

Title (en)

Variable pitch marine propeller with hydrodynamic shifting and shift biasing and synchronizing mechanism

Title (de)

Verstellbarer Schiffspropeller mit hydrodynamischer Einstellung, Verstellfeder und Synchronisierungsanlage

Title (fr)

Hélice marine à pas variable avec déplacement hydrodynamique, déplacement de ressort prédisposé et dispositif de synchronisation

Publication

EP 0721884 A1 19960717 (EN)

Application

EP 96104485 A 19921201

Priority

- EP 92310941 A 19921201
- US 80171391 A 19911202
- US 80171991 A 19911202

Abstract (en)

A marine propeller includes a hub rotatable about a longitudinal axis and having a plurality of blades extending radially outwardly therefrom and pivotable about respective radial pivot axes between a low pitch position and a high pitch position. Each blade has a hydrodynamic force characteristic which shifts the location of the resultant hydrodynamic force on the blade in a direction aiding up-pitching of the blade, and increasing the up-pitching pivot moment with decreasing angles of attack. A counteractive hydrodynamic force generating area is provided on the negative pressure backside surface of the blade and shifts the location of the resultant hydrodynamic force on the frontside surface forwardly with decreasing angle of attack. The blade is pivoted by increased water flow along the counteractive hydrodynamic force generating area with decreasing angles of attack, which increased water flow generates a backside hydrodynamic force on the blade at the counteractive hydrodynamic force generating area spaced from the pivot axis by a moment arm provided by the section of the blade between the pivot axis and the counteractive hydrodynamic force generating area, such that the backside hydrodynamic force acting on the moment arm pivots the blade to an increased pitch position. The counteractive hydrodynamic force generating area on the backside surface at the rearward trailing portion separates water flow along the backside surface at high angles of attack, and re-attaches water flow along the backside surface at low angles of attack to change the backside surface at the rearward trailing portion to a positive pressure area to generate the up-pitching moment. A disc has a plurality of guide slots each receiving and retaining a respective lever arm extending rearwardly within the hub from a respective blade. A biasing spring coaxial with the longitudinal axis of rotation of the hub biases the disc to in turn bias the lever arms and blades to the low pitch position. The disc is a generally flat planar plate-like member extending radially outwardly from the longitudinal axis at the rear of the hub and includes a preload mechanism accessible at the rear of the hub for adjusting the bias. The disc restricts movement of the lever arms along the guide slots such that the lever arms can move only in unison, which prevents blade flutter. Pivoting of the blades is controlled by both a) movement of the lever arms along the guide slots, and b) arcuate movement of the guide slots as the disc rotates about the longitudinal axis, such that pivoting of each blade from its low pitch position to its high pitch position requires both a) movement of the respective lever arm along its respective guide slot, and b) rotation of the disc to arcuately move the guide slot. <IMAGE>

IPC 1-7

B63H 3/00; **B63H 1/26**

IPC 8 full level

B63H 1/26 (2006.01); **B63H 3/00** (2006.01)

CPC (source: EP)

B63H 1/26 (2013.01); **B63H 3/002** (2013.01); **B63H 3/008** (2013.01); **B63H 2003/004** (2013.01)

Citation (search report)

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