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Miniature Fiberscope Utilizing a Single Coherent Fiber Bundle

TECH FIELD(S)

Endoscope, Fiberscope, Medical Device, Medical Imaging

FEATURES

Current endoscope technology utilizes separate fiber bundles to transmit illuminating light and viewing light. Use of two channels prevents miniaturization of the diameter of the endoscope tubing to less than 3-5mm diameter size. Smaller endoscope diameters are needed to enable diagnostic and surgical observation of regions that current endoscope technology is unable to view. Applications for a miniature endoscope include viewing peripheral regions of the lungs, and inner ear canal access for cochlear implant surgery.

Miniature fiber scopes are also needed for industrial applications including machining, computer repair or computer forensics, and fiber optic communication systems.

University of Iowa inventors have created a novel endoscope design that eliminates the need for a separate fiber channel for illumination, and can reduce the diameter to less than 1mm. This flexible fiberscope design transmits both illuminating light and viewing through a single coherent image fiber bundle by etching a coherent fiber bundle between the proximal and distal ends. This etched portion permits light to enter into one or more discrete channels of the fiber bundle thereby allowing the transmission of light down the periphery of the fiber bundle to produce a homogenous ring light illumination at the distal end of the fiberscope. The viewing image is transmitted by the interior fibers.

BENEFITS

- Reduced diameter endoscope allows visualization of regions of the body that have been difficult to access with current technology
- Construction process has been demonstrated, and appears feasible on a larger scale for commercialization
- Design is based on commercially available raw fiber bundles
- Device can be used for human diagnostic and surgical purposes, as well as for industrial applications
- Design can be employed on larger endoscopes to improve flexibility and reduce cost

INVENTOR(S)

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INTELLECTUAL PROPERTY STATUS /DEVELOPMENT STATUS

US Patent Application filed 2008.
Invention has been reduced to practice
Working prototype has been developed

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