

[54] **LASER BALLOON CATHETER**

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[57] **ABSTRACT**

A laser balloon catheter intended primarily for coronary angioplasty includes a flexible tube having an inflatable balloon secured to its distal end, a central shaft within the balloon for carrying a guide wire, an optical fiber for carrying laser radiation through the flexible tube into the balloon, and a tip assembly in the balloon for directing laser radiation outwardly through a major portion of the balloon surface while limiting shadowing by the central shaft. The tip assembly preferably includes a tip portion of the optical fiber contained within a transparent, heat-formable tube and formed into a spiral shape around the central shaft by the heat-formable tube. The optical fiber tip portion is tapered so that it directs laser radiation outwardly over its length. Deuterium oxide is preferably used for inflation of the balloon because of its very low attenuation of laser radiation in the wavelength range of interest. The disclosed laser balloon catheter is capable of delivering 30-40 watts of laser radiation to a surrounding artery for times on the order of 30 seconds without excessive heating of the balloon assembly.

47 Claims, 4 Drawing Sheets

