



Developable / Fully Collapsible Mechanisms

BYU #2018-045, 2018-046, 2018-047

DESCRIPTION

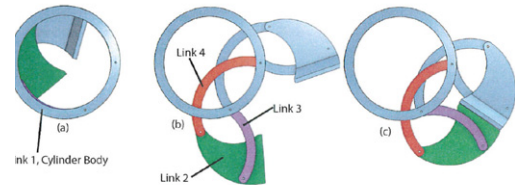
The invention consists in three variations based on the same principles but with different functions and applications. It is made out of a cylindrical shaft that conceals curved-link (developable) four-bar mechanisms that can actuate to: (1) create a second shaft adjacent to the first, (2) contact from two or more sides (such as to cut, grip, or squeeze) a workpiece that is outside the cylinder, (3) cut, grip, squeeze, objects on the inside of a cylinder.

PROBLEM SOLVED

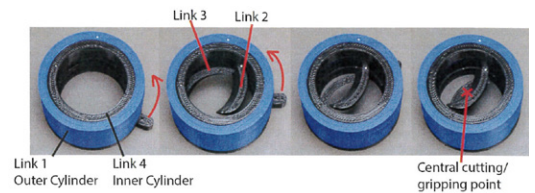
Current cylindrical shafts or tubes often allow only one tool to operate at the end of the shaft, especially when the tubes are small. This invention enables an instrument to be included in a cylindrical shaft and to enter a workspace through a single entrance in combination with other instruments on the end of the shaft. By reducing the number of tooling changes required, reducing the number of entrance holes/point required and using fewer shafts to enter the space multiple key advantages have been identified.



Variation (1): Multiplying Cylindrical Shaft



Variation (2): Cylindrical Gripping Mechanism



Variation (3): Internal Cutting or Gripping Mechanism

KEY ADVANTAGES

- » Reduced time required to perform a task in confined/remote workspace
- » Reduced trauma/damage to the boundary of the workspace
- » Reduced complexity of the control system used in conjunction with the tooling setup
- » Reduced cost of a procedure

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APPLICATIONS

Potential applications of the invention include: minimally invasive surgery instruments, down-hole drilling equipment, electronics with cylindrical shafts such as a laser, flashlight, camera lens, motor, speaker, charging port, robotic arm clamps, and biopsies.

IP Status:
Patent Pending



Lead Inventor

Dr. Larry Howell
PhD, Mechanical Engineering



Spencer Rogers
srogers@byu.edu
(801) 422-3676