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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

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Katherine Kelly Vidal

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



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

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(54) **STRUCTURE FORMED BY TEMPERATURE DIFFERENCE, METHOD OF FORMING THE STRUCTURE, AND LIGHTWEIGHT RIGID ASSEMBLY COMPRISING THE STRUCTURE**

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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 198 days.

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CPC **F16M 11/00** (2013.01)

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See application file for complete search history.

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(57) **ABSTRACT**

A structure formed by temperature difference includes an enveloped part, an enveloping part, and a low heat transfer layer. The enveloped part has a free section and an engagement section. The enveloping part defines an one holding space corresponding to the engagement section. The holding space is dimensioned to be slightly less than the engagement section and can be thermally expanded to be larger than the engagement section by heating the enveloping part to reach a predetermined temperature difference over the enveloped part, so that the engagement section can be put into the holding space. When the enveloping part is cooled, the holding space can shrink, causing the enveloping part to tightly hold the engagement section. The low heat transfer layer, which has a thermal conductivity less than each of the two parts, is disposed in the holding space, between the engagement section and the enveloping part.

9 Claims, 10 Drawing Sheets

