

[54] **ULTRASONIC DEVICE FOR APPLYING CAVITATION FORCES**

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[58] **Field of Search** **128/24 R, 24 A, 303 R, 128/305, 328, 660.03; 604/22**

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[57] **ABSTRACT**

An ultrasonic device for applying cavitation force to an unwanted material is provided. The device is particularly useful for removing plaque from a human artery

wherein a portion of the device can enter an artery and pass through the artery to the vicinity of the plaque. The device includes a solid wire of titanium material, a transducer, a generator for providing vibration energy via the transducer, and a handpiece enclosing the transducer and having a tapered end portion with an exponential surface of slightly concave profile. The tapered end portion is fixedly connected to an inner end of the wire. For human applications, the wire has an overall length in the range of about 5 inches to 40 inches and has a uniform outer diameter in the range of about from 0.015 inches to 0.040 inches. The device includes a catheter assembly having a catheter tube enclosing the wire and includes a container unit mounted on the tapered end portion of the handpiece. The container unit has a fluid chamber for receiving a contrast material which passes through the chamber, through the catheter tube, to the outer end tip portions of the wire and tube in the area of the plaque to be removed. The container unit also has a coupling unit forming an outer end wall thereof having a fixed portion and a rotatable knob portion for moving the catheter tube axially relative to the wire for adjusting the extension of the outer end tip portion of the wire beyond the outer end tip portion of the catheter tube.

14 Claims, 3 Drawing Sheets

