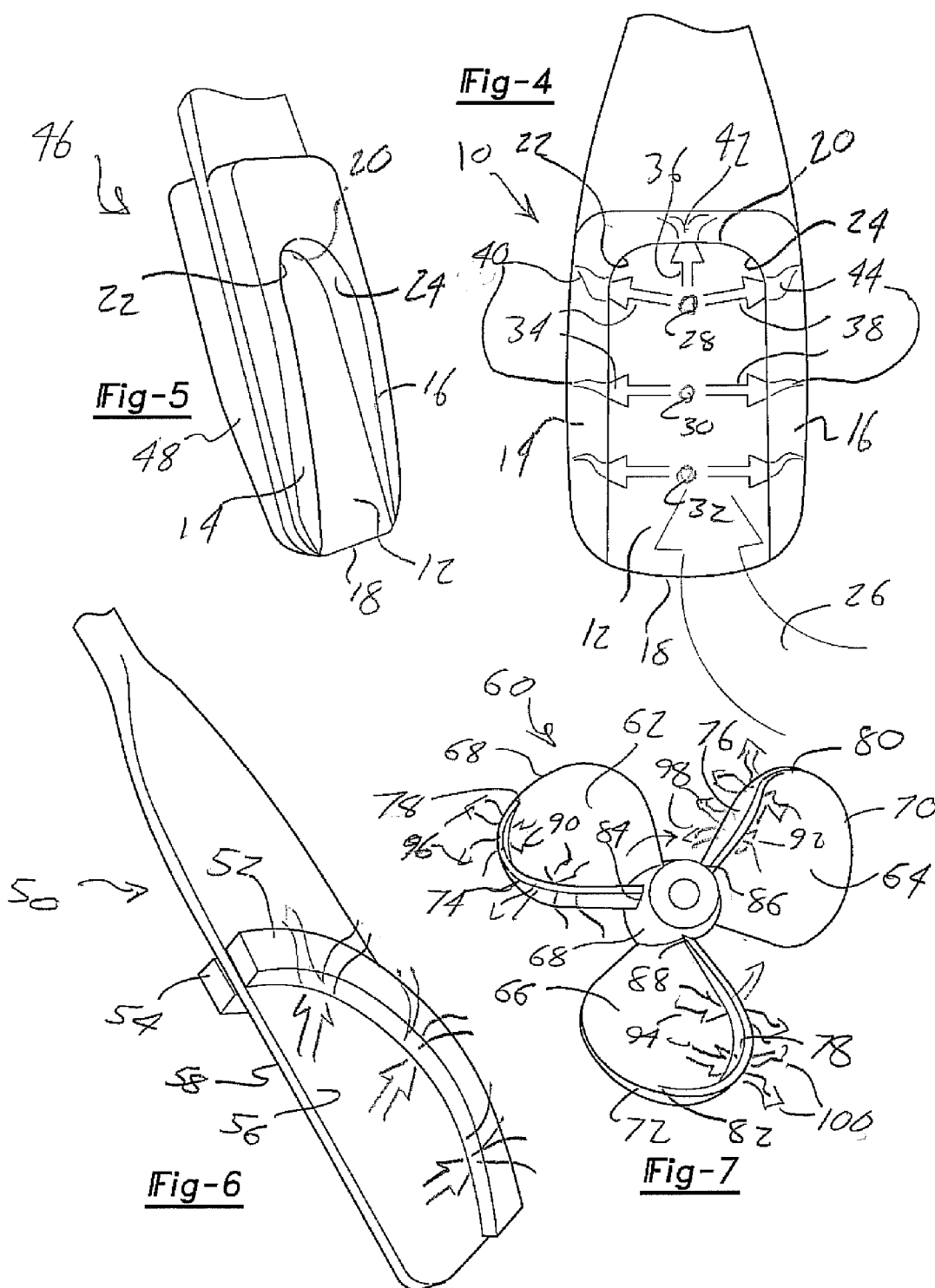
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A flow restrictive edge profile applied to a fluid propelled/propelling implement and for creating increased driving force as a blade interacts with a fluid medium. An arcuate blade face pattern, including such as a "horseshoe" or modified "U" shape profile, is applied to one or two opposite faces of an oar design, with a deepened and inner extending connecting (arcuate) edge establishing a maximum of resistance (and a corresponding minimization of fluid losses) when traveling through the fluid medium. This in turn maximizes the amount of driving efficiency (e.g. thrust) to the article, such as during it being physically translated through a water medium or acted upon by a wind stream medium. The flow restrictive edge profile also contemplates application into one more blades associated with such as a rotating propeller or a driven windmill.

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FLOW RESTRICTIVE EDGE PROFILE EXHIBITED UPON A SURFACE OF A FLUID PROPELLED/PROPELLING IMPLEMENT

FIELD OF THE INVENTION

[0001] The present invention relates generally to an improved blade face design incorporating an enhanced flow restrictive edge profile for creating increased thrust as a blade interacts with a fluid (water/air) medium. More specifically, the present invention discloses an arcuate blade face pattern, such as a “horseshoe” or modified “U” shape profile applied to one or two opposite faces of an oar design, and with a deepened and inner extending connecting (arcuate) edge, which establishes a maximum of resistance (and a corresponding minimization of fluid losses) when traveling through the fluid medium. This in turn maximizes the amount of driving efficiency (e.g. thrust) to the article, such as during it being physically translated through a water medium or acted upon by a wind stream medium. The flow restrictive edge profile of the present design also contemplates application into one more blades associated with such as a rotating propeller or windmill.

BACKGROUND OF THE INVENTION

[0002] The prior art is well documented with examples of propelling articles, such as employed within a fluid stream of some type. A most basic example of such an article is a paddle design used to propel a watercraft upon a body of water.

[0003] Also known among such prior art articles is the ability to reconfigure a profile of such a propelling implement, a first example of this being set forth in U.S. Pat. No. 7,309,364, to Wagenknecht, and which teaches a foldable paddle blade and shaft exhibiting a planar elongate polymer plastic substrate with two angularly directed and weakened hinge lines, these extending inwardly and angularly from a location at or near one elongated end of the later edges, and in order to form a blade with sidewalls and a free terminal end. Parallel weakened hinge lines extend parallel and traverse either three or four faceted tubular shafts.

[0004] U.S. Pat. No. 4,303,402, issued to Gooding, teaches a paddle for manually propelling a water craft with increased stroke efficiency and which includes a cupped-shaped blade formed of a foam injected plastic. The blade is angularly displaced from the shaft of the paddle. The shaft further exhibits such as a hexagonal shape and includes a T-shaped handle member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Reference will now be made to the attached drawings, when read in combination with the following detailed description, wherein like reference numerals refer to like parts throughout the several views, and in which:

[0006] FIG. 1 is an operational view of the improved blade face design applied to a surface of an oar according to one preferred embodiment of the present invention;

[0007] FIG. 2 is a perspective view of the blade face design of FIG. 1 and further illustrating the arcuate or modified “U” shape (horse shoe) profile applied to one or two opposite faces of an oar blade, the profile further exhibiting shallow-most forward extended side edges, these deepening in inner extending directions and terminating at an inner arcuate inter-connecting edge which establishes a maximum of resistance

(and a corresponding minimization of fluid losses) when traveling through the fluid medium;

[0008] FIG. 3 is a further rotated perspective of the oar blade face design of FIG. 2;

[0009] FIG. 4 is a plan view of the oar blade face design of FIG. 2 and further illustrating the restricted flow patterns created by the traversing of the oar face in a normal direction relative to a body of water, and as correspondingly illustrated in the operational view of FIG. 1;

[0010] FIG. 5 is a further partial perspective of a dual blade face design in which a U” shape profile is applied to each of opposite faces of an oar design;

[0011] FIG. 6 is an illustration of an alternative flow resisting profile applied to an oar blade face; and

[0012] FIG. 7 is an illustration of a multi-blade rotating element, such as applied to a marine propeller or a windmill-type element, and by which an edge extending and flow restricting profile is associated with each blade face.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Referring now to the several illustrations described below, the present invention relates generally to an improved blade face design incorporating an enhanced flow restrictive edge profile for creating increased thrust (whether by or upon the blade) as it interacts within a fluid (e.g. water/air) medium.

[0014] More specifically, the present invention discloses an arcuate blade face pattern, such as including any of a hook-shaped or horseshoe/modified “U” shape profile. In one variant, a “U” shaped profile is applied to one or two opposite faces of an oar design, and with a deepened and inner extending connecting (arcuate) edge, establishes a maximum of resistance (and a corresponding minimization of fluid losses) when traveling through the fluid medium. This in turn maximizes the amount of driving efficiency (e.g. thrust) to the article, such as during it being physically translated through a water medium or acted upon by a wind stream medium. A further variant contemplates a flow restrictive profile associated with an arcuate edge profile of each of a plurality of rotating blades mounted about a common hub, such as which can be associated with either a powered propeller or a driven windmill.

[0015] Referring first to FIG. 1, an operational view is shown of an improved blade face design applied to a surface of a paddle (or oar) 10 according to one preferred embodiment of the present invention. As further shown in the illustration of FIG. 1, the paddle 10 is traversed, such as ideally in a generally normal/parallel direction (generally referenced by arrow 2) through a fluid (e.g. water) body 4, in this instance by an individual 6 seated upon a watercraft such as a canoe 8. That said, any direction of travel of a surface area 12 exhibited by the paddle 10 at any angular direction relative the surrounding body of fluid 4 will provide a degree of driving force as will be described.

[0016] FIG. 2 is a perspective view of the paddle 10 in FIG. 1 and in which the identified surface area 12 better illustrates a blade face design of the paddle. A flow restrictive and arcuate profile associated with the paddle 10 includes a modified “U” shape (or horseshoe shape) profile applied to the blade surface area 12. In particular, the modified “U” shape profile includes first 14 and second 16 edge extending portions, these having a shallowest thickness dimension at a front edge 18 of the paddle and increasing in a thickness dimension

from their forward-most locations as they extend in a lengthwise/linear direction toward a handle portion of the paddle 10.

[0017] The extending edge portions 14 and 16 exhibit a thickest dimension (this defined as a maximum height of the inwardly facing edges of the sides 14 and 16 at the point in which they are interconnected with a central portion 20, at an inward recessed location of the paddle surface area 12. The central extending portion 20 extends the substantial width of the surface area 12 and further includes first 22 and second 24 arcuate interconnecting edges established between the central portion 20 and the first 14 and second 16 edge extending portions.

[0018] As shown, the central portion 20 further exhibits a width dimension separating the arcuate edge locations 22 and 24 (see as best shown in the plan view of FIG. 4). The configuration of the edge profile (again sides 14 and 16, and interconnecting central portion 20 which rounded edges 22 and 24) is such that it serves to restrict flow across the edges of the paddle surface area 12, this in turn increasing a resistance force exerted by the paddle 10 upon the fluid medium 4.

[0019] As shown, and upon the paddle body being translated through the fluid medium 4 (arrow 2 in FIG. 1), a generated flow of fluid initially impacts the surface area 12 of the paddle 12 (see arrow 26 in FIG. 4 and which further generically identifies representative contact locations 28, 30, and 32 upon the face of the paddle). The fluid flow impinging upon the face 12 of the paddle 10 spreads outwardly and, upon distributing across the body in directions towards the sides and inner ends, see arrows 34, 36 and 38, subsequently impacts each of the edge extending 14 and 16 profiles and interconnecting central/crosswise extending profile 20. At this point, and as again referenced in FIG. 4, flow restriction occurs along each of the sides and recessed center (see at identified locations 40, 42 and 44), thereby restricting flow across the edge portions and increasing a resistance force exerted upon the fluid medium 4 by the paddle body 10.

[0020] It is further understood that the modified horseshoe shaped pattern can also be applied to both of first and second opposite faces of an oar blade, see at 46, as further shown in FIG. 5. As with the variant of FIG. 4, each opposite configured profile again exhibits shallow-most forward extended side edges, these deepening in inner extending directions and terminating at an inner arcuate interconnecting edge which establishes a maximum of resistance (and a corresponding minimization of fluid losses) when traveling through the fluid medium.

[0021] The illustration of FIG. 5 largely hides the configuration of the second flow restricting profile, with the exception of a selected edge extending portion 48 positioned opposite corresponding edge extending profile 14, it being otherwise understood that each profile is identical in configuration. Experimentation has established that incorporating a single flow restricting profile (such as in FIG. 2) into a paddle/ or results in a 25% increase in exerted resistance (or driving) forces relative the surrounding fluid medium. Incorporating the flow restricting profile on both sides of the paddle further results in a 50% improvement in exerted forces.

[0022] It is further understood that any polygonal/arcuate shaped profile exhibiting an inner raised thickness (such as also generally referred to as a dam like edge) will provide a selected enhancement in the driving/driven properties of the body to which it is applied. In particular, and referring now to FIG. 6, a further example is shown at 50 of an oar/paddle in which either a single or pair of arcuate edge profiles, see at 52

and 54, are applied to either of first and/or second exposed faces, further at 56 and 58, of the paddle.

[0023] In contrast to the paddle with the horse-shoe shaped flow restricting profiles in FIG. 4, the configuration of FIG. 6 exhibits a more generally arcuate, pseudo-hook shape, this potentially exhibiting a dam-edge of constant thickness. That said, it is also understood that a profile extending edge of increasing thickness (similar to that shown for extending edges 14 and 16 in the profile of FIG. 2) can also be incorporated into the selected arcuate profile edge pattern of FIG. 6.

[0024] Referring finally to FIG. 7, an illustration is generally shown at 60 of a multi-blade rotating element, such as applied to a marine propeller or a windmill-type element, and by which an edge extending and flow restricting profile is associated with each blade face. As shown, a plurality of individual blades 62, 64, and 66 are mounted in rotating fashion about a common hub 68. Each of the blades 62, 64 and 66 exhibits an exposed face which can be substantially planar, however is typically somewhat arcuate (i.e. non-planar) in surface configuration, and each of which further exhibits an arcuate extending edge, at 68, 70 and 72.

[0025] A flow restrictive profile (see as correspondingly shown at 74, 76 and 78) is associated with each of the arcuate edge profiles 68, 70 and 72 of each of the rotating blades. As shown, each of the profiles initiates at an outermost location (78, 80 and 82) and increasing in thickness to a terminating and inner contacting location (respectively at 84, 86 and 88) with the hub 68.

[0026] In this fashion, a flow of fluid impacts each of the rotating blades 62, 64 & 66 and, upon distributing across a surface area of each blade, subsequently impacts the arcuate edge extending profiles 74, 76 and 78, thereby again restricting flow across the edge profiles in a similar fashion as described in reference to the paddle embodiment 10 in FIG. 4, and thus increasing a resistance to a rotating force exerted upon or by the fluid medium in relation to the body. Reference is further made to generally surface directional arrows 90, 92 and 94 identifying the flow of fluid across the surface area of the rotating blades, as well as subsequent flow restricted arrow designations 96, 98 and 100 identifying the edge profile where resistance/force generation occurs.

[0027] Known applications of the rotating blades include, in one instance, a multi-bladed and powered propeller for increasing a driving force to the fluid medium. Also contemplated is incorporation of the rotating blades and common hub into a freely rotating and multi-bladed windmill, this exhibiting an increased driven force exerted by the fluid medium, and such that the windmill element can in turn power any desired electro-magnetic work output.

[0028] Having described my invention, other and additional preferred embodiments will become apparent to those skilled in the art to which it pertains, and without deviating from the scope of the appended claims:

I claim:

1. An article for creating increased efficiency when interacting within a fluid medium, comprising:

- a body having a specified shape and size and exhibiting a surface area; and
- a flow restrictive and arcuate profile extending a distance along said surface area including at least an edge portion of said body;
- a flow of fluid across said body impacting said profile, thereby restricting flow across said edge portion and

increasing a resistance force exerted upon or by the fluid medium in relation to said body.

2. The article as described in claim 1, said body further comprising a paddle exhibiting a planar surface area.

3. The article as described in claim 2, said profile further comprising a modified “U” shape profile including first and second edge extending portions and a recessed and interconnecting central portion.

4. The article as described in claim 3, further comprising said edge extending portions increasing in thickness dimension from forward-most locations approximate a front edge of said paddle to a maximum thickness associated with said interconnecting central portion.

5. The article as described in claim 4, said flow restrictive profile further comprising first and second arcuate interconnecting edges established between said central portion and said first and second edge extending portions, said central portion further comprising a width dimension separating said edge extending portions.

6. The article as described in claim 2, further comprising a second and identically configured profile being applied to an opposite planar surface area of said paddle.

7. The article as described in claim 1, said body further comprising a plurality of individual blades mounted in rotating fashion about a common hub.

8. The article as described in claim 7, each of said blades further comprising an arcuate surface area.

9. The article as described in claim 8, said flow restrictive profile associated with each of said rotating blades further comprising an edge extending configuration initiating at an outermost location and increasing in thickness to an inner contacting location with said hub.

10. An article for creating increased efficiency when interacting within a fluid medium, comprising:

a paddle shaped body having a specified shape and size and exhibiting a planar surface area; and

a flow restrictive and arcuate profile extending a distance along said surface area including at least an edge portion of said body;

said body being translated through the fluid medium, such that a flow of fluid initially impacts said surface area and, upon distributing across said body subsequently impacts

said profile, restricting flow across said edge portion and increasing a resistance force exerted upon the fluid medium by said body.

11. The article as described in claim 10, said profile further comprising a modified “U” shape profile including first and second edge extending portions and a recessed and interconnecting central portion.

12. The article as described in claim 11, further comprising said edge extending portions increasing in thickness dimension from forward-most locations approximate a front edge of said paddle to a maximum thickness associated with said interconnecting central portion.

13. The article as described in claim 12, said flow restrictive profile further comprising first and second arcuate interconnecting edges established between said central portion and said first and second edge extending portions, said central portion further comprising a width dimension separating said edge extending portions.

14. The article as described in claim 10, further comprising a second and identically configured profile being applied to an opposite planar surface area of said paddle body.

15. An article for creating increased efficiency when interacting within a fluid medium, comprising:

a body including a plurality of individual blades mounted in rotating fashion about a common hub; and

a flow restrictive profile associated with an arcuate edge profile of each of said rotating blades, each of said profiles initiating at an outermost location and increasing in thickness to an inner contacting location with said hub;

a flow of fluid impacting each of said rotating blades and, upon distributing across a surface area of each blade, subsequently impacting said edge extending profile, thereby restricting flow across said edge profile and increasing a resistance to a rotating force exerted upon or by the fluid medium in relation to said body.

16. The article as described in claim 15, said body having a specified shape and size and further comprising a multi-bladed and powered propeller for increasing a driving force to the fluid medium.

17. The article as described in claim 15, said body having a specified shape and size and further comprising a freely rotating and multi-bladed windmill exhibiting an increased driven force exerted by the fluid medium.

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