

Variable stiffness cords

More rigid, more durable, thinner, and lighter than conventional mechanism

To robots, endoscopes, videoscopes

Overview

Current development efforts focus on a cord-like device, able to vary its rigidity to any given shape. These cord-like structures are specifically designed to operate effectively in biological, natural, and artificial environments where access can be challenging due to their narrow or obstacle-filled nature. They are frequently used in tools such as medical endoscopes and industrial videoscopes.

Conventional cord-like bodies include structures in which wires are threaded through beads, jamming mechanisms, mechanical methods, or structures that control rigidity by pressurizing a tube. However, none of these methods could fulfill all the required performance characteristics such as holding force, restoring force, a continuous structure, lightweight and thin design, and capability for long-distance deployment.

This invention addresses all these requirements by introducing a novel type of cord-like continuum body. Specifically, it employs an innovative combination of wire and rubber materials, thereby creating a structure capable of achieving a high level of holding strength through air pressure.

Product Application

- Robotic arm
- Medical endoscope
- Industrial videoscope

IP Data

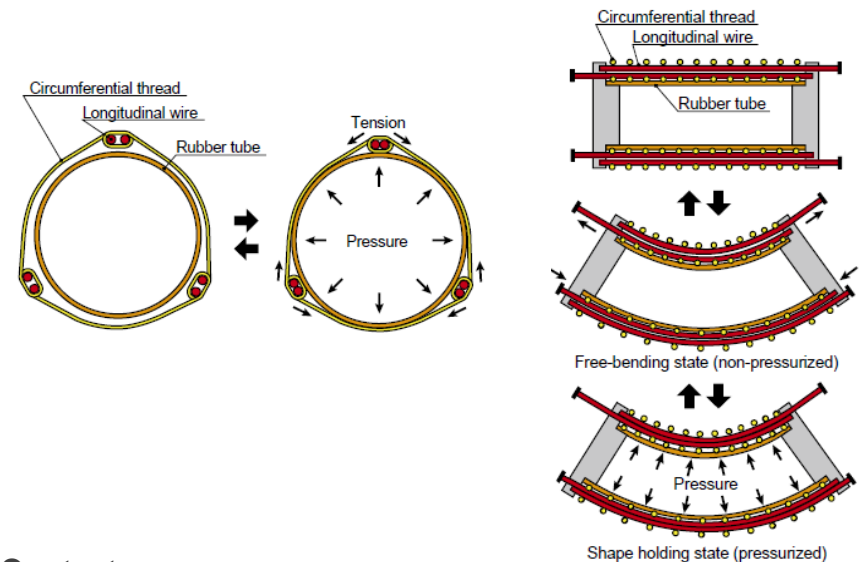
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prototype



Features· Performance

- ✓ **high stiffness** ··· Stiffness can be increased until material limitation
- ✓ **high durability** ··· Stiffness variable by air pressure
- ✓ **long-distance** ··· Target: 3 m ※Validating. Variable depending on inner diameter and material.
- ✓ **thin and lightweight** ··· Inner Diameter Thickness: Minimum 2 mm~
- ✓ **continuous structure** ··· Supports bending in more than two directions



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