(54) Title: PHONONIC MATERIALS USED TO CONTROL TURBULENT FLOW

![Diagram of phononic materials](image)

**FIG. 1A**

(57) Abstract: A phononic material and a method of using a phononic material for use in interacting with a fluid or solid flow are provided. In one implementation, a phononic material includes an interface surface and a subsurface feature. The interface surface moves in response to pressure and/or velocity gradients associated with complex motion of a turbulent flow. The subsurface feature extends from the interface surface and comprises a phononic crystal or locally resonant metamaterial adapted to receive the pressure and/or velocity gradients from the turbulent flow via the interface surface and alter the phase and amplitude of a plurality of frequency components of the turbulent flow to reduce or increase the kinetic energy of the turbulent flow. The interface surface is adapted to vibrate at a plurality of frequencies, phases and amplitudes in response to the frequency, phase and amplitude of at least one component of the turbulent flow.

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A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B64C 21/10; F15D 1/00; F15D 1/06 (2018.01)
CPC - B64C 21/10; F15D 1/06; F15D 1/0025; F15D 1/006; F15D 1/0085

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2016/0097410 A1 (The Regents of the University of Colorado, a body corporate) 07 April 2016 (07.04.2016) entire document especially</td>
<td>1, 4-5, 16-21 and 23-24</td>
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☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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