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(54) **EXPANDABLE VEIN LIGATOR CATHETER HAVING MULTIPLE ELECTRODE LEADS, AND METHOD**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 919 days.

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(52) **U.S. Cl.**
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See application file for complete search history.

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(57) **ABSTRACT**

A catheter includes a plurality of primary leads to deliver energy for ligating a hollow anatomical structure. Each of the primary leads includes an electrode located at the working end of the catheter. Separation is maintained between the primary leads such that each primary lead can individually receive power of selected polarity. The primary leads are constructed to expand outwardly to place the electrodes into apposition with an anatomical structure. High frequency energy can be applied from the leads to create a heating effect in the surrounding tissue of the anatomical structure. The diameter of the hollow anatomical structure is reduced by the heating effect, and the electrodes of the primary leads are moved closer to one another. Where the hollow anatomical structure is a vein, energy is applied until the diameter of the vein is reduced to the point where the vein is occluded. In one embodiment, a secondary lead is surrounded by the primary leads, and extends beyond the primary leads. The secondary lead includes an electrode at the working end of the catheter. The secondary lead can have a polarity opposite to the polarity of the primary leads in a bipolar configuration. The polarity of the leads can be switched and the catheter can be moved during treatment to ligate an extended length of the vein. The catheter can include a lumen to accommodate a guide wire or to allow fluid delivery.

34 Claims, 10 Drawing Sheets

