

CLAIMS

1. An electrosurgical instrument comprising:
a coaxial transmission line for conveying radiofrequency
(RF) energy and microwave energy;
an energy delivery tip coupled to a distal end of the
coaxial transmission line, wherein the energy delivery tip
comprises:
a first electrode electrically coupled to an inner
conductor of the coaxial transmission line and protruding
beyond a distal end of an outer conductor of the coaxial
transmission line;
a second electrode electrically coupled to the outer
conductor of the coaxial transmission line and extending
coaxially along a portion of the first electrode; and
a dielectric body disposed between the first
electrode and second electrode,
wherein:
the first electrode comprises a projecting nib that
protrudes beyond a distal end of the dielectric body;
the second electrode and the dielectric body
comprise portions that are exposed at the distal end of the
energy delivery tip; and
the first electrode and second electrode are
configured as (i) a bipolar structure for delivering the RF
energy conveyed by the coaxial transmission line, and (ii) an
antenna for radiating the microwave energy conveyed by the
coaxial transmission line.
2. An electrosurgical instrument according to claim 1,
wherein the energy delivery tip has a distally facing end
surface that comprises an exposed portion of the dielectric
body and an exposed portion of the second electrode arranged
concentrically around the projecting nib.
3. An electrosurgical instrument according to claim 2,
wherein the distally facing end surface is profiled to focus
the delivered RF energy at the projecting nib.
4. An electrosurgical instrument according to claim 2
or 3, wherein the distally facing end surface is conical.

5. An electrosurgical instrument according to claim 3, wherein the distally facing end surface subtends an angle of 45° to a longitudinal axis of the projecting nib.

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6. An electrosurgical instrument according to claim 2 or 3, wherein the distally facing end surface is rounded.

7. An electrosurgical instrument according to any preceding claim, wherein the first electrode is formed by a distally extending portion of the inner conductor.

8. An electrosurgical instrument according to any one of claims 1 to 6, wherein the first electrode is coupled to the inner conductor via a connector rod.

9. An electrosurgical instrument according to claim 8, wherein the connector rod comprises a proximal sheath that is secured to an outer surface of the inner conductor.

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10. An electrosurgical instrument according to claim 8 or 9, wherein the connector rod is connected to the inner conductor by crimping.

11. An electrosurgical instrument according to any preceding claim, wherein the second electrode comprises a conductive sleeve having a proximal portion that overlies a distal portion of the outer conductor.

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12. An electrosurgical instrument according to claim 11, wherein the conductive sleeve is secured to the outer conductor by crimping.

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13. An electrosurgical instrument according to any preceding claim further comprising an outer insulating jacket, arranged to cover a distal portion of the coaxial transmission line and a proximal portion of the energy delivery tip.

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14. An electrosurgical instrument according to any preceding claim, wherein the antenna is configured as an

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impedance transformer to couple the microwave energy into biological tissue.

- 5 15. An electrosurgical instrument according to claim 14, wherein the first electrode, dielectric body and second electrode have lengths selected to cause the energy delivery tip to operate as a quarter wavelength transformer for the microwave energy.