

(12) **United States Patent**
Atilano et al.

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(54) **MODULAR SUBMERGIBLE BREAKWATER FOR LOWERING WATER WAVE KINETIC ENERGY ESPECIALLY DURING STORMS OR ROUGH WATERS**

(58) **Field of Classification Search**
CPC E02B 3/04; E02B 3/06; E02B 3/062
USPC 405/21, 25, 26, 27, 28, 30, 35
See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 141 days.

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(57) **ABSTRACT**

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The present invention relates to submergible modular breakwaters for lowering the kinetic energy of water waves. In particular, the present invention is directed toward a physical embodiment that, when in its floating position, will provide resistance to the movement of water waves in the direction of the waves for a large range of wave periods. The invention is a submergible modular breakwater that can be kept underwater on the sea or lake floor as not to provide any barrier to navigation until it is needed to lower the kinetic energy of waves, when it is quickly raised afloat to provide protection, especially for coastal erosion control during storms or rough waters. Once the lowering of the kinetic energy of water waves is no longer needed, the modular breakwater can be quickly sunk to the sea or lake floor in order to remove any barrier to navigation.

(65) **Prior Publication Data**
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Related U.S. Application Data

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(51) **Int. Cl.**
E02B 3/06 (2006.01)

18 Claims, 21 Drawing Sheets

(52) **U.S. Cl.**
CPC **E02B 3/062** (2013.01)

