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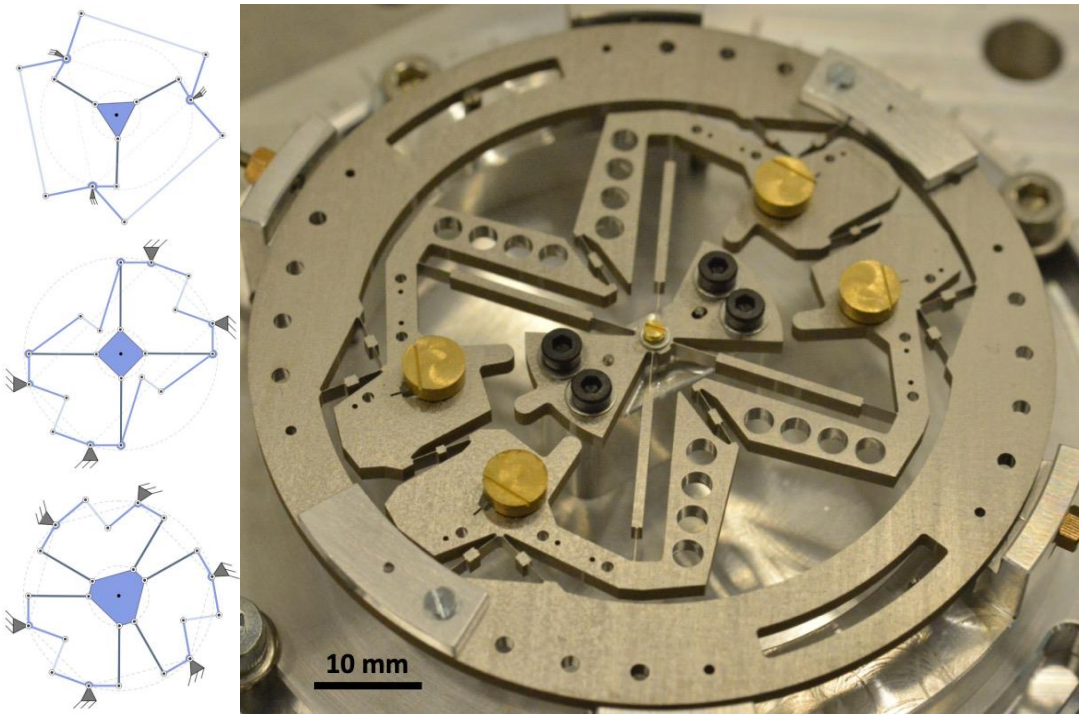
Licensing Opportunity

TTO – Technology Transfer Office

Flexure pivot family providing exact circular rotation and high radial stiffness



Three kinematic configurations of the novel pivot family and 2D flexure-based implementation of one of them as a time-base oscillator, including 4 eccentric masses used for isochronism tuning.

Ref. Nr

6.2376

Keywords

Flexure pivot, zero parasitic shift, hight radial stiffness, Remote Centre Compliance

Intellectual Property

EP 22206404.0

Publications

Zero parasitic shift pivoting kinematic structures based on coupled n-RRR planar parallel mechanisms for flexure pivot design, L. Tissot-Daguette et al., Proc. IDETC-CIE2023.

Video of the concept.

Date

29/09/2023

Description

Flexure pivots generally do not provide exactly circular rotations because of the parasitic shifts inherent to the underlying kinematic architectures. The known solutions for compensating these undesirable motions have the collateral effect of significantly reducing the radial stiffness of the pivots. The present patent covers a novel family of 2D kinematic architectures providing exact rotations over large angular stroke that can easily be implemented with flexures. This leads to zero-parasitic-shift flexure pivots with unequalled radial stiffness.

Advantages

The family covers a variety of architectures with 3 to 6 main flexure arms with symmetrical, isostatic and hyperstatic variants. All the structures are 2D, which allows for a direct implementation with flexures using a wide variety of manufacturing technologies. Some of the covered architecture allows for Remote Center Compliance arrangements leading to compact designs occupying only a small sector around the pivoting center. Other architecture allows for the tuning of the stiffness non-linearity (2^{nd} order) leading to a precise control of the oscillating isochronism.

Applications

- Horology: Oscillators for mechanical time bases.
- Aerospace and astrophysics: Optomechanical systems requiring exact rotations.
- Robotics: Systems requiring Remote-Centre-Compliance mechanisms with high radial stiffness.
- MedTech: Flexure-based surgical tools.
- MEMS: Exact rotation micro-mechanisms.