US 20250019049A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0019049 A1**

Teich et al. (43) **Pub. Date: Jan. 16, 2025**

(54) **HIGHLY STABLE PONTOON-BASED DEVICE TO ENABLE WEARER TO WALK/SKATE ON THE SURFACE OF WATER**

(71) Applicants: **Jonah Louis Teich**, Toronto (CA); **Ira Bernard Teich**, Toronto (CA)

(72) Inventors: **Jonah Louis Teich**, Toronto (CA); **Ira Bernard Teich**, Toronto (CA)

(21) Appl. No.: **18/353,090**

(22) Filed: **Jul. 16, 2023**

(30) **Foreign Application Priority Data**

Jul. 28, 2022 (CA) 3169424

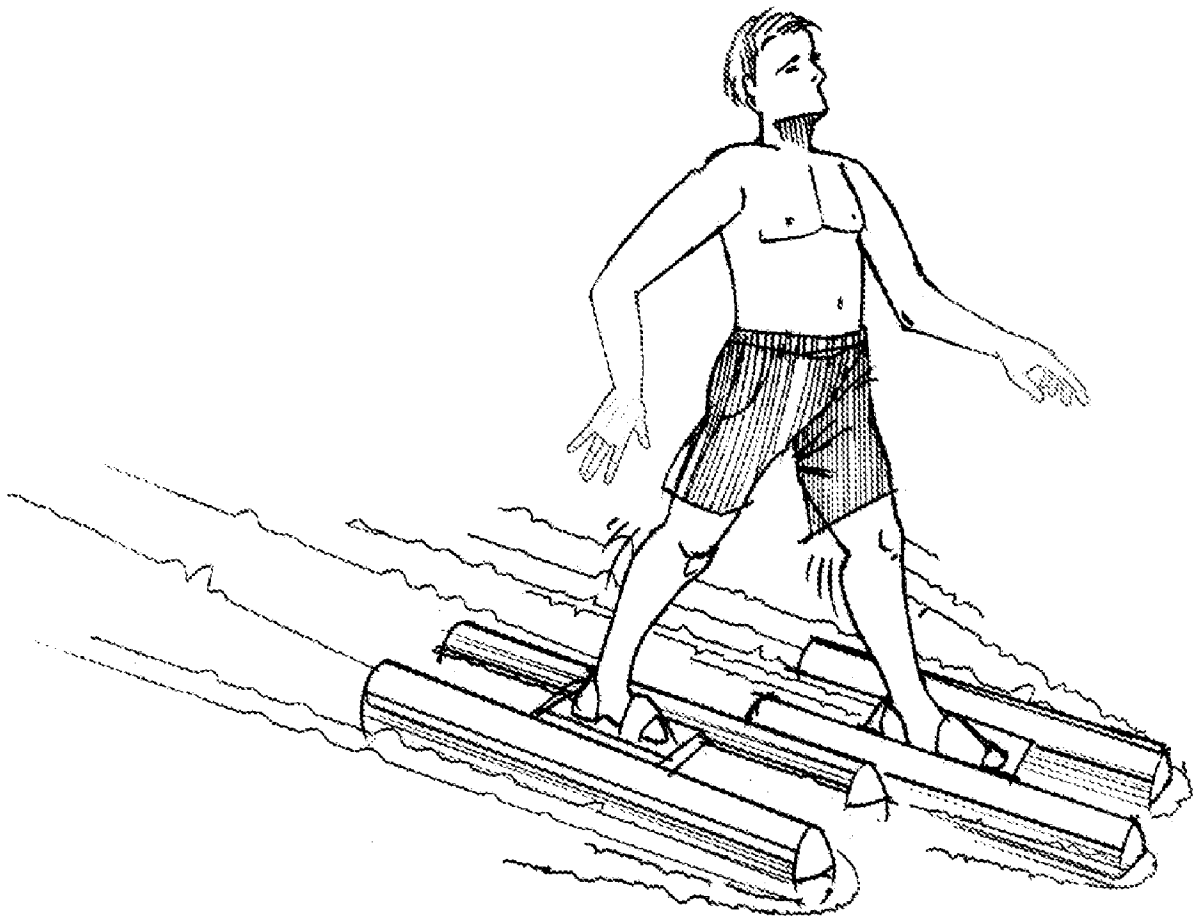
Publication Classification

(51) **Int. Cl.**
B63B 32/30 (2006.01)

(52) **U.S. Cl.**
CPC ***B63B 32/35*** (2020.02)

(57) **ABSTRACT**

A wearable device for personal locomotion on the surface of the water. This device consists of two 'skates' with each designed to be worn on a single foot. Each skate is separately mobile and allows for free movement on the surface of water. Locomotion is made possible by the addition of mechanical 'scoops' that provide a forward force generated by motion of the skates, or by addition of a propeller or similar system. The double-pontoon structure of each skate ensures stability that is not strongly reliant on users' skill.



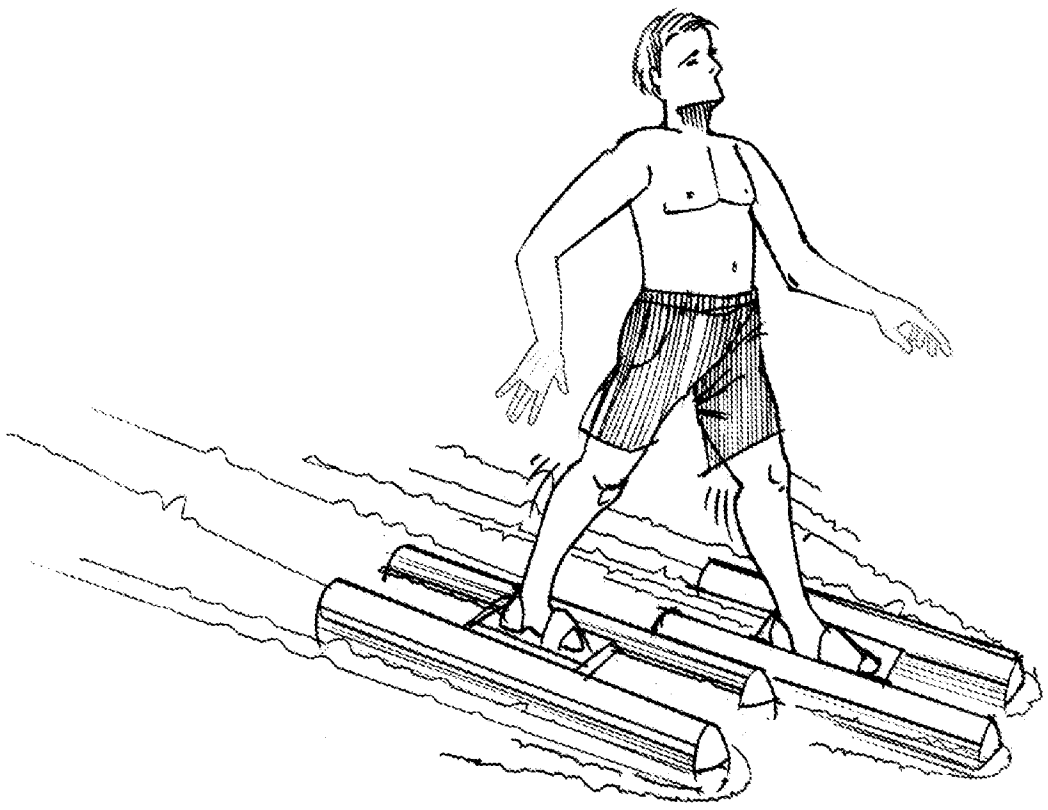


FIG. 1

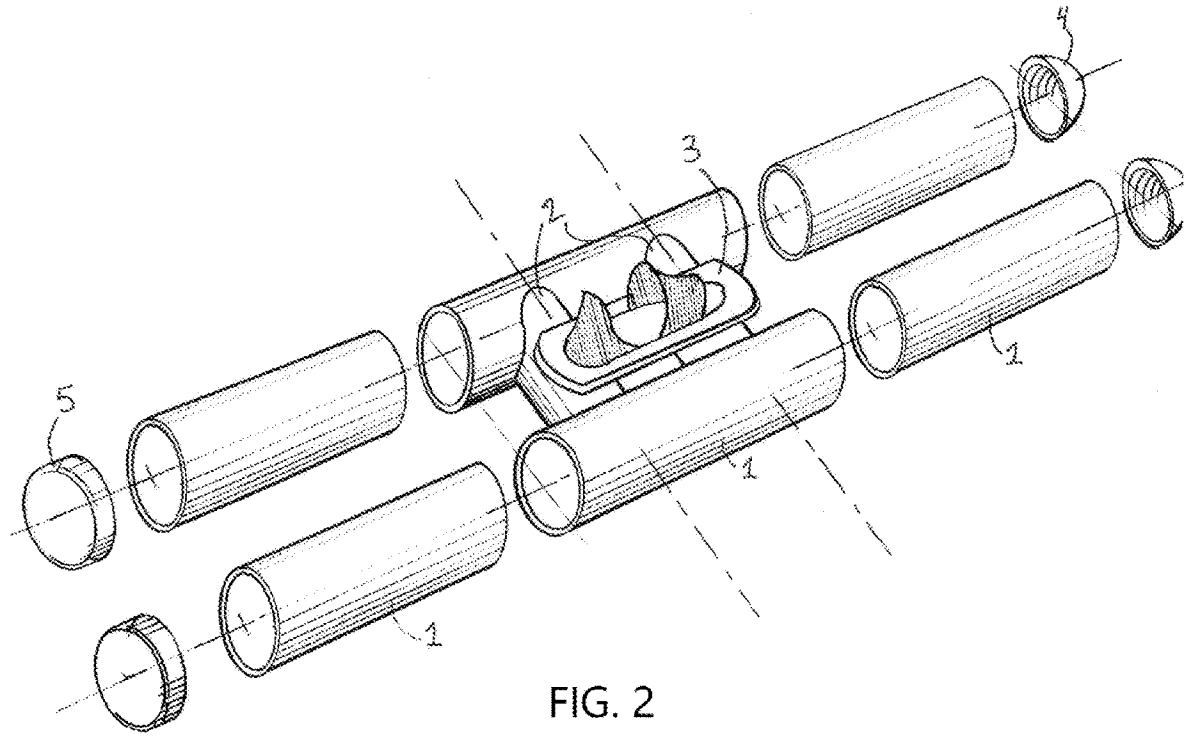


FIG. 2

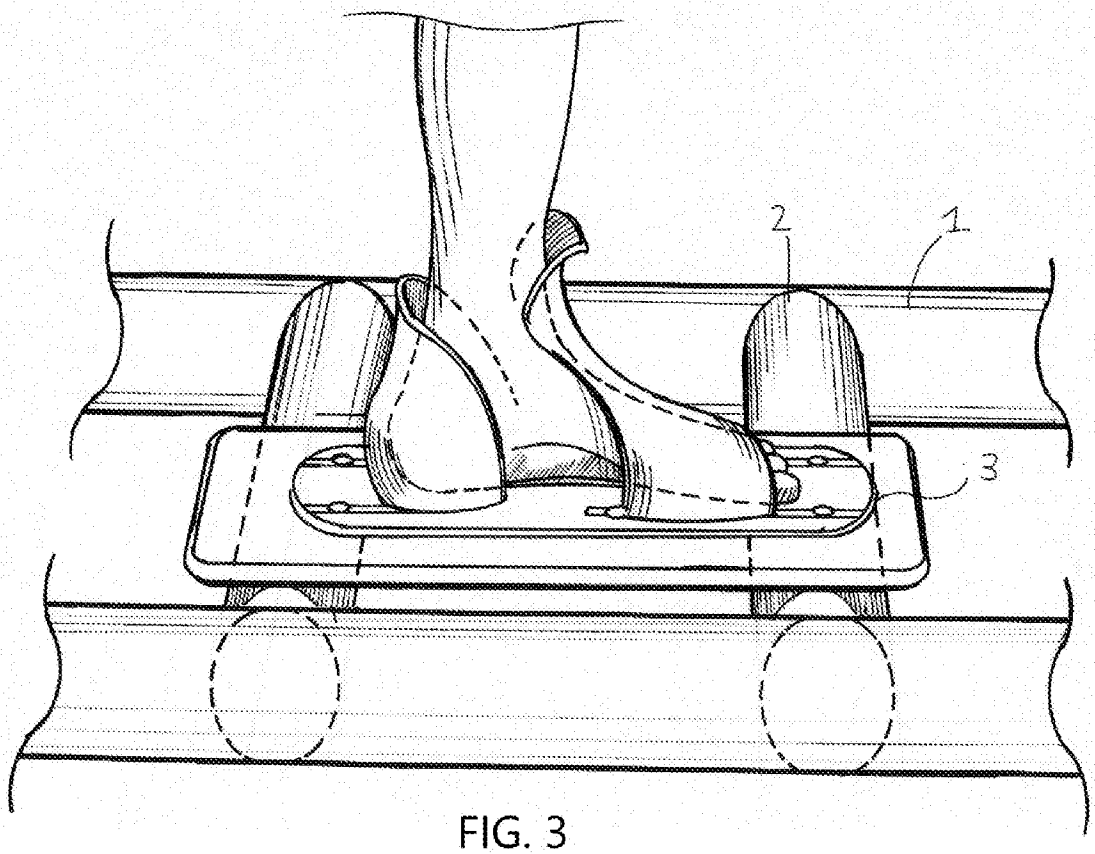


FIG. 3

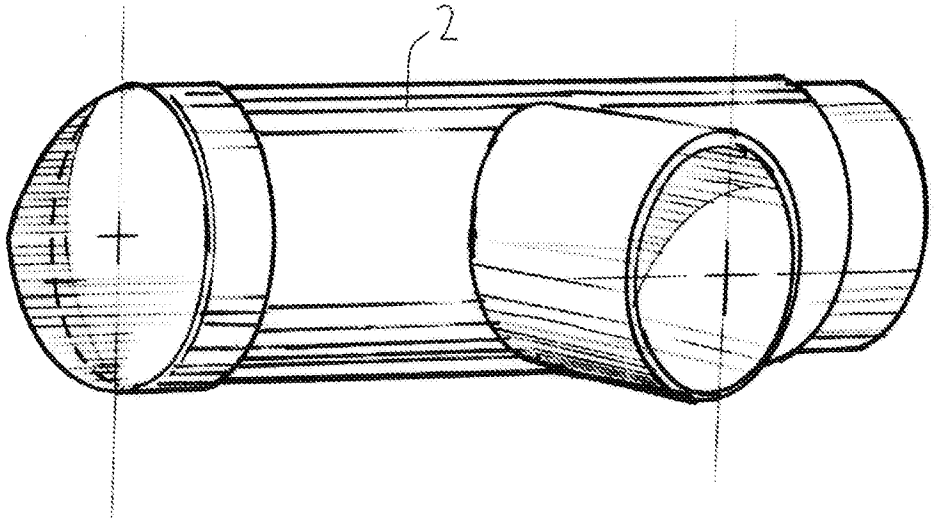


FIG. 4

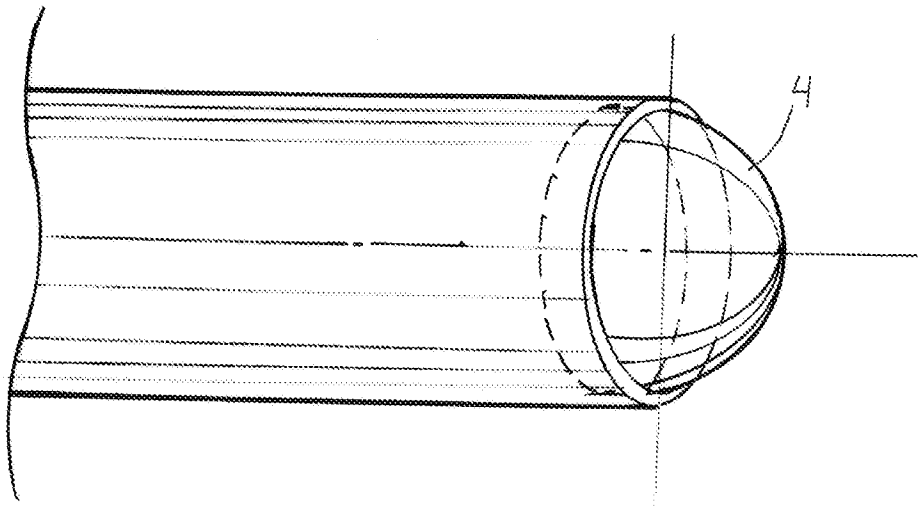


FIG. 5

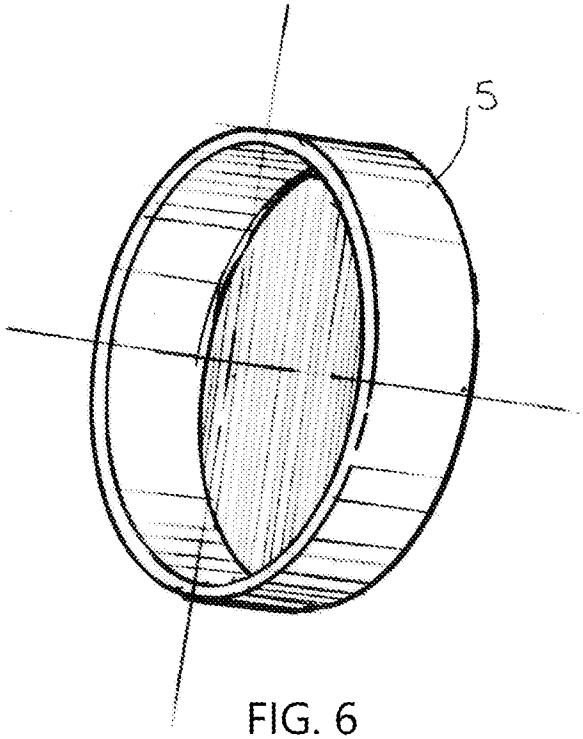


FIG. 6

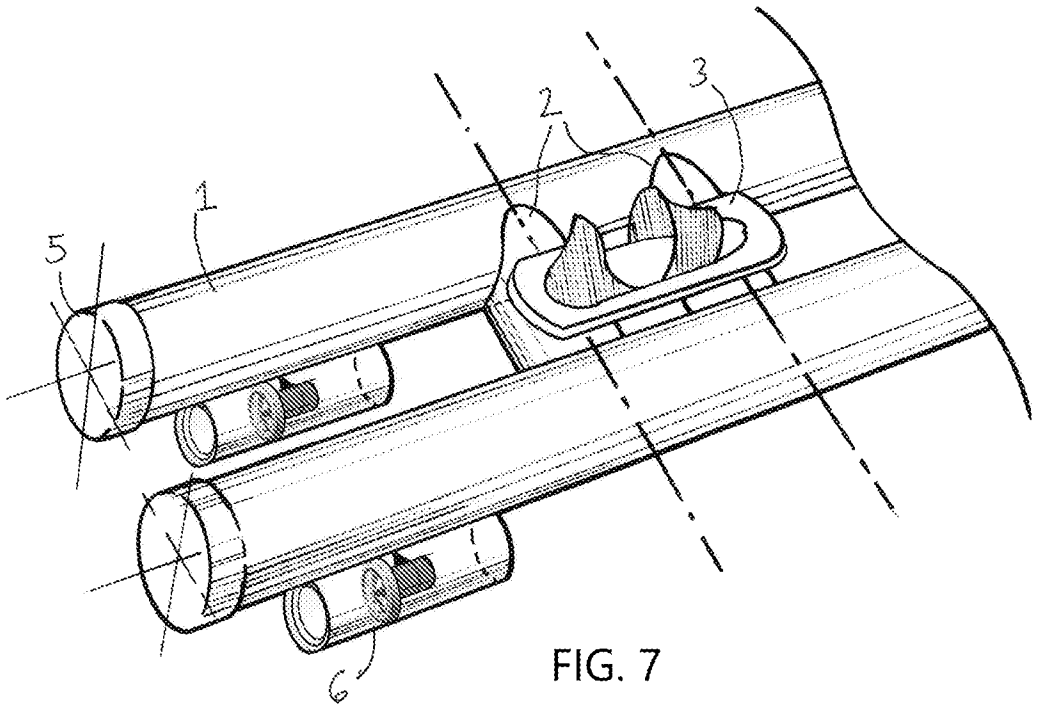


FIG. 7

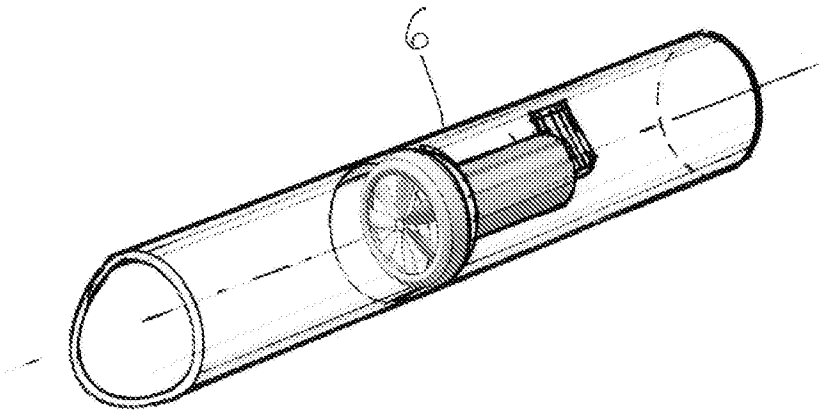


FIG. 8

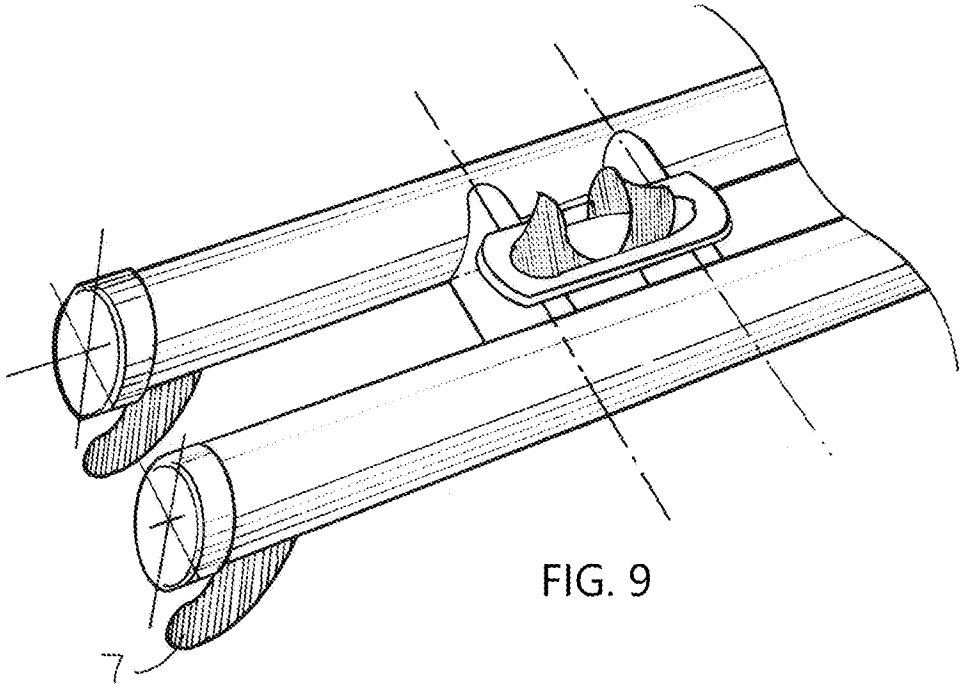


FIG. 9

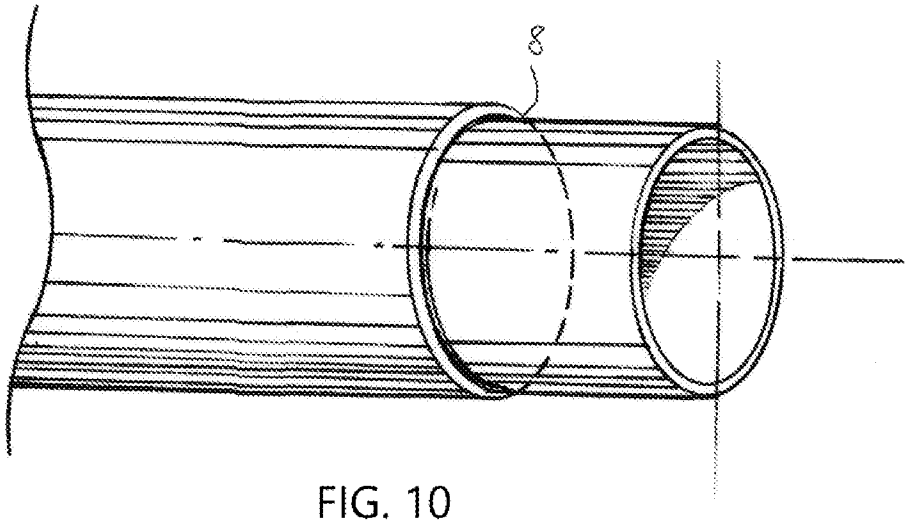


FIG. 10

HIGHLY STABLE PONTOON-BASED DEVICE TO ENABLE WEARER TO WALK/SKATE ON THE SURFACE OF WATER

FIELD OF THE INVENTION

[0001] The present invention relates to a device enabling locomotion on the surface of water and, more particularly, to a wearable device attached to the user's feet that enables personal floatation and locomotion on the surface of water.

BACKGROUND OF THE INVENTION

[0002] Devices attachable to wearers' feet that enable locomotion on the surface of water have been of interest for over 100 years (U.S. Pat. No. 1,275,727A, 1918). Despite this interest, there has not yet been a successful version of this device. Despite consistent efforts and vast interest (e.g., many YouTube videos with millions of views each)—past attempts have resulted in inventions that were either too unstable, incapable of effective locomotion, or too bulky to be of interest. Past designs all feature essentially the same construction-a single buoyant mass for each foot, with each foot either sitting on top of this buoyant mass, or being embedded inside.

[0003] This new invention-which can be understood as a manner of "water-skates"-features a unique configuration which overcomes the shortcomings of earlier attempts.

SUMMARY OF THE INVENTION

[0004] The present invention has a double-hulled design, wherein each foot is coupled with two pontoon-like hulls (one on either side of the foot) (**1**). This invention maximizes stability while also minimizing drag force. This invention also enables the foot-bindings (**3**) to be separated from the buoyant material, improving the qualitative feel of the use of the device. The structure of the pontoons also allows for water-catching structures to be installed at the rear-end of the pontoons to facilitate and maximize human-powered forward mobility. At the front end, the pontoons are shaped to cut through the water, reducing drag. Finally, this design is highly compatible with and enables the possibility of attaching propellers (**6**) or other powered devices to provide an alternate means of locomotion.

BRIEF DESCRIPTION OF DRAWINGS

[0005] FIG. **1** is an illustration of the intended use of the invention

[0006] FIG. **2** is a schematic showing components of one embodiment of the invention

[0007] FIG. **3** is a subsection of the embodiment from FIG. **2**, highlighting one possible foot-coupling system

[0008] FIG. **4** is an image of the cross-member unit (main component of the buoyant unit coupling system) of the embodiment from FIG. **2**

[0009] FIG. **5** is an image of the front end of the buoyant units in the embodiment from FIG. **2**

[0010] FIG. **6** is an image of the end-cap (which may also function as or house the propulsion unit) of the embodiment from FIG. **2**

[0011] FIG. **7** is an image of the invention with propeller-units attached

[0012] FIG. **8** is a close-up of a potential design for propeller-units

[0013] FIG. **9** is an image of the invention with fins at the rear end of the buoyant units, as mentioned for a potential embodiment

[0014] FIG. **10** is an example of an adjustable-length component in one mentioned embodiment

DETAILED DESCRIPTION OF INVENTION

[0015] There are 4 integral components to this invention:

[0016] 1) The buoyant units (**1**),

[0017] 2) The buoyant unit coupling system (**2**),

[0018] 3) The foot coupling system (**3**), and

[0019] 4) The propulsion units (**5**).

[0020] One water skate is to be worn on each foot, each consisting of 2 buoyant units (**1**), connected to each other via a coupling system, featuring propulsion units which may be directly connected to each buoyant unit. Between each buoyant unit is a gap, wide enough to accommodate the wearers foot.

1) Buoyant Units

[0021] Since each skate must be buoyant enough to float a minimum of 50% of the load, after taking the total weight of the device into account (and ideally probably closer to 75% of the total load), each of the four buoyant units must produce buoyant force equal to or greater than 25% of the total load. Each buoyant unit must also be narrow enough such that when the water skates are worn, the wearer's feet are able to be close enough to each to avoid a wide "straddle" and to ensure that appropriate balance and comfort are maintained.

[0022] The resulting design for these buoyant units is a shape that is ideally an elliptical cylinder, though other cross-sectional shapes may be used (e.g. cylindrical, or a grouping of stacked cylindrical units)—which is (ideally) higher than it is wide, and longer than it is high—with the exact dimensions adjustable based on desired buoyancy driven by the weight ranges of segments of human users. One example set of dimensions that has been used is 10 cm wide, 20 cm high, and 130 cm long. The ideal length-to-width ratio is probably in the range of 3-15 to allow for optimal balance without making the water skates overly long. The front of each buoyant unit may be shaped to reduce drag force (e.g., rounded nose cone), and the rear may also be aerodynamically shaped or may be shaped in a way to accommodate propulsion units (e.g., flat-backed, recessed end-cap, etc.).

[0023] Each buoyant unit may consist of either a single piece, or multiple pieces connected to form a single structure.

[0024] The material of which each buoyant unit is made is not important, with the exception that the material chosen should be strong and rigid enough to remain structurally sound during use and should be safe/stable for use in the water (e.g., PVC). Further, the buoyant units may be either solid or hollow, with a hollow structure being the preferred design, as it allows for wider choices for selecting potential materials.

[0025] An example of a buoyant unit that matches the above description would be an elliptical PVC pipe, capped at the front end with a rounded cap, and sealed at the back.

2) Buoyant Unit Coupling System

[0026] The buoyant unit coupling system (**2**) is the area where each pair of buoyant units are connected, maintaining their alignment (ideally parallel to each other), and maintaining the gap distance between them. This requires connection of one buoyant unit to the other using connectors either at multiple points, or as a single connection covering sufficient linear distance to resist a twisting motion of one buoyant unit (pontoon) relative to the other. This coupling system should feature components both front and rear of the lengthwise centre-point of each buoyant unit. The primary embodiment of this invention uses rigid connectors, though other types of connectors that allow controlled motion of the pontoons may enhance stability in rough waters. One example of a coupling system that is consistent with this description would be a pair of steel rods, one front of the centre line, and one rear of the centre line, both embedded into and/or glued to both buoyant units, connecting/coupling them.

3) the Foot Coupling System

[0027] The foot coupling system (**3**) may be integrated into the buoyant unit coupling system or may be separate. The only relevant requirement of this component is that it must be located between the two buoyant units (ideally at the centre of buoyancy), and that it must enable the wearer's foot to be securely attached to the buoyant unit pair to enable effective balance and efficient force transfer between the foot and the rest of the device. The foot should also be connected in such a way as to enable quick uncoupling. In its simplest form, the foot coupling system may be a horizontal board, located at the buoyant centre of the coupled buoyant units, connected to both buoyant units, with something resembling a water-ski foot connector (water ski bindings) attached to its upper surface. In one embodiment of the water skates, the buoyant unit coupling system may also be positioned at the centre of buoyancy of the water skates, providing a mounting site for the foot coupling system. The foot coupling system may be situated such that when in use, the foot will be above, at, or below the water level. A lower foot position is generally associated with greater stability.

4) the Propulsion Unit

[0028] The propulsion unit may either be a unit that enables human-powered propulsion, or one that provides external propulsion. A propulsion unit designed for human propulsion will be shaped in such a way as to catch water when the skate is pushed rearward. An example propulsion unit would be arched disk, oriented so that the curve arches outward towards the front of the skate, with "cup-like" walls that extend rearward to aid in catching the water and facilitating forward propulsion. In the preferred construction of this invention, these propulsion units are mounted at the rear of the buoyant units, to minimize drag force, but they may also (albeit less ideally) be connected elsewhere, with the requirement that they must be securely connected to the skate to ensure efficient energy transfer from the propulsion unit to the skate and must be positioned such that they will be below water during the rear power stroke of the motion.

[0029] An alternative design features powered propulsion units, to transform the water skates into a powered craft, from a human-powered one. In this design, powered propulsion units (e.g. propellers) may be used as the sole means of propulsion, or may function in addition to human-powered propulsion units, as described above. These powered propulsion units must be controllable by the person wearing the skates. Therefore, the ideal configuration would be simple, remote-controlled propellers, ideally wireless, that could be controlled by the wearer while standing.

Possible Modifications

[0030] If greater stability is desired, fins (**7**) may be added to the final design. To enhance lateral stability, vertical fins may be added in a number of places on the underside of the skate, ideally beneath either the foot-coupling system, or beneath the pontoons. To enhance fore-aft stability, horizontal fins may be added, ideally near the front and rear of the skates, bridging the gap between the pontoons, and beneath the water level. Horizontal fins of this design may also take the place of, or otherwise complement the buoyant unit coupling system.

Summary and Construction Guidelines of the Invention

[0031] The unique 'paired dual-pontoon' design used in this invention is an innovation that addresses and solves the stability issues inherent in balancing on the surface of the water. This structure makes each water skate self-balancing-removing the necessity for the user to play an active role in remaining upright.

[0032] The embodiment that follows is intended not to limit the scope of this invention, but rather to lay out clearly one possible construction method of one possible embodiment of the invention as described above. This description is intended to help clarify and provide specific examples of some of the non-specific components of this invention.

[0033] The embodiment is constructed as follows:

[0034] Each of the two water skates is constructed identically.

1. A pair of water skates for locomotion on the surface of water, each skate comprising:

a) a pair of buoyant units, each buoyant unit having a length, a width, and a height;

b) a buoyant unit coupling system to connect the pair of buoyant units, to keep them substantially parallel to each other, and to maintain a predefined distance from each other to form a hydrodynamic, highly stable paired structure;

c) a foot coupling system, positioned between the pair of buoyant units, to connect to a foot of a user, and configured to enable effective force transfer between the foot and the water skate; and

whereby the pair of water skates are configured to provide sufficient buoyant force to support the weight of the user; and

whereby each buoyant unit must also be narrow enough such that when the water skates are worn, the wearer's feet are able to be close enough to each other to avoid a wide "straddle" and to ensure that appropriate balance and comfort are maintained.

2. The pair of water skates of claim **1**, wherein the buoyant units have a cylindrical structure.

3. The pair of water skates of claim **1**, wherein the buoyant units have an elliptical structure.

4. The pair of water skates of claim **1**, wherein the buoyant units have a stacked-cylindrical structure.

5. The pair of water skates of claim **1**, wherein a ratio of the length to the width of the buoyant units is in the range of 3 to 15.

6. The pair of water skates of claim **1**, wherein the volumes of the buoyant units are adjustable.

7. The pair of water skates of claim **1**, wherein the buoyant unit coupling system connects the buoyant units together rigidly.

8. The pair of water skates of claim **1**, wherein the buoyant unit coupling system connects the buoyant units together using a hinged connection.

9. The pair of water skates of claim **1**, wherein the foot coupling system is supported by the buoyant unit coupling system.

10. The pair of water skates of claim **1**, wherein the foot coupling system is located below a water line of the water skates when fully loaded.

11. The pair of water skates of claim **1**, wherein the foot coupling system is located above the water line of the water skates when fully loaded.

12. The pair of water skates of claim **1**, wherein the foot coupling system is located at the water line of the water skates when fully loaded.

13. The pair of water skates of claim **1**, wherein the foot coupling system is size-adjustable to fit a range of wearers.

14. The pair of water skates of claim **1**, further having 1 or more fins attached to a bottom surface of the water skate.

15. The pair of water skates of claim **1**, further having a propulsion system.

16. The pair of water skates of claim **15**, wherein the propulsion system is a mechanical scoop that catches water when the water skate is moved rearwards.

17. The pair of water skates of claim **15**, wherein the propulsion system comprises of a set of propellers.

18. The pair of water skates of claim **15**, wherein the propulsion system comprises of a water jet.

* * * * *