

CLAIMS

1. An electrosurgical forceps comprising:

a coaxial cable for conveying microwave energy;

5 a pair of jaws mountable at a distal end of the coaxial cable, the pair of jaws being movable relative to each other to open and close a gap between opposing inner surfaces thereof,

wherein the pair of jaws comprises a first jaw having:

10 an outer jaw element operably engagable with an actuating element for causing relative movement between the pair of jaws,

an inner jaw element attached to the outer jaw element to form the inner surface of the first jaw, the inner jaw element comprising an applicator pad having a first electrode and an second electrode formed thereon, and

15 an energy transfer element for conveying microwave energy from the coaxial cable to the first electrode and second electrode, and

20 wherein the energy transfer element comprise a flexible dielectric substrate having a pair of conductive tracks formed thereon.

2. An electrosurgical forceps according to claim 1, wherein the pair of jaws comprises a second jaw disposed opposite the first jaw, the second jaw having:

25 an outer jaw element operably engagable with an actuating element for causing relative movement between the pair of jaws,

30 an inner jaw element attached to the outer jaw element to form the inner surface of the first jaw, the inner jaw element comprising an applicator pad having a first electrode and an second electrode formed thereon, and

35 an energy transfer element for conveying microwave energy from the coaxial cable to the first electrode and second electrode, and

wherein the energy transfer element comprise a flexible dielectric substrate having a pair of conductive tracks formed thereon.

3. An electrosurgical forceps according to claim 2,
wherein the first electrode and second electrode on the first
jaw oppose the first electrode and second electrode on the
second jaw across the gap between the pair of jaws, and
5 wherein the electrodes that oppose each other across the gap
have opposite electrical polarities.

4. An electrosurgical forceps according to claim 3,
wherein the coaxial cable is arranged to convey radiofrequency
10 (RF) energy to set up an electric field across the gap that is
suitable for cutting biological tissue.

5. An electrosurgical forceps according to any
preceding claim, wherein the pair of conductive tracks are
15 formed on opposite sides of the flexible dielectric substrate.

6. An electrosurgical forceps according to any one of
claims 1 to 4, wherein the pair of conductive tracks comprise
a first conductive track electrically connected to an inner
20 conductor of the coaxial cable, and a second conductive track
electrically connected to an outer conductor of the coaxial
cable.

7. An electrosurgical forceps according to claim 6,
25 wherein the first conductive track is electrically connected
to the first electrode and the second conductive track is
electrically connected to the second electrode.

8. An electrosurgical forceps according to any
30 preceding claim, wherein the applicator pad has a hole formed
therethrough, and wherein one of the first electrode and
second electrode is connected to one of the pair of conductive
tracks via the hole.

9. An electrosurgical forceps according to any
35 preceding claim, wherein the outer jaw element is preformed to
bias the pair of jaws into an open configuration.

10. An electrosurgical forceps according to any
40 preceding claim, wherein the outer jaw element comprises a
living hinge.

11. An electrosurgical forceps according to any preceding claim, wherein the flexible dielectric substrate is a ribbon having a width greater than a width of the pair of conductive tracks.

12. An electrosurgical forceps according to any preceding claim, wherein the applicator pad is a piece of ceramic, PEEK or PTFE.

13. An electrosurgical forceps according to any one of claims 1 to 11, wherein the applicator pad is an exposed distal portion of the flexible substrate.

14. An electrosurgical forceps according to any preceding claim, wherein the first electrode and second electrode comprise parallel elongate strips of conductive material on the inner surface of the jaw.

15. An electrosurgical forceps according to claim 14, wherein the parallel elongate strips of conductive material are straight, meandering, 'L' shape, or triangular.

16. An electrosurgical forceps according to any preceding claim, wherein the energy transfer element is dimensioned to match an impedance of the coaxial cable with an impedance of the first electrode and second electrode.

17. An electrosurgical forceps according to any preceding claim, wherein the actuating element is a sleeve slidably mounted on the coaxial cable.

18. An electrosurgical forceps according to claim 17, wherein the sleeve comprises a flexible proximal portion and a rigid distal portion.

19. An electrosurgical forceps according to claim 18, wherein the rigid distal portion has a length equal to or less than 10 mm.

20. An electrosurgical forceps according to claim 18 or 19, wherein the sleeve comprising an encapsulated braid, wherein the density of the braid within the encapsulation is greater in the rigid distal portion than in the flexible proximal portion.

21. An electrosurgical forceps according to any preceding claim, wherein the pair of jaws are dimensioned to fit within an instrument channel of a surgical scoping device.

22. An electrosurgical apparatus comprising:
an electrosurgical generator for supplying microwave energy;
a surgical scoping device having an instrument cord for insertion into a patient's body, the instrument cord having an instrument channel extending therethrough;
an electrosurgical forceps according to any preceding claim mounted in the instrument channel; and
a handle for actuating the forceps,
wherein the coaxial cable is connected at its proximal end to receive microwave energy from the electrosurgical generator, and
wherein the actuating element is operably connected to the handle.

23. An electrosurgical apparatus according to claim 22, wherein the actuating element is a sleeve that extends around and is axially slidably relative to the coaxial cable.

24. An electrosurgical apparatus according to claim 23, wherein the handle comprises an actuation mechanism for controlling axial movement of the sleeve, the actuation mechanism comprising:

a body fixed in the handle;
a carriage slidable relative to the body, and
a lever pivotably mounted on the body and operably engaged with the carriage, whereby rotation of the lever caused sliding motion of the carriage,
wherein the sleeve is attached to the carriage.

25. An electrosurgical apparatus according to claim 24, wherein the actuation mechanism includes a biasing element arranged to urge the carriage in a proximal direction.