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(54) **TOUCH TUNNEL**

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Publication Classification

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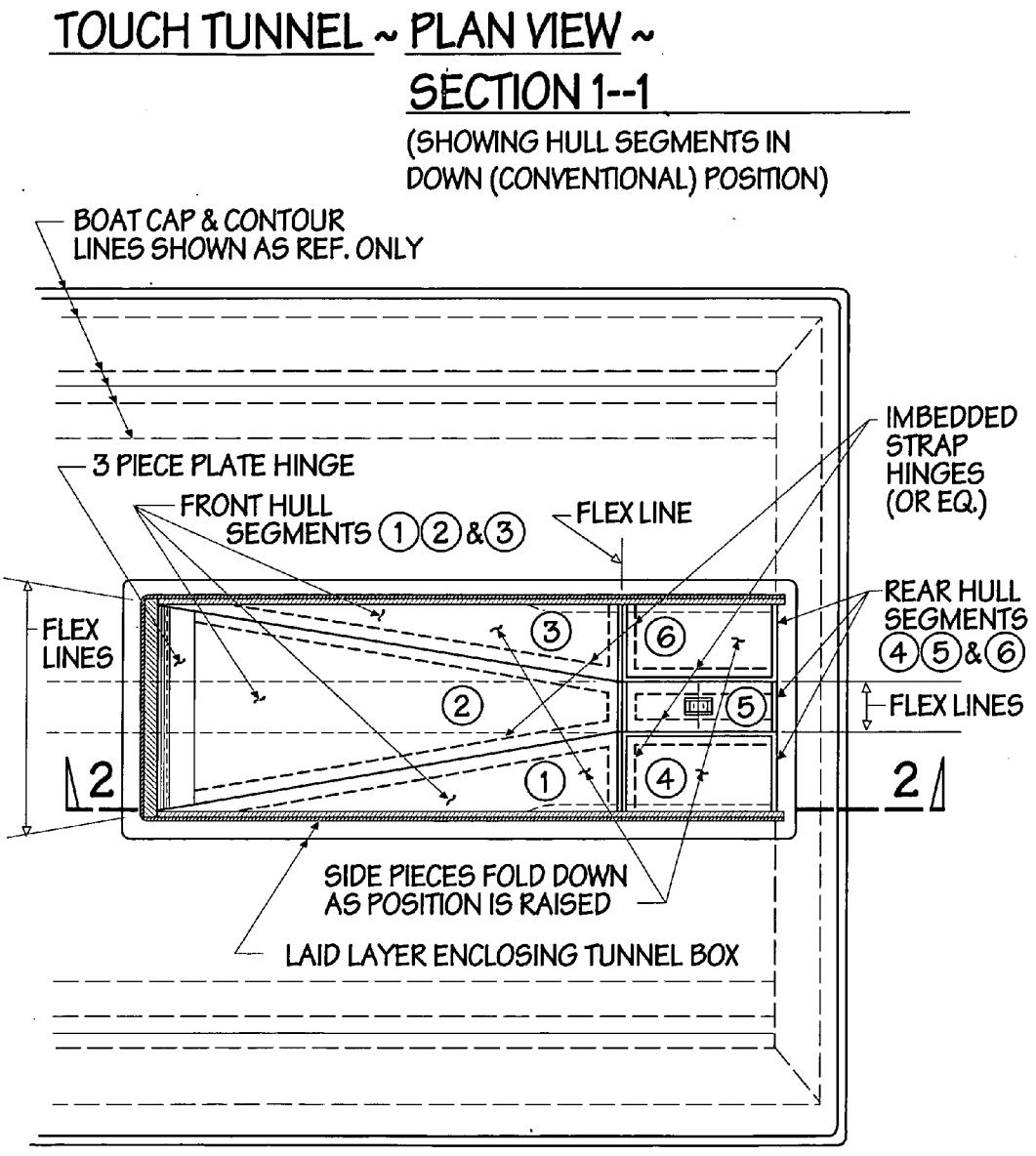
(52) **U.S. Cl.** **114/284**

(57) **ABSTRACT**

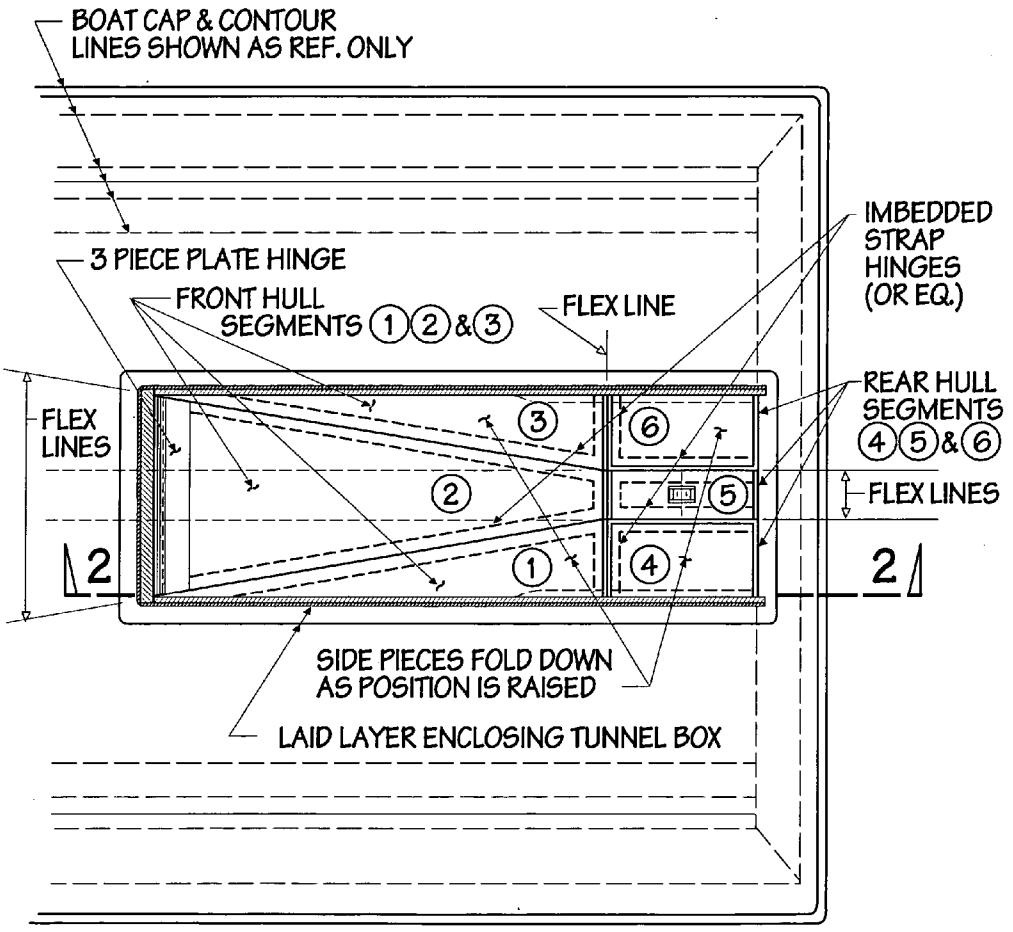
This invention is a method of using articulating boat hull segments to allow a boat operator to convert between a conventionally-hulled and a tunnel-hulled configuration.



TOUCH TUNNEL ~ PLAN VIEW ~ FIG#1

SECTION 1--1

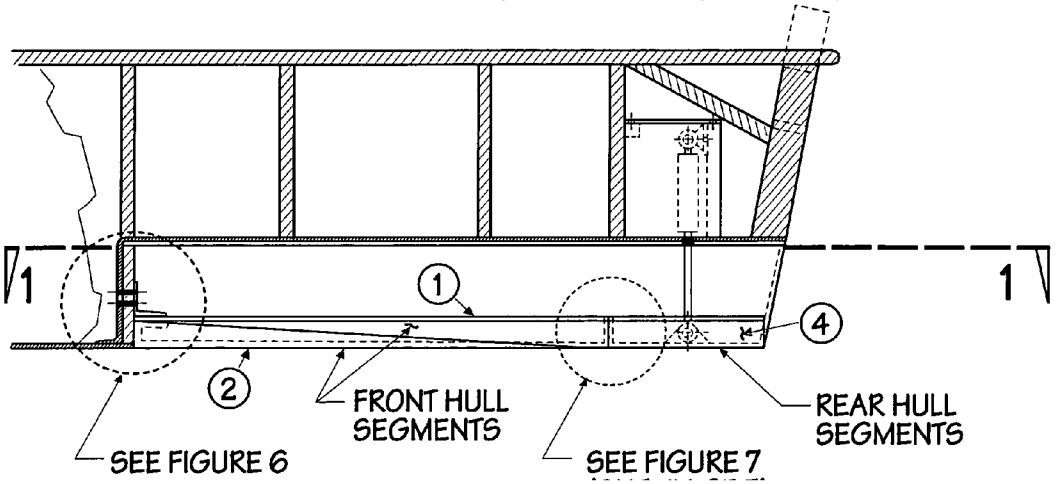
(SHOWING HULL SEGMENTS IN DOWN (CONVENTIONAL) POSITION)



TOUCH TUNNEL ~ ELEV. SIDE VIEW ~ FIG.#2

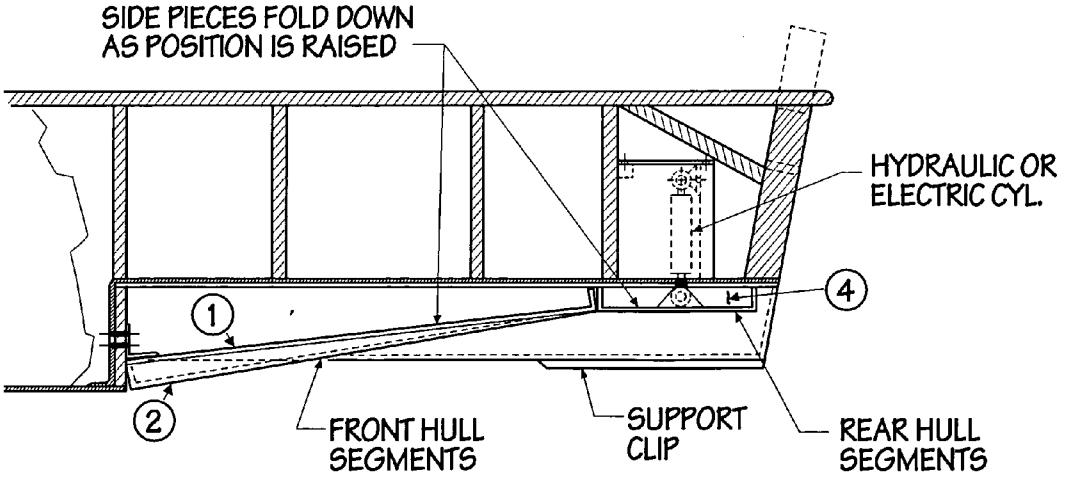
SECTION 2--

(SHOWING HULL SEGMENTS IN DOWN (CONVENTIONAL) POSITION)



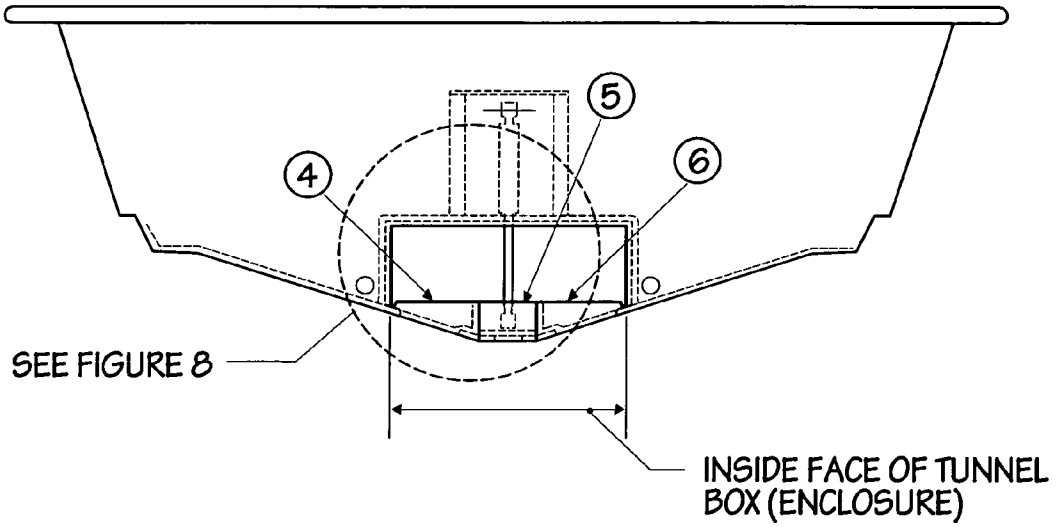
ELEV. SIDE VIEW ~ FIG. #3

(SHOWING HULL SEGMENTS IN RAISED (TUNNEL) POSITION)



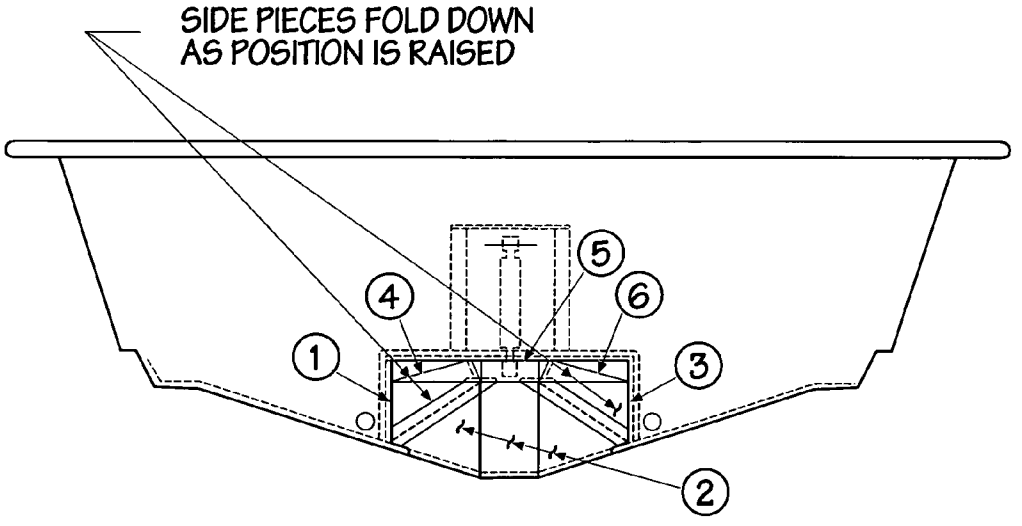
TOUCH TUNNEL ~ ELEV. END VIEW ~ FIG.#4

(SHOWING HULL SEGMENTS IN DOWN (CONV ENTIONAL) POSITION)



ELEV. END VIEW ~ FIG.#5

(SHOWING HULL SEGMENTS IN RAISED (TUNNEL) POSITION)



TOUCH TUNNEL ~ FIG. #6

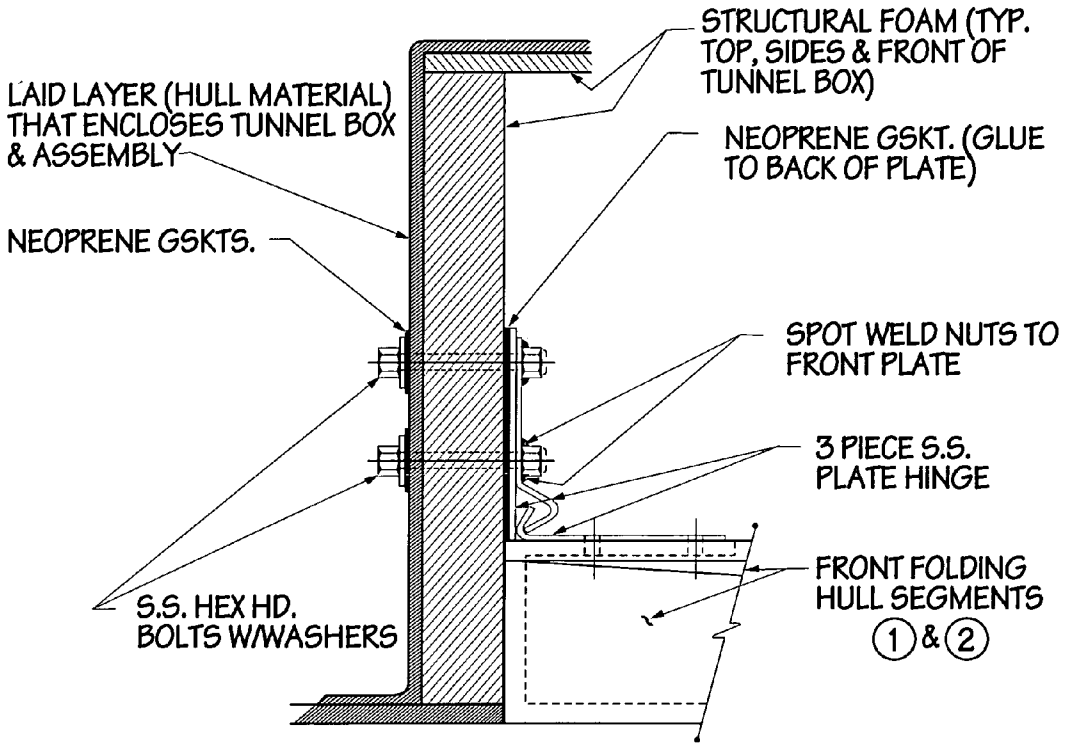
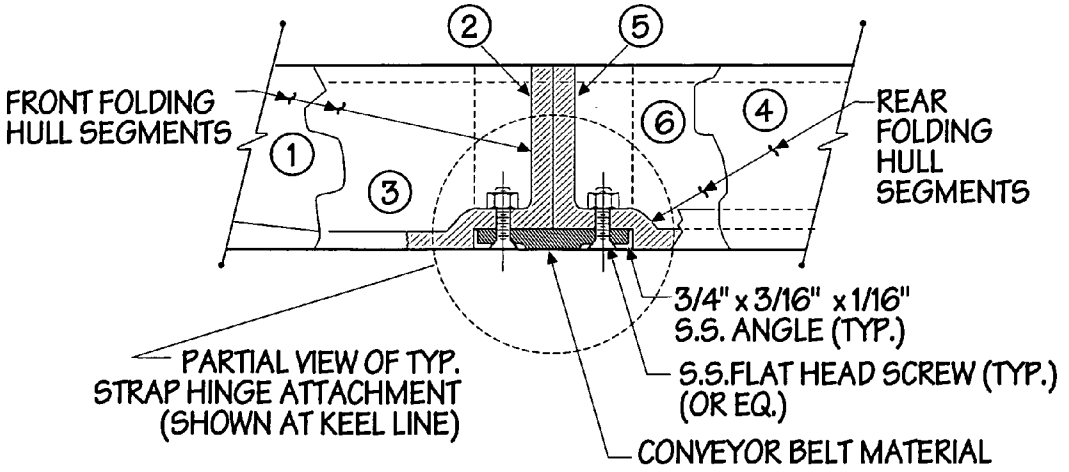
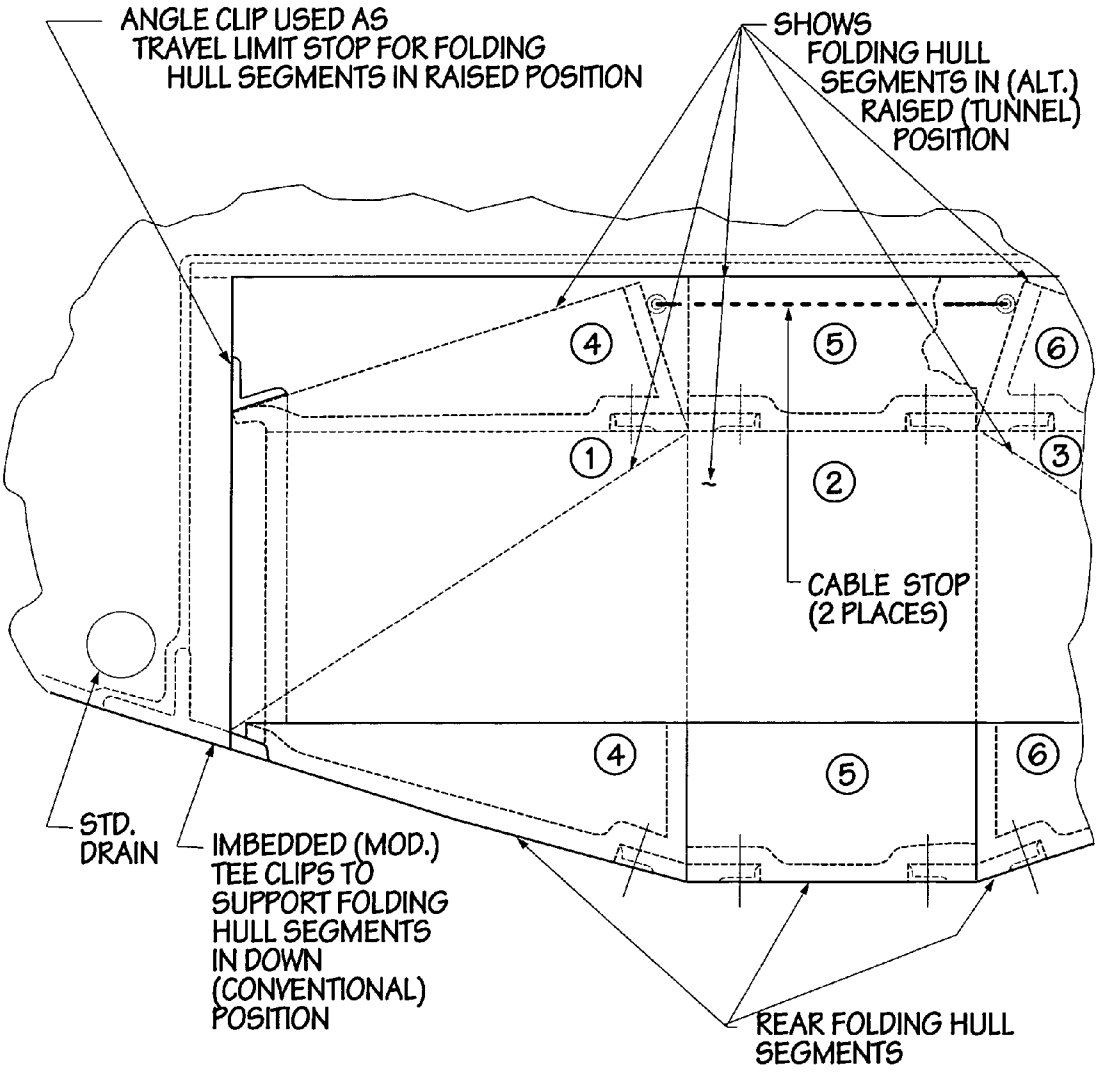


FIG.#7



TOUCH TUNNEL ~ FIG. #8



TOUCH TUNNEL

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] A Provisional Patent Application No. 60/277,895 submitted on filing date Mar. 23,2001 by Applicant: James Michael Costello, Titled: Touch Tunnel.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISK APPENDIX

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] The field of this invention relates to planing boat hulls in general. In particular, it relates to boats that need to operate in shallow or habitat-sensitive areas, using a method of reducing vessel draft while on plane.

[0005] It is known that some planing hulls are designed to operate in shallow water. Usually called skiff or flats boats (herein referred to as "skiffs"), these hulls range from flat bottoms to a deadrise of less than 20 degrees. These boats can usually operate in 18 inches to 36 inches of water, but because the propeller is fixed below the transom, operation in shallower areas can cause habitat (grass flats or coral flats) destruction and/or damage to marine animals (manatees, turtles, etc.).

[0006] It is known that by building a tunnel into these types of hulls, water is redirected upward in a manner that allows the motor (and thus the propeller) to be mounted in a significantly higher position on the transom. Because only a few inches of water are needed to fill the tunnel, this type of hull can perform in much shallower areas than conventionally-hulled skiffs, while reducing or eliminating propeller damage to habitat-sensitive areas.

[0007] Because conventionally-hulled skiffs are relatively fast and efficient (but draft deeper), and tunnel hulled skiffs are usually slower and less efficient (but draft shallower), a choice of hulls has been one or the other, prior to this invention. There is a need for boats that can display the best advantages of both configurations, as desired. It is necessary that these hulls have some means of raising and lowering the motor/propeller (such as a jackplate, etc.).

[0008] The idea for this invention was inspired by an encounter with a manatee, while operating a conventionally-hulled skiff. The inventor's objective was not to design an articulating tunnel to run in extremely shallow water (as most tunnels will do), but rather to try to elevate the propeller into a "non-intrusive mode." The effective height of the inventor's type of tunnel is more extreme than most, to help achieve this "non-intrusive mode."

BRIEF SUMMARY OF THE INVENTION

[0009] One of the objectives of this invention is to design an articulating tunnel to allow an operator to choose the most desirable hull configuration for changing operating conditions while underway or at rest.

[0010] A further objective is to produce a method of articulation that is adaptable to a broad selection of planing hull types.

[0011] Another objective is to produce a tunnel design with a more extreme effective height than most tunnel designs, to allow the propeller to be raised higher, relative to the bottom of the hull, thus creating a less intrusive mode of operation for habitat-sensitive areas.

[0012] Another objective is to design the invention as a module, made to be placed into a mold at the time of boat manufacture.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0013] **FIG. 1** is a cross-sectional view of the tunnel module along the plane **1-1** of **FIG. 2**, showing hull segments in down (conventional) position.

[0014] **FIG. 2** is a cross-sectional view of the tunnel module along the plane **2-2** of **FIG. 1**, showing hull segments in down (conventional) position.

[0015] **FIG. 3** is a cross-sectional view of the tunnel module along the plane **2-2** of **FIG. 1**, showing hull segments in raised (tunnel) position.

[0016] **FIG. 4** is an elevation end view of the stem of the hull, showing module with hull segments in down (conventional) position.

[0017] **FIG. 5** is an elevation end view of the stem of the hull, showing module with hull segments in raised (tunnel) position.

[0018] **FIG. 6** is a detail of **FIG. 2** showing plate hinge hull and module attachment.

[0019] **FIG. 7** is a detail of **FIG. 2** showing a partial view of typical imbedded strap hinge attachment.

[0020] **FIG. 8** is a detail of **FIG. 4** showing Tee clip supports and travel-limit stops.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Referring first to **FIG. 1**, the tunnel module is shown in plan view, installed in a conventional skiff hull. For clarity, The top of the module and the cap of the boat are not shown. The hull segments shown (**1-6**) are fabricated from hull material (typically fiberglass and Kevlar), taken from a partial lay-up in a factory mold. Since the prototype utilizes imbedded strap hinges (typically conveyor belt material) for its hull segment articulation, the strap hinges were laid in the mold prior to the lay-up, leaving the hull material flush with the planing surfaces of the hull segments. The hull segments were then cut apart at the flex line indicated at the center of the strap hinge, between the front hull segments (bow end) and the rear hull segments (stem end). A perpendicular cross piece was then formed at the rear of the front hull segments **1**, **2**, and **3**, and both the front and rear of the rear hull segments **4**, **5**, and **6** (see **FIG. 1**, **FIG. 4** and **FIG. 8**). An additional perpendicular cross piece with a horizontal flange made for the attachment of plate hinges, was also formed at

the front of front hull segment **2** (see **FIG. 6**). The remaining cuts are made along the flex lines indicated at the center of the strap hinges (**FIG. 1**), and projected through the cross pieces, separating segments **1**, **2**, **3**, **4**, **5**, and **6**. Two additional perpendicular stiffener plates are formed joining the perpendicular cross pieces at the front and back of rear hull segments **4** and **6**, as shown (**FIG. 1**, **FIG. 4** and **FIG. 8**).

[**0022**] Hull segments **1** through **6** were then attached to the strap hinges (see **FIG. 7**). The plate hinges are then fastened to the flange on the front of front hull segment **2**, and in turn fastened to the front of the tunnel module (see **FIG. 6**). The cylinder ram is attached to rear hull segment **5** (see **FIGS. 1 through 5**). Since all hull segments are now tied together, when the ram presses down hull segment **5** onto the module's support clip (see **FIG. 8**), this assembly now becomes a rigid unit (as the perpendicular cross pieces and stiffeners now butt up and brace into each other). In this "down" position, the profile of the hull segments now match the profile of a conventional hull.

[**0023**] When the cylinder switch is reversed, the ram lifts hull segment **5** (**FIG. 1**, **FIG. 4**, **FIG. 5** and **FIG. 8**). Because of the common strap hinge, hull segments **1**, **4**, **6** and **3** will swing in an outward and downward arc (see **FIGS. 2, 3**, **4**, **5**, and **8**). Hull segments **4**, **5**, and **6** swing out until they form a flat surface. They will not swing any further because segments **4** and **6** are tied together across the front, and across the back with two simple cable-type stops (see **FIG. 8**). As the ram reaches the top of its stroke, the outside edges of segments **1**, **4**, **6** and **3** will come to rest against and upper travel-limit stop (as shown in **FIG. 8**). This raised position produces a tunnel shape within the inside of the tunnel module. This shape focuses water upward between the walls of the box and the planing surfaces of segments **1**, **2** and **3**, toward the flat, horizontal lift pad formed by the planing surfaces of segments **4**, **5**, and **6** (see **FIGS. 3, 5** and **8**). A boat operator may engage the mechanism, up or down, underway or at rest, with the touch of a standard, directional toggle switch.

[**0024**] While it is to be understood that the illustrations shown imply a specific structure embodying the invention, it will be apparent to those skilled in the art that changes may be made without departing from the spirit, method and scope of the invention.

1. What I claim as my invention is a method of using articulating boat hull segments that allows a boat operator to convert a conventional hull configuration to a tunnel hull configuration, or vice versa.

2. The hull segment articulation method is adaptable to most conventional planing hulls.

3. This method can be scaled larger or smaller to accommodate different sizes of hulls and propellers.

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